Bowman

Draft Environmental Impact Statement

Cortlandville Sand and Gravel Mine Permit Modification

Route 13 Rocks, LLC
756 State Route
Cortland, New York 13045
Town of Cortlandville, Cortland County
NYSDEC Permit No. 7-1122-00043/00008
NYSDEC Mine No. #70436

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Contents

1.0 Introduction 6
1.1 Project Description 7
1.2 Executive Summary 7
1.2.1 Significant Potential Adverse Impacts 7
1.2.2 Alternative Actions Considered 7
1.2.3 Mitigation Measures Proposed 8
1.2.4 Matters to be Decided 8
1.3 Purpose and Need for the Proposed Project 8
1.4 Environmental Review Process 8
1.4.1 Approvals Required 8
1.4.2 State Environmental Quality Review 9
2.0 Environmental Setting, Significant Environmental Impacts, and Mitigation Measures 11
2.1 Groundwater Flows (Topic 1) 12
2.1.1 Environmental Setting 12
2.1.2 Work Plan 14
2.1.3 Data Collection 15
2.1.4 Data Review 15
2.1.5 Discussion 21
2.16 Conclusions 22
2.1.7 Monitoring and Mitigation 23
2.2 Groundwater Quality (Topic 2) 23
2.2.1 Environmental Setting 24
2.2.2 Work Plan 27
2.2.3 Data Collection 28
2.2.4 Data Review 28
2.2.5 Discussion 29
2.2.6 Conclusions 31
2.2.7 Monitoring and Mitigation 32
2.3 Ecological Impacts (Topic 3) 32
2.3.1 Environmental Setting 33
2.3.2 Work Plan 33
2.3.3 Data Collection 34
2.3.4 Data Review 37
2.3.5 Discussion 38
2.3.6 Conclusions 39
2.3.7 Monitoring and Mitigation 40
2.4 Recreational Impacts (Topic 4) 40
2.4.1 Work Plan 40

2.4.2 Data Collection 40
2.4.3 Data Analysis 41
2.4.4 Discussion and Conclusions 41
2.4.5 Monitoring and Mitigation 41
3.0 Alternatives to the Proposed Action 42
3.1 No Action 42
3.2 Increased Setback 42
3.3 Phased Authorizations 43
3.4 Decrease in Mining Depth 43
3.5 Exclusion of Southwest Corner of the Proposed Mining Pond 43
3.6 Modified Mine Schedule 44
3.7 Modified Mine Sequencing 44
3.8 Multiple Excavation Areas 45
3.9 Moving the Mine Pond Boundary to Exclude Previously Reclaimed Land 45
3.10 Combining Scenarios 2 and 5 and Pushing Both Further East 45
4.0 Irreversible and Irretrievable Commitment of Resources 47
5.0 Growth Inducing Aspects 48
6.0 Effect on the Use and Conservation of Energy 49
6.1 Emission Sources 49
6.2 Projected Future GHG Emissions 49
6.3 GHG Emission Mitigation 49
7.0 Prominent Issues that were Raised During Scoping and Determined to be Neither Relevant nor Environmentally Significant or that have been Adequately Addressed in the Prior Environmental Review 50
7.1 Conformity of the Proposal with Local Zoning 50
8.0 References 51

Tables

Table 1.3.A: New York Mineral Product Values 1999-2007 (USGS)
Table 1.4.A: Required Approvals
Table 2.1.A: Lime Hollow Rd Well Pumping Data
Table 2.1.B: Groundwater Levels vs Projected Mine Pond Surface Elevations
Table 2.1.C: Average Daily Groundwater and Surface Elevations
Table 2.1.D: Groundwater Flow Calculations Using Onsite Well Data
Table 2.1.E: Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Table 2.1.F: Groundwater Flow Calculations Using LH #7 Data
Table 2.1.G: Dilution Calculations and Probabilistic Analysis
Table 2.2.A: Existing Land Use Summary in Cortlandville (Town of Cortlandville, 2020)
Table 2.2.B: Spill Incident Database Search Details 2000-2022, Cortlandville, NY (NYSDEC)

Table 2.2.C: Marl Pond Water Quality Summary
Table 2.2.D: Terrace Rd Well Water Quality 2019-2022
Table 2.2.E: Lime Hollow Well Water Quality 2019-2022
Table 2.3.A.: Marl Pond Soil Characterization Table 2.3.B: Amphibian Emergence
Table 2.3.C: Egg Mass Count
Table 2.3.D: Marl Pond Vegetation Plots
Table 3.6.A: Monthly Radius of Influence Calculations
Table 6.1.A: Summary of Test Data for Construction Sand and Gravel Processing

Figures

Figure 1.A: Site Location Map
Figure 1.B: Mine Plan Map
Figure 1.C: Proposed Reclamation Plan
Figure 2.1.A: Aquifer Boundary with Regional Groundwater Contours
Figure 2.1.B: Town Well Wellhead Protection Area
Figure 2.1.C: Data Collection and Monitoring Locations
Figure 2.1.E: Cortlandville, NY Bedrock Geometry
Figure 2.1.F: Cortlandville, NY Aquifer Thickness Geometry
Figure 2.1.G: Particle Tracking Analysis
Figure 2.1.H: Potential for Comingling in North Marl Pond
Figure 2.1.Ra-j: Groundwater Contours and Cross Sections of Proposed Water Table Under Various Phases of Proposed Mine Pond Development
Figure 2.2.A: Proposed Mine Pond Watershed
Figure 2.2.B: Town of Cortlandville Zoning
Figure 2.2.C: Environmental Reference Sites
Figure 2.2.D: Overlapping Proposed Watershed Tax Parcels
Figure 2.2.E: Cortlandville Spill Report Locations
Figure 2.3.A: Marl Pond Soil Samples Location
Figure 2.3.B: Biological Survey Transects
Figure 2.3.D: Cortlandville Marl Ponds Soil Map
Figure 2.4.A: Current Topography and Bathymetry
Figure 2.4.B: Proposed Topography and Bathymetry
Figure 2.4.C: Current and Proposed Hydraulic Gradients Between Surface Water Bodies
Figure 2.4.E: Existing and Future Topography
Figure 3.2.A: Alternatives Analysis Scenario 2
Figure 3.4.A: Alternatives Analysis Scenario 4
Figure 3.4.B: Alternatives Analysis Scenario 4 – Cross Section of A-A'
Figure 3.4.C: Alternatives Analysis Scenario 4 – Cross Section of B-B'
Figure 3.5.A: Alternatives Analysis Scenario 5
Figure 3.7.A: Alternatives Analysis Scenario 7
Figure 3.7.B: Alternatives Analysis Scenario 7, Phase 1

Figure 3.7.C: Alternatives Analysis Scenario 7, Phase 2
Figure 3.7.D: Alternatives Analysis Scenario 7, Phase 3
Figure 3.7.E: Alternatives Analysis Scenario 7, Phase 4
Figure 3.8.A: Alternatives Analysis, Scenario 8
Figure 3.10.A Alternatives Analysis, Scenario 10

Appendices

Appendix 1.A: 2015 NYSDEC MLR Permit (NYSDEC)
Appendix 1.B: 2021 Notice of Positive Declaration (NYSDEC)
Appendix 1.C: 2022 Final Scoping Document for Draft Environmental Impact Statement (NYSDEC)
Appendix 1.D: 2017 Notice of Incomplete Application (NYSDEC)
Appendix 1.E: 2019 Baseline Quarters 1&2 Hydrogeologic Investigation Report (H2H Geoscience Engineering, PLLC)
Appendix 1.F: 2020 Addendum to the Baseline Quarters 1&2 Hydrogeologic Investigation Report (H2H Geoscience Engineering, PLLC)
Appendix 1.G: 2021 Response to Public Comments (H2H Geoscience Engineering, PLLC)
Appendix 1.G.A: 2021 Response to Public Comments – All Exhibits
Appendix 1.1.A: 2017 NYSDEC Mine Permit Modification Application (H2H Geoscience Engineering, PLLC)
Appendix 1.1.B: Spill Prevention and Response Plan (H2H, a Bowman Company), Revised 2023)
Appendix 1.4.A: 2017 Coordinated Review Transmittal (NYSDEC)
Appendix 2.1.A: Grain Size Analysis (H2H Geoscience Engineering, PLLC)
Appendix 2.1.B: Test Boring Log (H2H Geoscience Engineering, PLLC)
Appendix 2.1.C: Town of Cortlandville FOIA Request Documents (Town of Cortlandville)
Appendix 2.2.A: Pyrotek Environmental Profile (USEPA)
Appendix 2.2.B: Pyrotek 2013 and 2018 Annual Certification Reports SPDES MSGPs (NYSDEC)
Appendix 2.2.C: Pyrotek Air Facility Registration October 2012 (NYSDEC)
Appendix 2.2.D: Byrne Hollow 2019 Conditional No Exposure Certification SPDES MSGP (NYSDEC)
Appendix 2.2.E: Byrne Hollow Storage Tank Environmental Details (NYSDEC)
Appendix 2.2.F: Byrne Hollow Farm/C'Ville Yoghurt Inc. Environmental Profile (USEPA)
Appendix 2.2.G: Byrne Hollow Air Facility Registration Certificate 2022 (NYSDEC)
Appendix 2.2.H: J M Murray Environmental Profile (USEPA and NYSDEC)
Appendix 2.2.I: Marl Pond Water Quality Lab Analysis (Alpha Analytical)
Appendix 2.3.A: Ecological Survey Data Sheets (H2H Geoscience Engineering, PLLC)
Appendix 2.3.B: Ecological Survey Photograph Log (H2H Geoscience Engineering, PLLC)

1.0 Introduction

The Cortlandville Sand and Gravel Mine (Mine) is owned and operated by Route 13 Rocks, LLC (Applicant). The Mine is located in the Town of Cortlandville (Town), Cortland County, New York, on a parcel west of Route 13, south of Lime Hollow Road, and east of the Lime Hollow Nature Center (**Figure 1.A**). The permitted Life of Mine (LOM) area comprises 66.8 acres (**Appendix 1.A**). The permitted mine floor elevation of approximately 1,172 feet (357.23 meters) above mean sea level (amsl) is based on maintaining a minimum 8-foot (2.4 meters) separation distance above the mean high-water table (**Figure 1.B**).

On May 26, 2021, the New York State Department of Environmental Conservation (NYSDEC), as Lead Agency designated pursuant to the New York State Environmental Quality Review Act (SEQR), issued a Positive Declaration for a mine expansion proposed by the Applicant (**Appendix 1.B**). This positive declaration requires the Applicant to prepare a Draft Environmental Impact Statement (DEIS) in accordance with a scoping document (**Appendix 1.C**). The regulations at 6 NYCRR §617.8 require the NYSDEC to develop this scoping document, which must include "a description of the proposed action, the potential significant adverse impacts, the extent and quality of information needed to address each impact (including the methods for obtaining and analyzing this information), an initial identification of mitigation measures, and the reasonable alternatives to be considered." Prior to the Department's issuance of the SEQR Positive Declaration, the proposed mine expansion underwent extensive Departmental review in accordance with the Mined Land Reclamation Act, SEQR regulations, and the Uniform Procedures Act. In response to Notices of Incomplete Application (**Appendix 1.D**) in March of 2018, the Applicant retained H2H Geoscience Engineering, PLLC (now Bowman Consulting Group, LTD) (Consultant) to conduct a hydrogeologic investigation. The purpose of the investigation was to evaluate how the proposed modification could potentially affect the quality and quantity of groundwater at the Town's Lime Hollow well field, which is located about 800 feet northwest of the permitted mine. The Consultant conducted the investigation, collecting data over the one-year period from February 2019 to February 2020, summarizing findings in a progress report in July 2019 (**Appendix 1.E**) and a final report dated March 20, 2020 (**Appendix 1.F).** The Consultant provided additional findings in a Response to Public Comment Document dated April 16, 2021 (**Appendix 1.G and 1.G.A**). From 2021-2022, the Consultant continued hydrological data collection and conducted assessments on ecological and other general conditions of the associated Lime Hollow Marl Ponds, which is supplied in this report.

The purpose of this DEIS is to fulfill the requirements established by the final scoping document issued by the NYSDEC under the SEQR regulations at 6 NYCRR § 617.8. The NYSDEC has outlined significant potential adverse impacts to groundwater flows and quality, ecological condition, and recreation. Descriptions of the listed impacts, associated assessments and workplans, and proposed mitigation are outlined in **Sections 2.0** of this document. The alternatives to the proposed mine pond, including no action, increased setbacks from natural communities, phased authorizations, decreased mining depths, restricted mining schedules, modified sequencing, divided excavations, alteration of the mine pond

boundary, and combining alternatives are summarized in **Section 3.0**. The required approvals and permits are listed in **Section 1.4**.

1.1 Project Description

In April 2017, the Applicant applied to the NYSDEC to modify an existing Mined Land Reclamation Permit for the Cortlandville Sand and Gravel Mine (**Appendix 1.1.A**). The Applicant is seeking a permit modification to mine an additional 10.1 acres laterally and to mine approximately 100 feet (30.48 meters) below the water table to the bottom of the sand and gravel outwash deposit, which may be as deep as elevation 1,070 feet (326.14 meters) amsl (**Figure 1.B**). Mining below the mean high-water table is not currently permitted at the mine and requires a modification of the current 8-foot (2.4 meters) separation distance requirement. If the application is approved, the Applicant will reclaim the site to a 54.5-acre pond with an open water surface, along with graded and revegetated slopes (**Figure 1.C**).

As proposed at full build-out, the deepened mine would be approximately 50 acres, 400 to 600 feet (121.92-182.88 meters) wide (west-east), 2,500 feet (762 meters) long, and a maximum of approximately 100 feet (30.48 meters) deep in the middle of the proposed mine pond. Due to the access limitations of the mine site (the only portion of the property having a feasible method of egress being the southern portion of the mine), proposed excavation would begin at the north end and extend full depth as mining migrates back and forth, east to west, and gradually advance to the south. Upland slopes will be reclaimed prior to excavation below the water table. The open area of the proposed mine pond will increase gradually as mining progresses. The rate of advancement and overall duration of mining would depend upon market-based demand for sand and gravel.

1.2 Executive Summary

1.2.1 Significant Potential Adverse Impacts

The NYSDEC has outlined multiple potential adverse impacts in relation to the proposed mine expansion, including to groundwater flows and quality, and ecological conditions. Resources such as the Town of Cortlandville water supply wells and the marl ponds located within the Lime Hollow Nature Reserve were given consideration for such impacts within this DEIS. Descriptions of the listed impacts, associated assessments and workplans, and proposed mitigation are outlined in **Section 2.0** of this document.

1.2.2 Alternative Actions Considered

The considered alternatives to the proposed mine pond, including no action, increased setbacks from natural communities, phased authorizations, decreased mining depths, restricted mining schedules, modified sequencing, divided excavations, alteration of the mine pond boundary, and combining alternative scenarios are summarized in **Section 3.0**.

1.2.3 Mitigation Measures Proposed

The proposed mitigation measures for each potential adverse impact are outlined briefly following a description of the topic in **Section 2.0**. A Spill Prevention and Response Plan has been included in **Appendix 1.1.B**.

1.2.4 Matters to be Decided

The proposed expansion will require approvals from state and local agencies, including the NYSDEC and Town of Cortlandville, further described in **Section 3.4.1**. For the Applicant to obtain the required permitting, the lead agency (NYSDEC) will first have to decide if the Draft Environmental Impact Statement provided is acceptable to be reviewed by the public. Further steps and decisions within the SEQR review process are outlined in **Section 3.4.2**.

1.3 Purpose and Need for the Proposed Project

Mining has existed at the Cortlandville Sand & Gravel site for approximately 40 years. The sand and gravel above and below the water table serve as a valuable source of aggregate. Aggregate is a principal component required for maintenance and building of infrastructure (e.g., roads, foundations, etc.), and local/regional development projects. According to the American Institute of Architects and the Association of Builders and Contractors, declines in construction due to sand shortages have had detrimental effects on construction in the Northeast United States since 2022 (Baird-Remba 2022). The New York Mineral Association (NYMaterials) reported increasing scarcity of stone, sand, and gravel deposits suitable for mining from 2007-2010 (Kelly 2011). **Table 1.3.A** shows the value of construction aggregates and percentage of total value of New York mineral products from 1999-2007, where construction aggregate consistently made up approximately 50% of the total mineral value within New York.

The current Cortlandville mine has approximately 2.9 million cubic yards of reserves remaining. The proposed action will increase the life of mine to approximately 8.7 million cubic yards, tripling the current remaining life of mine.

1.4 Environmental Review Process

1.4.1 Approvals Required

This section of the DEIS provides an overview of the permits and approvals presently anticipated to be required for the proposed project, the agencies responsible for the approvals, and the applicable law or regulations associated with each approval (**Table 1.4.A**). The processing of certain environmental permit applications by the NYSDEC is governed by the requirements of the Uniform Procedures Regulations within 6 NYCRR Part 621. The intent of the Uniform Procedures Regulations is to ensure timely review of projects requiring NYSDEC environmental permits. Projects that are also subject to the SEQR regulations must satisfy SEQR requirements before the permit applications reviewed under Part 621 are deemed complete. When the NYSDEC, as the SEQR lead agency, determines that a DEIS is

required, the acceptance of the DEIS for public review is a pre-requisite for a complete NYSDEC permit application.

1.4.2 State Environmental Quality Review

The purpose of the SEQR process is to give opportunity to the local, regional, and state agencies to examine the environmental, social, and economic implications for the proposed action. This DEIS is intended to act as a disclosure document to provide information regarding the potential impacts of the proposed action and provide a basis for informed decisions. This DEIS identifies and addresses the potential environmental impacts of the proposed project, reasonable alternatives, and mitigation for any potential adverse effect to the maximum extent practicable. Also addressed in this DEIS are irreversible and irretrievable commitments of resources, growth inducing aspects, and the use and conservation of energy.

This section of the DEIS provides a brief description and chronology of the key SEQR review steps (e.g., lead agency designation, positive declaration, etc.).

1. **Classifying the Action:** The initial Mine Land Use Permit (MLUP) Modification proposal was submitted to the NYSDEC in 2017 (2017 MLUP Modification) by the Consultant. The proposal was considered a Type 1 Action under 6 NYCRR §617.4.

2. **Complete the Correct Environmental Assessment Form:** A Full Environmental Assessment Form, Part 1 (FEAF) was submitted as an appendix to the 2017 MLUP Modification. It was also attached to amendments to the application submitted in response to NYSDEC Notices of Incomplete Applications (NOIA) issued in 2017 and 2020. The FEAF was later modified in 2021 and submitted as part of an acreage and other corrections to the MLUP Modification.

3. **Coordinate Review:** The NYSDEC initiated coordinated review with the Town of Cortlandville in 2017 and proposed to act as lead agency for the SEQR review (**Appendix 1.4.A**).

4. **Determine Significance**: On May 26, 2021, the Department, now as Lead Agency, issued a Positive Declaration for the proposed modification.

5. **Scope the Draft EIS:** The state issued the Final Scoping Document for the DEIS on May 27, 2022, after coordination with the public and the Applicant.

6. **Preparation of the Draft EIS**: The Consultant utilized the scoping document issued by the state to prepare the DEIS as required.

7. **Determine the Adequacy of the Draft EIS:** If the State determines this draft to be acceptable it will be subject to public review. Under the NYSDEC's regulations, it has 45 days to make this determination. If it is disapproved, it will be returned for modification and resubmitted. NYSDEC then has 30 days to determine adequacy.

8. **Publish Notice that an EIS is Accepted for Public Review:** If the NYSDEC determines that

the DEIS is adequate and the MLUP Modification is complete, it will issue a Combined Notice of Adequacy of the DEIS for Public Review and Notice of Complete Application (Notice of Completion). The DEIS will then be placed on a publicly available website.

9. **Public Comment:** The filing of the Notice of Completion of a DEIS starts the public comment period. That period must be a minimum of 30 days, during which all concerned parties are encouraged to offer their comments to the lead agency. The comment period must continue at least 10 days following the close of a public hearing if one is held.

10. **Public Comment Hearing:** After the lead agency accepts the DEIS, it must decide whether to hold a public hearing [see 617.9(a)(4)]. A SEQR hearing is not mandatory. However, if a hearing is to be held, the lead agency must prepare and file a Notice of Public Hearing (Public Hearing Notice). The Public Hearing Notice may be combined with the Notice of Completion. The hearing cannot start sooner than the 15th day following the Public Hearing Notice, nor more than 60 days from the date of filing of the Notice of Completion. The Notice of Completion and Public Hearing Notice must be prepared, filed, and distributed as prescribed in section 617.12 The notice must also be published in a newspaper of general circulation in the area of the potential impacts at least 14 days prior to the hearing date. If a public hearing is required under an applicable local or state law, it is not necessary to hold a separate SEQR hearing. One hearing can be held to satisfy both processes under 6 NYCRR Parts 617 and 621.

11. **Preparation of the Final EIS:** The lead agency is responsible for the adequacy and accuracy of the final EIS (FEIS), regardless of who prepares it. The FEIS should be prepared within 45 calendar days after the close of any hearings or within 60 days after the filing of the DEIS, whichever occurs last. The final EIS must consist of the draft EIS, including any necessary revisions and supplements, copies or a summary of the substantive comments received and their sources, and the lead agency's response to the comments. The Notice of Completion of the FEIS must be prepared, filed, distributed, and published as described in section 617.12. The lead agency must also publish the FEIS on a publicly available website.

12. **SEQR Findings:** Part 617.11 requires that each involved agency must prepare its own written SEQR findings statement, after a FEIS has been filed and before the agency makes a final decision. In the case of this DEIS, the involved agencies include the NYSDEC and the Town of Cortlandville. The findings certify that the requirements of Part 617 have been met. A positive findings statement means that the action chosen is the one that avoids or minimizes adverse environmental impacts presented in the EIS and weighs and balances them with the social, economic, and other essential considerations. If the action is not approvable, a negative findings statement documenting the reasons for the denial must be prepared. The findings can be finalized after 10 days elapse following the filing of the Notice of Completion of the FEIS, and if the action involves an applicant, the lead agency's findings must be made within 30 days from the filing date. Findings of each agency must be filed with all other involved agencies and the applicant at the time they are adopted. Findings and a decision may be made simultaneously.

2.0 Environmental Setting, Significant Environmental Impacts, and Mitigation Measures

This DEIS describes the environmental setting (existing conditions), potentially significant environmental impacts, and mitigation measures, if needed, within each of the topic areas identified below. It also describes potential adverse environmental impacts that may be unavoidable if the proposed action is implemented.

The topic areas listed below were determined by the NYSDEC from the Notice of Positive Declaration. In that document, the potentially significant impacts of mining 100 feet (30.48 meters) below the mean high-water table include impacts on the underlying aquifer and associated quantity and quality of municipal potable water supplies, impacts on nearby recreational facilities, and impacts on the unique flora and fauna of adjacent marl ponds. The potential impacts to ground water/ human health are summarized as the potential risk to the sole source aquifer and nearby water supply wells, specifically including potentially significant impacts associated with microbes and pathogens that may enter the water table from the mine pond. Accordingly, the topic areas for the DEIS as follows:

1. Potential that mine pond water could enter the wellheads at the Lime Hollow wells and potential risk to the quantity of the municipal potable water supply,

2. Assuming the mine pond water could enter the wellheads at Lime Hollow wells, potential risk to the quality of the municipal potable water supply,

3. Potential for the mine pond to negatively impact the unique flora and fauna of the adjacent marl ponds and,

4. Potential for impact on recreation, scientific education, and scientific research opportunities that are dependent on the unique flora and fauna of the marl ponds.

The first two topics are specifically parsed to separate a) the consideration of the flow paths from the proposed mine pond to surrounding areas and b) the contamination potential of microbes and pathogens from the mine pond to the town well. The scoping document issued by the NYSDEC had posed Topic 2 to assume that, whether true or not, the mine pond water could enter the wellheads at the Lime Hollow wells. Topic 1 addresses how the mine pond water would be separated from the Lime Hollow wells, but for the sake of completeness, Topic 2 was written without complete consideration of these conclusions.

Where data was not collected for the South Marl Pond due to limited accessibility, the North and Mid Marl ponds were assessed in its place. The data collected as part of this effort and previous reports does not suggest any reason to believe that the North and Mid Marl Ponds are not representative of the site. Ecologically, the South Marl Pond is arranged similarly to the North and Mid Marl Ponds, in that it likely desiccates annually, providing habitat to local salamander populations. Hydrologically,

the behavior of surface water within the South Marl Pond does not impact the groundwater conditions discussed in **Section 2.1** and bears no influence on the town wells. The South Marl Pond will be monitored as part of proposed mitigation.

For each topic area identified above, the DEIS describes the environmental setting, evaluates potentially significant environmental impacts, and identifies impact mitigation measures.

2.1 Groundwater Flows (Topic 1)

The first topic area is the potential that the water from the mine pond will flow via groundwater flow paths to the area of the municipal wellheads and be drawn into the municipal wells to enter the Town's potable water supply. This topic focuses on the determination of whether groundwater has the potential to flow from the mine pond directly or in a zig-zag path to the wells, and whether groundwater has the potential to flow from the proposed mine pond to an existing marl pond called North Pond and subsequently to the wells. This potential for water to reach the wells and be drawn into the wellheads is reviewed across all variations of the water table based on the seasonal and annual trends.

The analysis of groundwater flows in this section ultimately concludes that the municipal water supply would not be impacted by the creation of the proposed mine pond. However, the scope issued by the NYSDEC requires considerations for "worst-case scenarios", regardless of how unlikely.

Other items evaluated include flow paths regarding the potential for mixing of mine pond water with other groundwater that flows into the area from west of the mine pond, creating what is called a peripheral flow zone. The DEIS includes consideration of the "mounding effect" that can impact flow paths of groundwater in the vicinity of large surface water bodies, such as the proposed mine pond. The DEIS discusses how the combined presence of a peripheral flow zone and the mounding effect would likely impact groundwater flow paths. It also includes a consideration of preferential groundwater flow that can, under local conditions, allow water to travel through an aquifer faster than it would through a purely homogeneous sand and gravel aquifer.

Predicted flow paths and duration of the flow are discussed with respect to current maximum water withdrawals permitted for the municipal wells.

2.1.1 Environmental Setting

Local Hydrogeologic Setting

The study area overlies a highly productive, approximately 100-foot-thick (30.48 meters) unconfined glacial aquifer system comprised of well-graded, coarse sand and gravel with trace (1.4 to 6.4%) silt and clay (**Appendix 2.1.A and 2.1.B**). The mine site is near the upgradient head of the aquifer that

supplies the primary source of drinking water to the Cortlandville Community. The aquifer has been designated a sole source aquifer (**Figure 2.1.A**).

Natural Resources

The two Lime Hollow well field wells operate alternately to potentially withdraw up to 2,292 gallons per minute (gpm) of groundwater. The sand and gravel 8-feet (2.44 meters) above the water table and below the water table serve as a valuable source of sand and gravel aggregate. The study area thus contains two important natural resources: an aquifer that supplies the principal source of water for the community; and aggregate, a principal component required for maintenance and building of infrastructure and local/regional development projects.

Ambient Groundwater Flow

The ambient groundwater flow for the site was calculated in previous data analysis using continual water level measurements in the three shallow and one deep water monitoring wells at the north end of the proposed mine pond. This data enabled resolution of the apparent groundwater flow direction by day. The analysis indicated that groundwater flows horizontally in a northeasterly direction year-round under a seasonally varying hydraulic gradient that averages approximately 0.003 (**Appendix 1.E**).

Town Wells Recharge

The groundwater recharge to the Town wells is predominantly by the natural groundwater flow from the area southwest of the well field. The width of groundwater flow captured passively by the Town wells varies based on groundwater level and the hydraulic gradient. Assuming well withdrawal of 2,292 gpm (maximum reported) (**Table 2.1.A**), the width of the flow path perpendicular to the flow direction under the lowest observed recharge conditions is approximately 1,325 feet (403.86 meters). In the area east of the well field under varying groundwater level conditions the flow path is halved, approximately 662.5 feet (201.93 meters). This number is a theoretical maximum that is derived in GFLOW, (**Figure 2.1.B)** using conditions that are improbable to occur simultaneously (i.e. maximum aquifer thickness will never coincide with minimum hydraulic gradient; highest recharge rate will never coincide with minimum water table elevation). This document evaluates whether the Town well's radius will reach the North Marl Pond or the mine pond under various scenarios of water table conditions. It also evaluates whether any mine pond water, if it reaches the wells, would potentially travel to the depth of the intake of the wells.

Future Changes to Groundwater Levels and Flow System

Minimal changes to the local groundwater levels and flow directions would gradually change at the north and south ends of the proposed mine pond as the excavation expands. This expansion will result in the mine pond's surface water level equilibrating with the modified ambient groundwater levels at the north and south ends of the mine pond. The mine pond surface water level will be relatively higher

than ambient groundwater at the north end, and lower at the south end. Water will flow out of the mine pond at the north end to the north and northeast and into the mine pond at the south end from the southwest, south, and southeast. At proposed full build-out, the total elevation difference of groundwater levels at the north and south ends would be approximately 1.6 feet during low groundwater conditions (**Table 2.1.B**). The magnitude of the surface and groundwater elevation differences at the two pond ends would therefore be approximately 0.8 feet (0.49 meters). Under maximum water level conditions, the pond level and groundwater levels should be the same at the midline of the mine pond, defined as the saddle where the Mid Marl Pond and South Marl Pond connect. No water flow exchange is anticipated for these locations.

Wellhead Protection Area

The Town has designated a wellhead protection area that extends in a hydraulically side-gradient direction onto the Applicant's property east of the North Marl Pond. The wellhead protection area was developed by the Cortland County Soil and Water Conservation District (SWCD) using a 2002 numerical model that was based on certain assumptions not available to the Applicant or the NYSDEC. The DEIS includes re-assessment of this modeling and compares it to past studies, USGS datasets, current investigation analyses, and future condition predictions.

The USGS model is based on manual groundwater measurements over two days in March of 1990, eight days in June of 1991, and three days in October of 1991. The data collection that occurred monthly from July 1989 to October 1991 was used to identify seasonal fluctuations only. In summary, the USGS model uses 3 measurements per well, over a 17-month timeframe. The analysis included in this report uses hundreds of measurements per day over 3.5 years of continuous data collection (**Table 2.1.C**) from February 2019 to October 2022.

This document also includes re-estimations using calculations of the updated modeling and compares it to past studies, USGS datasets, current investigation analyses, and future condition predictions.

2.1.2 Work Plan

The Hydrogeologic Investigation Report submitted in 2019 in support of the MLUP Modification acts as a baseline of hydrologic data collection for the site (**Appendix 1.E**). The DEIS includes the following additional data and hydrogeological analysis, analytical modeling, and evaluations:

- Water level data from the Town supply wells was obtained and compared with other data,
- Hydrogeologic cross-sections for different water levels, well pumping conditions, and mining scenarios were developed,
- Hydraulic gradients, flow velocities, flux rates, travel times, and travel distances for groundwater flowing from the proposed mine pond toward the well field under current and anticipated future conditions were recalculated and compared with the results of the prior investigations,
- Hypothetical dilution ratio of groundwater induced to flow toward the nearest Town well from groundwater to the southeast was estimated,

- and the approximate distance that the Town well's radius of influence extends onto the mine property for different seasonal scenarios under existing and anticipated future conditions was calculated.

2.1.3 Data Collection

An important element of the hydrogeologic investigation was characterizing the interaction between groundwater and the North, Mid, and South Marl Ponds along the western side of the Site (**Figure 2.1.C**). The North Marl Pond is located between the Site and the Town's well field. Temporary staff gauges were installed at the three ponds to evaluate the interactions as proposed in the scoping document. The Consultant measured pond water levels periodically using a GPS unit in order to corroborate the transducer data that was being collected at the staff gauges.

Data from the transducers for the 2019-2020 study was downloaded and reviewed for completeness. Several data gaps exist due to data storage limits, but all data from February 5, 2019, to October 6, 2022, is present within the three wells in the north portion of the proposed mine pond area (MW-02, MW-3S, and MW-4S). This data was summarized and compared with the data from the previous report (**Table 2.1.C and Table 2.1.D**).

A Freedom of Information Law (FOIL) request was submitted to the Town of Cortlandville for all existing records pertaining to water level data from the Town monitoring and supply wells and flow data for each well location from February 2019 to July 2022. Pre- and post-treatment sampling for the Town wells was conducted at each well location, as well as QA sampling/laboratory analysis results for all analytes. Pump depths for the #2 and #7 (shown as LH#2 and LH#7 on **Figure 2.1.C**) wells were requested. The Town responded with all data requested, including well construction diagrams, complete daily pumping, and groundwater elevation data for all locations (**Appendix 2.1.C**). This information was digitized and used in the additional hydrogeologic analysis conducted for this report.

Based on survey information, the bottom elevations of the ponds are approximately as follows: North Pond (1,161.8 ft/493.17 meters amsl), Mid Pond (1,167 ft/355.70 meters amsl), and South Pond (1,168 ft/365.00 meters amsl). Surveys were conducted via manual continuous topographic points collected while field staff traversed across all accessible feature locations. A drone flight was used to supplement this manual data and as validation. High water marks were identified in the field and surveyed. LiDAR data was collected using a truck mounted laser scanner. All data collected was verified using New York State available data to ensure completeness and accuracy.

2.1.4 Data Review

The Town's data was combined with the existing Site data and used to develop hydrogeologic cross-sections for different water level and well pumping conditions and mining scenarios. Many different iterations were developed for maximum, average and minimum flow conditions during average and maximum pumping periods from the Lime Hollow Rd wells for the current and proposed conditions.

The groundwater flowing from the proposed mine pond adjacent to the Lime Hollow Rd well field under current and anticipated conditions was analyzed and compared with the results of the prior investigations for the following components:

- Hydraulic gradient,
- Groundwater velocity,
- Flux rate,
- Travel times,
- And travel distance.

Geomorphology

The mine is located on a broad low undissected northeasterly-sloping terrace just east of the low-lying area. Ground surface elevations at the Site range from 1,240 ft (377.95 meters) amsl in the southwest to 1,170 ft (365.62 meters) amsl in the northeast. The terrace deposits originated as glacial outwash. Otter Creek flows at the far eastern edge of the terrace. Other than Otter Creek, several small streams draining the eastern uplands terminate upon reaching the permeable terrace deposits as the flow totally infiltrates into the permeable deposit as a source of groundwater recharge. The overall southwest to northeast drainage pattern with easterly bend further north is readily apparent in the bedrock geometry, which serves as the impermeable bottom boundaries for the lateral portions of the aquifer. The western half of the mine property overlays a northeast trending bedrock trough, oriented northeast-southwest, generally coincident with ground water flow (**Figure 2.1.E**).

The published regional hydrogeologic data, site-specific stratigraphic data, pond level data, and water temperature data all consistently indicate that the aquifer at the Site is unconfined. No confining layers have been identified. The aquifer's potentiometric surface is the water table. It follows that the proposed future mine pond water surface level would coincide with the water table.

According to the USGS dataset, the aquifer thickness onsite varies between 61 feet (18.59 meters) in the southwest corner to 163 feet (49.7 meters) in the north central portion of the mine area. Aquifer thickness varies seasonally, as it would be greater during high water table conditions and lower during low water table conditions. The typical annual water table fluctuation is 10 to 13 feet (3.05 to 3.96 meters) depending on the well location and year.

The aquifer's geometry thickens dramatically from the middle of the mine pond area to the northeast, where it goes from approximately 100 feet (30.48 meters) thick to 200 feet (60.96 meters) thick. The thickest part of the aquifer in this area is 200 feet (60.96 meters), beginning where MW-4S is located and extending at an orientation of 38.5 degrees east of north (**Figure 2.1.F**).

Groundwater Flow

Groundwater flow velocity can be estimated from Darcy's Law: velocity equals hydraulic conductivity times hydraulic gradient, divided by effective porosity. The estimated hydraulic conductivity[1] (880 ft/268.22 meters per day) and porosity (0.30) are obtained from the USGS WRI Report 96-4255. The hydraulic gradient is estimated from the groundwater contour maps developed from site data and USGS simulations reported in the WRI Report 96-4255. Based on the 0.0030 horizontal gradient, the estimated average groundwater velocity is 8.8 ft (3.2 meters) per day toward the northeast. This velocity is not necessarily the transport velocity of elemental-, chemical-, micro-organism-groundwater constituents because of retardation effects which will slow down transport (further described in **Section 2.1**). Constituent concentrations would be further affected by lateral and vertical dispersion which would be enhanced by the high flow velocity.

To determine groundwater flow direction, the data from the Lime Hollow Rd wells (LH#2 and LH#7) in conjunction with the data from MW-2, MW-3S, and MW-4S, was utilized to model the orientation of the water table. The daily mean groundwater elevations for the monitoring period were used to estimate flow direction for every day during the hydrogeologic investigation period. During that time, flow directions were to the east-northeast with a prevailing flow direction of approximately north 84.3° east, which is substantially more easterly than previously determined. This is due to the data that was incorporated from the Town's wells. When using only data collected onsite, the flow direction appears to be more to the north-northeast.

Reported daily groundwater elevations at the Lime Hollow Rd wells, according to data received from the Cortlandville Water Superintendent, are greater than those found at MW-3S 93.8% of the time, at MW-02 95.2 % of the time, and at MW-4S 99.9% of the time (**Table 2.1.C**). When the MW-3S water level is higher than the Lime Hollow Rd wells, the groundwater elevation at MW-02 is lower than MW-3S 100% of the time. When the MW-3S water level is greater than the Lime Hollow Rd wells, the groundwater elevation at MW-02 is lower than the groundwater elevation at the Lime Hollow Rd wells 74.0% of the time. Of the 1,240 days used in this analysis, it was only possible for groundwater to flow towards the Lime Hollow Rd wells for 20 of those days, or 1.6% of the time. This does not imply that groundwater was moving in that direction, just that it was possible. However, the analysis shows that none of these periods of time where flow towards the Lime Hollow Rd wells was possible exceeded one consecutive day. Given that the maximum groundwater velocity calculated was 8.8 ft (3.2 meters) per day, it is improbable that any pathogens, microbes or petroleum constituents could reach the Lime Hollow Rd wells from the proposed mine pond.

[1] Hydraulic conductivity can be conceptualized as the relative ease of fluid passage through a porous material. It has direction and magnitude and is represented as a vector; thus, it has units of velocity (e.g., meters/seconds, meters/day). However, hydraulic conductivity is not a velocity, rather it represents the transmission properties of the porous material.

Groundwater level readings were collected daily for each of the Lime Hollow Rd Wells. According to the Cortlandville Water Superintendent, these levels were taken in the morning each day from water level sensors mounted in the wells themselves. The measurements reflect the groundwater levels for the wells prior to when any pumping occurs. Pumping at the Lime Hollow Rd Wells only occurs approximately 29% of the time at each well. When the pump is being operated, it operates for less than 12 hours per day 83% of the time. The maximum drawdown for LH #2 is approximately 5.3 ft, when conducting a pumping test at a rate of 1575 gpm in April of 2001. The average pumping rate for LH #2 from January 2019 through July 2022 was 356 gpm. In that same interval LH #7's average rate was 377 gpm. This average rate, over the course of 365 days, under the lowest aquifer conditions, produces a calculated drawdown value of 0.0016 ft (0.5 mm) at the most proximal portion of the proposed mine pond.

During this additional investigation, the Consultant conducted a "particle tracking" analysis based on mean flow velocities under many varying conditions. These varying conditions involved modeling particle tracks during times when groundwater was at its highest levels, at its lowest levels, periods with a lot of precipitation and low groundwater conditions, periods of drought but high groundwater levels, etc. Analysis is included during seasonal fluctuations as well. The daily flow direction currently fluctuates between north 29.0° east and north 96.9° east. The particles tracked originated from MW-3S and from the center of the North Marl Pond and represent 60 days of groundwater travel. The velocity of each particle was updated daily to simulate actual flow conditions to determine the final positions of the particles under various conditions (**Figure 2.1.G**). Findings based upon this analysis indicate that no water particles migrate to the town wells under any of the scenarios evaluated.

Mounding Effect

Open water bodies are generally flat lying, especially in relatively small surface water features such as the proposed mine pond. Because of this, the water table will be naturally lower in the areas adjacent to the south part of the mine pond, and higher in the areas adjacent to the north part of the mine pond. Hydraulic gradients will increase in areas adjacent to the pond, especially where the static groundwater levels are highest (south) and lowest (north) due to the hydraulic buildup in the water table, because water can move much faster as surface water than as groundwater. This is known as the "mounding effect". While transport of any mine pond water to the municipal wells may or may not occur because of this increase in the hydraulic gradient, (specifically the increase associated with the northwest portion of the proposed mine pond) the NYSDEC requested that an analysis be performed as to whether the combined effect of mounding and simultaneous drawdown during dry conditions could create a hypothetical "worst-case scenario", a scenario that is addressed below.

The higher groundwater levels that would result from the mine pond at the north part of the Site would increase hydraulic gradients and flow velocities away from the mine pond, but it does not appear that there would be a significant effect on recharge to the Town's well field because of the predominantly northeasterly flow direction, which can be seen in the orientation of the worst-case

scenario Wellhead Protection Area (WPA) calculated using GFLOW, (a modeling tool maintained by the EPA Center for Exposure Assessment Modeling (CEAM) (**Figure 2.1.B**). The head increase along the northern portion of the mine area will be least in the northwest corner and at most in the northeast corner. The anticipated head increase where MW-3S is located is only 0.4 feet (0.12 meters) during low flow conditions (**Table 2.1.D**). This means that generally the groundwater elevations at the Lime Hollow Rd wells will be greater than the proposed mine pond (**Table 2.1.E**), and since the groundwater elevation at MW-4S is always lower than both the proposed mine pond and the Lime Hollow Rd wells, the flow direction will still be towards the northeast.

Mounding will not impact the North Marl Pond because the increased gradient will negate the increase in head in the northwest corner of the proposed mine pond. Groundwater flow from Mid Marl Pond to the North Marl Pond (which is located immediately down gradient of the Mid Marl Pond) ranges between .0052 and .0130, 2 to 4 times higher than that of the groundwater in the vicinity. The gradient between the proposed mine pond and the North Marl Pond (assuming groundwater flow is in that direction) would only need to be 0.0018 higher than the ambient groundwater gradient in the immediate area to absorb the additional increase in head on the north portion of the proposed mine pond and still ensure that the North Marl Pond dries out seasonally. The hydraulic gradient of the groundwater in the vicinity of the proposed mine pond and the North Marl Pond currently ranges between 0.0027 and .0041. Based on calculations for the projected surface water elevations of the proposed mine pond, adding the increase in gradient needed to accommodate mounding in the northern part of the proposed mine pond when the North Marl Pond would be drying out would (the distance from the north edge of the proposed mine pond to the north end of the North Marl Pond) need to be, at most, 0.0045. Since the minimum gradient between the Mid and North Marl Ponds was 0.0052, there is ample evidence to conclude that the increased gradient between the North Marl Pond and the proposed mine pond can be accommodated. **Figure 2.1.Ra-j** shows theses gradients as a cross section with the minimum gradient from the existing pond features on site superimposed upon them. Analysis of the future groundwater contours shows that the effect on the water table from the northwest corner of the mine pond towards the Town's wells only extends 40 feet (12.19 meters). The effects of the mine pond in the northeast corner extends towards the northeast approximately 70 feet (21.34 meters).

Wellhead Protection Area

The data used in the USGS model, reportedly used by the Cortland County SWCD to develop their wellhead protection areas, was obtained from the USGS website to evaluate the conclusions made during this investigation and by the Cortland County SWCD. The bedrock geometry, groundwater elevations, aquifer thickness, and probabilistic flow measurements were input into a GIS database and used to make assumptions regarding the nature of the flow directions observed within the area of the proposed mine pond, the marl ponds, and the Lime Hollow Rd wells.

According to the EPA website, GFLOW is an analytic element model, which solves steady state groundwater flow in a single aquifer. GFLOW supports three-dimensional particle tracking, but employs the Dupuit-Forchheimer approximation, thereby ignoring resistance to vertical flow. This program was used to calculate wellhead protection areas (WPA) under many different scenarios to compare with the USGS dataset, the Cortland County SWCD's dataset, and with the current calculations that were performed during this investigation.

The USGS Potentiometric Surface Data shows a flow direction divide that runs southwest to northeast, parallel with the shape of the bedrock geometry in the vicinity. On the northwest side of the divide, all flow moves west to east toward the divide. On the southeast side of the divide, flow ranges anywhere from northwest to east (**Figure 2.1.B**). All data collection to date supports this conclusion as well. Once the divide is encountered, from either direction, groundwater moves towards the northeast. When using MW-02, MW-3S and MW-4 to calculate flow direction, the values range from 346 degrees north-northwest to 100 degrees east-southeast (**Table 2.1.D**). When the Lime Hollow Rd well #7 is used to calculate flow direction, the flow is more consistent (ranging from 25 degrees north-northeast to 80 degrees east-northeast) (**Table 2.1.F**). Particle tracking analysis consistently shows that when using a starting location that originates in the northwest corner of the proposed mine pond, the 60- day tracked motion moves between 29 degrees north-northeast and 40 degrees northeast, while particles originating in the North Marl Pond move between 53 degrees northeast and 87 degrees east.

Mine Pond to Lime Hollow Road Flow and Dilution Analysis

Only one possible scenario exists where contaminated water originating from the proposed mine pond could be drawn into the Town's wells. That scenario only occurs if the contamination event occurs during an unseasonably dry time while the North Marl Pond still has water in it and then a heavy precipitation event was to occur, rapidly raising the elevation of the North Marl Pond. For the contamination to reach the Town's wells, the following sequence would need to occur:

1. Contamination of the proposed mine pond,
2. Flow from the mine pond would need to go towards the North Marl Pond,
3. This flow direction would need to persist for 20 days minimum,
4. A heavy precipitation event would need to raise the elevation of the North Marl Pond above the elevation of the Town's wells,
5. Finally, this higher elevation would need to persist for more than 26 days.

These steps only lay out how contamination is possible, not that it will occur. There are many factors that influence the groundwater flow direction in this vicinity. Further, dilution estimates from the proposed mine pond to the North Marl Pond and, subsequently, the Town's wells show that even if 500 gallons of diesel were incidentally released directly into the northwest corner of the proposed mine pond, and all of the above conditions met for 40+ days (**Figure 2.1.H**), the maximum concentration for the sum of all analytes that make up diesel fuel (Benzene, Toluene, Ethylbenzene, p-Xylene,m-xylene, o-Xylene, Isopropylbenzene, n-Propylbenzene, p-Isopropyltoluene, 4-Ethyl toluene,

2-Ethyl toluene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, sec-Butylbenzene, n-Butylbenzene, Styrene, Naphthalene, n-Heptane, n-Octane, n-Nonane, n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane, n-Hexadecane, Cyclohexane, Methyl cyclohexane, etc.) that could reach the wells is 0.097 ppb, or approximately one drop of diesel per 136,000 gallons of water (**Table 2.1.G**).

2.1.5 Discussion

In the 1998 USGS WRI report 96-4255, the first line of the "Unconfined" section on page 21 states that "Water in the unconfined aquifer generally moves laterally from the edges of the valley toward the center, then northeastward along the axis of the Otter Creek-Dry Creek valley…". MW-3S and MW-4S are centrally located within the valley, and the Lime Hollow Rd wells are situated more proximal to the bedrock wall that makes up the northwest boundary of the Otter Creek-Dry Creek valley, translating to easterly groundwater migration bending to the northeast as it approaches the center of the valley. Locally, this translates to flow from the Lime Hollow wells moving to the east and then northeast as it migrates towards MW-4S. Groundwater in the vicinity of MW-3S is then to the northeast, and MW-02 is to the northwest and bending to the northeast as it migrates towards the center of the valley (MW-4S). **Figure 2.1.E** shows the bedrock geometry with the locations of the monitoring and production wells in the area surrounding the proposed mine pond location. All analysis conducted during this study shows a lack of evidence for a direct flow path from the mine area to the Lime Hollow wells. Based on the data obtained from the Town, particle tracking analysis, groundwater contours generated for all possible conditions, and USGS potentiometric data obtain from the USGS.gov website, groundwater moves, regionally, to the northeast.

Further analysis of the data showed a local flow regime to the east-northeast, with the mean direction in the area between the Town's wells and the proposed mine pond being 75 degrees east-northeast, or 15 degrees north of east. This is much more easterly trending than the prior study concluded and is due to the inclusion of the Town's well data in the analysis. Further investigation revealed a likely preferential flow path to the northeast from the marl pond areas. All water south and east of the marl ponds flows between north and east depending on local hydrologic conditions. All groundwater west of and immediately adjacent to the marl ponds flow east to northeast when the marl ponds are recharging, and north to northwest when the marl ponds are discharging.

Once the proposed mine pond's projected influence on the water table was modeled, analysis showed insignificant impacts to the local, much less the regional, hydrology. The most impacted area is to the northeast portion of the proposed mine pond area, where flows will increase due to the increase in the hydraulic gradients, and be pushed more preferentially in that direction. Therefore, no impacts to the Town's wells are anticipated.

The shorelines of the North Marl Pond range from approximately 329 feet (100.28 meters) to 469 feet (142.95 meters) east of the nearest Town well and appear to be located seasonally within the Town wells' capture zone. After review of all data collected as a part of this investigation, the influence of the

North Marl Pond on the Town wells is even less likely than originally anticipated. The area where the town wells are located are typically higher than where the proposed mine pond is located **(Table 2.1.C**). Further, because the predominant recharge for the Lime Hollow Rd wells comes from the southwest and west, it is only during high runoff conditions, when the marl ponds are temporarily mounded, that the potential for flow towards the Town's wells from the North Marl Pond is present. During these events, the groundwater elevation in the northwest corner of the proposed mine pond is also lower than that of the North Marl Pond. This implies that, while flow may be moving towards the Town's wells under these conditions, the flow is concurrently flowing towards the mine area.

Whenever the North Marl Pond elevation is less than that of MW-3, it is also less than the Town's Wells. Groundwater is never flowing from the mine area towards the North Marl Pond and from the North Marl Pond towards the Town's wells at the same time. The North Marl Pond only overlaps the capture radius of the Town's wells by 129 feet (39.32 meters) when the radius of influence is at its 3-year monthly max (**Figure 2.1.H**). This represents only 0.33 acres of the 6.8-acre pond (4.85%). However, this area is only within the capture zone of the Town wells when the pond is at its maximum elevation and when the town is using the LH#7 Pump. Because of topography, groundwater flow direction, separation distance between the areas where the mine pond may potentially recharge the North Marl Pond, the LH#7 well could potentially be recharged by comingling of the two areas. However, this is not likely, especially considering the results from the particle tracking analysis. The only time when comingling is theoretically possible is outlined in **Section 2.1.6** below.

2.16 Conclusions

The hydrogeologic data that has been collected (including for this DEIS) provides insight into the now well-characterized local hydrogeologic conditions. Based on the existing conditions observed and measured during the one- year hydrogeologic assessment period (**Appendices 1.E and 1.F**), all the data additionally collected since that time (**Section 2.1.3 and Section 2.1.4**), data received from the Town of Cortlandville (**Appendix 2.1.C),** and the USGS data obtained (**Figures 2.1.A, 2.1.E and 2.1.F**), the proposed mine pond would have minimal and inconsequential hydraulic interaction with and effect on the water quality and quantity at the Town's two Lime Hollow Road wells. The potential for significant adverse impacts to the municipal well would be negligible. This calculation is based on multiple lines of evidence indicating that groundwater flow at the proposed mine pond is northeasterly and away from the capture zone of the Town wells.

Only one scenario exists where contaminated water originating from the proposed mine pond could be drawn into the Town's wells. That scenario, laid out in **Section 2.1.4**, only occurs if the contamination event occurs during an unseasonably dry time while the North Marl Pond still has water in it and then a heavy precipitation event was to occur, rapidly raising the elevation of the North Marl Pond. In the "Mine Pond to Lime Hollow Road Flow and Dilution Analysis" portion of **Section 2.1.4**, the analysis shows that, in the unlikely event that all prerequisite conditions needed to introduce any analytes of concern from the proposed mine pond to the Lime Hollow Road wells are met, the dilution

that would occur between the two locations would mitigate any potential release that may occur in the proposed mine pond.

2.1.7 Monitoring and Mitigation

Groundwater and surface water level monitoring began at Cortlandville Sand and Gravel in 1989. Since the program's inception, groundwater and surface water levels have been observed and recorded through the utilization of groundwater monitoring wells. In 2019, additional wells were installed and are currently being monitored. The extrapolation of water level data is utilized to observe and predict changes and/or potential impacts to static water levels at nearby offsite water wells. Proposed monitoring and mitigation measures are detailed in the Spill Prevention and Response Plan contained in **Appendix 1.1.B**. Potential well loss for MW-3S will be mitigated with the addition of a new monitoring well in accordance with NYSDEC requirements.

2.2 Groundwater Quality (Topic 2)

The second topic area is the risk to the quality of the municipal potable water supply. In this topic area, the assumption is made that the mine pond water can reach the municipal wells and enter the municipal water supply, despite the contradicting information supplied in **Section 2.1**. The analysis in this topic area will include (a) the potential for pollutants, including petroleum and/or microbes and pathogens (e.g., Giardia, Cryptosporidia, certain bacteria, protozoa, fungi, and viruses), to enter the sole- source aquifer from the mine pond, (b) the potential for those pollutants to attenuate and/or survive as they are carried into and through the aquifer directly or indirectly via groundwater toward the municipal wellheads, and (c) the potential impact of such pollutants, microbes and pathogens, assuming they can reach the municipal wells, on the municipal water supply and ultimately on public health or on the need for additional water treatment to protect public health. Additional water treatment is often required if visible color and/or total dissolved solids trigger a regulatory requirement for water filtration and/or for the addition of chemicals that cause precipitation of impurities. In addition to microbes and pathogens, this section will address pollution risk from toxic algal blooms, which can reportedly occur under certain conditions even in low-nutrient settings with phosphorus concentrations as low as 25 ug/L.

The microbes of concern may travel through the aquifer's pore spaces as colloids. Typical size ranges for colloids and some of the microbes of concern are the following:

- Colloids – general term for small particles of the size 0.001 to 10 um; this includes natural clay particles (<2 to5 micrometers (um)) and microbes,
- Viruses – 0.004 – 0.25 um size range,
- Bacteria – 0.4-10 um size range,
- Cyanobacteria - 0.5 to 40 um, blue-green algae that may cause harmful algal blooms if sufficient nutrients and other conditions are present,
- Cryptosporidia – 4-5 um in diameter, typical source is feces from parasite-infected animals, especially when water is contaminated with animal wastes,

- Giardia cysts – 10-14 um on average, typical source is feces from infected animals.

2.2.1 Environmental Setting

Proposed Mine Pond Site

Based on hydrogeologic and groundwater quality analyses, the proposed mine pond would consist of a relatively nutrient-poor, low dissolved solids groundwater-flow-through pond. **Figure 2.2.A** depicts the future mine pond drainage watershed, which encompasses approximately 372 acres overlapping with the existing mining operation. The watershed area is zoned as light industrial, general industrial, planned commercial business, and agricultural (**Figure 2.2.B**). The area is characterized as predominantly underdeveloped open space with forested, agricultural and mine land development. Residential, commercial, and industrial land uses are absent, but some peripheral light industrial development is present along Route 13. The groundwater recharge area for the Town wells is generally predominantly forested. According to the 2020 Draft Comprehensive Town Plan, the Town of Cortlandville contains approximately 2,941 acres of agricultural land currently utilized for livestock, 8,321 acres of agricultural land utilized for field crops, and 8,347 acres of vacant agricultural lands. **Table 2.2.A** summarizes the existing land use within the Town of Cortlandville.

Mapping provided by the NYSDEC depicts environmental reference areas adjacent to and overlapping with the proposed mine pond drainage basin, including chemical bulk storage facilities, environmental remediation sites, vehicle dismantling facilities, Multi-Sector General Permit (MSGP) areas, and permitted and reclaimed mines (**Figure 2.2.C**), all of which could represent potential sources of groundwater impairment.

Figure 2.2.D depicts the parcels and owners within and directly adjacent to the proposed drainage basin:

- **Pyrotek Inc.**

  Pyrotek Inc. is a manufacturing warehouse specializing in aluminum foundries operating with a Standard Industrial Code (SIC) 3297 (nonclay refractories). According to information provided by the USEPA, the facility discharges unpotable water into an unnamed stream through multiple outfalls (**Appendix 2.2.A**). Annual Certification Reports for two outfalls from 2013 to 2018 and other Stormwater Pollutant Discharge Elimination Systems (SPDES) Multi-Sector General Permits (MSGP) are included in **Appendix 2.2.B**. An Air Facility Registration was issued as of October 9, 2012 (Registration ID: 7-1122-00061/00008) (**Appendix 2.2.C**). The Pyrotek Inc. parcel is located southwest of the proposed mine pond, on the southwestern tip of the drainage basin, upgradient of the mine.

- **C'Ville LLC (Byrne Hollow Farm**)

  Byrne Dairy Inc. owns multiple parcels within the proposed drainage basin, directly south and west of the proposed mine pond, partially upgradient from the current mine. Byrne Dairy currently operates as a dairy processing facility with a SIC 2026 – fluid milk. The agricultural land associated with the facility does not appear to be utilized for livestock. According to data provided by the NYSDEC, Byrne Hollow Farm/C'Ville Yoghurt, Inc. discharges non potable water into Otter Creek with a Conditional No Exposure Certification for exclusion from permitting under the SPDES MSGP for Stormwater Discharges associated with Industrial Activity (**Appendix 2.2.D**). The NYSDEC has listed the property as containing bulk chemical storage (Site no. 7- 0000385), but no further tank information was available (**Appendix 2.2.E**). According to the USEPA, C'ville Yoghurt Inc. utilizes nitrate compounds and nitric acid, with waste treated offsite (**Appendix 2.2.F**). An Air Facility Registration was issued as of July 29, 2022 (Registration ID: 7-1122-00195/00001) (**Appendix 2.2.G**).

- **J M Murray Center**

  J M Murray is a nonprofit organization that provides injection molding services for medical device manufacturing. According to the Environmental Site Remediation Database provided by the NYSDEC, from 1981-1987 the J M Murray Center discharged approximately 78,250 gallons of furniture stripping rinse water into a dry well onsite. The dry well has since been closed and put out of service (**Appendix 2.2.H**). The J M Murray parcel just barely overlaps with the northeastern portion of the proposed mine pond watershed, downgradient from the mine.

- **CB Cortlandville, LLC (Cortland Commerce Center, LLC)**

  The Cortland Commerce Center, LLC is an industrial complex combining office and warehouse space for a variety of tenants. The Cortland Commerce Center is located to the east of the proposed mine pond watershed, downgradient from the mine.

- **Town of Cortlandville**

  Based on aerial imagery, it appears that the Town of Cortlandville is utilizing this parcel for a right of way powerline.

- **Christopher Henry Holdings, LLC (Cortlandville Sand and Gravel)**

- **HS Associates LLC**

  HS Associates LLC is a corporate law service firm providing accounting and business services.

- **East Lakes Venture LLC**

  The parcel labeled as East Lakes Ventures LLC appears to be an agricultural site utilized for crops. It does not overlap with the proposed mine pond watershed but is located adjacent to the southwest corner of the boundary.

- **Sky Hospitality LLC**

  Sky Hospitality LLC is a Best Western hotel fronting Route 13. It does not overlap with the proposed watershed but is adjacent on its southeastern boundary.

Table 2.2.B summarizes the reported spill records of chemicals and petroleum within the Town of Cortlandville for the past five years (2018-2023). The approximate spill locations are depicted on **Figure 2.2.E**, except for Spill # 1803453, due to an un-plottable address, although it was known to occur along Interstate 81 northbound. A total of 18 spills were reported, 12 of which were due to traffic accidents. Of these spills, three were documented as affecting surface or groundwater. The Dry Creek was listed as the effected resource in two of these occasions, both in 2022 with amounts of exposure material unknown. Spill # 2207735, occurring on Friday, December 16, 2022, in which an unknown amount of motor oil was spilled into the groundwater resource at Dry Creek due to a traffic accident, remains unclosed[2]. Two other spills (#2208200 and # 2110379) occurring March 2022 and January 2023 have also not been closed, although no water resource was listed as being affected. There is no existing information indicating that these spills contributed to negative affects within the local drinking water.

Current Raw Water Treatment

As of 2021, the Cortlandville water system served approximately 4,000 people, producing approximately 750,000 gallons a day for water consumption. The water source is from two groundwater wells at separate locations, one drawing water from a drilled depth of 92 feet (28.04 meters) (Lime Hollow Wells) and the other from 62 feet (18.90 meters) (Terrace Rd Well). The water is treated with 3 pounds of gaseous chlorine for every 750,000 gallons produced. The water is sourced from the Otter-Creek Aquifer, which underlies the Site area, has been designated a "Sole Source Aquifer", and serves both the Town of Cortlandville and City of Cortland, which is located about 3 miles northeast of the mine Site.

[2] "Date Spill Closed" means the date the spill case was closed by the case manager in the Department of Environmental Conservation (the Department). The spill case was closed because either; a) the records and data submitted indicate that the necessary cleanup and removal actions have been completed and no further remedial activities are necessary, or b) the case was closed for administrative reasons (e.g., multiple reports of a single spill consolidated into a single spill number). The Department however reserves the right to require additional remedial work in relation to the spill, if in the future it determines that further action is necessary.

The Cortlandville Town Water monitoring plan calls for sampling of residual products from chlorination treatment, total coliform, nitrates, nitrites, lead and copper, (in)-organic chemicals, asbestos, and radiological samples. In 2021, untreated samples obtained from the Lime Hollow wells were determined to contain iron bacteria – Gallionella sp., which is very common and not a health factor. In 2018, fecal indicators of E.Coli were detected in raw water at the Terrace Well, but not detected after the chlorine injection point.

In the 2018 Source Water Assessment, the Town of Cortlandville identified potential microbial, pathogenic, or petroleum constituent sources as runoff from fertilizer use, leaching from septic tanks, road salt, water softeners, discharge from metal refineries, and animal waste. Based on these indicated sources, the pathogens with a reasonable likelihood to be present on the local landscape, and thus discussed as part of this DEIS, are Escherichia coli (E.coli), giardia, cryptosporidium, viral pathogens, cyanobacteria, coliform bacteria, and other naturally occurring microbes (Legionella, Pfiesteria, etc.). Municipal biosolids or chemicals from local land uses may also have the potential to be present within the landscape.

2.2.2 Work Plan

The DEIS evaluates the potential risk of impacts from microbes, pathogens, and other biologic and abiotic contaminants, which depends on exposure and toxicity. The following factors are addressed:

- Whether pathogenic microbes and/or other biological or abiotic contaminants will originate from a source (typically wildlife for pathogenic microbes) at the proposed mine pond,
- Whether the removal of the 8-foot (2.44 meter) separation between the mine floor and the water table will increase the probability of microbes and/or other biological or abiotic contaminants entering groundwater,
- Whether microbes will survive natural attenuation mechanisms within the habitat of the mine pond,
- Whether microbes and/or other biological or abiotic contaminants will be entrained in the pond water that exfiltrates into groundwater from the pond,
- Whether microbes will survive natural attenuation mechanisms within the sand and gravel aquifer from the pond to the Town well intake; these mechanisms may include sorption, filtration, degradation, and senescence,
- Whether microbes and/or other biological and abiotic contaminants will interact with the gravel, sand, silt, and clay particles which may cause them to be transported more slowly than groundwater; the microbes would need to survive the total travel time required for microbe transport to the wells,
- Whether any harmful microbes would survive routine chlorination/treatment at the potable water treatment plant,
- Whether the microbes and/or other biological or abiotic contaminants would have the potential to adversely affect people and animals that drink or use the municipal water.

Field water quality data described below was acquired for the existing Site monitoring wells and the Town wells for comparison with prior data and assessment for the potential of microbial migration.

2.2.3 Data Collection

Section 2.1 discusses the hydrologic influence of the North Marl Pond on the municipal water supply. To reiterate, the North Marl Pond has the potential to overlap with the radius of influence from the Town Wells under specific conditions, allowing for the potential transport of pathogens, microbes, or petroleum constituents via groundwater flow through the aquifer. Based on this existing influence, the North Marl Pond was assessed for multiple water quality parameters to identify any potential existing microbes within the wellhead vicinity.

The North and Mid Marl Ponds were sampled for general field parameters on 25 April 2022 and 4 May 2022 and lab analysis was conducted for both ponds on 4 May 2022. The results of the sampling effort are summarized in **Table 2.2.C**. and lab analytical report conducted by Alpha Analytical is located in **Appendix 2.2.I**.

Water quality analysis conducted by the Town of Cortlandville for the Lime Hollow Wells and the Terrace Road Wells from 2019 to 2022 are summarized in **Table 2.2.D** and **Table 2.2.E**.

2.2.4 Data Review

The phosphorous levels in the North Marl Pond as of 4 May 2022 were 0.979 mg/l, which is relatively high when compared to New York State and USEPA standards for nutrient load limits for surface water features. However, the coinciding high turbidity levels (60.30 NTU) suggests that the sample may have contained higher than typical levels of sediment. Phosphorous levels at the Mid-Pond were only 0.034 mg/L in comparison. Chlorophyll A levels were also high at the North Pond at 19.4 mg/m3. These high nutrient levels are associated with microbes such as cyanobacteria, a photosynthetic bacterium, which the NYSDEC listed as a potential concern for the proposed mine pond. Algal blooms will likely not be as present within the proposed mine pond for many reasons, including:

- Isolation of the pond from stormwater septic field discharges, point source onsite fertilizer use, and urban stormwater runoff,
- Relatively steep side slopes that limit the width of the littoral zone where vegetation and detritus associated with bacteria are present,
- Deep water,
- No surface stream inputs,
- Constant flow-through of low-nutrient groundwater,
- And no novel sources of bacteria and/or viruses.[3]

The calcium levels for the marl ponds were 77.4 mg/L for the North Pond and 71.4 mg/L for the Mid Pond, which is reflective of the substrate condition. Calcium levels are important to consider for lake

[3] Here, novel meaning sources of bacteria and/or viruses that are not already present or likely present on the landscape as naturally occurring microbes.

conditions, as levels above 20 mg/L may be susceptible to zebra mussel colonization. Due to the isolation of the proposed mine pond from other large waterbody features, this will not be an issue.

The Marl Pond pH is ubiquitously alkaline and there are moderately high levels of dissolved oxygen, consistent with well-aerated water.

2.2.5 Discussion

In its final scoping document, the NYSDEC has outlined specific pathogens of concern, including Giardia, Cryptosporidium, bacteria, protozoa, fungi, and viruses to evaluate in this DEIS. These are generally consistent with the sources indicated by the Town of Cortlandville and represent a variety of pathogen groups. Giardia and cryptosporidia are both protozoa, single-celled eukaryotic microbes that range from 4-14 um (microns). Cyanobacteria and Escherichia coli (E. coli) represent the bacterial group, ranging from 0.4-40 um. The World Health Organization (WHO) has identified the following water-transmitted viral pathogens as having moderate to high health significance: denovirus, astrovirus, hepatitis A and E viruses, rotavirus, norovirus and other caliciviruses, and enteroviruses, including coxsackieviruses and polioviruses (Gall et al. 2015), ranging from 0.004 – 0.25 um.

The concern presented by the scoping document can be summarized as the conditions of the aquifer being vulnerable to contamination and this being amplified by the introduction of additional sources of pathogens, microbes, and petroleum constituents via the creation of the proposed mine pond. The aquifer is considered "vulnerable" by the USGS and Department of Health (DOH) based on its permeability and proximity to land surface.

Many pathogens are fecal borne parasites (Daniels et al. 2016) and may originate from a variety of wildlife and/or agricultural sources. Species such as beaver, muskrat and waterfowl often contribute pathogens to water sources due to their aquatic nature (EPA 2000). Cattle and agricultural runoff are also cited as potential sources (Health Canada 2019). Pathogens such as Giardia, Cryptosporidium, Salmonella, Hepatitis, and E. coli may cause adverse health issues to the general population if consumed in drinking water. Sources of fecal-born pathogens exist within the current landscape, including at the North Marl Pond, which supplies wildlife habitat to the Lime Hollow Reserve. As noted in **Section 2.1**, the North Marl Pond already has the potential to influence the town wells, and yet contamination by protozoa has never been documented, despite the presence of multiple sources. The single documentation of E. coli presence in raw water at the Terrace Well was successfully treated during chlorination and never effected a single user of the aquifer system. There is no reason to believe that the proposed mine pond would present novel or higher-than-normal concentrations of pathogens. The low-nutrient groundwater, anticipated narrow littoral zone, anticipated low biological production and presence of zoonotic grazers, absence of stream inputs, and fluctuating water levels that would periodically lead to exposure and oxidation of near-shore sediments, are all factors contributing to unextraordinary populations of pathogens.

A presence of microbial pathogens in a surface water system is not immediately grounds for concern regarding well infiltration. Migrations of pathogens in groundwater would be controlled by advection

and dispersion. The physical process of advection is typically governed by water velocity, where advection = average groundwater velocity (as determined by the product of hydraulic conductivity and hydraulic gradient) / porosity (Abu-Ashour 1993). The spreading of solutes, colloids, and microorganisms along a water path is known as hydrodynamic dispersion (Abu Ashour 1993), a process effected by multiple environmental parameters, such as fluid velocity, pore channel size, convergence/divergence of pore channels, microbial size and persistence, soil characteristics and water quality parameters (Hijnen et al. 2005). **Section 2.1** uses many of these parameters to define the time frame in which groundwater could travel from the proposed mine pond to the vulnerable portion of the North Marl Pond as 8.8 feet (3.2 meters) per day maximum. This means that the travel time of microbes from the mine pond to the town well would be at least 40 days in ideal conditions. However, based on the hydrogeologic analysis, conditions facilitating a maximum velocity scenario in the direction of the town wells never persisted for more than one day consecutively, expanding the dispersion travel time immensely. For example, the survival of a Giardia cyst in the environment is inversely proportional to the temperature of the water. Cysts may remain viable for 2-3 months in water temperatures of less than 10° Celsius (50° Fahrenheit) (EPA 2000). However, during the monitoring efforts that took place over the summer of 2022, water temperatures exceeded this as early as April. As the water levels decline and temperatures rise over the summer season, the survival rate of the cysts will decline as well. Likewise, a very small fraction of cysts can survive a single freeze-thaw cycle, which restricts the timeline of maximum survival for the cysts for a very brief portion of the year that would have to also overlap with the "worst-case scenario" conditions described in **Section 2.1** to allow for the direct influence of waters potentially containing cysts. At water temperatures of 21° Celsius (69.8° Fahrenheit), cyst survival falls to about 1 month (EPA 2000), which is not enough time for migration from the mine pond to the town wells even under "worst-case scenario" conditions.

In the unlikely case that temperatures favoring cyst survival coincided with the "worst-case scenario" conditions described in **Section 2.1**, filtration through soil will be the first line of defense from potential pathogens within the mine pond. Many microorganisms in surface water are too large to exfiltrate and migrate into groundwater from the pond, such as protozoa (Daniels et al. 2016). This process, known as straining, is dependent on soil characteristics and particle size. The North Marl Pond has accumulated a large organic layer (**See Section 2.3**), which contains very fine sediments that will help to slow microbial dispersion into the ground water. Surface level filtration of pathogens will sometimes form a visible "mat" or "filter cake" on the soil surface (Abu- Ashour 1993). Fine sediment and detritus deposition settling on the bottom of the proposed mine pond will be an effective strainer and contribute to building a filter cake that will only enhance the filtration of the substrate and prevent significant quantity of pathogens from migrating away from the proposed mine pond.

If a smaller microorganism is entrained into groundwater from the mine pond, it may be hindered by the adsorption process, which is governed by electrostatic forces (Hinjen et al. 2005). Studies have shown adsorption to be particularly effective in the removal of bacteria and viruses, which are smaller in size, and easily adsorbed by anionic surfaces (Abu-Ashour 1993). This process is influenced by soil

type, pH and temperature changes, and desorption may be initiated by rainfall events. Bacterial adsorption to soils is enhanced by low pH conditions (Bitton and Harvey 1992), as is the case with the marl soils underlying the North Marl Pond. Adsorption influences other biological processes, such as degradation and senescence, by acting as a retardant to dispersal. The individual grains of sand, silt and clay within the 800-foot minimum flow zone will provide a large amount of surface area for adsorption. Heterotrophic protozoan predators will graze on and consume much of the bacteria, yeast, fungi, and algae that may be present in surface water or soil (Taylor and Sanders 2010).

As previously stated, the Town of Cortlandville drinking water supply is treated with 3 pounds of gaseous chlorine for every 750,000 gallons produced. Chlorine kills most viruses and bacteria, such as E. Coli, but may be less effective on other microorganisms such as Giardia and Cryptosporidium. However, if the well is not directly under the influence of surface water, Giardia and Cryptosporidia are unlikely to reach the drinking water source due to soil filtration. The presence of the proposed mine pond would not lead to a groundwater under the direct influence of surface water situation, as discussed within **Section 2.1**. To reiterate, the surface water within the mine pond will not directly influence the ground water within the town wells based on ground water flow direction and velocity. The water from the mine pond would encounter multiple opportunities for filtration and adsorption over the minimum forty-day dispersion course to the town wells.

There will be naturally occurring microbes, such as bacteria and protozoa, within the proposed mine pond, as there are in all freshwater bodies. However, this presence does not automatically indicate a threat of pathogens to the municipal water supply. The New York State Department of Health (NYSDOH) has outlined drinking water setbacks for streams, lakes, watercourses, drainage ditches, or wetlands as 25 feet (7.62 meters), a threshold that the proposed mine pond does not come close to crossing (Title 10. Department of Health, Chapter 1. State Sanitary Code, Part 5 Drinking Water Supplies, Subpart 5-1 Standards for Water Wells, Appendix 5B, Public Health Law, Section 225). The presence of the mine pond does not present a source of novel pathogens. Microbes introduced into the system by fecal matter and other local sources are already present within the adjacent surface water features. The only additional source of petroleum constituents the mine pond potentially presents are those related to the site itself, such as fuel sources for equipment that may be stored on-site. **Section 2.1** describes a "worst-case scenario" in which diesel is spilled into the mine pond during improbable groundwater conditions that would lead to a Town Well contamination. Even in this exaggerated scenario, the amount of diesel that would make it to the wells is miniscule, about one drop per 136,000 gallons.

2.2.6 Conclusions

Microbes such as bacteria, protozoa, and viruses are naturally occurring in all freshwater bodies, typically sourced from background wildlife activity. However, the soil acts as a barrier to many potential pathogen threats via straining (particularly effective on larger protozoa and some bacteria) and adsorption (particularly effective on smaller viruses and some bacteria). Research indicates that scenarios of contaminated groundwater typically only occur when the well source is under the direct

influence of surface water (Moulton et al. 2000). Chlorinated treatment of drinking water supplies is an effective method for protection from most bacteria and viruses. While some protozoans may be resistant to chlorination in certain capacities, their presence is the result of direct influence of surface water (Moulton et al. 2000). The data collected in **Section 2.1** illustrates that even in extreme conditions, this scenario is highly unlikely. To reiterate, the data collected in **Section 2.1** shows very particular conditions that must occur for the proposed Mine Pond to have any influence over the Town Wells. Specific conditions, such as water temperature and soil pH, as described in **Section 2.2** make it even more unlikely that water carrying microbes, pathogens, or petroleum constituents from the mine pond could ever reach the Town Wells.

2.2.7 Monitoring and Mitigation

Prior to commencing below-water table operations, Best Management Practices (BMPs) that minimize risk associated with the water quality in the proposed mine pond will be implemented. These BMPs include: any chemical storage, vehicle parking and storage, maintenance, and traffic onsite, will be kept to the southeast part of the mine property, outside of the capture zone of the Town's water supply wells, and as far away from the proposed mine pond as possible. All parking, storage and maintenance activities will be limited to paved impervious surfaces that are visually inspected daily for indications of leaks that may occur.

A Spill Prevention and Response Plan has been developed (**Appendix 1.1.B**) and will be implemented to prevent the potential that any microbial, pathogenic, or petroleum constituent infiltration from off site will reach the proposed mine pond via overland flow. The only influent source of water to the proposed mine pond will be groundwater recharge and direct precipitation. Additionally, all stormwater that originates offsite will be directed, where possible, to the southeast, so that any microbes, pathogens, or petroleum constituents that may come from offsite sources are prevented from entering the Town's water supply at the Lime Hollow Rd location.

Microbial analysis of the town wells will be conducted once prior to expansion beneath the water table to assess baseline conditions and then bi-annually once mining advances beneath the water table. Analysis will be conducted specifically for protozoa, as they are the only microbes that may potentially persist after chlorination treatment.

If excessive sources of biological contamination are observed at the proposed mine pond, or if direct sampling of the wells indicates biological contamination, mitigative methods for deterrent of bird and mammal species will be deployed. This may include fencing, trapping, relocation, and other generally accepted deterrent methodologies.

2.3 Ecological Impacts (Topic 3)

This topic area includes the potential for the proposed mine pond to negatively impact the unique flora and fauna of the marl ponds due to changes in hydrology (in particular, the propensity for and timing of marl pond desiccation) and associated changes in water chemistry. This section discusses the

desiccation of the marl ponds regarding time frame and frequency, chemistry of the ponds, and potential impacts to unique flora and fauna.

2.3.1 Environmental Setting

The offsite area immediately west of the mining site is dominated by wetlands, bogs, and marl ponds. Except for the area adjacent to the north end of the proposed mine pond, these natural environmental assets comprise part of the Lime Hollow Nature Center preserve or are managed by the Nature Center under agreement with the Town. The northernmost and largest of the three marl ponds in this habitat, the North Marl Pond, is on Applicant's property and generally between the area north of the proposed mine pond's northern shoreline and the Town's well field. The marl ponds are unique post-glacial features that occupy closed depressions generally at and slightly below the water table. Owing to the relatively high seasonal variation of the depth to the water table, the marl pond bottoms are occasionally stranded seasonally above the water table during sufficiently low groundwater periods.

Where data was not collected for the South Marl Pond due to limited accessibility, the North and Mid Marl ponds were assessed in its place. The data collected as part of this effort and previous reports does not suggest any reason to believe that the North and Mid Marl Ponds are not representative of the site. Ecologically, the South Marl Pond is arranged similarly to the North and Mid Marl Ponds, in that it likely desiccates annually, providing habitat to local salamander populations. Hydrologically, the behavior of surface water within the South Marl Pond does not impact the groundwater conditions discussed in **Section 2.1** and bears no influence on the town wells. The South Marl Pond will be monitored as part of proposed mitigation.

2.3.2 Work Plan

The DEIS included a phased sampling of all salamander species in the marl ponds. The scope issued by the NYSDEC had outlined specific sampling for two-lined salamanders (Eurycea bislineata) with genetic variation, but this was omitted from field efforts. Sampling was omitted from field efforts since the results would not have provided information necessary to evaluate the potential impact of mining on the salamanders. No seasonal movement is associated with breeding for two-lined salamanders as for the Ambystoma species assessed as part of this DEIS, making it difficult to anticipate their position on the landscape (Virginia Herpetological Society 2023). They were not specifically excluded from any assessment, but also not specifically considered and no genetic testing was conducted.

This DEIS includes an analysis of the potential impacts on salamanders, such as the propensity for the marl pond desiccation. It is understood that the marl pond ecosystems and the salamander habitat within them are dependent upon periodic desiccation. The DEIS identifies additional observed fauna and flora.

A. Surface and Groundwater Levels
    a. Data relative to surface and groundwater levels is discussed in **Section 2.1**. To summarize, transducers installed within the North and Mid Marl ponds provided information regarding the surface and groundwater levels from 2019-2020 (**Table**

2.1.C and Table 2.1.D.).

B. Topography and Bathymetry
    a. Data relative to topography and bathymetry collection are discussed in **Sections 2.1 and 2.4**. To summarize, surveys were conducted via manual continuous topographic points collected while field staff traversed across all accessible feature locations. A drone flight was used to supplement this manual data and as validation. High water marks were identified in the field and surveyed. Based on survey information, the bottom elevations of the ponds are approximately as follows: North Marl Pond (1,161.8 ft/493.17 meters amsl), Mid Pond (1,167 ft/355.70 meters amsl), South Marl Pond (1,168 ft/365.00 meters amsl).
C. Substrate Conditions
    a. Desiccation cracks were documented,
    b. A substrate analysis was performed for the North and Mid Marl Ponds,
    c. The evaluation of each location for evidence of surface water infiltration or groundwater exfiltration was based upon inferences described in the hydrogeologic discussion.
D. Aquatic Habitat
    a. An aquatic habitat impact assessment of the marl ponds was performed to identify flora and fauna to better understand each species microhabitat zones and sensitivity to fluctuations in water level and subsequent desiccation cycles. This study included office research, requests for interviews, and fieldwork,
    b. A hydric soil boundary was documented using Munsell color charts and historical soil surveys.
E. Water Chemistry
    a. Water quality was sampled for the North and Mid Marl Ponds.

2.3.3 Data Collection

Certain amphibian characteristics, such as their thin, permeable skin, unshelled eggs, limited dispersal capabilities, and restricted home ranges, make them sensitive to fluctuating habitat conditions. In turn, this makes them ideal tools in assessing overall ecological health of both their aquatic and terrestrial habitats. However, because of their complex life history and development, amphibian population assessments must be carefully outlined to capture their life stages.

The purpose of the following methodology, adopted from protocols provided by USEPA and NYSDEC, was used to obtain a baseline dataset of the amphibian populations at the North and Mid Marl Ponds.

Substrate Analysis

Soil samples were taken to at least 12 inches below surface using a soil auger to determine the hydric soil boundary of the North and Mid ponds. The soils were analyzed for color using a Munsell soil book (**Table 2.3.A**) and texture using the ribbon test as described by the USDA in Field Indicators of Hydric

Soils in the United States (2016). Six samples were taken within the North Marl Pond and three within the Mid Marl Pond (**Figure 2.3.A**).

Emergence Survey

An "emergence" refers to the mass migration of pond-breeding amphibians from their terrestrial setting to breeding area, typically a temporary, forested wetland. This migration is triggered by specific conditions in temperature and humidity, which often results in what is referred to as the "Big Night", when amphibians may potentially relocate by the hundreds or even thousands (Hudson River Estuary Program 2020). In New York state, conditions optimal for the "Big Night" typically occur in late March or early April.

A complete emergence survey was conducted along 590 meters (1,935.7 feet) of Lime Hollow Road and 850 meters (2,788.71 feet) of the Lehigh Valley Trail (**Figure 2.3.B**). This survey area was designed to encapsulate the entire habitat length and reduce accessibility bias of one pond over another (Fellers and Freel 1995). Surveying was conducted at the onset of optimal migratory conditions: thawed ground, warmer temperatures, (typically above 40 degrees Fahrenheit), moderate-heavy rain, and began shortly after sunset (Hudson River Estuary Program 2020) for a minimum of three hours (Bingham et al. 2018). The following general conditions were noted on each data sheet: Observer, date, time sampling, location of crossing, air temperature, water temperature, approximate water level, ice surface percentage, wind speed and direction, cloud cover, precipitation, weather conditions for past 24 hours, traffic conditions, and UTM coordinates (**Appendix 2.3.A**).

Although the NYSDEC prohibits the collection and possession of amphibians without a permit, momentary assistance or incidental movement is not considered possession provided the specimen is released and placed back into its environment immediately.

Each observer collected samples for further assessment along the defined transects. Observers were supplied with a clean bucket further rinsed with pond water from the site, a head lamp, reflective vest, hip waders, data forms, camera, and identification guide for New York State amphibians. Prior to collecting samples, all surveyors washed their hands with rain or pond water. Samples were collected at a maximum of five at a time and processed for release. The following data was collected for each specimen: species, sex, if found in amplexus, mortality, and other observations. Sex of each sample was determined by examining the cloaca or tympanum. Supplemental photographs are provided (**Appendix 2.3.B**). All specimens were released to the pond closest to where they were captured.

If no or minimal movement was detected during the first sampling effort, a subsequent survey was conducted to ensure observation during the migratory period.

Egg Mass Survey

Amphibian egg mass surveys are useful in confirming breeding within the study area and provide information regarding health and abundance. Egg masses are readily identifiable based on shape, size, oviposition, depth, etc. (U.S. EPA 2002).

Egg mass surveys were conducted for the North and Mid Marl Ponds within a month after the emergence survey (U.S. EPA 2002). The following conditions were documented prior to any surveying efforts: air and water temperature, pH, turbidity, approximate water depth, cloud cover, and precipitation (Young 2010) (**Appendix 2.3.A**).

An area-constrained survey was conducted for the ponds, as it is the recommended sampling method for relatively small and confined lentic habitats (Thomas et al. 1997). Area constrained surveys facilitate the calculation of relative abundance by the number of egg masses per meter sampled (Young 2010). At least five transects were predetermined along the baseline of each pond, perpendicular to the waterline (**Figure 2.3.B**). The transects were marked off with a visible border prior to the survey. A dependent double-observer egg mass count was then be conducted over a 1–2- meter (3.2-6.6 foot) search path over each transect. This method of egg count removes observer bias and results in a robust sample size (Snyder et al. 2017). The survey began at the edge of the pond (the waterline) and followed the transect through the shallow and shore zone until interrupted by un-wadeable conditions (U.S. EPA 2002). Unmotorized vessels were utilized if water depth was unsurpassable even along the shallow zones. The first and second observes individually identified egg masses by visual encounter and compared results at the end of each transect. Each egg mass was identified by species, approximate number of eggs, and type of attachment (Young 2010). Supplemental photographs of the samples are provided (**Appendix 2.3.B**). If no or minimal egg masses were identified, a subsequent visit was conducted to ensure observation during breeding.

Floral Assessment

The primary purpose of the floral assessment within the North and Mid Marl Ponds was to generate a baseline of species presence and identify the general features of tolerance and intolerance within the current plant communities. This data will allow further considerations for the necessary specificity of hydrologic features that may potentially be altered during the proposed mining activity.

The unique chemical and hydrological characteristics of Marl Ponds create conditions that facilitate unique floral communities. Stoneworts (Chara sp.), algae, and moss can contribute to photosynthetic precipitation of calcium carbonate, which is typically greater than 50 ppm within the ponds. Although there is generally low primary productivity, pondweeds may persist as dominant aquatic macrophytes (NYNHP 2022).

Site vegetation was surveyed using transect methodologies adopted from by the New York State Wetland Condition Assessment EPA Wetland Program Development Grant Final Report (2016) and Methods for Evaluating Wetland Condition: Using Vegetation to Assess Environmental Conditions in

Wetlands (2002). In-field plant identification commenced at "leaf-on" conditions, typically late May for New York State (U.S. EPA 2002).

The number of transects developed for each pond was dependent on total pond size, but each transect traversed a minimum of 100 m (328.09 feet) and included upland area (**Figure 2.3.B**). 1m^2 circular sampling plots were spaced at even intervals along each transect. Approximately 8-12 plots were allotted per acre of wetland area. The maximum number of sample plots was capped at 30, due to a leveling off sample effort (U.S. EPA 2002). Transects were labeled numerically and by pond name. Plots were labeled by the transect number they are in and a unique letter or letter combination (i.e., Plot North1A).

Each plot was assessed for dominant plant species, which were defined as species with greater than 5% cover within the plot. Percent cover of each species was visually estimated to the nearest 5%.

Supplemental soil samples were also collected.

2.3.4 Data Review

Substrate Analysis

The NRCS has mapped the area surrounding the marl ponds as primarily Valois and Howard gravelly loams, with 3-8 or 25-40 percent slopes (**Figure 2.3.D**).

The substrate analysis within the marl ponds found that hydric soil indicators mostly consisted of histic epipedons, defined by the USDA as "An 8- to 16-inch soil layer at or near the surface that is saturated for 30 consecutive days or more during the growing season in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent organic matter when 60 percent or more clay is present". Organic material was indicated by muck and detritus.

Emergence Survey

Two emergence surveys were conducted by two surveyors per night on March 19 and 24, 2022, during rainy conditions. Both surveys commenced at 1930 and ended at approximately 2230. The temperature was consistently slightly above 50 degrees Fahrenheit for both survey nights.

Fourteen samples of five different species were surveyed on March 19, 13 of which were located on Lime Hollow Rd (**Table 2.3.B**). Three frog/toad species were identified: northern leopard frog (*Lithobates pipiens*), American toad (*Anaxyrus americanus*) and spring peeper (*Pseudacris crucifer*); two salamander species were identified spotted salamander (Ambystoma maculatum) and Jefferson/blue-spotted complex (*Ambystoma jeffersonianum/laterale*)[4], and one dead sample was unidentifiable. 8 of

[4] Due to hybridization of the Jefferson and Blue-spotted salamanders, it was not feasible to determine pure speciation. Hybridization of this species was always assumed when encountered.

the samples were dead due to road traffic, although traffic appeared to be slow at approximately 5-6 cars per hour.

Of the living samples, four were identified as female and one was identified as male.

All 9 samples of two different species identified on March 24 were located on Lime Hollow Rd (**Table 2.3.B**). One salamander species (spotted salamander) and one frog species (spring peeper) was identified. Of the spotted salamanders, three were alive and five were dead. Only one of the live samples was female. The spring peeper was alive, but due to its small tympanum size, its sex was undetermined.

Egg Mass Survey

Two egg mass surveys were conducted on April 25 and May 4 of 2022 (**Table 2.3.C**). Five transects were established for each pool and marked with flagging prior to the survey (**Figure 2.3.B**). The survey conducted on April 25 was conducted by wading, but, due to high water levels, a canoe and dipnet were utilized for the survey on May 4. Due to the chemical composition of the pond substrate, water clarity was very clear and visibility to the bottom of the ponds accommodated identification of egg masses. Water quality parameters were measured prior to each survey and are reported in **Section 2.2**. The average water depth was approximately 9 feet (2.74 meters) at the center of the North Pond and 12.5 feet (3.81 meters) at the center of the Middle Pond.

Floral Assessment

The floral assessment was conducted using a plot-transect design with the same five transects used for the egg mass count. 2-3 sample plots were spaced evenly along the transects, for a total of 15 plots in the North Marl Pond and 10 plots in the Mid Marl Pond. The nonvascular vegetation, Chara sp., was documented along with vascular vegetation during the floral assessment. All Chara sp. documented during the floral assessment was desiccated.

The North Pond had a species richness of 11 (**Table 2.3.D**). Chara sp. was the most documented. Dominant species within the North Marl Pond were pondweed (*Potamogeton sp*.), winterberry *(Ilex verticillata*), and early meadow-rue (*Thalictrum dioicum*). The northern end of the pond contained stands of willow (*Salix sp*). The Middle Pond had a species richness of 8 (**Table 2.3.D**). Once again, Chara sp. was the most documented species and dominated wetland plots.

2.3.5 Discussion

The purpose of the habitat study conducted at the Marl Ponds is to assess the baseline ecology and extrapolate estimated resistance to hydrological fluctuations. During the study period, the water levels within the ponds fluctuated naturally from approximately 12.5 feet (3.81 meters) above ground to almost completely below ground. This would indicate that the local ecology would adapt to variable hydrological conditions in a very basic sense. An important aspect for consideration is the period of desiccation and the potential effects to flora and fauna within the ponds. For example, Chara sp. plays

an important role in the chemical composition of the marl ponds. The Chara sp. is submerged in calcium carbonate during periods where the water table is high, which precipitates on the algae. When the pond desiccates, the Chara decomposition contributes to the unique landscape (Walz et al. 2001). This cyclical feedback promotes other species that have adapted to the calcareous conditions. Some common marl plant species that were observed during the survey include pondweed and horsetail (Eleocharis). Chara sp. is especially well-adapted to fluctuating water levels.

The submerged vegetation within the ponds also contributes to the amphibian population as a source of cover and food source base for macroinvertebrates. Spotted salamanders were one of the dominant amphibian species observed during the study period. They rely on ephemeral bodies of water for breeding and can be very sensitive to ecological changes, particularly acidification of their breeding environments. The Chara sp. within the ponds replaces carbon dioxide produced by the embryos with usable oxygen (Clark et al. 2008). Maintaining the calcification and algae populations within the marl ponds will be important to their reproduction.

2.3.6 Conclusions

The Lime Hollow Marl Ponds are regionally well-studied, and it is understood that the unique ecology within the marl ponds is based upon its chemical properties, which is dependent on the period and frequency of desiccation. Potential impacts to the flora and fauna by the proposed mine pond are related to the potential hydrological impacts. However, it must be understood what qualifies as a significant hydrological change for the water levels within the marl ponds. This would foremost be any statistically significant deviation in the current duration of desiccation (i.e., how long a period the pond is dry) or the timing of the desiccation (i.e., the date the pond is wet and the date the pond is dry).

It's important that the timing of desiccation does not deviate from its annual occurrence and that it continues to align with the life cycles of the local salamander species. For example, the timeline in which a spotted salamander egg turns to an adult is approximately 80-150 days. During this time, the egg and larvae must be within water to survive (Connecticut 2016). Two-lined salamanders, typically stream breeders, require more time to complete the egg to adult transformation. The eggs hatch within approximately a month, but the larvae take 1-3 years to mature into adults (Connecticut 2016). The two-lined salamander population within the marl ponds is unique in that it inhabits standing water ecology. It is unclear based on the data collected for this DEIS how the aquatic larvae persist during periods of desiccation.

The initial amphibian emergence was documented on March 19. Spotted salamander eggs were observed within the ponds by April 25. By July 26, the water table was nearly beneath the surface. This time frame indicates integral periods within the life cycles of the observed species when the ponds must contain water. Likewise, annual desiccation must occur to ensure no populations of fish are able to persist within the marl ponds and predate upon the salamander eggs and/or larvae.

Other subtleties within the hydrologic regime and fluctuation should also be considered in how they relate to the chemical dilution or concentration of the marl ponds and assessed within a similar fashion of statistical difference to current conditions.

The natural conditions at the marl ponds are adapted to a variable water table due to the hydrogeological conditions at the site. The proposed action does not propose to alter hydrologic conditions outside of this water table fluctuation and therefore there is no anticipated impact to the ecology. Local species of vascular and non-vascular plants and amphibians that rely on periodic desiccation and water fluctuations will not be impacted by the proposed action.

2.3.7 Monitoring and Mitigation

Monitoring to establish a baseline desiccation frequency and period will be conducted using transducers measuring the water table in perpetuity of the mining operation. If deviations from the statistically established period and frequency were to occur, artificial desiccation via pumping would be implemented, where the excess surface water would be manually pumped into an approved holding basin. Emergence and egg mass surveys will be conducted during the first five years of monitoring during post-construction of the mine pond and discontinued only if no effect is observed. If any significant deviation in desiccation is documented, the surveying will recommence. All data collection will be submitted to NYSDEC with a copy to the Lime Hollow Preserve.

2.4 Recreational Impacts (Topic 4)

This topic area will include the potential for impact on recreation, including impact on scientific research and education associated with changes in the hydrology and changes in the unique flora and fauna of the marl ponds. Potential impacts on recreation could result from a) changes in hydrology that might conceivably cause flooding of trails, or b) changes in hydrology or water chemistry that would lead to a loss of the unique flora and fauna that draw scientists and amateur naturalists to the Lime Hollow Nature Preserve.

2.4.1 Work Plan

The DEIS includes an updated topographic map for existing and proposed future conditions at the mine area and adjacent Lime Hollow Nature Center. Locations and elevations of surface water bodies, wetlands and trail locations are included on the map **Figure 2.4.A**.

Potential adverse impacts to recreational activities at the Nature Center were evaluated based on map review and analysis of potential changes in flora and fauna and ecological integrity as identified under **Topic 3**.

2.4.2 Data Collection

Surveys were conducted via manual continuous topographic points collected while field staff traversed all accessible feature locations. A drone flight was used to supplement this manual data and as validation. High water marks were identified in the field and surveyed. LiDAR data was collected using

a truck mounted laser scanner. All data collected referenced New York State available data to ensure completeness and accuracy. This effort produced topographic and bathymetric contours of the subject area and all surrounding marl ponds (**Figure 2.4.A**), as well as for the future proposed mine pond scenario (**Figure 2.4.B**).

Mine pond surface levels were projected using past water level data and compared against marl pond elevations, monitoring well levels, and current hydraulic gradients in the vicinity of the North Marl Pond, the proposed mine pond, and the Town's wells (Table 2.1.B). This data was then compared to the hydraulic gradients observed between the existing ponds in the vicinity to determine the gradients likely to be present with the introduction of the new mine pond. Finally, the distances between the proposed mine pond and the North Marl Pond were calculated based on topography and the corresponding water levels at each location. Updated hydraulic gradients were generated based on this calculation (**Figure 2.4.C**).

2.4.3 Data Analysis

Due to the increase in water level at the north end of the mine pond, the concern was that the lower elevations of the nature trail may become inundated with water, where such flooding may not have normally occurred. However, the updated hydraulic gradient was not greater than half of the minimum gradient between the Mid Marl Pond and The North Marl Pond in any of the scenarios evaluated. This implies that even under mounded conditions, the increased gradient between the mine area and the North Marl Pond will not cause any flooding of the trail as, by the time the groundwater reaches the areas of lower elevation, potential mounding will no longer be affecting water levels in those areas.

2.4.4 Discussion and Conclusions

The DEIS includes an updated topographic map for existing and proposed future conditions at the mine area and adjacent Lime Hollow Nature Center (**Figure 2.4.E**). Locations and elevations of surface water bodies, wetlands and trail locations are included on the map. Potential adverse impacts to recreational activities at the Nature Center were evaluated based on map review and analysis of potential changes in flora and fauna and ecological integrity as identified under **Topic 3**. The resulting impact on opportunities for recreation, education, and research were determined to be de minimis, as discussed in **Section 2.4.3** above.

2.4.5 Monitoring and Mitigation

Because any impact to recreation that may occur would be a direct result of impacts to either water table fluctuations (flow direction) addressed in **Section 2.1**, water quality impacts addressed in **Section 2.2**, or ecological impacts in **Section 2.3,** any impacts to recreation, should they occur, will be abated with the current Monitoring and Mitigation Plans described in Sections **2.1.7, 2.2.7, and 2.3.7**.

3.0 Alternatives to the Proposed Action

An analysis of alternative project configurations or designs is required to allow the lead agency to determine if there are reasonable, feasible alternatives that would allow some or all the adverse impacts to be avoided while generally satisfying the Applicant's goals. In particular, 6 NYCRR § 617.9(b)(5)(v) requires that the DEIS include "a description and evaluation of the range of reasonable alternatives to the action that are feasible, considering the objectives and capabilities of the project sponsor. The description and evaluation of each alternative should be at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. The range of alternatives must include the no action alternative. The no action alternative discussion should evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future, in the absence of the proposed action." A discussion satisfying these requirements follows.

3.1 No Action

The "No Action" Alternative scenario is discussed to provide a baseline for evaluation of impacts and comparisons of other impacts. The substance of the no action discussion is a description of the likely circumstances at the project site if the project does not proceed.

In the scenario where the project does not proceed at all, the impact would be primarily to Route 13 Rocks, LLC and the regional businesses and infrastructure, including roads, and the building and construction industry that rely on the materials produced by the mine. According to the currently permitted Life of Mine (LOM), there are approximately 2.9 million cubic yards of reserves.

3.2 Increased Setback

This alternative assesses whether the exclusion of the northwest corner of the LOM area from the proposed vertical expansion would be a viable and necessary measure to mitigate the potential for comingling of groundwater from the mine area with public supply well water. The setback boundary was selected by connecting the portion of the bermed area adjacent to the Mid Marl Pond to the area of the mine along the north portion of the pit, just south of the eastern most part of the North Marl Pond (**Figure 3.2.A**). This dividing line follows the regional flow path for groundwater, thus adding distance between below water table operations and the Lime Hollow Rd wellheads. All mining north and west of the divide will remain as currently permitted.

This scenario would increase the distance from the mine pond water, under maximum groundwater conditions, from 880 feet (268 meters) to 957 feet (292 meters), for a total increase of 197 feet (60.0 meters). This alternative also moves the location where the mine pond's surface water is closest to the Lime Hollow Rd wells approximately 384 feet (117 meters) to the east-northeast, which moves it further away from the documented flow path of the groundwater in the vicinity.

The reserves loss for this scenario is approximately 3,400,000 cubic yards, which represents approximately 39.1% of the remaining proposed life of mine**.**

3.3 Phased Authorizations

The Phased Authorizations alternative refers to permitting the vertical expansion in portions rather than all at once. This is impractical due to the cost and time frame associated with the permit preparation. This scenario also does not change the outcome of the permitted activities, or the data provided to the NYSDEC. The monitoring plan outlines periodical submittals to be made to the state in congruence with the vertical phasing, acting in place of a phased authorization without the additional cost imposed upon the applicant.

3.4 Decrease in Mining Depth

This scenario evaluates the impact of decreasing the mining to a depth of only 50 feet (15.24 meters) rather than 100 feet (30.48 meters) below the water table to decrease likelihood that water from the mine pond could potentially travel horizontally in the aquifer to the depth at which water is drawn into the public water supply wells (**Figures 3.4.A, 3.4.B, and 3.4.C**).

Upon review of the Town's well construction drawings, this scenario does not make sense. The screened intervals for the two wells located at the Lime Hollow Rd location are between elevations 1,108 feet (337.72 meters) amsl and 1,140 feet (347.37 meters) amsl. The 50-foot (15.24 meter) mining depth would be down to elevation 1,120 feet (341.38 meters) amsl, which falls between the screened intervals for both wells.

The reserves loss for this scenario is approximately 1,900,000 cubic yards, which represents approximately 21.8% of the remaining proposed life of mine.

3.5 Exclusion of Southwest Corner of the Proposed Mining Pond

This scenario addresses the impact of increasing the distance between the proposed mine pond and South Marl Pond so that the proposed mine pond is no longer hydraulically upgradient of this marl pond. As currently proposed, upon full build-out of the mine pond, this southwest corner of the proposed mine pond may intercept groundwater that would otherwise flow to South Marl Pond. This may potentially impact unique flora and fauna of the marl pond. Increasing the distance between the proposed mine pond and South Marl Pond modifies the mine pond footprint to prevent this change in the existing groundwater flow field. This scope requested that this alternative be evaluated in combination with other alternatives that address separate potential environmental impacts.

Part of this DEIS was to develop a combined, and updated, topographic map, which includes bathymetric data for the marl ponds in the vicinity of both the proposed mine pond and the town's Lime Hollow Rd wells (**Figure 3.5.B**). The results show that the bottom elevation of the South Marl Pond is 1,167.3 feet (355.80 meters) amsl. This is well below the anticipated seasonal high-water

elevation for the surface of the mine pond (1,174.8 feet/358.08 meters amsl). This shows that the mine pond could not cause the permanent dewatering of the South Marl Pond.

The reserves loss is approximately 600,000 cubic yards, which represents approximately 6.9% of the remaining proposed life of mine.

3.6 Modified Mine Schedule

This scenario evaluates the impact of modifying the mine schedule, such that no mining would occur when the water table is low. This time constraint would act to avoid active below water mining during the seasonal low groundwater level period during October to November, when the North Marl Pond is essentially dry and the potential groundwater recharge from the mine pond to the Lime Hollow wells is highest.

The idea behind this scenario is that the modification would reduce potential for any pollutants from the actual mining operation influencing the municipal drinking water wells. However, as evaluated by the DEIS, the groundwater flow during these times is still drawn away from the town's wells. Since the marl ponds are dry, there is no chance that the mine pond would impact the water quality of the water being captured by the town's wells. Further analysis of the Radii of Influences, calculated based on seasonal groundwater levels, hydraulic gradients, and recharge values, show that the radius of influence for the nearest water supply well (LH#7) fluctuates between 320 feet (97.54 meters) and 420 feet (128.02 meters), depending on the month and year, with the higher radii typically occurring between January and April and the lower radii occurring between August and November.

While the modification of the mining schedule should have little impact on the mine's operation due to climate related restrictions (ice), arbitrary restrictions such as this proposal could impact future operations.

3.7 Modified Mine Sequencing

This scenario evaluates the impact of modifying the mine sequencing by starting mining in the south end, as opposed to the currently proposed plan of starting in the north end. Starting the mine pond excavation at the south end of the site would enable additional groundwater level data to be collected during mine pond development to enable real-time assessment of the range of influence of the mine pond excavation on local groundwater levels. This would enable future adjustments to be made in the mining as the excavations progress northward.

This scenario poses several issues. First, to economically mine the material, mining would begin at the location most distal from the access point from the quarry and work towards the scale house/exit. Access to the main road from the mine can only be accomplished at its current location. The mine has road frontage in two areas. One is on Route 13, where the mine entrance is currently located, and the other is along Lime Hollow Rd. adjacent to the North Marl Pond. However, due to the State Historic

Preservation Office (SHPO) restrictions on the north end of the pit, the Education Trails, and the North Marl Pond, using Lime Hollow Rd as the primary route of ingress and egress is not an option (**Figure 3.7.A**).

One possible modification to the mine sequencing could potentially be accomplished. Mining from the southwest quadrant clockwise around to the southeast quadrant may be possible. **Figures 3.7.B-E** detail the four phases of the sequence.

3.8 Multiple Excavation Areas

This scenario evaluates the impact of dividing the mine into South and North Excavations: The maximum disturbance of existing groundwater conditions at the north and south ends of the mine pond would occur once the continuous north-south extent of the proposed 2,500-foot-long (726-meter-long) mine pond is fully built out. The magnitude of the ambient groundwater level changes at the north and south ends of the pond may be mitigated to some degree if the property is mined as two discontinuous mine ponds that do not interconnect (**Figure 3.8.A**).

The findings in this DEIS, however, show that this modification is unnecessary as the current design is not anticipated to have any negative impacts on the water quality or quantity, to the town, the marl ponds, or any other potential uses with respect to recreation and/or the environment.

The reserves loss for this scenario is approximately 500,000 cubic yards, which represents approximately 5.7% of the remaining proposed life of mine.

3.9 Moving the Mine Pond Boundary to Exclude Previously Reclaimed Land

This scenario evaluates the impact of pushing the below water table mining area so that the toe of the previously reclaimed areas (**Figure 1.B**) becomes the shoreline for the proposed mine pond.

The findings in this DEIS show that this modification is impractical as it would limit the vertical and lateral extents of the proposed pit, while providing no additional environmentally significant benefit to the proposed mining activities. Further, it negates the possibility of lateral expansion, especially below the water table, in the southeast portion of the property.

The reserves loss for this scenario was not determined.

3.10 Combining Scenarios 2 and 5 and Pushing Both Further East

This scenario evaluates the impact of pushing the below water table mining area east so that all mining below the water table would only occur in areas west of the imaginary line that runs along the eastern edge of the North Marl Pond, parallel with the regional flow direction (**Figure 3.10.A**).

This scenario would increase the distance from the mine pond water, under maximum groundwater conditions, from 880 feet (268 meters) to 957 feet (292 meters), for a total increase of 197 feet (60.0

meters). This alternative also moves the location where the mine pond's surface water is closest to the Lime Hollow Rd wells approximately 384 feet (117 meters) to the east-northeast, which moves it further away from the documented flow path of the groundwater in the vicinity.

Just like in Scenario 2, this scenario offers a little more of a buffer between the town's wells and the proposed mine pond. However, the reserves loss is substantially increased from that of Scenario 2. And just like in scenario 5 (Scenario 10 being an amalgamation of scenarios 2 and 5), does not contribute to the environmental viability of this project, while arbitrarily limiting the reserves volume.

The reserves loss for this scenario was not determined.

4.0 Irreversible and Irretrievable Commitment of Resources

In accordance with SEQR regulations (617.9(b)(5)(c)), this section of the DEIS addresses irreversible and irretrievable commitment of resources, where irreversible is a term that describes the loss of environmental resources. It applies primarily to the impacts of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods of time (NYSDEC 2020).

Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. For example, if farmland is used for a non-agricultural event, some, or all of the agricultural production from an area of farmland is lost irretrievably while the area is temporarily used for another purpose. The production lost is irretrievable, but the action is not irreversible.

Approximately 78 acres in total would be disturbed with irreversible effects on soils through mixing, compaction, and movement to different locations. However, of the 78 acres, only 12.4 would be new disturbance. Within the 78-acre area, there would be irreversible effects on vegetation, wildlife habitat, and livestock grazing, and visual resources within what would become a 54-acre surface water feature.

The Proposed Action would include concurrent reclamation of open pit disturbance. Selected access roads intended for post-mining monitoring would remain as post-mining facilities.

Effects to groundwater levels resulting due to the mounding effect, discussed in **Section 2.1** of this report, are anticipated to persist under the Proposed Action and other action alternatives.

5.0 Growth Inducing Aspects

In accordance with the SEQR regulations (6 NYCRR § 617.9(b)(5)(d)), this section of the DEIS addresses growth-inducing aspects of the proposed action. The term "growth-inducing aspects" generally refers to "secondary" impacts of a proposed action that trigger further development outside the directly affected area.

No growth inducing aspects are anticipated in the expansion of a mining operation only proposes to extract minerals beyond what is currently permitted and will not change the operational methodology, causing no additional energy to be consumed.

6.0 Effect on the Use and Conservation of Energy

In accordance with the SEQR regulations (6 NYCRR § 617.9(b)(5)(e), this section of the DEIS addresses the effect on the use and conservation of energy of the proposed action.

The Community Risk and Resiliency Act (CRRA) was amended by the 2019 Climate Leadership and Community Protection Act (CLCPA), which, as issued by the NYSDEC Division of Air Resources, outlines the requirements for analyses. According to Section 7(3) of the CLCPA, the applicant must provide objective analysis regarding the new and proposed greenhouse gas (GHG) and carbon dioxide (CO2) emission sources for each portion of a proposed project. This includes actual emissions calculations and potential to emit (PTE).

6.1 Emission Sources

Construction sand and gravel plants are classified under Standard Industrial Classification (SIC) code 1442, construction sand and gravel. Emission sources in construction sand and gravel processing are included under the Source Classification Code (SCC) 3-05-025 (EPA 1995). Sand and gravel are typically mined in a moist condition by open pit excavation, which is carried out at the Cortlandville Sand and Gravel Mine via front-end loader. After mining, the material is transported to a mobile processing site with a haul truck, which separates the fine and coarse aggregate material. Coarse aggregate is further crushed and screened. Washing of material does not take place onsite.

Emissions sourced from sand and gravel mining typically consists of particulate matter (PM) and PM less than 10 micrometers in aerodynamic diameter (PM10) that are emitted by conveying, screening, crushing, and storing of material. **Table 6.1.A** depicts the emission factors for construction sand and gravel processing based on information from test reports, where emission factor is defined as "a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of the pollutant. Emission factors are usually expressed as the weight of the pollutant divided by the unit weight, volume, distance, or duration of the activity that emits the pollutant" (EPA 1995).

6.2 Projected Future GHG Emissions

The Applicant is proposing to increase the duration of mining, but not the rate at which material is removed. Therefore, the emissions will only increase as a factor of the operational longevity.

6.3 GHG Emission Mitigation

Emissions from sand and gravel operations primarily are in the form of fugitive dust. Some successful control techniques include suppressant application, windbreaks, enclosures, and soil stabilizers, which are often applied onsite.

7.0 Prominent Issues that were Raised During Scoping and Determined to be Neither Relevant nor Environmentally Significant or that have been Adequately Addressed in the Prior Environmental Review

7.1 Conformity of the Proposal with Local Zoning

Although conformity of the proposal with local zoning is not part of the scope, the apparent intent of the law is to protect public drinking water. This was considered during the drafting of the EIS.

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Tables

Year	Value of Construction Sand & Gravel plus Crushed Stone (Thousands)	Percentage of Total Mineral Value, New York
1999	$ 418,000.00	42%
2000	$ 458,000.00	45%
2001	$ 513,000.00	49%
2002	$ 549,000.00	55%
2003	$ 524,000.00	52%
2004	$ 516,000.00	47%
2005	$ 649,000.00	50%
2006	$ 671,000.00	50%
2007	$ 827,000.00	50%

Source: US Geological Survey

Table 1.3.A: Value of Construction Aggregates and Percentage of Total Value of New York

State Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
NYSDEC	Mined Land Reclamation	ECL-23-2701
Federal Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
Local Government		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
Town of Cortlandville	Site Plan Approval and Conditional Permit	

Table 1.4.A: Required Approvals and Permits

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
1/1/2019	920,000	15.1	1,015	639	0	0.0	0	0
1/2/2019	0	0.0	0	0	870,000	10.5	1,381	604
1/3/2019	0	0.0	0	0	482,000	5.8	1,385	335
1/4/2019	848,000	13.1	1,079	589	0	0.0	0	0
1/5/2019	420,000	6.5	1,077	292	221,000	2.7	1,364	153
1/6/2019	0	0.0	0	0	458,000	5.5	1,388	318
1/7/2019	897,000	13.9	1,076	623	0	0.0	0	0
1/8/2019	517,000	8.0	1,077	359	0	0.0	0	0
1/9/2019	0	0.0	0	0	753,000	9.1	1,379	523
1/10/2019	0	0.0	0	0	562,000	6.8	1,377	390
1/11/2019	725,000	11.7	1,033	503	0	0.0	0	0
1/12/2019	373,000	5.4	1,151	259	0	0.0	0	0
1/13/2019	0	0.0	0	0	769,000	9.3	1,378	534
1/14/2019	962,000	14.7	1,091	668	0	0.0	0	0
1/15/2019	478,000	7.5	1,062	332	0	0.0	0	0
1/16/2019	0	0.0	0	0	981,000	11.9	1,374	681
1/17/2019	132,000	2.1	1,048	92	448,000	5.4	1,383	311
1/18/2019	863,000	13.3	1,081	599	0	0.0	0	0
1/19/2019	458,000	7.1	1,075	318	0	0.0	0	0
1/20/2019	0	0.0	0	0	440,000	5.3	1,384	306
1/21/2019	1,013,000	15.7	1,075	703	0	0.0	0	0
1/22/2019	488,000	7.6	1,070	339	0	0.0	0	0
1/23/2019	0	0.0	0	0	989,000	11.9	1,385	687
1/24/2019	0	0.0	0	0	497,000	6.0	1,381	345
1/25/2019	988,000	15.3	1,076	686	0	0.0	0	0
1/26/2019	590,000	9.1	1,081	410	0	0.0	0	0
1/27/2019	0	0.0	0	0	564,000	6.9	1,362	392
1/28/2019	1,152,000	17.8	1,079	800	0	0.0	0	0
1/29/2019	500,000	7.8	1,068	347	0	0.0	0	0
1/30/2019	0	0.0	0	0	869,000	10.5	1,379	603
1/31/2019	11,000	0.2	917	8	469,000	5.7	1,371	326
2/1/2019	955,000	14.8	1,075	663	0	0.0	0	0
2/2/2019	504,000	7.8	1,077	350	174,000	2.4	1,208	121
2/3/2019	57,000	0.9	1,056	40	496,000	5.8	1,425	344
2/4/2019	1,024,000	15.8	1,080	711	0	0.0	0	0
2/5/2019	546,000	8.5	1,071	379	0	0.0	0	0
2/6/2019	0	0.0	0	0	883,000	10.7	1,375	613
2/7/2019	0	0.0	0	0	475,000	5.7	1,389	330
2/8/2019	965,000	14.9	1,079	670	0	0.0	0	0
2/9/2019	446,000	7.5	991	310	0	0.0	0	0
2/10/2019	0	0.0	0	0	504,000	6.1	1,377	350
2/11/2019	561,000	17.2	544	390	0	0.0	0	0
2/12/2019	525,000	8.1	1,080	365	0	0.0	0	0
2/13/2019	0	0.0	0	0	889,000	10.8	1,372	617
2/14/2019	0	0.0	0	0	474,000	5.7	1,386	329
2/15/2019	1,114,000	17.2	1,079	774	0	0.0	0	0
2/16/2019	499,000	7.0	1,188	347	0	0.0	0	0
2/17/2019	0	0.0	0	0	526,000	6.4	1,370	365
2/18/2019	1,066,000	16.5	1,077	740	0	0.0	0	0
2/19/2019	521,000	8.0	1,085	362	0	0.0	0	0
2/20/2019	0	0.0	0	0	893,000	10.8	1,378	620
2/21/2019	0	0.0	0	0	605,000	7.3	1,381	420
2/22/2019	1,014,000	15.7	1,076	704	0	0.0	0	0
2/23/2019	528,000	8.1	1,086	367	0	0.0	0	0
2/24/2019	0	0.0	0	0	946,000	11.4	1,383	657
2/25/2019	1,077,000	16.6	1,081	748	0	0.0	0	0
2/26/2019	537,000	8.4	1,065	373	0	0.0	0	0
2/27/2019	0	0.0	0	0	889,000	10.8	1,372	617

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
2/28/2019	26,000	0.4	1,083	18	486,000	5.8	1,397	338
3/1/2019	902,000	13.9	1,082	626	0	0.0	0	0
3/2/2019	674,000	10.5	1,070	468	0	0.0	0	0
3/3/2019	357,000	5.6	1,062	248	498,000	6.0	1,383	346
3/4/2019	613,000	9.4	1,087	426	0	0.0	0	0
3/5/2019	697,000	8.9	1,305	484	126,000	1.6	1,312	88
3/6/2019	0	0.0	0	0	814,000	9.8	1,384	565
3/7/2019	0	0.0	0	0	791,000	9.5	1,388	549
3/8/2019	850,000	13.2	1,073	590	0	0.0	0	0
3/9/2019	619,000	9.5	1,086	430	0	0.0	0	0
3/10/2019	0	0.0	0	0	848,000	10.4	1,359	589
3/11/2019	712,000	11.0	1,079	494	0	0.0	0	0
3/12/2019	488,000	7.6	1,070	339	0	0.0	0	0
3/13/2019	0	0.0	0	0	1,060,000	12.9	1,370	736
3/14/2019	0	0.0	0	0	597,000	7.3	1,363	415
3/15/2019	1,086,000	16.9	1,071	754	0	0.0	0	0
3/16/2019	508,000	7.8	1,085	353	0	0.0	0	0
3/17/2019	0	0.0	0	0	641,000	7.8	1,370	445
3/18/2019	1,029,000	16.1	1,065	715	0	0.0	0	0
3/19/2019	547,000	8.5	1,073	380	0	0.0	0	0
3/20/2019	0	0.0	0	0	971,000	11.9	1,360	674
3/21/2019	35,000	0.6	972	24	470,000	5.7	1,374	326
3/22/2019	1,019,000	15.8	1,075	708	0	0.0	0	0
3/23/2019	480,000	7.5	1,067	333	0	0.0	0	0
3/24/2019	0	0.0	0	0	511,000	6.3	1,352	355
3/25/2019	1,147,000	17.8	1,074	797	0	0.0	0	0
3/26/2019	525,000	9.1	962	365	0	0.0	0	0
3/27/2019	0	0.0	0	0	940,000	11.5	1,362	653
3/28/2019	0	0.0	0	0	461,000	6.0	1,281	320
3/29/2019	969,000	15.1	1,070	673	0	0.0	0	0
3/30/2019	618,000	9.5	1,084	429	55,000	0.4	2,292	38
3/31/2019	183,000	2.9	1,052	127	481,000	5.9	1,359	334
4/1/2019	237,000	3.8	1,039	165	0	0.0	0	0
4/2/2019	675,000	10.4	1,082	469	0	0.0	0	0
4/3/2019	0	0.0	0	0	127,000	1.6	1,323	88
4/4/2019	0	0.0	0	0	608,000	7.4	1,369	422
4/5/2019	0	0.0	0	0	0	0.0	0	0
4/6/2019	706,000	11.0	1,070	490	0	0.0	0	0
4/7/2019	0	0.0	0	0	616,000	7.2	1,426	428
4/8/2019	0	0.0	0	0	0	0.0	0	0
4/9/2019	737,000	11.4	1,077	512	0	0.0	0	0
4/10/2019	0	0.0	0	0	0	0.0	0	0
4/11/2019	0	0.0	0	0	653,000	8.1	1,344	453
4/12/2019	0	0.0	0	0	0	0.0	0	0
4/13/2019	609,000	9.5	1,068	423	0	0.0	0	0
4/14/2019	0	0.0	0	0	525,000	6.4	1,367	365
4/15/2019	0	0.0	0	0	0	0.0	0	0
4/16/2019	642,000	10.0	1,070	446	0	0.0	0	0
4/17/2019	0	0.0	0	0	0	0.0	0	0
4/18/2019	0	0.0	0	0	620,000	7.6	1,360	431
4/19/2019	0	0.0	0	0	0	0.0	0	0
4/20/2019	756,000	11.8	1,068	525	0	0.0	0	0
4/21/2019	0	0.0	0	0	490,000	6.0	1,361	340
4/22/2019	0	0.0	0	0	0	0.0	0	0
4/23/2019	616,000	9.5	1,081	428	0	0.0	0	0
4/24/2019	0	0.0	0	0	0	0.0	0	0
4/25/2019	0	0.0	0	0	560,000	7.7	1,212	389
4/26/2019	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
4/27/2019	570,000	8.9	1,067	396	0	0.0	0	0
4/28/2019	0	0.0	0	0	539,000	6.6	1,361	374
4/29/2019	0	0.0	0	0	0	0.0	0	0
4/30/2019	675,000	10.5	1,071	469	0	0.0	0	0
5/1/2019	0	0.0	0	0	0	0.0	0	0
5/2/2019	0	0.0	0	0	584,000	7.2	1,352	406
5/3/2019	0	0.0	0	0	0	0.0	0	0
5/4/2019	645,000	10.0	1,075	448	0	0.0	0	0
5/5/2019	0	0.0	0	0	490,000	5.9	1,384	340
5/6/2019	0	0.0	0	0	0	0.0	0	0
5/7/2019	697,000	10.9	1,066	484	0	0.0	0	0
5/8/2019	0	0.0	0	0	0	0.0	0	0
5/9/2019	0	0.0	0	0	633,000	7.8	1,353	440
5/10/2019	0	0.0	0	0	0	0.0	0	0
5/11/2019	657,000	10.2	1,074	456	0	0.0	0	0
5/12/2019	0	0.0	0	0	502,000	6.2	1,349	349
5/13/2019	0	0.0	0	0	0	0.0	0	0
5/14/2019	588,000	9.1	1,077	408	0	0.0	0	0
5/15/2019	0	0.0	0	0	0	0.0	0	0
5/16/2019	0	0.0	0	0	597,000	7.3	1,363	415
5/17/2019	0	0.0	0	0	0	0.0	0	0
5/18/2019	641,000	9.9	1,079	445	0	0.0	0	0
5/19/2019	0	0.0	0	0	589,000	7.1	1,383	409
5/20/2019	0	0.0	0	0	0	0.0	0	0
5/21/2019	646,000	11.1	970	449	0	0.0	0	0
5/22/2019	0	0.0	0	0	0	0.0	0	0
5/23/2019	0	0.0	0	0	623,000	7.7	1,348	433
5/24/2019	0	0.0	0	0	0	0.0	0	0
5/25/2019	655,000	10.2	1,070	455	0	0.0	0	0
5/26/2019	0	0.0	0	0	554,000	6.7	1,378	385
5/27/2019	0	0.0	0	0	0	0.0	0	0
5/28/2019	617,000	9.6	1,071	428	0	0.0	0	0
5/29/2019	0	0.0	0	0	0	0.0	0	0
5/30/2019	0	0.0	0	0	611,000	7.5	1,358	424
5/31/2019	0	0.0	0	0	0	0.0	0	0
6/1/2019	668,000	10.3	1,081	464	0	0.0	0	0
6/2/2019	0	0.0	0	0	516,000	6.3	1,365	358
6/3/2019	0	0.0	0	0	0	0.0	0	0
6/4/2019	635,000	9.8	1,080	441	0	0.0	0	0
6/5/2019	0	0.0	0	0	0	0.0	0	0
6/6/2019	0	0.0	0	0	704,000	8.6	1,364	489
6/7/2019	0	0.0	0	0	0	0.0	0	0
6/8/2019	624,000	9.8	1,061	433	0	0.0	0	0
6/9/2019	0	0.0	0	0	586,000	7.2	1,356	407
6/10/2019	0	0.0	0	0	0	0.0	0	0
6/11/2019	804,000	12.5	1,072	558	0	0.0	0	0
6/12/2019	0	0.0	0	0	0	0.0	0	0
6/13/2019	0	0.0	0	0	710,000	8.7	1,360	493
6/14/2019	0	0.0	0	0	0	0.0	0	0
6/15/2019	560,000	8.7	1,073	389	0	0.0	0	0
6/16/2019	0	0.0	0	0	520,000	6.4	1,354	361
6/17/2019	0	0.0	0	0	0	0.0	0	0
6/18/2019	587,000	9.1	1,075	408	0	0.0	0	0
6/19/2019	0	0.0	0	0	0	0.0	0	0
6/20/2019	0	0.0	0	0	453,000	5.5	1,373	315
6/21/2019	0	0.0	0	0	0	0.0	0	0
6/22/2019	667,000	10.5	1,059	463	0	0.0	0	0
6/23/2019	0	0.0	0	0	530,000	6.5	1,359	368

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
6/24/2019	0	0.0	0	0	0	0.0	0	0
6/25/2019	652,000	10.1	1,076	453	0	0.0	0	0
6/26/2019	0	0.0	0	0	0	0.0	0	0
6/27/2019	0	0.0	0	0	555,000	6.8	1,360	385
6/28/2019	0	0.0	0	0	0	0.0	0	0
6/29/2019	601,000	9.4	1,066	417	0	0.0	0	0
6/30/2019	0	0.0	0	0	540,000	6.6	1,364	375
7/1/2019	0	0.0	0	0	0	0.0	0	0
7/2/2019	672,000	10.6	1,057	467	0	0.0	0	0
7/3/2019	0	0.0	0	0	0	0.0	0	0
7/4/2019	0	0.0	0	0	621,000	7.7	1,344	431
7/5/2019	0	0.0	0	0	0	0.0	0	0
7/6/2019	602,000	9.3	1,079	418	0	0.0	0	0
7/7/2019	0	0.0	0	0	554,000	6.8	1,358	385
7/8/2019	194,000	3.0	1,078	135	0	0.0	0	0
7/9/2019	544,000	8.7	1,042	378	0	0.0	0	0
7/10/2019	0	0.0	0	0	0	0.0	0	0
7/11/2019	0	0.0	0	0	761,000	9.4	1,349	528
7/12/2019	0	0.0	0	0	0	0.0	0	0
7/13/2019	832,000	13.0	1,067	578	0	0.0	0	0
7/14/2019	0	0.0	0	0	594,000	7.3	1,356	413
7/15/2019	0	0.0	0	0	0	0.0	0	0
7/16/2019	739,000	11.6	1,062	513	0	0.0	0	0
7/17/2019	0	0.0	0	0	0	0.0	0	0
7/18/2019	0	0.0	0	0	620,000	7.7	1,342	431
7/19/2019	0	0.0	0	0	0	0.0	0	0
7/20/2019	739,000	11.5	1,071	513	0	0.0	0	0
7/21/2019	0	0.0	0	0	561,000	6.9	1,355	390
7/22/2019	0	0.0	0	0	0	0.0	0	0
7/23/2019	683,000	10.6	1,074	474	0	0.0	0	0
7/24/2019	0	0.0	0	0	0	0.0	0	0
7/25/2019	0	0.0	0	0	605,000	7.4	1,363	420
7/26/2019	0	0.0	0	0	0	0.0	0	0
7/27/2019	718,000	11.3	1,059	499	0	0.0	0	0
7/28/2019	0	0.0	0	0	537,000	6.6	1,356	373
7/29/2019	0	0.0	0	0	0	0.0	0	0
7/30/2019	620,000	9.7	1,065	431	0	0.0	0	0
7/31/2019	0	0.0	0	0	905,000	11.2	1,347	628
8/1/2019	0	0.0	0	0	0	0.0	0	0
8/2/2019	0	0.0	0	0	0	0.0	0	0
8/3/2019	0	0.0	0	0	0	0.0	0	0
8/4/2019	0	0.0	0	0	0	0.0	0	0
8/5/2019	0	0.0	0	0	457,000	5.6	1,360	317
8/6/2019	700,000	11.0	1,061	486	0	0.0	0	0
8/7/2019	0	0.0	0	0	0	0.0	0	0
8/8/2019	0	0.0	0	0	0	0.0	0	0
8/9/2019	0	0.0	0	0	590,000	7.4	1,329	410
8/10/2019	601,000	9.4	1,066	417	0	0.0	0	0
8/11/2019	0	0.0	0	0	0	0.0	0	0
8/12/2019	0	0.0	0	0	525,000	6.4	1,367	365
8/13/2019	675,000	10.5	1,071	469	0	0.0	0	0
8/14/2019	0	0.0	0	0	0	0.0	0	0
8/15/2019	0	0.0	0	0	0	0.0	0	0
8/16/2019	0	0.0	0	0	585,000	7.3	1,336	406
8/17/2019	582,000	9.1	1,066	404	0	0.0	0	0
8/18/2019	0	0.0	0	0	0	0.0	0	0
8/19/2019	0	0.0	0	0	568,000	7.1	1,333	394
8/20/2019	657,000	10.3	1,063	456	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
8/21/2019	0	0.0	0	0	0	0.0	0	0
8/22/2019	0	0.0	0	0	0	0.0	0	0
8/23/2019	0	0.0	0	0	633,000	7.8	1,353	440
8/24/2019	638,000	10.0	1,063	443	0	0.0	0	0
8/25/2019	0	0.0	0	0	0	0.0	0	0
8/26/2019	0	0.0	0	0	574,000	7.1	1,347	399
8/27/2019	627,000	9.8	1,066	435	0	0.0	0	0
8/28/2019	0	0.0	0	0	0	0.0	0	0
8/29/2019	0	0.0	0	0	0	0.0	0	0
8/30/2019	0	0.0	0	0	573,000	7.1	1,345	398
8/31/2019	738,000	11.7	1,051	513	0	0.0	0	0
9/1/2019	0	0.0	0	0	0	0.0	0	0
9/2/2019	0	0.0	0	0	534,000	6.7	1,328	371
9/3/2019	792,000	12.5	1,056	550	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
9/4/2019	0	0.0	0	0	0	0.0	0	0
9/5/2019	0	0.0	0	0	0	0.0	0	0
9/6/2019	0	0.0	0	0	744,000	9.3	1,333	517
9/7/2019	615,000	9.8	1,046	427	0	0.0	0	0
9/8/2019	0	0.0	0	0	0	0.0	0	0
9/9/2019	0	0.0	0	0	419,000	4.9	1,425	291
9/10/2019	698,000	11.0	1,058	485	0	0.0	0	0
9/11/2019	0	0.0	0	0	0	0.0	0	0
9/12/2019	0	0.0	0	0	0	0.0	0	0
9/13/2019	0	0.0	0	0	669,000	8.4	1,327	465
9/14/2019	726,000	11.4	1,061	504	0	0.0	0	0
9/15/2019	0	0.0	0	0	0	0.0	0	0
9/16/2019	0	0.0	0	0	564,000	7.0	1,343	392
9/17/2019	701,000	11.1	1,053	487	0	0.0	0	0
9/18/2019	0	0.0	0	0	0	0.0	0	0
9/19/2019	0	0.0	0	0	0	0.0	0	0
9/20/2019	0	0.0	0	0	826,000	10.3	1,337	574
9/21/2019	771,000	12.2	1,053	535	0	0.0	0	0
9/22/2019	0	0.0	0	0	0	0.0	0	0
9/23/2019	0	0.0	0	0	583,000	7.3	1,331	405
9/24/2019	780,000	12.4	1,048	542	0	0.0	0	0
9/25/2019	0	0.0	0	0	0	0.0	0	0
9/26/2019	0	0.0	0	0	0	0.0	0	0
9/27/2019	0	0.0	0	0	775,000	9.8	1,318	538
9/28/2019	808,000	12.8	1,052	561	0	0.0	0	0
9/29/2019	0	0.0	0	0	0	0.0	0	0
9/30/2019	0	0.0	0	0	574,000	7.1	1,347	399
10/1/2019	743,000	11.7	1,058	516	0	0.0	0	0
10/2/2019	0	0.0	0	0	0	0.0	0	0
10/3/2019	0	0.0	0	0	675,000	8.6	1,308	469
10/4/2019	0	0.0	0	0	0	0.0	0	0
10/5/2019	628,000	10.0	1,047	436	0	0.0	0	0
10/6/2019	0	0.0	0	0	526,000	6.5	1,349	365
10/7/2019	0	0.0	0	0	0	0.0	0	0
10/8/2019	733,000	11.6	1,053	509	0	0.0	0	0
10/9/2019	0	0.0	0	0	0	0.0	0	0
10/10/2019	0	0.0	0	0	719,000	9.1	1,317	499
10/11/2019	0	0.0	0	0	0	0.0	0	0
10/12/2019	758,000	12.1	1,044	526	0	0.0	0	0
10/13/2019	0	0.0	0	0	579,000	7.3	1,322	402
10/14/2019	0	0.0	0	0	0	0.0	0	0
10/15/2019	735,000	11.6	1,056	510	0	0.0	0	0
10/16/2019	0	0.0	0	0	0	0.0	0	0
10/17/2019	0	0.0	0	0	733,000	9.2	1,328	509
10/18/2019	0	0.0	0	0	0	0.0	0	0
10/19/2019	674,000	11.3	994	468	0	0.0	0	0
10/20/2019	0	0.0	0	0	568,000	7.1	1,333	394
10/21/2019	0	0.0	0	0	0	0.0	0	0
10/22/2019	745,000	11.8	1,052	517	0	0.0	0	0
10/23/2019	0	0.0	0	0	0	0.0	0	0
10/24/2019	0	0.0	0	0	739,000	8.3	1,484	513
10/25/2019	0	0.0	0	0	0	0.0	0	0
10/26/2019	706,000	11.2	1,051	490	0	0.0	0	0
10/27/2019	0	0.0	0	0	654,000	8.1	1,346	454
10/28/2019	0	0.0	0	0	0	0.0	0	0
10/29/2019	782,000	12.5	1,043	543	0	0.0	0	0
10/30/2019	0	0.0	0	0	0	0.0	0	0
10/31/2019	0	0.0	0	0	686,000	8.7	1,314	476

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
11/1/2019	0	0.0	0	0	0	0.0	0	0
11/2/2019	666,000	10.5	1,057	463	0	0.0	0	0
11/3/2019	0	0.0	0	0	566,000	7.1	1,329	393
11/4/2019	749,000	11.9	1,049	520	0	0.0	0	0
11/5/2019	0	0.0	0	0	0	0.0	0	0
11/6/2019	0	0.0	0	0	0	0.0	0	0
11/7/2019	0	0.0	0	0	691,000	8.6	1,339	480
11/8/2019	1,043,000	15.8	1,100	724	0	0.0	0	0
11/9/2019	0	0.0	0	0	0	0.0	0	0
11/10/2019	0	0.0	0	0	822,000	10.3	1,330	571
11/11/2019	995,000	15.6	1,063	691	0	0.0	0	0
11/12/2019	0	0.0	0	0	0	0.0	0	0
11/13/2019	0	0.0	0	0	460,000	5.7	1,345	319
11/14/2019	0	0.0	0	0	784,000	9.6	1,361	544
11/15/2019	961,000	15.1	1,061	667	0	0.0	0	0
11/16/2019	0	0.0	0	0	0	0.0	0	0
11/17/2019	0	0.0	0	0	801,000	10.0	1,335	556
11/18/2019	968,000	15.2	1,061	672	0	0.0	0	0
11/19/2019	0	0.0	0	0	0	0.0	0	0
11/20/2019	0	0.0	0	0	0	0.0	0	0
11/21/2019	0	0.0	0	0	945,000	12.1	1,302	656
11/22/2019	956,000	15.0	1,062	664	0	0.0	0	0
11/23/2019	0	0.0	0	0	0	0.0	0	0
11/24/2019	0	0.0	0	0	722,000	9.0	1,337	501
11/25/2019	942,000	14.8	1,061	654	0	0.0	0	0
11/26/2019	0	0.0	0	0	0	0.0	0	0
11/27/2019	0	0.0	0	0	0	0.0	0	0
11/28/2019	0	0.0	0	0	855,000	10.7	1,332	594
11/29/2019	942,000	14.8	1,061	654	0	0.0	0	0
11/30/2019	0	0.0	0	0	0	0.0	0	0
12/1/2019	0	0.0	0	0	675,000	8.4	1,339	469
12/2/2019	0	0.0	0	0	0	0.0	0	0
12/3/2019	976,000	15.4	1,056	678	0	0.0	0	0
12/4/2019	0	0.0	0	0	0	0.0	0	0
12/5/2019	0	0.0	0	0	780,000	9.7	1,340	542
12/6/2019	0	0.0	0	0	0	0.0	0	0
12/7/2019	1,072,000	16.8	1,063	744	0	0.0	0	0
12/8/2019	0	0.0	0	0	697,000	8.6	1,351	484
12/9/2019	0	0.0	0	0	0	0.0	0	0
12/10/2019	1,088,000	17.0	1,067	756	0	0.0	0	0
12/11/2019	0	0.0	0	0	0	0.0	0	0
12/12/2019	0	0.0	0	0	872,000	10.9	1,333	606
12/13/2019	0	0.0	0	0	0	0.0	0	0
12/14/2019	967,000	15.2	1,060	672	0	0.0	0	0
12/15/2019	0	0.0	0	0	741,000	9.1	1,357	515
12/16/2019	0	0.0	0	0	0	0.0	0	0
12/17/2019	687,000	10.8	1,060	477	0	0.0	0	0
12/18/2019	0	0.0	0	0	0	0.0	0	0
12/19/2019	0	0.0	0	0	470,000	5.8	1,351	326
12/20/2019	0	0.0	0	0	0	0.0	0	0
12/21/2019	676,000	10.7	1,053	469	0	0.0	0	0
12/22/2019	0	0.0	0	0	682,000	8.5	1,337	474
12/23/2019	0	0.0	0	0	0	0.0	0	0
12/24/2019	615,000	9.6	1,068	427	0	0.0	0	0
12/25/2019	0	0.0	0	0	0	0.0	0	0
12/26/2019	0	0.0	0	0	532,000	6.5	1,364	369
12/27/2019	0	0.0	0	0	0	0.0	0	0
12/28/2019	562,000	10.2	918	390	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
12/29/2019	0	0.0	0	0	559,000	6.9	1,350	388
12/30/2019	0	0.0	0	0	0	0.0	0	0
12/31/2019	595,000	9.4	1,055	413	0	0.0	0	0
1/1/2020	0	0.0	0	0	0	0.0	0	0
1/2/2020	0	0.0	0	0	965,000	11.9	1,352	670
1/3/2020	0	0.0	0	0	0	0.0	0	0
1/4/2020	898,000	14.0	1,069	624	0	0.0	0	0
1/5/2020	0	0.0	0	0	870,000	10.7	1,355	604
1/6/2020	0	0.0	0	0	0	0.0	0	0
1/7/2020	735,000	11.5	1,065	510	0	0.0	0	0
1/8/2020	0	0.0	0	0	0	0.0	0	0
1/9/2020	0	0.0	0	0	858,000	10.5	1,362	596
1/10/2020	0	0.0	0	0	0	0.0	0	0
1/11/2020	1,073,000	16.7	1,071	745	0	0.0	0	0
1/12/2020	0	0.0	0	0	663,000	8.1	1,364	460
1/13/2020	0	0.0	0	0	0	0.0	0	0
1/14/2020	884,000	13.8	1,068	614	0	0.0	0	0
1/15/2020	0	0.0	0	0	0	0.0	0	0
1/16/2020	0	0.0	0	0	798,000	9.8	1,357	554
1/17/2020	0	0.0	0	0	0	0.0	0	0
1/18/2020	984,000	15.4	1,065	683	0	0.0	0	0
1/19/2020	0	0.0	0	0	587,000	7.2	1,359	408
1/20/2020	0	0.0	0	0	0	0.0	0	0
1/21/2020	598,000	9.4	1,060	415	0	0.0	0	0
1/22/2020	0	0.0	0	0	0	0.0	0	0
1/23/2020	0	0.0	0	0	675,000	8.3	1,355	469
1/24/2020	0	0.0	0	0	0	0.0	0	0
1/25/2020	671,000	10.5	1,065	466	0	0.0	0	0
1/26/2020	0	0.0	0	0	536,000	6.6	1,354	372
1/27/2020	0	0.0	0	0	0	0.0	0	0
1/28/2020	754,000	11.8	1,065	524	0	0.0	0	0
1/29/2020	0	0.0	0	0	0	0.0	0	0
1/30/2020	0	0.0	0	0	737,000	9.1	1,350	512
1/31/2020	0	0.0	0	0	0	0.0	0	0
2/1/2020	955,000	15.1	1,054	663	0	0.0	0	0
2/2/2020	0	0.0	0	0	731,000	9.2	1,324	508
2/3/2020	0	0.0	0	0	0	0.0	0	0
2/4/2020	656,000	10.4	1,051	456	0	0.0	0	0
2/5/2020	0	0.0	0	0	0	0.0	0	0
2/6/2020	0	0.0	0	0	665,000	8.3	1,335	462
2/7/2020	0	0.0	0	0	0	0.0	0	0
2/8/2020	607,000	9.5	1,065	422	0	0.0	0	0
2/9/2020	505,000	7.9	1,065	351	161,000	2.2	1,220	112
2/10/2020	0	0.0	0	0	0	0.0	0	0
2/11/2020	653,000	10.2	1,067	453	0	0.0	0	0
2/12/2020	0	0.0	0	0	0	0.0	0	0
2/13/2020	0	0.0	0	0	708,000	8.8	1,341	492
2/14/2020	0	0.0	0	0	0	0.0	0	0
2/15/2020	711,000	11.2	1,058	494	0	0.0	0	0
2/16/2020	0	0.0	0	0	632,000	7.8	1,350	439
2/17/2020	0	0.0	0	0	0	0.0	0	0
2/18/2020	778,000	12.2	1,063	540	0	0.0	0	0
2/19/2020	0	0.0	0	0	0	0.0	0	0
2/20/2020	0	0.0	0	0	863,000	10.7	1,344	599
2/21/2020	0	0.0	0	0	0	0.0	0	0
2/22/2020	934,000	14.6	1,066	649	0	0.0	0	0
2/23/2020	0	0.0	0	0	744,000	9.2	1,348	517
2/24/2020	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
2/25/2020	914,000	14.3	1,065	635	0	0.0	0	0
2/26/2020	0	0.0	0	0	0	0.0	0	0
2/27/2020	0	0.0	0	0	880,000	11.0	1,333	611
2/28/2020	0	0.0	0	0	0	0.0	0	0
2/29/2020	869,000	13.6	1,065	603	0	0.0	0	0
3/1/2020	0	0.0	0	0	738,000	9.0	1,367	513
3/2/2020	0	0.0	0	0	0	0.0	0	0
3/3/2020	878,000	13.7	1,068	610	0	0.0	0	0
3/4/2020	0	0.0	0	0	0	0.0	0	0
3/5/2020	0	0.0	0	0	926,000	11.5	1,342	643
3/6/2020	0	0.0	0	0	0	0.0	0	0
3/7/2020	876,000	12.5	1,167	608	0	0.0	0	0
3/8/2020	384,000	5.5	1,167	267	1,004,000	12.6	1,328	697
3/9/2020	0	0.0	0	0	0	0.0	0	0
3/10/2020	910,000	14.2	1,068	632	0	0.0	0	0
3/11/2020	0	0.0	0	0	0	0.0	0	0
3/12/2020	0	0.0	0	0	816,000	10.2	1,333	567
3/13/2020	0	0.0	0	0	0	0.0	0	0
3/14/2020	823,000	12.9	1,063	572	0	0.0	0	0
3/15/2020	0	0.0	0	0	613,000	7.5	1,362	426
3/16/2020	0	0.0	0	0	0	0.0	0	0
3/17/2020	821,000	12.8	1,069	570	0	0.0	0	0
3/18/2020	0	0.0	0	0	0	0.0	0	0
3/19/2020	0	0.0	0	0	860,000	10.7	1,340	597
3/20/2020	0	0.0	0	0	0	0.0	0	0
3/21/2020	852,000	13.4	1,060	592	0	0.0	0	0
3/22/2020	0	0.0	0	0	622,000	7.7	1,346	432
3/23/2020	0	0.0	0	0	0	0.0	0	0
3/24/2020	823,000	12.7	1,080	572	0	0.0	0	0
3/25/2020	0	0.0	0	0	0	0.0	0	0
3/26/2020	0	0.0	0	0	829,000	10.3	1,341	576
3/27/2020	0	0.0	0	0	0	0.0	0	0
3/28/2020	954,000	14.9	1,067	663	0	0.0	0	0
3/29/2020	0	0.0	0	0	742,000	9.7	1,275	515
3/30/2020	0	0.0	0	0	0	0.0	0	0
3/31/2020	827,000	12.9	1,068	574	0	0.0	0	0
4/1/2020	0	0.0	0	0	0	0.0	0	0
4/2/2020	0	0.0	0	0	1,057,000	13.0	1,355	734
4/3/2020	0	0.0	0	0	0	0.0	0	0
4/4/2020	935,000	14.6	1,067	649	0	0.0	0	0
4/5/2020	0	0.0	0	0	812,000	10.1	1,340	564
4/6/2020	0	0.0	0	0	0	0.0	0	0
4/7/2020	933,000	14.5	1,072	648	0	0.0	0	0
4/8/2020	0	0.0	0	0	0	0.0	0	0
4/9/2020	0	0.0	0	0	864,000	10.7	1,346	600
4/10/2020	0	0.0	0	0	0	0.0	0	0
4/11/2020	862,000	13.5	1,064	599	0	0.0	0	0
4/12/2020	0	0.0	0	0	585,000	7.3	1,336	406
4/13/2020	0	0.0	0	0	0	0.0	0	0
4/14/2020	949,000	14.8	1,069	659	0	0.0	0	0
4/15/2020	0	0.0	0	0	0	0.0	0	0
4/16/2020	0	0.0	0	0	907,000	11.3	1,338	630
4/17/2020	0	0.0	0	0	0	0.0	0	0
4/18/2020	822,000	12.9	1,062	571	0	0.0	0	0
4/19/2020	0	0.0	0	0	616,000	7.6	1,351	428
4/20/2020	0	0.0	0	0	0	0.0	0	0
4/21/2020	839,000	13.2	1,059	583	0	0.0	0	0
4/22/2020	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
4/23/2020	0	0.0	0	0	852,000	10.5	1,352	592
4/24/2020	0	0.0	0	0	0	0.0	0	0
4/25/2020	896,000	14.0	1,067	622	0	0.0	0	0
4/26/2020	0	0.0	0	0	703,000	8.7	1,347	488
4/27/2020	0	0.0	0	0	0	0.0	0	0
4/28/2020	908,000	14.1	1,073	631	0	0.0	0	0
4/29/2020	0	0.0	0	0	0	0.0	0	0
4/30/2020	0	0.0	0	0	943,000	11.6	1,355	655
5/1/2020	0	0.0	0	0	0	0.0	0	0
5/2/2020	984,000	16.0	1,025	683	0	0.0	0	0
5/3/2020	0	0.0	0	0	757,000	9.2	1,371	526
5/4/2020	0	0.0	0	0	0	0.0	0	0
5/5/2020	896,000	13.9	1,074	622	0	0.0	0	0
5/6/2020	0	0.0	0	0	0	0.0	0	0
5/7/2020	0	0.0	0	0	882,000	10.8	1,361	613
5/8/2020	0	0.0	0	0	0	0.0	0	0
5/9/2020	882,000	13.7	1,073	613	0	0.0	0	0
5/10/2020	0	0.0	0	0	799,000	9.7	1,373	555
5/11/2020	0	0.0	0	0	0	0.0	0	0
5/12/2020	884,000	13.7	1,075	614	0	0.0	0	0
5/13/2020	0	0.0	0	0	0	0.0	0	0
5/14/2020	0	0.0	0	0	927,000	11.4	1,355	644
5/15/2020	0	0.0	0	0	0	0.0	0	0
5/16/2020	928,000	14.4	1,074	644	0	0.0	0	0
5/17/2020	0	0.0	0	0	733,000	8.9	1,373	509
5/18/2020	0	0.0	0	0	0	0.0	0	0
5/19/2020	1,020,000	15.8	1,076	708	0	0.0	0	0
5/20/2020	0	0.0	0	0	0	0.0	0	0
5/21/2020	0	0.0	0	0	1,030,000	12.6	1,362	715
5/22/2020	0	0.0	0	0	0	0.0	0	0
5/23/2020	1,046,000	15.5	1,125	726	0	0.0	0	0
5/24/2020	0	0.0	0	0	856,000	10.5	1,359	594
5/25/2020	0	0.0	0	0	0	0.0	0	0
5/26/2020	989,000	15.2	1,084	687	0	0.0	0	0
5/27/2020	0	0.0	0	0	0	0.0	0	0
5/28/2020	0	0.0	0	0	896,000	-9,989.1	-1	622
5/29/2020	0	0.0	0	0	0	0.0	0	0
5/30/2020	932,000	14.5	1,071	647	0	0.0	0	0
5/31/2020	0	0.0	0	0	707,000	10,008.7	1	491
6/1/2020	0	0.0	0	0	0	0.0	0	0
6/2/2020	937,000	14.5	1,077	651	0	0.0	0	0
6/3/2020	0	0.0	0	0	0	0.0	0	0
6/4/2020	0	0.0	0	0	1,026,000	13.0	1,315	713
6/5/2020	0	0.0	0	0	0	0.0	0	0
6/6/2020	1,008,000	15.6	1,077	700	0	0.0	0	0
6/7/2020	0	0.0	0	0	836,000	10.2	1,366	581
6/8/2020	0	0.0	0	0	0	0.0	0	0
6/9/2020	1,019,000	15.8	1,075	708	0	0.0	0	0
6/10/2020	0	0.0	0	0	0	0.0	0	0
6/11/2020	0	0.0	0	0	886,000	10.9	1,355	615
6/12/2020	0	0.0	0	0	0	0.0	0	0
6/13/2020	959,000	14.9	1,073	666	0	0.0	0	0
6/14/2020	0	0.0	0	0	796,000	9.8	1,354	553
6/15/2020	0	0.0	0	0	0	0.0	0	0
6/16/2020	1,008,000	15.6	1,077	700	0	0.0	0	0
6/17/2020	0	0.0	0	0	0	0.0	0	0
6/18/2020	0	0.0	0	0	1,038,000	12.7	1,362	721
6/19/2020	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
6/20/2020	1,057,000	15.6	1,129	734	0	0.0	0	0
6/21/2020	0	0.0	0	0	864,000	10.7	1,346	600
6/22/2020	0	0.0	0	0	0	0.0	0	0
6/23/2020	1,022,000	15.9	1,071	710	0	0.0	0	0
6/24/2020	0	0.0	0	0	0	0.0	0	0
6/25/2020	0	0.0	0	0	758,000	9.4	1,344	526
6/26/2020	0	0.0	0	0	0	0.0	0	0
6/27/2020	791,000	12.5	1,055	549	0	0.0	0	0
6/28/2020	0	0.0	0	0	884,000	11.1	1,327	614
6/29/2020	0	0.0	0	0	0	0.0	0	0
6/30/2020	1,019,000	16.2	1,048	708	0	0.0	0	0
7/1/2020	0	0.0	0	0	0	0.0	0	0
7/2/2020	0	0.0	0	0	803,000	10.0	1,338	558
7/3/2020	0	0.0	0	0	0	0.0	0	0
7/4/2020	751,000	11.8	1,061	522	0	0.0	0	0
7/5/2020	0	0.0	0	0	631,000	7.8	1,348	438
7/6/2020	0	0.0	0	0	0	0.0	0	0
7/7/2020	967,000	15.2	1,060	672	0	0.0	0	0
7/8/2020	0	0.0	0	0	0	0.0	0	0
7/9/2020	0	0.0	0	0	743,000	9.2	1,346	516
7/10/2020	0	0.0	0	0	0	0.0	0	0
7/11/2020	623,000	10.0	1,038	433	0	0.0	0	0
7/12/2020	0	0.0	0	0	537,000	6.6	1,356	373
7/13/2020	0	0.0	0	0	0	0.0	0	0
7/14/2020	753,000	11.6	1,082	523	0	0.0	0	0
7/15/2020	0	0.0	0	0	0	0.0	0	0
7/16/2020	0	0.0	0	0	869,000	11.0	1,317	603
7/17/2020	0	0.0	0	0	0	0.0	0	0
7/18/2020	820,000	13.2	1,035	569	0	0.0	0	0
7/19/2020	0	0.0	0	0	618,000	7.7	1,338	429
7/20/2020	0	0.0	0	0	0	0.0	0	0
7/21/2020	860,000	13.6	1,054	597	0	0.0	0	0
7/22/2020	0	0.0	0	0	0	0.0	0	0
7/23/2020	0	0.0	0	0	746,000	9.4	1,323	518
7/24/2020	0	0.0	0	0	0	0.0	0	0
7/25/2020	801,000	12.8	1,043	556	0	0.0	0	0
7/26/2020	0	0.0	0	0	605,000	7.5	1,344	420
7/27/2020	0	0.0	0	0	0	0.0	0	0
7/28/2020	847,000	13.4	1,053	588	0	0.0	0	0
7/29/2020	0	0.0	0	0	0	0.0	0	0
7/30/2020	0	0.0	0	0	762,000	9.6	1,323	529
7/31/2020	0	0.0	0	0	0	0.0	0	0
8/1/2020	797,000	12.5	1,063	553	0	0.0	0	0
8/2/2020	0	0.0	0	0	568,000	7.2	1,315	394
8/3/2020	0	0.0	0	0	0	0.0	0	0
8/4/2020	687,000	11.0	1,041	477	0	0.0	0	0
8/5/2020	0	0.0	0	0	0	0.0	0	0
8/6/2020	0	0.0	0	0	702,000	9.0	1,300	488
8/7/2020	0	0.0	0	0	0	0.0	0	0
8/8/2020	799,000	13.0	1,024	555	0	0.0	0	0
8/9/2020	0	0.0	0	0	295,000	7.0	702	205
8/10/2020	0	0.0	0	0	0	0.0	0	0
8/11/2020	708,000	11.0	1,073	492	0	0.0	0	0
8/12/2020	0	0.0	0	0	0	0.0	0	0
8/13/2020	0	0.0	0	0	787,000	10.0	1,312	547
8/14/2020	0	0.0	0	0	0	0.0	0	0
8/15/2020	793,000	13.0	1,017	551	0	0.0	0	0
8/16/2020	0	0.0	0	0	657,000	8.0	1,369	456

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
8/17/2020	0	0.0	0	0	0	0.0	0	0
8/18/2020	798,000	13.0	1,023	554	0	0.0	0	0
8/19/2020	0	0.0	0	0	0	0.0	0	0
8/20/2020	0	0.0	0	0	817,000	11.0	1,238	567
8/21/2020	0	0.0	0	0	0	0.0	0	0
8/22/2020	904,000	14.0	1,076	628	0	0.0	0	0
8/23/2020	0	0.0	0	0	638,000	8.0	1,329	443
8/24/2020	0	0.0	0	0	0	0.0	0	0
8/25/2020	870,000	14.0	1,036	604	0	0.0	0	0
8/26/2020	0	0.0	0	0	0	0.0	0	0
8/27/2020	0	0.0	0	0	754,061	9.0	1,396	524
8/28/2020	0	0.0	0	0	0	0.0	0	0
8/29/2020	820,723	13.0	1,052	570	0	0.0	0	0
8/30/2020	0	0.0	0	0	574,067	8.0	1,196	399
8/31/2020	0	0.0	0	0	0	0.0	0	0
9/1/2020	878,000	14.0	1,045	610	0	0.0	0	0
9/2/2020	0	0.0	0	0	0	0.0	0	0
9/3/2020	0	0.0	0	0	809,741	10.0	1,350	562
9/4/2020	0	0.0	0	0	0	0.0	0	0
9/5/2020	816,111	13.0	1,046	567	0	0.0	0	0
9/6/2020	0	0.0	0	0	588,855	7.0	1,402	409
9/7/2020	0	0.0	0	0	0	0.0	0	0
9/8/2020	847,761	14.0	1,009	589	0	0.0	0	0
9/9/2020	0	0.0	0	0	0	0.0	0	0
9/10/2020	936,869	15.0	1,041	651	0	0.0	0	0
9/11/2020	0	0.0	0	0	0	0.0	0	0
9/12/2020	864,812	14.0	1,030	601	0	0.0	0	0
9/13/2020	655,818	10.0	1,093	455	0	0.0	0	0
9/14/2020	0	0.0	0	0	0	0.0	0	0
9/15/2020	879,336	14.0	1,047	611	0	0.0	0	0
9/16/2020	0	0.0	0	0	0	0.0	0	0
9/17/2020	911,944	15.0	1,013	633	0	0.0	0	0
9/18/2020	0	0.0	0	0	0	0.0	0	0
9/19/2020	917,485	15.0	1,019	637	0	0.0	0	0
9/20/2020	657,811	10.0	1,096	457	0	0.0	0	0
9/21/2020	0	0.0	0	0	0	0.0	0	0
9/22/2020	923,340	15.0	1,026	641	0	0.0	0	0
9/23/2020	0	0.0	0	0	0	0.0	0	0
9/24/2020	935,232	15.0	1,039	649	0	0.0	0	0
9/25/2020	0	0.0	0	0	0	0.0	0	0
9/26/2020	923,500	16.0	962	641	0	0.0	0	0
9/27/2020	740,823	12.0	1,029	514	0	0.0	0	0
9/28/2020	0	0.0	0	0	0	0.0	0	0
9/29/2020	910,536	15.0	1,012	632	0	0.0	0	0
9/30/2020	0	0.0	0	0	0	0.0	0	0
10/1/2020	0	0.0	0	0	0	0.0	0	0
10/2/2020	0	0.0	0	0	0	0.0	0	0
10/3/2020	0	0.0	0	0	0	0.0	0	0
10/4/2020	0	0.0	0	0	0	0.0	0	0
10/5/2020	0	0.0	0	0	0	0.0	0	0
10/6/2020	0	0.0	0	0	0	0.0	0	0
10/7/2020	0	0.0	0	0	0	0.0	0	0
10/8/2020	0	0.0	0	0	0	0.0	0	0
10/9/2020	0	0.0	0	0	0	0.0	0	0
10/10/2020	0	0.0	0	0	0	0.0	0	0
10/11/2020	0	0.0	0	0	0	0.0	0	0
10/12/2020	0	0.0	0	0	0	0.0	0	0
10/13/2020	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
10/14/2020	0	0.0	0	0	0	0.0	0	0
10/15/2020	0	0.0	0	0	0	0.0	0	0
10/16/2020	0	0.0	0	0	0	0.0	0	0
10/17/2020	0	0.0	0	0	0	0.0	0	0
10/18/2020	0	0.0	0	0	0	0.0	0	0
10/19/2020	0	0.0	0	0	0	0.0	0	0
10/20/2020	0	0.0	0	0	0	0.0	0	0
10/21/2020	0	0.0	0	0	0	0.0	0	0
10/22/2020	0	0.0	0	0	0	0.0	0	0
10/23/2020	0	0.0	0	0	0	0.0	0	0
10/24/2020	0	0.0	0	0	0	0.0	0	0
10/25/2020	0	0.0	0	0	0	0.0	0	0
10/26/2020	0	0.0	0	0	0	0.0	0	0
10/27/2020	0	0.0	0	0	0	0.0	0	0
10/28/2020	0	0.0	0	0	0	0.0	0	0
10/29/2020	0	0.0	0	0	0	0.0	0	0
10/30/2020	0	0.0	0	0	0	0.0	0	0
10/31/2020	0	0.0	0	0	0	0.0	0	0
11/1/2020	470,688	7.0	1,121	327	0	0.0	0	0
11/2/2020	0	0.0	0	0	0	0.0	0	0
11/3/2020	545,232	9.0	1,010	379	0	0.0	0	0
11/4/2020	0	0.0	0	0	0	0.0	0	0
11/5/2020	767,869	12.0	1,066	533	0	0.0	0	0
11/6/2020	0	0.0	0	0	0	0.0	0	0
11/7/2020	947,265	16.0	987	658	0	0.0	0	0
11/8/2020	484,828	8.0	1,010	337	0	0.0	0	0
11/9/2020	0	0.0	0	0	0	0.0	0	0
11/10/2020	689,569	11.0	1,045	479	0	0.0	0	0
11/11/2020	0	0.0	0	0	0	0.0	0	0
11/12/2020	537,551	9.0	995	373	0	0.0	0	0
11/13/2020	0	0.0	0	0	0	0.0	0	0
11/14/2020	854,554	14.0	1,017	593	0	0.0	0	0
11/15/2020	78,176	1.0	1,303	54	0	0.0	0	0
11/16/2020	747,303	12.0	1,038	519	0	0.0	0	0
11/17/2020	857,105	14.0	1,020	595	0	0.0	0	0
11/18/2020	234,856	4.0	979	163	0	0.0	0	0
11/19/2020	610,748	10.0	1,018	424	0	0.0	0	0
11/20/2020	0	0.0	0	0	0	0.0	0	0
11/21/2020	675,250	20.0	563	469	0	0.0	0	0
11/22/2020	425,336	9.0	788	295	0	0.0	0	0
11/23/2020	0	0.0	0	0	0	0.0	0	0
11/24/2020	763,928	12.0	1,061	531	0	0.0	0	0
11/25/2020	0	0.0	0	0	0	0.0	0	0
11/26/2020	683,311	11.0	1,035	475	0	0.0	0	0
11/27/2020	0	0.0	0	0	0	0.0	0	0
11/28/2020	622,099	11.0	943	432	0	0.0	0	0
11/29/2020	579,586	9.0	1,073	402	0	0.0	0	0
11/30/2020	0	0.0	0	0	0	0.0	0	0
12/1/2020	711,413	12.0	988	494	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
12/2/2020	0	0.0	0	0	0	0.0	0	0
12/3/2020	713,252	11.0	1,081	495	0	0.0	0	0
12/4/2020	0	0.0	0	0	0	0.0	0	0
12/5/2020	624,898	10.0	1,041	434	0	0.0	0	0
12/6/2020	546,430	9.0	1,012	379	0	0.0	0	0
12/7/2020	0	0.0	0	0	0	0.0	0	0
12/8/2020	702,243	12.0	975	488	0	0.0	0	0
12/9/2020	0	0.0	0	0	0	0.0	0	0
12/10/2020	675,472	11.0	1,023	469	0	0.0	0	0
12/11/2020	0	0.0	0	0	0	0.0	0	0
12/12/2020	683,309	11.0	1,035	475	0	0.0	0	0
12/13/2020	598,895	9.0	1,109	416	0	0.0	0	0
12/14/2020	0	0.0	0	0	0	0.0	0	0
12/15/2020	671,980	11.0	1,018	467	0	0.0	0	0
12/16/2020	0	0.0	0	0	0	0.0	0	0
12/17/2020	674,652	11.0	1,022	469	0	0.0	0	0
12/18/2020	0	0.0	0	0	0	0.0	0	0
12/19/2020	696,264	11.0	1,055	484	0	0.0	0	0
12/20/2020	518,391	9.0	960	360	0	0.0	0	0
12/21/2020	0	0.0	0	0	0	0.0	0	0
12/22/2020	644,380	10.0	1,074	447	0	0.0	0	0
12/23/2020	0	0.0	0	0	0	0.0	0	0
12/24/2020	652,194	11.0	988	453	0	0.0	0	0
12/25/2020	0	0.0	0	0	0	0.0	0	0
12/26/2020	525,075	8.0	1,094	365	0	0.0	0	0
12/27/2020	550,543	9.0	1,020	382	0	0.0	0	0
12/28/2020	0	0.0	0	0	0	0.0	0	0
12/29/2020	578,803	9.0	1,072	402	0	0.0	0	0
12/30/2020	0	0.0	0	0	0	0.0	0	0
12/31/2020	668,852	11.0	1,013	464	0	0.0	0	0
1/1/2021	0	0.0	0	0	0	0.0	0	0
1/2/2021	495,249	8.0	1,032	344	0	0.0	0	0
1/3/2021	535,993	9.0	993	372	0	0.0	0	0
1/4/2021	0	0.0	0	0	0	0.0	0	0
1/5/2021	564,209	8.0	1,175	392	0	0.0	0	0
1/6/2021	0	0.0	0	0	0	0.0	0	0
1/7/2021	0	0.0	0	0	554,921	7.0	1,321	385
1/8/2021	0	0.0	0	0	0	0.0	0	0
1/9/2021	677,898	11.0	1,027	471	0	0.0	0	0
1/10/2021	0	0.0	0	0	525,059	7.0	1,250	365
1/11/2021	0	0.0	0	0	0	0.0	0	0
1/12/2021	708,710	11.0	1,074	492	0	0.0	0	0
1/13/2021	0	0.0	0	0	0	0.0	0	0
1/14/2021	0	0.0	0	0	638,811	8.0	1,331	444
1/15/2021	0	0.0	0	0	0	0.0	0	0
1/16/2021	712,173	11.0	1,079	495	0	0.0	0	0
1/17/2021	0	0.0	0	0	558,760	7.0	1,330	388
1/18/2021	0	0.0	0	0	0	0.0	0	0
1/19/2021	687,308	12.0	955	477	0	0.0	0	0
1/20/2021	0	0.0	0	0	0	0.0	0	0
1/21/2021	0	0.0	0	0	591,837	7.0	1,409	411
1/22/2021	0	0.0	0	0	0	0.0	0	0
1/23/2021	622,796	10.0	1,038	432	0	0.0	0	0
1/24/2021	0	0.0	0	0	521,066	7.0	1,241	362
1/25/2021	0	0.0	0	0	0	0.0	0	0
1/26/2021	810,755	12.0	1,126	563	0	0.0	0	0
1/27/2021	0	0.0	0	0	0	0.0	0	0
1/28/2021	0	0.0	0	0	782,429	9.0	1,449	543

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
1/29/2021	0	0.0	0	0	0	0.0	0	0
1/30/2021	800,783	13.0	1,027	556	0	0.0	0	0
1/31/2021	0	0.0	0	0	584,564	7.0	1,392	406
2/1/2021	0	0.0	0	0	0	0.0	0	0
2/2/2021	750,326	12.0	1,042	521	0	0.0	0	0
2/3/2021	0	0.0	0	0	0	0.0	0	0
2/4/2021	0	0.0	0	0	882,189	11.0	1,337	613
2/5/2021	0	0.0	0	0	0	0.0	0	0
2/6/2021	917,497	14.0	1,092	637	0	0.0	0	0
2/7/2021	0	0.0	0	0	581,120	7.0	1,384	404
2/8/2021	0	0.0	0	0	0	0.0	0	0
2/9/2021	988,833	16.0	1,030	687	0	0.0	0	0
2/10/2021	0	0.0	0	0	0	0.0	0	0
2/11/2021	0	0.0	0	0	848,322	11.0	1,285	589
2/12/2021	0	0.0	0	0	0	0.0	0	0
2/13/2021	805,025	13.0	1,032	559	0	0.0	0	0
2/14/2021	0	0.0	0	0	554,722	7.0	1,321	385
2/15/2021	0	0.0	0	0	0	0.0	0	0
2/16/2021	849,426	13.0	1,089	590	0	0.0	0	0
2/17/2021	0	0.0	0	0	0	0.0	0	0
2/18/2021	0	0.0	0	0	963,379	12.0	1,338	669
2/19/2021	0	0.0	0	0	0	0.0	0	0
2/20/2021	925,758	15.0	1,029	643	0	0.0	0	0
2/21/2021	0	0.0	0	0	679,409	8.0	1,415	472
2/22/2021	0	0.0	0	0	0	0.0	0	0
2/23/2021	979,833	15.0	1,089	680	0	0.0	0	0
2/24/2021	0	0.0	0	0	0	0.0	0	0
2/25/2021	0	0.0	0	0	1,106,790	14.0	1,318	769
2/26/2021	0	0.0	0	0	0	0.0	0	0
2/27/2021	1,049,600	17.0	1,029	729	0	0.0	0	0
2/28/2021	0	0.0	0	0	679,798	8.0	1,416	472
3/1/2021	0	0.0	0	0	0	0.0	0	0
3/2/2021	1,026,469	16.0	1,069	713	0	0.0	0	0
3/3/2021	0	0.0	0	0	0	0.0	0	0
3/4/2021	0	0.0	0	0	969,179	12.0	1,346	673
3/5/2021	0	0.0	0	0	0	0.0	0	0
3/6/2021	989,063	16.0	1,030	687	0	0.0	0	0
3/7/2021	0	0.0	0	0	672,209	9.0	1,245	467
3/8/2021	0	0.0	0	0	0	0.0	0	0
3/9/2021	1,052,389	16.0	1,096	731	0	0.0	0	0
3/10/2021	0	0.0	0	0	0	0.0	0	0
3/11/2021	0	0.0	0	0	1,049,958	13.0	1,346	729
3/12/2021	0	0.0	0	0	0	0.0	0	0
3/13/2021	783,469	13.0	1,004	544	0	0.0	0	0
3/14/2021	0	0.0	0	0	482,489	6.0	1,340	335
3/15/2021	0	0.0	0	0	0	0.0	0	0
3/16/2021	740,015	11.0	1,121	514	0	0.0	0	0
3/17/2021	0	0.0	0	0	0	0.0	0	0
3/18/2021	0	0.0	0	0	691,199	8.0	1,440	480
3/19/2021	0	0.0	0	0	0	0.0	0	0
3/20/2021	780,292	13.0	1,000	542	0	0.0	0	0
3/21/2021	0	0.0	0	0	635,226	8.0	1,323	441
3/22/2021	0	0.0	0	0	0	0.0	0	0
3/23/2021	847,617	13.0	1,087	589	0	0.0	0	0
3/24/2021	0	0.0	0	0	0	0.0	0	0
3/25/2021	0	0.0	0	0	691,951	8.0	1,442	481
3/26/2021	0	0.0	0	0	0	0.0	0	0
3/27/2021	673,384	11.0	1,020	468	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
3/28/2021	0	0.0	0	0	521,942	7.0	1,243	362
3/29/2021	0	0.0	0	0	0	0.0	0	0
3/30/2021	884,138	14.0	1,053	614	0	0.0	0	0
3/31/2021	0	0.0	0	0	0	0.0	0	0
4/1/2021	0	0.0	0	0	701,317	9.0	1,299	487
4/2/2021	0	0.0	0	0	0	0.0	0	0
4/3/2021	804,876	12.0	1,118	559	0	0.0	0	0
4/4/2021	0	0.0	0	0	576,935	7.0	1,374	401
4/5/2021	0	0.0	0	0	0	0.0	0	0
4/6/2021	879,584	14.0	1,047	611	0	0.0	0	0
4/7/2021	0	0.0	0	0	0	0.0	0	0
4/8/2021	0	0.0	0	0	832,287	10.0	1,387	578
4/9/2021	0	0.0	0	0	0	0.0	0	0
4/10/2021	982,881	15.0	1,092	683	0	0.0	0	0
4/11/2021	0	0.0	0	0	541,340	7.0	1,289	376
4/12/2021	0	0.0	0	0	0	0.0	0	0
4/13/2021	947,784	15.0	1,053	658	0	0.0	0	0
4/14/2021	0	0.0	0	0	0	0.0	0	0
4/15/2021	0	0.0	0	0	858,207	10.0	1,430	596
4/16/2021	0	0.0	0	0	0	0.0	0	0
4/17/2021	780,080	13.0	1,000	542	0	0.0	0	0
4/18/2021	0	0.0	0	0	588,149	7.0	1,400	408
4/19/2021	0	0.0	0	0	0	0.0	0	0
4/20/2021	917,764	14.0	1,093	637	0	0.0	0	0
4/21/2021	0	0.0	0	0	0	0.0	0	0
4/22/2021	0	0.0	0	0	765,917	10.0	1,277	532
4/23/2021	0	0.0	0	0	0	0.0	0	0
4/24/2021	912,886	14.0	1,087	634	0	0.0	0	0
4/25/2021	0	0.0	0	0	533,542	6.0	1,482	371
4/26/2021	0	0.0	0	0	0	0.0	0	0
4/27/2021	937,251	15.0	1,041	651	0	0.0	0	0
4/28/2021	0	0.0	0	0	0	0.0	0	0
4/29/2021	0	0.0	0	0	802,465	10.0	1,337	557
4/30/2021	0	0.0	0	0	0	0.0	0	0
5/1/2021	762,964	12.0	1,060	530	0	0.0	0	0
5/2/2021	0	0.0	0	0	544,880	7.0	1,297	378
5/3/2021	0	0.0	0	0	0	0.0	0	0
5/4/2021	950,418	15.0	1,056	660	0	0.0	0	0
5/5/2021	0	0.0	0	0	0	0.0	0	0
5/6/2021	0	0.0	0	0	883,733	10.0	1,473	614
5/7/2021	0	0.0	0	0	0	0.0	0	0
5/8/2021	830,552	13.0	1,065	577	0	0.0	0	0
5/9/2021	0	0.0	0	0	533,335	6.0	1,481	370
5/10/2021	0	0.0	0	0	0	0.0	0	0
5/11/2021	880,068	14.0	1,048	611	0	0.0	0	0
5/12/2021	0	0.0	0	0	0	0.0	0	0
5/13/2021	0	0.0	0	0	829,674	10.0	1,383	576
5/14/2021	0	0.0	0	0	0	0.0	0	0
5/15/2021	915,732	14.0	1,090	636	0	0.0	0	0
5/16/2021	0	0.0	0	0	608,463	8.0	1,268	423
5/17/2021	0	0.0	0	0	0	0.0	0	0
5/18/2021	1,057,414	17.0	1,037	734	0	0.0	0	0
5/19/2021	0	0.0	0	0	0	0.0	0	0
5/20/2021	0	0.0	0	0	1,025,734	13.0	1,315	712
5/21/2021	0	0.0	0	0	0	0.0	0	0
5/22/2021	1,017,998	16.0	1,060	707	0	0.0	0	0
5/23/2021	0	0.0	0	0	571,235	7.0	1,360	397
5/24/2021	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
5/25/2021	1,095,356	17.0	1,074	761	0	0.0	0	0
5/26/2021	0	0.0	0	0	0	0.0	0	0
5/27/2021	0	0.0	0	0	846,441	10.0	1,411	588
5/28/2021	0	0.0	0	0	0	0.0	0	0
5/29/2021	728,369	11.0	1,104	506	0	0.0	0	0
5/30/2021	0	0.0	0	0	643,090	8.0	1,340	447
5/31/2021	0	0.0	0	0	0	0.0	0	0
6/1/2021	1,066,437	17.0	1,046	741	0	0.0	0	0
6/2/2021	0	0.0	0	0	0	0.0	0	0
6/3/2021	0	0.0	0	0	870,924	11.0	1,320	605
6/4/2021	0	0.0	0	0	0	0.0	0	0
6/5/2021	896,734	14.0	1,068	623	0	0.0	0	0
6/6/2021	0	0.0	0	0	573,540	7.0	1,366	398
6/7/2021	0	0.0	0	0	0	0.0	0	0
6/8/2021	835,068	13.0	1,071	580	0	0.0	0	0
6/9/2021	0	0.0	0	0	0	0.0	0	0
6/10/2021	0	0.0	0	0	878,292	10.0	1,464	610
6/11/2021	0	0.0	0	0	0	0.0	0	0
6/12/2021	775,819	12.0	1,078	539	0	0.0	0	0
6/13/2021	0	0.0	0	0	591,626	8.0	1,233	411
6/14/2021	0	0.0	0	0	0	0.0	0	0
6/15/2021	914,724	15.0	1,016	635	0	0.0	0	0
6/16/2021	0	0.0	0	0	0	0.0	0	0
6/17/2021	0	0.0	0	0	888,193	11.0	1,346	617
6/18/2021	0	0.0	0	0	0	0.0	0	0
6/19/2021	788,700	12.0	1,095	548	0	0.0	0	0
6/20/2021	0	0.0	0	0	514,746	6.0	1,430	357
6/21/2021	0	0.0	0	0	0	0.0	0	0
6/22/2021	874,919	14.0	1,042	608	0	0.0	0	0
6/23/2021	0	0.0	0	0	0	0.0	0	0
6/24/2021	0	0.0	0	0	797,406	10.0	1,329	554
6/25/2021	0	0.0	0	0	0	0.0	0	0
6/26/2021	815,112	13.0	1,045	566	0	0.0	0	0
6/27/2021	0	0.0	0	0	597,419	7.0	1,422	415
6/28/2021	0	0.0	0	0	0	0.0	0	0
6/29/2021	1,101,148	18.0	1,020	765	0	0.0	0	0
6/30/2021	0	0.0	0	0	0	0.0	0	0
7/1/2021	0	0.0	0	0	824,989	14.0	982	573
7/2/2021	0	0.0	0	0	0	0.0	0	0
7/3/2021	835,290	13.0	1,071	580	0	0.0	0	0
7/4/2021	0	0.0	0	0	564,899	7.0	1,345	392
7/5/2021	0	0.0	0	0	0	0.0	0	0
7/6/2021	779,226	12.0	1,082	541	0	0.0	0	0
7/7/2021	0	0.0	0	0	0	0.0	0	0
7/8/2021	0	0.0	0	0	617,537	7.0	1,470	429
7/9/2021	0	0.0	0	0	0	0.0	0	0
7/10/2021	1,069,646	17.0	1,049	743	0	0.0	0	0
7/11/2021	0	0.0	0	0	587,533	9.0	1,088	408
7/12/2021	0	0.0	0	0	0	0.0	0	0
7/13/2021	1,079,754	17.0	1,059	750	0	0.0	0	0
7/14/2021	0	0.0	0	0	0	0.0	0	0
7/15/2021	0	0.0	0	0	808,540	10.0	1,348	561
7/16/2021	0	0.0	0	0	0	0.0	0	0
7/17/2021	563,671	11.0	854	391	0	0.0	0	0
7/18/2021	0	0.0	0	0	462,865	6.0	1,286	321
7/19/2021	0	0.0	0	0	0	0.0	0	0
7/20/2021	858,214	13.0	1,100	596	0	0.0	0	0
7/21/2021	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
7/22/2021	0	0.0	0	0	718,993	9.0	1,331	499
7/23/2021	0	0.0	0	0	0	0.0	0	0
7/24/2021	665,551	11.0	1,008	462	0	0.0	0	0
7/25/2021	0	0.0	0	0	584,770	7.0	1,392	406
7/26/2021	0	0.0	0	0	0	0.0	0	0
7/27/2021	881,509	14.0	1,049	612	0	0.0	0	0
7/28/2021	0	0.0	0	0	0	0.0	0	0
7/29/2021	0	0.0	0	0	715,276	9.0	1,325	497
7/30/2021	0	0.0	0	0	0	0.0	0	0
7/31/2021	911,737	14.0	1,085	633	0	0.0	0	0
8/1/2021	0	0.0	0	0	523,960	6.0	1,455	364
8/2/2021	0	0.0	0	0	0	0.0	0	0
8/3/2021	836,711	13.0	1,073	581	0	0.0	0	0
8/4/2021	0	0.0	0	0	0	0.0	0	0
8/5/2021	0	0.0	0	0	828,426	10.0	1,381	575
8/6/2021	0	0.0	0	0	0	0.0	0	0
8/7/2021	874,941	14.0	1,042	608	0	0.0	0	0
8/8/2021	0	0.0	0	0	550,562	7.0	1,311	382
8/9/2021	0	0.0	0	0	0	0.0	0	0
8/10/2021	1,013,719	16.0	1,056	704	0	0.0	0	0
8/11/2021	0	0.0	0	0	0	0.0	0	0
8/12/2021	0	0.0	0	0	831,438	11.0	1,260	577
8/13/2021	0	0.0	0	0	0	0.0	0	0
8/14/2021	932,475	15.0	1,036	648	0	0.0	0	0
8/15/2021	0	0.0	0	0	587,795	7.0	1,400	408
8/16/2021	0	0.0	0	0	0	0.0	0	0
8/17/2021	933,599	15.0	1,037	648	0	0.0	0	0
8/18/2021	0	0.0	0	0	0	0.0	0	0
8/19/2021	0	0.0	0	0	730,139	9.0	1,352	507
8/20/2021	0	0.0	0	0	0	0.0	0	0
8/21/2021	738,301	11.0	1,119	513	0	0.0	0	0
8/22/2021	0	0.0	0	0	544,936	7.0	1,297	378
8/23/2021	0	0.0	0	0	0	0.0	0	0
8/24/2021	940,853	15.0	1,045	653	0	0.0	0	0
8/25/2021	0	0.0	0	0	0	0.0	0	0
8/26/2021	0	0.0	0	0	758,774	9.0	1,405	527
8/27/2021	0	0.0	0	0	0	0.0	0	0
8/28/2021	844,026	14.0	1,005	586	0	0.0	0	0
8/29/2021	0	0.0	0	0	566,946	7.0	1,350	394
8/30/2021	0	0.0	0	0	0	0.0	0	0
8/31/2021	971,975	15.0	1,080	675	0	0.0	0	0
9/1/2021	0	0.0	0	0	0	0.0	0	0
9/2/2021	0	0.0	0	0	711,940	9.0	1,318	494
9/3/2021	0	0.0	0	0	0	0.0	0	0
9/4/2021	836,559	13.0	1,073	581	0	0.0	0	0
9/5/2021	0	0.0	0	0	558,949	7.0	1,331	388
9/6/2021	0	0.0	0	0	0	0.0	0	0
9/7/2021	1,031,938	16.0	1,075	717	0	0.0	0	0
9/8/2021	0	0.0	0	0	0	0.0	0	0
9/9/2021	0	0.0	0	0	784,545	9.0	1,453	545
9/10/2021	0	0.0	0	0	0	0.0	0	0
9/11/2021	920,692	14.0	1,096	639	0	0.0	0	0
9/12/2021	0	0.0	0	0	571,942	7.0	1,362	397
9/13/2021	0	0.0	0	0	0	0.0	0	0
9/14/2021	1,048,038	17.0	1,027	728	0	0.0	0	0
9/15/2021	0	0.0	0	0	0	0.0	0	0
9/16/2021	0	0.0	0	0	788,746	10.0	1,315	548
9/17/2021	0	0.0	0	0	0	0.0	0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
9/18/2021	992,778	15.0	1,103	689	0	0.0	0	0
9/19/2021	0	0.0	0	0	599,104	7.0	1,426	416
9/20/2021	0	0.0	0	0	0	0.0	0	0
9/21/2021	972,192	16.0	1,013	675	0	0.0	0	0
9/22/2021	0	0.0	0	0	0	0.0	0	0
9/23/2021	0	0.0	0	0	826,935	11.0	1,253	574
9/24/2021	0	0.0	0	0	0	0.0	0	0
9/25/2021	1,059,440	16.0	1,104	736	0	0.0	0	0
9/26/2021	0	0.0	0	0	566,592	7.0	1,349	393
9/27/2021	0	0.0	0	0	0	0.0	0	0
9/28/2021	957,656	15.0	1,064	665	0	0.0	0	0
9/29/2021	0	0.0	0	0	0	0.0	0	0
9/30/2021	0	0.0	0	0	867,999	10.0	1,447	603
10/1/2021	0	0.0	0	0	0	0.0	0	0
10/2/2021	939,132	15.0	1,043	652	0	0.0	0	0
10/3/2021	0	0.0	0	0	553,201	7.0	1,317	384
10/4/2021	0	0.0	0	0	0	0.0	0	0
10/5/2021	1,000,613	16.0	1,042	695	0	0.0	0	0
10/6/2021	0	0.0	0	0	0	0.0	0	0
10/7/2021	0	0.0	0	0	838,276	10.0	1,397	582
10/8/2021	0	0.0	0	0	0	0.0	0	0
10/9/2021	772,258	12.0	1,073	536	0	0.0	0	0
10/10/2021	0	0.0	0	0	532,370	7.0	1,268	370
10/11/2021	0	0.0	0	0	0	0.0	0	0
10/12/2021	918,087	14.0	1,093	638	0	0.0	0	0
10/13/2021	0	0.0	0	0	0	0.0	0	0
10/14/2021	0	0.0	0	0	701,300	9.0	1,299	487
10/15/2021	0	0.0	0	0	0	0.0	0	0
10/16/2021	685,709	11.0	1,039	476	0	0.0	0	0
10/17/2021	0	0.0	0	0	567,152	7.0	1,350	394
10/18/2021	0	0.0	0	0	0	0.0	0	0
10/19/2021	786,841	13.0	1,009	546	0	0.0	0	0
10/20/2021	0	0.0	0	0	0	0.0	0	0
10/21/2021	0	0.0	0	0	822,203	9.0	1,523	571
10/22/2021	0	0.0	0	0	0	0.0	0	0
10/23/2021	690,143	10.0	1,150	479	0	0.0	0	0
10/24/2021	0	0.0	0	0	585,200	8.0	1,219	406
10/25/2021	315,434	5.0	1,051	219	0	0.0	0	0
10/26/2021	646,153	11.0	979	449	0	0.0	0	0
10/27/2021	0	0.0	0	0	0	0.0	0	0
10/28/2021	0	0.0	0	0	665,476	8.0	1,386	462
10/29/2021	0	0.0	0	0	0	0.0	0	0
10/30/2021	601,824	9.0	1,114	418	0	0.0	0	0
10/31/2021	0	0.0	0	0	493,391	6.0	1,371	343
11/1/2021	0	0.0	0	0	0	0.0	0	0
11/2/2021	738,013	20.0	615	513	0	0.0	0	0
11/3/2021	0	0.0	0	0	0	0.0	0	0
11/4/2021	0	0.0	0	0	549,700	7.0	1,309	382
11/5/2021	0	0.0	0	0	0	0.0	0	0
11/6/2021	624,706	9.0	1,157	434	0	0.0	0	0
11/7/2021	0	0.0	0	0	518,118	6.0	1,439	360
11/8/2021	0	0.0	0	0	0	0.0	0	0
11/9/2021	708,583	11.0	1,074	492	0	0.0	0	0
11/10/2021	0	0.0	0	0	0	0.0	0	0
11/11/2021	0	0.0	0	0	676,964	9.0	1,254	470
11/12/2021	0	0.0	0	0	0	0.0	0	0
11/13/2021	532,810	9.0	987	370	0	0.0	0	0
11/14/2021	0	0.0	0	0	567,797	6.0	1,577	394

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
11/15/2021	0	0.0	0	0	0	0.0	0	0
11/16/2021	729,830	11.0	1,106	507	0	0.0	0	0
11/17/2021	0	0.0	0	0	0	0.0	0	0
11/18/2021	0	0.0	0	0	656,054	8.0	1,367	456
11/19/2021	0	0.0	0	0	0	0.0	0	0
11/20/2021	579,004	9.0	1,072	402	0	0.0	0	0
11/21/2021	0	0.0	0	0	621,532	8.0	1,295	432
11/22/2021	0	0.0	0	0	0	0.0	0	0
11/23/2021	669,014	11.0	1,014	465	0	0.0	0	0
11/24/2021	0	0.0	0	0	0	0.0	0	0
11/25/2021	0	0.0	0	0	560,209	7.0	1,334	389
11/26/2021	0	0.0	0	0	0	0.0	0	0
11/27/2021	605,568	9.0	1,121	421	0	0.0	0	0
11/28/2021	0	0.0	0	0	689,430	8.0	1,436	479
11/29/2021	0	0.0	0	0	0	0.0	0	0
11/30/2021	851,583	13.0	1,092	591	0	0.0	0	0
12/1/2021	0	0.0	0	0	0	0.0	0	0
12/2/2021	0	0.0	0	0	998,369	12.0	1,387	693
12/3/2021	0	0.0	0	0	0	0.0	0	0
12/4/2021	1,030,697	16.0	1,074	716	0	0.0	0	0
12/5/2021	0	0.0	0	0	621,799	8.0	1,295	432
12/6/2021	0	0.0	0	0	0	0.0	0	0
12/7/2021	922,500	14.0	1,098	641	0	0.0	0	0
12/8/2021	465,759	8.0	970	323	0	0.0	0	0
12/9/2021	0	0.0	0	0	832,761	10.0	1,388	578
12/10/2021	0	0.0	0	0	0	0.0	0	0
12/11/2021	883,384	13.0	1,133	613	0	0.0	0	0
12/12/2021	0	0.0	0	0	626,120	8.0	1,304	435
12/13/2021	0	0.0	0	0	0	0.0	0	0
12/14/2021	1,028,435	16.0	1,071	714	0	0.0	0	0
12/15/2021	0	0.0	0	0	0	0.0	0	0
12/16/2021	0	0.0	0	0	800,957	10.0	1,335	556
12/17/2021	0	0.0	0	0	0	0.0	0	0
12/18/2021	593,884	10.0	990	412	0	0.0	0	0
12/19/2021	0	0.0	0	0	483,246	6.0	1,342	336
12/20/2021	0	0.0	0	0	0	0.0	0	0
12/21/2021	725,417	11.0	1,099	504	0	0.0	0	0
12/22/2021	0	0.0	0	0	0	0.0	0	0
12/23/2021	0	0.0	0	0	650,734	8.0	1,356	452
12/24/2021	0	0.0	0	0	0	0.0	0	0
12/25/2021	432,447	7.0	1,030	300	0	0.0	0	0
12/26/2021	0	0.0	0	0	490,054	6.0	1,361	340
12/27/2021	0	0.0	0	0	0	0.0	0	0
12/28/2021	820,400	13.0	1,052	570	0	0.0	0	0
12/29/2021	0	0.0	0	0	0	0.0	0	0
12/30/2021	0	0.0	0	0	666,630	9.0	1,235	463
12/31/2021	0	0.0	0	0	0	0.0	0	0
1/1/2022	509,398	8.0	1,061	354	0		0	0
1/2/2022	0		0	0	502,545	6.0	1,396	349
1/3/2022	0		0	0	0		0	0
1/4/2022	997,863	15.0	1,109	693	0		0	0
1/5/2022	0		0	0	0		0	0
1/6/2022	0		0	0	895,922	11.0	1,357	622
1/7/2022	0		0	0	0		0	0
1/8/2022	908,052	14.0	1,081	631	0		0	0
1/9/2022	0		0	0	516,503	6.0	1,435	359
1/10/2022	0		0	0	0		0	0
1/11/2022	1,007,379	16.0	1,049	700	0		0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
1/12/2022	0		0	0	0		0	0
1/13/2022	0		0	0	978,222	12.0	1,359	679
1/14/2022	0		0	0	0		0	0
1/15/2022	900,414	14.0	1,072	625	0		0	0
1/16/2022	0		0	0	769,317	9.0	1,425	534
1/17/2022	0		0	0	0		0	0
1/18/2022	1,050,485	16.0	1,094	730	0		0	0
1/19/2022	0		0	0	0		0	0
1/20/2022	0		0	0	1,013,867	13.0	1,300	704
1/21/2022	0		0	0	0		0	0
1/22/2022	1,125,516	18.0	1,042	782	0		0	0
1/23/2022	0		0	0	874,279	10.0	1,457	607
1/24/2022	0		0	0	0		0	0
1/25/2022	1,123,452	17.0	1,101	780	0		0	0
1/26/2022	0		0	0	0		0	0
1/27/2022	0		0	0	960,258	14.0	1,143	667
1/28/2022	0		0	0	0		0	0
1/29/2022	1,266,667	21.0	1,005	880	0		0	0
1/30/2022	0		0	0	754,434	9.0	1,397	524
1/31/2022	430,517	7.0	1,025	299	0		0	0
2/1/2022	874,140	15.0	971	607	0		0	0
2/2/2022	0		0	0	0		0	0
2/3/2022	0		0	0	982,193	12.0	1,364	682
2/4/2022	0		0	0	0		0	0
2/5/2022	956,806	15.0	1,063	664	0		0	0
2/6/2022	0		0	0	638,039	8.0	1,329	443
2/7/2022	0		0	0	0		0	0
2/8/2022	939,820	15.0	1,044	653	0		0	0
2/9/2022	0		0	0	0		0	0
2/10/2022	0		0	0	856,430	11.0	1,298	595
2/11/2022	0		0	0	0		0	0
2/12/2022	861,801	13.0	1,105	598	0		0	0
2/13/2022	0		0	0	580,035	7.0	1,381	403
2/14/2022	0		0	0	0		0	0
2/15/2022	850,216	13.0	1,090	590	0		0	0
2/16/2022	0		0	0	0		0	0
2/17/2022	0		0	0	904,556	11.0	1,371	628
2/18/2022	0		0	0	0		0	0
2/19/2022	784,362	13.0	1,006	545	0		0	0
2/20/2022	0		0	0	602,011	7.0	1,433	418
2/21/2022	0		0	0	0		0	0
2/22/2022	843,530	13.0	1,081	586	0		0	0
2/23/2022	0		0	0	0		0	0
2/24/2022	0		0	0	857,466	10.0	1,429	595
2/25/2022	0		0	0	0		0	0
2/26/2022	757,298	12.0	1,052	526	0		0	0
2/27/2022	0		0	0	565,077	7.0	1,345	392
2/28/2022	0		0	0	0		0	0
3/1/2022	951,278	15.0	1,057	661	0		0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
3/2/2022	0		0	0	0		0	0
3/3/2022	0		0	0	903,234	11.0	1,369	627
3/4/2022	0		0	0	0		0	0
3/5/2022	857,832	13.0	1,100	596	0		0	0
3/6/2022	0		0	0	603,199	8.0	1,257	419
3/7/2022	0		0	0	0		0	0
3/8/2022	778,200	12.0	1,081	540	0		0	0
3/9/2022	0		0	0	0		0	0
3/10/2022	0		0	0	770,698	9.0	1,427	535
3/11/2022	0		0	0	0		0	0
3/12/2022	711,491	11.0	1,078	494	0		0	0
3/13/2022	0		0	0	537,560	7.0	1,280	373
3/14/2022	0		0	0	0		0	0
3/15/2022	871,449	14.0	1,037	605	0		0	0
3/16/2022	0		0	0	0		0	0
3/17/2022	0		0	0	1,202,036	14.0	1,431	835
3/18/2022	0		0	0	0		0	0
3/19/2022	1,055,619	16.0	1,100	733	0		0	0
3/20/2022	0		0	0	936,357	12.0	1,300	650
3/21/2022	0		0	0	0		0	0
3/22/2022	115,877	18.0	107	80	0		0	0
3/23/2022	0		0	0	0		0	0
3/24/2022	0		0	0	1,101,082	13.0	1,412	765
3/25/2022	0		0	0	0		0	0
3/26/2022	1,093,916	17.0	1,072	760	0		0	0
3/27/2022	0		0	0	808,775	10.0	1,348	562
3/28/2022	0		0	0	0		0	0
3/29/2022	1,090,570	16.0	1,136	757	0		0	0
3/30/2022	0		0	0	0		0	0
3/31/2022	0		0	0	1,568,341	19.0	1,376	1,089
4/1/2022	0		0	0	0		0	0
4/2/2022	1,106,632	18.0	1,025	768	0		0	0
4/3/2022	0		0	0	1,394,729	17.0	1,367	969
4/4/2022	0		0	0	0		0	0
4/5/2022	1,538,743	23.0	1,115	1,069	0		0	0
4/6/2022	0		0	0	0		0	0
4/7/2022	0		0	0	1,414,189	17.0	1,386	982
4/8/2022	0		0	0	0		0	0
4/9/2022	1,139,055	18.0	1,055	791	0		0	0
4/10/2022	0		0	0	1,044,709	13.0	1,339	725
4/11/2022	0		0	0	0		0	0
4/12/2022	1,286,835	20.0	1,072	894	0		0	0
4/13/2022	0		0	0	0		0	0
4/14/2022	0		0	0	758,149	9.0	1,404	526
4/15/2022	0		0	0	0		0	0
4/16/2022	682,955	11.0	1,035	474	0		0	0
4/17/2022	0		0	0	507,384	6.0	1,409	352
4/18/2022	0		0	0	0		0	0
4/19/2022	766,389	12.0	1,064	532	0		0	0
4/20/2022	0		0	0	0		0	0
4/21/2022	0		0	0	716,616	9.0	1,327	498
4/22/2022	0		0	0	0		0	0
4/23/2022	634,795	10.0	1,058	441	0		0	0
4/24/2022	0		0	0	545,625	7.0	1,299	379
4/25/2022	0		0	0	0		0	0
4/26/2022	629,725	9.0	1,166	437	0		0	0
4/27/2022	0		0	0	0		0	0
4/28/2022	0		0	0	558,891	6.0	1,552	388

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
4/29/2022	0		0	0	0		0	0
4/30/2022	616,582	10.0	1,028	428	0		0	0
5/1/2022	0		0	0	503,685	7.0	1,199	350
5/2/2022	0		0	0	0		0	0
5/3/2022	632,799	10.0	1,055	439	0		0	0
5/4/2022	0		0	0	0		0	0
5/5/2022	0		0	0	611,619	7.0	1,456	425
5/6/2022	0		0	0	0		0	0
5/7/2022	669,916	10.0	1,117	465	0		0	0
5/8/2022	0		0	0	514,184	7.0	1,224	357
5/9/2022	0		0	0	0		0	0
5/10/2022	804,172	13.0	1,031	558	0		0	0
5/11/2022	0		0	0	0		0	0
5/12/2022	0		0	0	792,363	9.0	1,467	550
5/13/2022	0		0	0	0		0	0
5/14/2022	754,391	12.0	1,048	524	0		0	0
5/15/2022	0		0	0	554,486	7.0	1,320	385
5/16/2022	0		0	0	0		0	0
5/17/2022	594,337	9.0	1,101	413	0		0	0
5/18/2022	0		0	0	0		0	0
5/19/2022	0		0	0	590,824	8.0	1,231	410
5/20/2022	0		0	0	0		0	0
5/21/2022	695,928	11.0	1,054	483	0		0	0
5/22/2022	0		0	0	462,373	5.0	1,541	321
5/23/2022	0		0	0	0		0	0
5/24/2022	623,075	10.0	1,038	433	0		0	0
5/25/2022	0		0	0	0		0	0
5/26/2022	0		0	0	661,508	8.0	1,378	459
5/27/2022	0		0	0	0		0	0
5/28/2022	528,146	8.0	1,100	367	0		0	0
5/29/2022	0		0	0	493,575	6.0	1,371	343
5/30/2022	0		0	0	0		0	0
5/31/2022	747,983	12.0	1,039	519	0		0	0
6/1/2022	0		0	0	0		0	0
6/2/2022	0		0	0	637,608	8.0	1,328	443
6/3/2022	0		0	0	0		0	0
6/4/2022	768,996	12.0	1,068	534	0		0	0
6/5/2022	0		0	0	584,557	8.0	1,218	406
6/6/2022	0		0	0	0		0	0
6/7/2022	747,523	12.0	1,038	519	0		0	0
6/8/2022	0		0	0	0		0	0
6/9/2022	0		0	0	708,533	8.0	1,476	492
6/10/2022	0		0	0	0		0	0
6/11/2022	652,823	9.0	1,209	453	0		0	0
6/12/2022	0		0	0	473,956	6.0	1,317	329
6/13/2022	0		0	0	0		0	0
6/14/2022	662,160	11.0	1,003	460	0		0	0
6/15/2022	0		0	0	0		0	0
6/16/2022	0		0	0	631,129	8.0	1,315	438
6/17/2022	0		0	0	0		0	0
6/18/2022	653,126	11.0	990	454	0		0	0
6/19/2022	0		0	0	506,405	69.0	122	352
6/20/2022	0		0	0	0		0	0
6/21/2022	779,082	12.0	1,082	541	0		0	0
6/22/2022	0		0	0	0		0	0
6/23/2022	0		0	0	674,492	9.0	1,249	468
6/24/2022	0		0	0	0		0	0
6/25/2022	804,723	13.0	1,032	559	0		0	0

Table 2.1.A
Lime Hollow Rd Well Pumping Data
Town of Cortlandville, NY

	LH #2				LH #7			
	Gallons, total	hours	gpm, pumping	gpm, daily average	Gallons, total	hours	gpm, pumping	gpm, daily average
6/26/2022	0		0	0	474,216	6.0	1,317	329
6/27/2022	0		0	0	0		0	0
6/28/2022	647,532	10.0	1,079	450	0		0	0
6/29/2022	0		0	0	0		0	0
6/30/2022	0		0	0	693,710	8.0	1,445	482
7/1/2022	0		0	0	0		0	0
7/2/2022	661,215	11.0	1,002	459	0		0	0
7/3/2022	0		0	0	477,948	6.0	1,328	332
7/4/2022	0		0	0	0		0	0
7/5/2022	502,560	8.0	1,047	349	0		0	0
7/6/2022	0		0	0	0		0	0
7/7/2022	0		0	0	505,222	7.0	1,203	351
7/8/2022	0		0	0	0		0	0
7/9/2022	545,067	8.0	1,136	379	0		0	0
7/10/2022	0		0	0	485,858	6.0	1,350	337
7/11/2022	0		0	0	0		0	0
7/12/2022	681,086	11.0	1,032	473	0		0	0
7/13/2022	0		0	0	0		0	0
7/14/2022	0		0	0	715,699	9.0	1,325	497
7/15/2022	0		0	0	0		0	0
7/16/2022	813,963	13.0	1,044	565	0		0	0
7/17/2022	0		0	0	472,164	6.0	1,312	328
7/18/2022	0		0	0	0		0	0
7/19/2022	564,194	9.0	1,045	392	0		0	0
7/20/2022	0		0	0	0		0	0
7/21/2022	0		0	0	631,220	8.0	1,315	438
7/22/2022	0		0	0	0		0	0
7/23/2022	682,476	11.0	1,034	474	0		0	0
7/24/2022	0		0	0	489,084	6.0	1,359	340
7/25/2022	0		0	0	0		0	0
7/26/2022	563,281	9.0	1,043	391	0		0	0
7/27/2022	0		0	0	0		0	0
7/28/2022	0		0	0	715,156	9.0	1,324	497
7/29/2022	0		0	0	0		0	0
7/30/2022	723,397	11.0	1,096	502	0		0	0
7/31/2022	0		0	0	499,106	6.0	1,386	347

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	Projected Mine Pond Surface Elevation, ft amsl	MW-3S Groundwater Elevation, ft amsl	MW-4S Groundwater Elevation, ft amsl	Gradient between MW-3S and MW-4S	Distance from Mine Pond to North Marl Pond, ft	Gradient between Projected Mine Pond and North Marl Pond
2/5/2019	1173.8	1172.3	1169.0	0.0030	272	0.0087
2/6/2019	1173.8	1172.3	1169.1	0.0030	272	0.0086
2/7/2019	1173.9	1172.4	1169.2	0.0029	271	0.0085
2/8/2019	1174.1	1172.5	1169.4	0.0029	271	0.0087
2/9/2019	1174.2	1172.6	1169.5	0.0029	271	0.0088
2/10/2019	1174.4	1172.7	1169.6	0.0029	270	0.0092
2/11/2019	1174.5	1172.8	1169.7	0.0029	270	0.0092
2/12/2019	1174.7	1172.9	1169.7	0.0030	269	0.0097
2/13/2019	1174.8	1173.0	1169.8	0.0030	269	0.0097
2/14/2019	1174.8	1173.0	1169.7	0.0030	269	0.0098
2/15/2019	1174.8	1173.0	1169.7	0.0030	269	0.0097
2/16/2019	1174.7	1173.0	1169.7	0.0030	269	0.0094
2/17/2019	1174.7	1172.9	1169.6	0.0031	269	0.0096
2/18/2019	1174.6	1172.9	1169.6	0.0030	270	0.0094
2/19/2019	1174.5	1172.8	1169.5	0.0030	270	0.0094
2/20/2019	1174.5	1172.7	1169.4	0.0031	270	0.0096
2/21/2019	1174.4	1172.7	1169.4	0.0031	270	0.0094
2/22/2019	1174.3	1172.6	1169.2	0.0031	270	0.0094
2/23/2019	1174.2	1172.5	1169.1	0.0031	271	0.0094
2/24/2019	1174.2	1172.5	1169.1	0.0031	271	0.0095
2/25/2019	1174.1	1172.4	1169.0	0.0031	271	0.0094
2/26/2019	1173.9	1172.3	1168.9	0.0031	271	0.0091
2/27/2019	1173.9	1172.2	1168.9	0.0031	271	0.0093
2/28/2019	1173.8	1172.1	1168.8	0.0031	272	0.0092
3/1/2019	1173.7	1172.0	1168.7	0.0031	272	0.0092
3/2/2019	1173.6	1172.0	1168.7	0.0031	272	0.0091
3/3/2019	1173.5	1171.9	1168.6	0.0030	272	0.0090
3/4/2019	1173.4	1171.8	1168.5	0.0030	273	0.0089
3/5/2019	1173.3	1171.7	1168.4	0.0030	273	0.0089
3/6/2019	1173.2	1171.6	1168.4	0.0030	273	0.0089
3/7/2019	1173.1	1171.5	1168.2	0.0030	273	0.0089
3/8/2019	1172.9	1171.4	1168.1	0.0030	274	0.0086
3/9/2019	1172.8	1171.3	1168.1	0.0030	274	0.0086
3/10/2019	1172.8	1171.2	1168.0	0.0030	274	0.0088
3/11/2019	1172.7	1171.1	1168.0	0.0029	274	0.0087
3/12/2019	1172.6	1171.1	1167.9	0.0029	275	0.0086
3/13/2019	1172.5	1171.0	1167.8	0.0029	275	0.0085
3/14/2019	1172.4	1170.9	1167.9	0.0028	275	0.0083
3/15/2019	1172.4	1170.9	1167.9	0.0027	275	0.0083
3/16/2019	1172.3	1170.8	1167.9	0.0027	275	0.0081
3/17/2019	1172.3	1170.8	1167.9	0.0026	275	0.0082
3/18/2019	1172.3	1170.7	1167.9	0.0026	275	0.0083
3/19/2019	1172.2	1170.7	1167.9	0.0026	276	0.0081
3/20/2019	1172.2	1170.7	1167.8	0.0026	276	0.0082
3/21/2019	1172.2	1170.6	1167.8	0.0026	276	0.0083
3/22/2019	1172.2	1170.7	1167.9	0.0026	276	0.0081
3/23/2019	1172.1	1170.7	1167.9	0.0026	276	0.0078
3/24/2019	1172.1	1170.7	1167.9	0.0025	276	0.0078
3/25/2019	1172.1	1170.6	1167.9	0.0025	276	0.0078
3/26/2019	1172.1	1170.6	1167.8	0.0026	276	0.0080
3/27/2019	1172.1	1170.6	1167.8	0.0026	276	0.0081
3/28/2019	1172.1	1170.6	1167.8	0.0026	276	0.0081

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

3/29/2019	1172.1	1170.6	1167.8	0.0026	276	0.0081
3/30/2019	1172	1170.5	1167.8	0.0026	276	0.0078
3/31/2019	1172	1170.5	1167.8	0.0026	276	0.0079
4/1/2019	1172	1170.5	1167.8	0.0025	276	0.0079
4/2/2019	1172	1170.5	1167.8	0.0025	276	0.0079
4/3/2019	1172	1170.5	1167.8	0.0025	276	0.0079
4/4/2019	1171.9	1170.5	1167.7	0.0025	276	0.0077
4/5/2019	1171.9	1170.5	1167.8	0.0025	276	0.0077
4/6/2019	1171.9	1170.5	1167.8	0.0025	276	0.0077
4/7/2019	1171.8	1170.4	1167.7	0.0025	277	0.0075
4/8/2019	1171.9	1170.5	1167.8	0.0025	276	0.0077
4/9/2019	1171.8	1170.5	1167.7	0.0025	277	0.0074
4/10/2019	1171.8	1170.4	1167.7	0.0025	277	0.0075
4/11/2019	1171.8	1170.4	1167.7	0.0025	277	0.0076
4/12/2019	1171.7	1170.4	1167.7	0.0025	277	0.0073
4/13/2019	1171.7	1170.4	1167.7	0.0025	277	0.0073
4/14/2019	1171.7	1170.3	1167.6	0.0025	277	0.0075
4/15/2019	1171.7	1170.4	1167.7	0.0025	277	0.0072
4/16/2019	1171.7	1170.4	1167.7	0.0024	277	0.0072
4/17/2019	1171.7	1170.4	1167.8	0.0024	277	0.0072
4/18/2019	1171.7	1170.4	1167.8	0.0024	277	0.0071
4/19/2019	1171.7	1170.4	1167.8	0.0024	277	0.0070
4/20/2019	1171.8	1170.6	1167.9	0.0024	277	0.0069
4/21/2019	1171.8	1170.5	1167.9	0.0024	277	0.0069
4/22/2019	1171.9	1170.6	1168.0	0.0024	276	0.0071
4/23/2019	1172	1170.7	1168.0	0.0025	276	0.0073
4/24/2019	1172	1170.7	1168.0	0.0025	276	0.0072
4/25/2019	1172	1170.7	1168.0	0.0025	276	0.0071
4/26/2019	1172.1	1170.8	1168.1	0.0025	276	0.0073
4/27/2019	1172.2	1170.9	1168.1	0.0025	276	0.0074
4/28/2019	1172.2	1170.9	1168.1	0.0026	276	0.0074
4/29/2019	1172.2	1170.9	1168.1	0.0025	276	0.0073
4/30/2019	1172.3	1170.9	1168.1	0.0026	275	0.0076
5/1/2019	1172.3	1170.9	1168.1	0.0026	275	0.0076
5/2/2019	1172.3	1170.9	1168.1	0.0026	275	0.0075
5/3/2019	1172.4	1171.0	1168.1	0.0026	275	0.0078
5/4/2019	1172.4	1171.0	1168.2	0.0026	275	0.0078
5/5/2019	1172.3	1171.0	1168.1	0.0027	275	0.0076
5/6/2019	1172.3	1171.0	1168.1	0.0026	275	0.0075
5/7/2019	1172.3	1170.9	1168.1	0.0026	275	0.0075
5/8/2019	1172.3	1170.9	1168.1	0.0026	275	0.0076
5/9/2019	1172.3	1170.9	1168.1	0.0026	275	0.0076
5/10/2019	1172.3	1170.9	1168.2	0.0026	275	0.0075
5/11/2019	1172.3	1171.0	1168.2	0.0026	275	0.0074
5/12/2019	1172.3	1171.0	1168.2	0.0026	275	0.0074
5/13/2019	1172.4	1171.1	1168.3	0.0025	275	0.0074
5/14/2019	1172.5	1171.2	1168.6	0.0025	275	0.0071
5/15/2019	1172.6	1171.3	1168.7	0.0024	275	0.0070
5/16/2019	1172.7	1171.4	1168.8	0.0025	274	0.0071
5/17/2019	1172.8	1171.5	1168.8	0.0025	274	0.0071
5/18/2019	1173	1171.6	1168.9	0.0025	274	0.0077
5/19/2019	1173	1171.6	1168.9	0.0026	274	0.0075
5/20/2019	1173.1	1171.7	1168.9	0.0026	273	0.0076
5/21/2019	1173.2	1171.8	1168.8	0.0028	273	0.0079
5/22/2019	1173.2	1171.8	1168.8	0.0028	273	0.0079

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

5/23/2019	1173.2	1171.8	1168.8	0.0028	273	0.0078
5/24/2019	1173.3	1171.8	1168.8	0.0028	273	0.0081
5/25/2019	1173.3	1171.9	1168.8	0.0028	273	0.0081
5/26/2019	1173.3	1171.9	1168.8	0.0028	273	0.0081
5/27/2019	1173.3	1171.9	1168.8	0.0028	273	0.0081
5/28/2019	1173.3	1171.9	1168.8	0.0028	273	0.0080
5/29/2019	1173.3	1171.9	1168.8	0.0028	273	0.0080
5/30/2019	1173.2	1171.9	1168.8	0.0028	273	0.0077
5/31/2019	1173.2	1171.8	1168.8	0.0028	273	0.0078
6/1/2019	1173.2	1171.8	1168.7	0.0028	273	0.0079
6/2/2019	1173.1	1171.7	1168.6	0.0029	273	0.0079
6/3/2019	1173	1171.7	1168.6	0.0029	274	0.0077
6/4/2019	1173	1171.6	1168.5	0.0029	274	0.0079
6/5/2019	1172.9	1171.6	1168.5	0.0028	274	0.0076
6/6/2019	1172.9	1171.6	1168.5	0.0028	274	0.0077
6/7/2019	1172.8	1171.5	1168.5	0.0028	274	0.0075
6/8/2019	1172.7	1171.5	1168.5	0.0028	274	0.0073
6/9/2019	1172.6	1171.4	1168.4	0.0028	275	0.0072
6/10/2019	1172.6	1171.3	1168.4	0.0027	275	0.0074
6/11/2019	1172.5	1171.3	1168.3	0.0027	275	0.0072
6/12/2019	1172.4	1171.2	1168.2	0.0027	275	0.0072
6/13/2019	1172.3	1171.1	1168.1	0.0028	275	0.0072
6/14/2019	1172.2	1171.0	1168.0	0.0028	276	0.0071
6/15/2019	1172.1	1170.9	1167.9	0.0028	276	0.0071
6/16/2019	1172	1170.8	1167.8	0.0028	276	0.0071
6/17/2019	1172	1170.8	1167.8	0.0028	276	0.0071
6/18/2019	1171.9	1170.7	1167.7	0.0028	276	0.0070
6/19/2019	1171.9	1170.7	1167.7	0.0027	276	0.0071
6/20/2019	1171.8	1170.7	1167.7	0.0028	277	0.0069
6/21/2019	1171.8	1170.7	1167.7	0.0028	277	0.0068
6/22/2019	1171.8	1170.6	1167.6	0.0028	277	0.0070
6/23/2019	1171.7	1170.5	1167.5	0.0028	277	0.0070
6/24/2019	1171.7	1170.5	1167.5	0.0028	277	0.0071
6/25/2019	1171.7	1170.5	1167.4	0.0028	277	0.0073
6/26/2019	1171.6	1170.4	1167.4	0.0028	277	0.0071
6/27/2019	1171.5	1170.4	1167.4	0.0028	277	0.0069
6/28/2019	1171.5	1170.3	1167.4	0.0027	277	0.0070
6/29/2019	1171.5	1170.3	1167.3	0.0027	277	0.0071
6/30/2019	1171.4	1170.2	1167.2	0.0027	278	0.0071
7/1/2019	1171.3	1170.1	1167.2	0.0027	278	0.0069
7/2/2019	1171.3	1170.1	1167.2	0.0027	278	0.0071
7/3/2019	1171.2	1170.0	1167.1	0.0027	278	0.0069
7/4/2019	1171.1	1169.9	1167.1	0.0027	278	0.0068
7/5/2019	1171	1169.9	1167.0	0.0026	279	0.0067
7/6/2019	1171	1169.8	1167.0	0.0026	279	0.0069
7/7/2019	1170.9	1169.7	1166.9	0.0026	279	0.0069
7/8/2019	1170.8	1169.6	1166.9	0.0026	279	0.0068
7/9/2019	1170.7	1169.5	1166.8	0.0026	280	0.0067
7/10/2019	1170.6	1169.5	1166.7	0.0025	280	0.0066
7/11/2019	1170.5	1169.4	1166.6	0.0025	280	0.0066
7/12/2019	1170.4	1169.3	1166.6	0.0025	280	0.0064
7/13/2019	1170.3	1169.2	1166.5	0.0025	281	0.0064
7/14/2019	1170.2	1169.1	1166.4	0.0025	281	0.0065
7/15/2019	1170.1	1169.0	1166.4	0.0024	281	0.0064
7/16/2019	1170	1168.9	1166.3	0.0025	281	0.0062

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

7/17/2019	1169.9	1168.9	1166.3	0.0024	282	0.0060
7/18/2019	1169.8	1168.8	1166.3	0.0024	282	0.0058
7/19/2019	1169.8	1168.8	1166.2	0.0023	282	0.0060
7/20/2019	1169.7	1168.7	1166.2	0.0024	282	0.0059
7/21/2019	1169.6	1168.6	1166.0	0.0024	282	0.0059
7/22/2019	1169.5	1168.5	1166.0	0.0023	283	0.0057
7/23/2019	1169.5	1168.5	1166.0	0.0023	283	0.0058
7/24/2019	1169.4	1168.5	1166.0	0.0023	283	0.0056
7/25/2019	1169.4	1168.4	1165.9	0.0023	283	0.0058
7/26/2019	1169.3	1168.3	1165.9	0.0023	283	0.0057
7/27/2019	1169.2	1168.3	1165.8	0.0023	283	0.0056
7/28/2019	1169.1	1168.1	1165.6	0.0024	284	0.0058
7/29/2019	1169	1168.0	1165.6	0.0023	284	0.0057
7/30/2019	1168.9	1168.0	1165.4	0.0023	284	0.0056
7/31/2019	1168.8	1167.9	1165.3	0.0023	284	0.0057
8/1/2019	1168.7	1167.7	1165.2	0.0023	285	0.0057
8/2/2019	1168.6	1167.7	1165.3	0.0022	285	0.0055
8/3/2019	1168.5	1167.6	1165.2	0.0022	285	0.0053
8/4/2019	1168.4	1167.5	1165.1	0.0022	285	0.0053
8/5/2019	1168.3	1167.4	1165.1	0.0022	286	0.0052
8/6/2019	1168.2	1167.3	1164.9	0.0022	286	0.0052
8/7/2019	1168.1	1167.2	1164.9	0.0022	286	0.0052
8/8/2019	1168	1167.1	1164.8	0.0022	287	0.0052
8/9/2019	1167.9	1167.1	1164.8	0.0021	288	0.0051
8/10/2019	1167.8	1167.0	1164.7	0.0021	288	0.0050
8/11/2019	1167.7	1166.8	1164.5	0.0022	289	0.0052
8/12/2019	1167.6	1166.7	1164.5	0.0021	289	0.0051
8/13/2019	1167.5	1166.6	1164.4	0.0021	290	0.0050
8/14/2019	1167.4	1166.5	1164.3	0.0021	291	0.0051
8/15/2019	1167.3	1166.4	1164.2	0.0021	292	0.0051
8/16/2019	1167.2	1166.3	1164.1	0.0020	293	0.0050
8/17/2019	1167.1	1166.2	1164.0	0.0021	294	0.0050
8/18/2019	1167	1166.1	1163.9	0.0021	295	0.0050
8/19/2019	1166.9	1166.1	1163.9	0.0020	296	0.0049
8/20/2019	1166.8	1166.0	1163.8	0.0020	297	0.0048
8/21/2019	1166.7	1165.9	1163.7	0.0020	298	0.0048
8/22/2019	1166.6	1165.8	1163.6	0.0020	299	0.0048
8/23/2019	1166.5	1165.7	1163.5	0.0020	300	0.0048
8/24/2019	1166.4	1165.5	1163.4	0.0020	301	0.0048
8/25/2019	1166.2	1165.4	1163.2	0.0020	303	0.0047
8/26/2019	1166.1	1165.3	1163.2	0.0020	304	0.0046
8/27/2019	1166	1165.2	1163.1	0.0020	307	0.0046
8/28/2019	1165.9	1165.1	1163.0	0.0020	310	0.0045
8/29/2019	1165.9	1165.0	1162.9	0.0019	310	0.0047
8/30/2019	1165.8	1165.0	1162.9	0.0019	313	0.0046
8/31/2019	1165.7	1164.8	1162.8	0.0019	316	0.0046
9/1/2019	1165.5	1164.7	1162.6	0.0020	322	0.0044
9/2/2019	1165.5	1164.6	1162.6	0.0019	322	0.0047
9/3/2019	1165.4	1164.5	1162.5	0.0019	322	0.0046
9/4/2019	1165.3	1164.4	1162.3	0.0019	325	0.0046
9/5/2019	1165.2	1164.3	1162.2	0.0020	329	0.0046
9/6/2019	1165	1164.2	1162.2	0.0019	335	0.0042
9/7/2019	1164.9	1164.1	1162.1	0.0019	339	0.0042
9/8/2019	1164.8	1164.0	1161.9	0.0020	342	0.0043
9/9/2019	1164.7	1163.9	1161.9	0.0019	346	0.0042

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

9/10/2019	1164.6	1163.8	1161.7	0.0019	349	0.0041
9/11/2019	1164.5	1163.7	1161.6	0.0019	352	0.0041
9/12/2019	1164.4	1163.6	1161.5	0.0019	371	0.0040
9/13/2019	1164.3	1163.5	1161.5	0.0019	389	0.0039
9/14/2019	1164.3	1163.4	1161.4	0.0019	389	0.0042
9/15/2019	1164.1	1163.3	1161.2	0.0020	426	0.0039
9/16/2019	1164	1163.2	1161.1	0.0019	445	0.0037
9/17/2019	1164	1163.1	1161.0	0.0019	445	0.0040
9/18/2019	1163.8	1163.0	1160.9	0.0019	618	0.0032
9/19/2019	1163.7	1162.9	1160.8	0.0019	705	0.0031
9/20/2019	1163.6	1162.8	1160.7	0.0019	791	0.0029
9/21/2019	1163.5	1162.7	1160.5	0.0020	878	0.0029
9/22/2019	1163.4	1162.5	1160.4	0.0020	882	0.0030
9/23/2019	1163.3	1162.4	1160.4	0.0019	885	0.0029
9/24/2019	1163.2	1162.3	1160.3	0.0019	889	0.0029
9/25/2019	1163.1	1162.2	1160.2	0.0019	893	0.0028
9/26/2019	1163	1162.1	1160.1	0.0019	896	0.0029
9/27/2019	1162.9	1162.0	1160.0	0.0018	900	0.0028
9/28/2019	1162.8	1161.9	1159.9	0.0019	903	0.0029
9/29/2019	1162.7	1161.8	1159.7	0.0019	907	0.0029
9/30/2019	1162.6	1161.7	1159.7	0.0018	910	0.0028
10/1/2019	1162.5	1161.6	1159.6	0.0019	914	0.0028
10/2/2019	1162.4	1161.5	1159.6	0.0018	919	0.0028
10/3/2019	1162.3	1161.4	1159.5	0.0018	924	0.0028
10/4/2019	1162.3	1161.5	1159.5	0.0018	924	0.0027
10/5/2019	1162.2	1161.4	1159.4	0.0018	929	0.0027
10/6/2019	1162.1	1161.2	1159.3	0.0018	935	0.0027
10/7/2019	1162	1161.3	1159.4	0.0018	940	0.0026
10/8/2019	1162	1161.3	1159.3	0.0018	940	0.0026
10/9/2019	1161.9	1161.1	1159.3	0.0017	945	0.0025
10/10/2019	1161.9	1161.1	1159.2	0.0018	945	0.0026
10/11/2019	1161.8	1161.0	1159.1	0.0017	950	0.0026
10/12/2019	1161.7	1160.9	1159.0	0.0018	951	0.0026
10/13/2019	1161.7	1160.8	1158.9	0.0018	951	0.0027
10/14/2019	1161.6	1160.8	1158.9	0.0017	951	0.0026
10/15/2019	1161.6	1160.7	1158.8	0.0018	951	0.0027
10/16/2019	1161.6	1160.6	1158.7	0.0018	951	0.0028
10/17/2019	1161.6	1160.8	1158.7	0.0019	951	0.0028
10/18/2019	1161.6	1160.7	1158.9	0.0017	951	0.0026
10/19/2019	1161.7	1160.7	1158.9	0.0017	951	0.0027
10/20/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/21/2019	1161.6	1160.7	1158.9	0.0017	951	0.0026
10/22/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/23/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/24/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/25/2019	1161.6	1160.7	1158.9	0.0017	951	0.0027
10/26/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/27/2019	1161.6	1160.6	1158.7	0.0018	951	0.0028
10/28/2019	1161.6	1160.7	1158.8	0.0017	951	0.0027
10/29/2019	1161.6	1160.7	1158.8	0.0018	951	0.0027
10/30/2019	1161.6	1160.7	1158.8	0.0018	951	0.0027
10/31/2019	1161.6	1160.7	1158.8	0.0018	951	0.0027
11/1/2019	1161.8	1161.2	1159.4	0.0016	950	0.0023
11/2/2019	1162	1161.4	1159.9	0.0014	940	0.0020
11/3/2019	1162.1	1161.6	1160.1	0.0014	935	0.0019

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

11/4/2019	1162.3	1161.9	1160.5	0.0013	924	0.0018
11/5/2019	1162.5	1162.1	1160.7	0.0014	914	0.0018
11/6/2019	1162.7	1162.3	1160.8	0.0014	907	0.0018
11/7/2019	1162.9	1162.5	1160.9	0.0015	900	0.0019
11/8/2019	1163.1	1162.7	1161.1	0.0015	893	0.0019
11/9/2019	1163.3	1162.8	1161.1	0.0016	885	0.0021
11/10/2019	1163.4	1162.8	1161.0	0.0017	882	0.0023
11/11/2019	1163.5	1163.0	1161.3	0.0016	878	0.0022
11/12/2019	1163.7	1163.1	1161.3	0.0016	705	0.0025
11/13/2019	1163.7	1163.1	1161.4	0.0016	705	0.0025
11/14/2019	1163.8	1163.1	1161.3	0.0017	618	0.0028
11/15/2019	1163.9	1163.2	1161.4	0.0016	531	0.0029
11/16/2019	1164	1163.3	1161.5	0.0017	445	0.0033
11/17/2019	1164	1163.2	1161.4	0.0017	445	0.0034
11/18/2019	1164.1	1163.3	1161.6	0.0016	426	0.0034
11/19/2019	1164.1	1163.4	1161.6	0.0017	426	0.0033
11/20/2019	1164.1	1163.4	1161.7	0.0016	426	0.0032
11/21/2019	1164.2	1163.5	1161.6	0.0017	408	0.0035
11/22/2019	1164.2	1163.5	1161.7	0.0016	408	0.0033
11/23/2019	1164.2	1163.5	1161.7	0.0017	408	0.0033
11/24/2019	1164.2	1163.5	1161.7	0.0017	408	0.0034
11/25/2019	1164.2	1163.6	1161.8	0.0016	408	0.0032
11/26/2019	1164.3	1163.6	1161.8	0.0017	389	0.0035
11/27/2019	1164.3	1163.6	1161.9	0.0016	389	0.0034
11/28/2019	1164.3	1163.7	1161.8	0.0017	389	0.0033
11/29/2019	1164.3	1163.7	1161.9	0.0016	389	0.0032
11/30/2019	1164.4	1163.8	1162.0	0.0017	371	0.0034
12/1/2019	1164.4	1163.8	1161.9	0.0017	371	0.0035
12/2/2019	1164.5	1163.8	1162.1	0.0016	352	0.0035
12/3/2019	1164.5	1163.9	1162.1	0.0017	352	0.0034
12/4/2019	1164.6	1163.9	1162.1	0.0017	349	0.0036
12/5/2019	1164.6	1163.9	1162.1	0.0017	349	0.0036
12/6/2019	1164.7	1164.0	1162.2	0.0017	346	0.0037
12/7/2019	1164.8	1164.0	1162.1	0.0017	342	0.0041
12/8/2019	1164.7	1163.9	1162.0	0.0018	346	0.0040
12/9/2019	1164.6	1164.0	1162.2	0.0017	349	0.0033
12/10/2019	1164.8	1164.2	1162.3	0.0018	342	0.0034
12/11/2019	1164.9	1164.4	1162.7	0.0016	339	0.0031
12/12/2019	1165.1	1164.6	1162.9	0.0015	332	0.0031
12/13/2019	1165.3	1164.8	1163.2	0.0014	325	0.0030
12/14/2019	1165.5	1165.1	1163.4	0.0015	322	0.0028
12/15/2019	1165.7	1165.3	1163.6	0.0015	316	0.0029
12/16/2019	1165.9	1165.5	1164.0	0.0014	310	0.0026
12/17/2019	1166.2	1165.8	1164.2	0.0014	303	0.0028
12/18/2019	1166.4	1166.0	1164.5	0.0014	301	0.0028
12/19/2019	1166.6	1166.2	1164.6	0.0015	299	0.0030
12/20/2019	1166.8	1166.3	1164.7	0.0015	297	0.0031
12/21/2019	1166.9	1166.5	1164.8	0.0016	296	0.0031
12/22/2019	1167.1	1166.6	1164.8	0.0016	294	0.0035
12/23/2019	1167.2	1166.7	1164.9	0.0016	293	0.0034
12/24/2019	1167.4	1166.8	1165.0	0.0017	291	0.0038
12/25/2019	1167.5	1166.9	1165.1	0.0017	290	0.0038
12/26/2019	1167.6	1167.0	1165.1	0.0018	289	0.0038
12/27/2019	1167.7	1167.1	1165.2	0.0018	289	0.0038
12/28/2019	1167.9	1167.2	1165.2	0.0018	288	0.0042

Table 2.1.B
Groundwater Levels vs Projected Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

12/29/2019	1168	1167.3	1165.3	0.0018	287	0.0043
12/30/2019	1168.1	1167.5	1165.5	0.0018	286	0.0040
12/31/2019	1168.3	1167.7	1165.7	0.0018	286	0.0041
1/1/2020	1168.4	1167.8	1165.9	0.0018	285	0.0038
1/2/2020	1168.6	1167.9	1166.0	0.0018	285	0.0042
1/3/2020	1168.7	1168.0	1166.0	0.0018	285	0.0042
1/4/2020	1168.9	1168.2	1166.1	0.0019	284	0.0045
1/5/2020	1169	1168.3	1166.2	0.0019	284	0.0046
1/6/2020	1169.1	1168.4	1166.3	0.0019	284	0.0045
1/7/2020	1169.2	1168.5	1166.4	0.0020	283	0.0045
1/8/2020	1169.3	1168.6	1166.5	0.0019	283	0.0045
1/9/2020	1169.4	1168.6	1166.4	0.0020	283	0.0048
1/10/2020	1169.5	1168.7	1166.6	0.0020	283	0.0048
1/11/2020	1169.6	1168.9	1166.6	0.0021	282	0.0047
1/12/2020	1169.7	1168.9	1166.7	0.0021	282	0.0049
1/13/2020	1169.8	1169.0	1166.8	0.0020	282	0.0049
1/14/2020	1170	1169.1	1166.8	0.0021	281	0.0053
1/15/2020	1170	1169.2	1166.9	0.0021	281	0.0050
1/16/2020	1170.1	1169.3	1166.9	0.0021	281	0.0051
1/17/2020	1170.2	1169.3	1167.0	0.0021	281	0.0053
1/18/2020	1170.3	1169.4	1167.0	0.0022	281	0.0054
1/19/2020	1170.4	1169.4	1167.0	0.0022	280	0.0057
1/20/2020	1170.4	1169.5	1167.1	0.0022	280	0.0055
1/21/2020	1170.5	1169.5	1167.1	0.0023	280	0.0057
1/22/2020	1170.5	1169.6	1167.2	0.0023	280	0.0055
1/23/2020	1170.6	1169.6	1167.1	0.0023	280	0.0058
1/24/2020	1170.6	1169.7	1167.2	0.0023	280	0.0057
1/25/2020	1170.7	1169.7	1167.2	0.0023	280	0.0058
1/26/2020	1170.8	1169.8	1167.3	0.0023	279	0.0059
1/27/2020	1170.8	1169.9	1167.4	0.0023	279	0.0056
1/28/2020	1170.9	1169.9	1167.4	0.0023	279	0.0058
1/29/2020	1170.9	1169.9	1167.4	0.0023	279	0.0058
1/30/2020	1171	1169.9	1167.4	0.0023	279	0.0062
1/31/2020	1171	1169.9	1167.4	0.0023	279	0.0062
2/1/2020	1171	1169.9	1167.4	0.0024	279	0.0061
2/2/2020	1171	1170.0	1167.4	0.0024	279	0.0061
2/3/2020	1171	1170.0	1167.4	0.0023	279	0.0060
2/4/2020	1171	1170.0	1167.4	0.0024	279	0.0060
2/5/2020	1171	1170.0	1167.4	0.0023	279	0.0061
2/6/2020	1171	1170.0	1167.5	0.0023	279	0.0059

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
1/1/2019							1172.97	1173.60		
1/2/2019							1171.87	1173.70		
1/3/2019							1173.07	1166.40		
1/4/2019							1171.17	1173.70		
1/5/2019							1172.97	1172.80		
1/6/2019							1172.97	1173.60		
1/7/2019							1170.97	1173.60		
1/8/2019							1172.87	1172.60		
1/9/2019							1172.37	1173.60		
1/10/2019							1172.97	1165.30		
1/11/2019							1171.07	1173.70		
1/12/2019							1172.87	1172.80		
1/13/2019							1172.97	1173.50		
1/14/2019							1170.97	1173.60		
1/15/2019							1171.87	1172.60		
1/16/2019							1172.67	1172.60		
1/17/2019							1170.97	1165.80		
1/18/2019							1172.57	1173.40		
1/19/2019							1171.57	1172.60		
1/20/2019							1170.77	1173.20		
1/21/2019							1172.37	1165.40		
1/22/2019							1172.47	1172.30		
1/23/2019							1172.27	1173.00		
1/24/2019							1172.47	1173.20		
1/25/2019							1170.47	1173.00		
1/26/2019							1172.47	1173.20		
1/27/2019							1170.47	1172.20		
1/28/2019							1172.17	1173.10		
1/29/2019							1172.37	1162.20		
1/30/2019							1172.17	1172.90		
1/31/2019							1170.77	1172.30		
2/1/2019							1170.37	1172.00		
2/2/2019							1172.17	1172.80		
2/3/2019							1170.47	1172.10		
2/4/2019							1171.77	1172.50		
2/5/2019	1176.18	1171.36	1172.26	1172.40	1168.98		1172.17	1172.90		
2/6/2019	1176.19	1171.43	1172.29	1172.43	1169.06		1170.97	1165.70		
2/7/2019	1176.33	1171.57	1172.40	1172.54	1169.21		1172.57	1173.30		
2/8/2019	1176.50	1171.69	1172.51	1172.66	1169.40		1172.57	1173.20		
2/9/2019	1176.62	1171.77	1172.59	1172.74	1169.50		1172.87	1173.50		
2/10/2019	1176.87	1171.89	1172.70	1172.86	1169.59		1170.97	1172.60		
2/11/2019	1177.09	1171.98	1172.81	1172.97	1169.66		1172.57	1173.20		
2/12/2019	1177.27	1172.06	1172.90	1173.06	1169.69		1172.97	1173.70		
2/13/2019	1177.42	1172.12	1172.99	1173.15	1169.76		1172.77	1173.50		
2/14/2019	1177.43	1172.08	1172.98	1173.15	1169.73		1171.37	1173.00		
2/15/2019	1177.48	1172.10	1173.01	1173.18	1169.73		1172.67	1173.40		
2/16/2019	1177.41	1172.04	1172.98	1173.15	1169.69		1171.97	1166.00		
2/17/2019	1177.38	1172.00	1172.93	1173.11	1169.64		1170.87	1172.50		
2/18/2019	1177.34	1171.95	1172.90	1173.07	1169.61		1172.37	1173.10		
2/19/2019	1177.20	1171.85	1172.80	1172.97	1169.50		1172.67	1173.30		
2/20/2019	1177.16	1171.80	1172.74	1172.91	1169.43		1171.47	1165.60		
2/21/2019	1177.11	1171.74	1172.69	1172.86	1169.37		1172.57	1173.20		
2/22/2019	1176.96	1171.63	1172.58	1172.76	1169.25		1170.57	1172.20		
2/23/2019	1176.87	1171.56	1172.50	1172.67	1169.13		1171.97	1173.00		
2/24/2019	1176.87	1171.54	1172.48	1172.65	1169.08		1170.57	1172.10		
2/25/2019	1176.73	1171.45	1172.41	1172.57	1169.01		1171.97	1172.70		
2/26/2019	1176.55	1171.34	1172.29	1172.45	1168.92		1172.17	1172.90		
2/27/2019	1176.46	1171.28	1172.20	1172.37	1168.86		1171.87	1172.60		
2/28/2019	1176.36	1171.19	1172.12	1172.29	1168.80		1170.37	1172.00		
3/1/2019	1176.24	1171.12	1172.04	1172.21	1168.73		1170.07	1171.00		
3/2/2019	1176.15	1171.05	1171.96	1172.13	1168.66		1171.87	1172.60		
3/3/2019	1176.03	1170.97	1171.88	1172.05	1168.59		1169.87	1171.60		
3/4/2019	1175.93	1170.90	1171.80	1171.97	1168.53		1169.97	1169.60		
3/5/2019	1175.80	1170.80	1171.70	1171.87	1168.44		1170.67	1164.60		
3/6/2019	1175.67	1170.69	1171.59	1171.76	1168.35		1170.57	1164.40		
3/7/2019	1175.53	1170.58	1171.48	1171.65	1168.25		1171.47	1170.10		
3/8/2019	1175.40	1170.48	1171.37	1171.54	1168.14		1169.57	1171.20		
3/9/2019	1175.27	1170.38	1171.27	1171.44	1168.05		1169.67	1164.60		
3/10/2019	1175.18	1170.32	1171.20	1171.37	1168.01		1171.27	1171.90		
3/11/2019	1175.07	1170.25	1171.13	1171.30	1167.95		1169.47	1171.10		
3/12/2019	1174.96	1170.18	1171.05	1171.22	1167.89		1169.87	1164.10		
3/13/2019	1174.87	1170.12	1170.97	1171.14	1167.83		1170.97	1171.70		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
3/14/2019	1174.79	1170.03	1170.88	1171.06	1167.88		1169.07	1170.80		
3/15/2019	1174.75	1170.03	1170.87	1171.06	1167.91		1170.87	1171.60		
3/16/2019	1174.64	1170.00	1170.80	1170.99	1167.92		1171.07	1171.70		
3/17/2019	1174.57	1169.98	1170.77	1170.96	1167.94		1171.07	1171.70		
3/18/2019	1174.57	1169.96	1170.74	1170.93	1167.91		1168.97	1170.60		
3/19/2019	1174.54	1169.91	1170.69	1170.88	1167.85		1170.97	1171.60		
3/20/2019	1174.50	1169.88	1170.66	1170.85	1167.84		1170.67	1171.40		
3/21/2019	1174.46	1169.85	1170.62	1170.81	1167.80		1169.27	1171.00		
3/22/2019	1174.47	1169.90	1170.68	1170.86	1167.88		1170.57	1171.20		
3/23/2019	1174.41	1169.89	1170.66	1170.84	1167.90		1170.97	1171.60		
3/24/2019	1174.38	1169.90	1170.65	1170.84	1167.91		1168.97	1170.70		
3/25/2019	1174.39	1169.89	1170.65	1170.83	1167.90		1168.77	1170.60		
3/26/2019	1174.37	1169.85	1170.61	1170.79	1167.84		1170.87	1171.50		
3/27/2019	1174.33	1169.83	1170.58	1170.76	1167.83		1169.67	1164.00		
3/28/2019	1174.32	1169.82	1170.57	1170.75	1167.81		1170.87	1171.60		
3/29/2019	1174.31	1169.80	1170.56	1170.74	1167.80		1168.87	1170.50		
3/30/2019	1174.27	1169.80	1170.55	1170.73	1167.77		1170.87	1171.50		
3/31/2019	1174.26	1169.77	1170.52	1170.70	1167.75		1168.87	1170.60		
4/1/2019	1174.19	1169.76	1170.51	1170.69	1167.78		1170.77	1171.50		
4/2/2019	1174.15	1169.77	1170.51	1170.69	1167.77		1170.77	1171.50		
4/3/2019	1174.16	1169.75	1170.50	1170.68	1167.78		1170.77	1171.50		
4/4/2019	1174.09	1169.72	1170.47	1170.65	1167.73		1170.77	1171.50		
4/5/2019	1174.05	1169.72	1170.46	1170.64	1167.75		1170.87	1171.60		
4/6/2019	1174.04	1169.73	1170.48	1170.66	1167.77		1170.77	1171.40		
4/7/2019	1174.00	1169.69	1170.43	1170.61	1167.68		1170.77	1171.50		
4/8/2019	1174.00	1169.71	1170.45	1170.63	1167.75		1170.87	1171.50		
4/9/2019	1173.98	1169.72	1170.45	1170.63	1167.74		1170.67	1171.40		
4/10/2019	1173.94	1169.67	1170.41	1170.59	1167.72		1170.77	1171.40		
4/11/2019	1173.87	1169.64	1170.38	1170.56	1167.68		1170.67	1171.40		
4/12/2019	1173.83	1169.64	1170.37	1170.55	1167.70		1170.77	1171.50		
4/13/2019	1173.80	1169.62	1170.36	1170.53	1167.69		1170.67	1171.40		
4/14/2019	1173.76	1169.59	1170.32	1170.50	1167.61		1170.67	1171.40		
4/15/2019	1173.78	1169.64	1170.38	1170.56	1167.73		1170.77	1171.50		
4/16/2019	1173.71	1169.66	1170.38	1170.55	1167.75		1170.77	1171.40		
4/17/2019	1173.70	1169.67	1170.38	1170.56	1167.79		1170.87	1171.50		
4/18/2019	1173.73	1169.69	1170.40	1170.57	1167.77		1170.77	1171.50		
4/19/2019	1173.77	1169.70	1170.42	1170.59	1167.81		1170.87	1171.60		
4/20/2019	1173.80	1169.83	1170.56	1170.72	1167.94		1170.97	1171.60		
4/21/2019	1173.84	1169.84	1170.55	1170.72	1167.95		1170.97	1171.70		
4/22/2019	1173.88	1169.88	1170.59	1170.76	1167.99		1171.07	1171.80		
4/23/2019	1173.98	1169.96	1170.66	1170.84	1168.01		1171.07	1171.74		
4/24/2019	1174.07	1169.99	1170.70	1170.87	1168.03		1171.07	1171.80		
4/25/2019	1174.01	1170.02	1170.73	1170.91	1168.02		1171.07	1171.80		
4/26/2019	1174.09	1170.08	1170.79	1170.97	1168.07		1171.17	1171.90		
4/27/2019	1174.21	1170.14	1170.87	1171.04	1168.14		1171.17	1171.80		
4/28/2019	1174.22	1170.13	1170.85	1171.03	1168.10		1171.17	1171.80		
4/29/2019	1174.24	1170.15	1170.88	1171.05	1168.13		1171.17	1171.90		
4/30/2019	1174.38	1170.16	1170.90	1171.08	1168.12		1171.17	1171.80		
5/1/2019	1174.45	1170.17	1170.92	1171.10	1168.12		1171.27	1171.80		
5/2/2019	1174.51	1170.19	1170.94	1171.12	1168.13		1171.17	1171.90		
5/3/2019	1174.52	1170.20	1170.96	1171.14	1168.15		1171.27	1171.90		
5/4/2019	1174.53	1170.21	1170.98	1171.15	1168.15		1171.17	1172.00		
5/5/2019	1174.52	1170.18	1170.95	1171.13	1168.08		1171.17	1171.90		
5/6/2019	1174.50	1170.18	1170.96	1171.13	1168.14		1171.27	1171.90		
5/7/2019	1174.45	1170.17	1170.95	1171.12	1168.12		1171.17	1171.90		
5/8/2019	1174.41	1170.15	1170.92	1171.10	1168.11		1170.67	1171.80		
5/9/2019	1174.38	1170.15	1170.91	1171.09	1168.10		1171.17	1171.80		
5/10/2019	1174.36	1170.17	1170.95	1171.12	1168.18		1171.27	1172.00		
5/11/2019	1174.37	1170.22	1170.98	1171.15	1168.21		1170.37	1164.40		
5/12/2019	1174.35	1170.21	1170.97	1171.14	1168.19		1171.27	1172.00		
5/13/2019	1174.41	1170.30	1171.05	1171.22	1168.33		1171.57	1172.20		
5/14/2019	1174.50	1170.49	1171.23	1171.40	1168.56		1171.67	1172.30		
5/15/2019	1174.58	1170.62	1171.34	1171.51	1168.71		1171.87	1172.50		
5/16/2019	1174.72	1170.71	1171.43	1171.60	1168.76		1171.87	1172.50		
5/17/2019	1174.89	1170.80	1171.52	1171.69	1168.83		1171.87	1172.60		
5/18/2019	1175.05	1170.86	1171.59	1171.76	1168.85		1171.87	1172.60		
5/19/2019	1175.17	1170.91	1171.64	1171.82	1168.85		1171.97	1172.60		
5/20/2019	1175.32	1170.95	1171.74	1171.91	1168.93		1172.07	1172.70		
5/21/2019	1175.42	1170.92	1171.78	1171.93	1168.81		1171.97	1172.60		
5/22/2019	1175.45	1170.94	1171.80	1171.94	1168.80		1172.07	1172.70		
5/23/2019	1175.51	1170.98	1171.84	1171.98	1168.82		1172.07	1172.70		
5/24/2019	1175.58	1170.97	1171.85	1171.99	1168.84		1172.17	1172.80		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
5/25/2019	1175.56	1170.97	1171.85	1171.99	1168.80		1171.27	1165.20		
5/26/2019	1175.58	1170.97	1171.86	1172.01	1168.80		1172.07	1172.70		
5/27/2019	1175.57	1170.97	1171.87	1172.01	1168.82		1172.07	1172.80		
5/28/2019	1175.54	1170.99	1171.89	1172.03	1168.83		1172.07	1172.70		
5/29/2019	1175.55	1170.98	1171.88	1172.02	1168.84		1172.17	1172.80		
5/30/2019	1175.51	1170.97	1171.87	1172.01	1168.82		1172.07	1172.70		
5/31/2019	1175.47	1170.94	1171.84	1171.98	1168.81		1172.07	1172.70		
6/1/2019	1175.41	1170.91	1171.81	1171.95	1168.74		1171.97	1172.60		
6/2/2019	1175.36	1170.82	1171.74	1171.88	1168.61		1171.87	1172.50		
6/3/2019	1175.30	1170.77	1171.69	1171.83	1168.59		1171.87	1172.60		
6/4/2019	1175.20	1170.72	1171.63	1171.77	1168.53		1171.77	1172.50		
6/5/2019	1175.13	1170.69	1171.59	1171.73	1168.53		1171.77	1172.50		
6/6/2019	1175.07	1170.66	1171.57	1171.71	1168.51		1171.77	1172.40		
6/7/2019	1174.99	1170.62	1171.52	1171.66	1168.50		1171.77	1172.40		
6/8/2019	1174.90	1170.57	1171.47	1171.60	1168.46		1171.67	1172.30		
6/9/2019	1174.80	1170.49	1171.38	1171.51	1168.36		1171.67	1172.30		
6/10/2019	1174.72	1170.44	1171.33	1171.47	1168.38		1171.57	1172.20		
6/11/2019	1174.66	1170.38	1171.27	1171.41	1168.32		1171.47	1172.10		
6/12/2019	1174.55	1170.29	1171.18	1171.32	1168.21		1171.37	1172.10		
6/13/2019	1174.45	1170.20	1171.10	1171.24	1168.07		1171.27	1172.00		
6/14/2019	1174.36	1170.09	1171.01	1171.14	1167.97		1171.27	1171.90		
6/15/2019	1174.26	1170.00	1170.92	1171.05	1167.87		1171.07	1171.80		
6/16/2019	1174.16	1169.91	1170.83	1170.97	1167.77		1171.07	1171.70		
6/17/2019	1174.09	1169.90	1170.81	1170.94	1167.80		1171.07	1171.80		
6/18/2019	1174.00	1169.86	1170.75	1170.88	1167.74		1170.97	1171.60		
6/19/2019	1173.93	1169.81	1170.69	1170.82	1167.72		1170.97	1171.70		
6/20/2019	1173.87	1169.78	1170.67	1170.80	1167.68		1170.97	1171.60		
6/21/2019	1173.83	1169.79	1170.68	1170.81	1167.71		1170.87	1171.60		
6/22/2019	1173.79	1169.76	1170.63	1170.76	1167.64		1170.77	1171.40		
6/23/2019	1173.75	1169.68	1170.54	1170.68	1167.52		1170.77	1171.40		
6/24/2019	1173.75	1169.63	1170.50	1170.64	1167.51		1170.67	1171.40		
6/25/2019	1173.73	1169.58	1170.46	1170.59	1167.44		1170.67	1171.30		
6/26/2019	1173.69	1169.53	1170.41	1170.54	1167.43		1170.67	1171.30		
6/27/2019	1173.61	1169.49	1170.36	1170.49	1167.37		1170.57	1171.20		
6/28/2019	1173.54	1169.45	1170.31	1170.44	1167.37		1170.57	1171.30		
6/29/2019	1173.49	1169.41	1170.28	1170.41	1167.32		1170.47	1171.20		
6/30/2019	1173.46	1169.33	1170.20	1170.33	1167.24		1170.37	1171.10		
7/1/2019	1173.40	1169.27	1170.14	1170.27	1167.24		1170.47	1171.10		
7/2/2019	1173.33	1169.22	1170.09	1170.22	1167.17		1170.27	1171.00		
7/3/2019	1173.27	1169.13	1170.01	1170.14	1167.13		1170.27	1171.00		
7/4/2019	1173.18	1169.06	1169.94	1170.07	1167.06		1170.17	1170.90		
7/5/2019	1173.09	1168.99	1169.86	1169.99	1167.04		1170.27	1170.90		
7/6/2019	1172.99	1168.93	1169.80	1169.93	1166.98		1170.07	1170.80		
7/7/2019	1172.90	1168.83	1169.70	1169.83	1166.87		1169.97	1170.70		
7/8/2019	1172.80	1168.76	1169.63	1169.76	1166.86		1168.37	1170.00		
7/9/2019	1172.69	1168.69	1169.55	1169.68	1166.78		1169.87	1170.50		
7/10/2019	1172.58	1168.60	1169.46	1169.59	1166.72		1169.77	1170.50		
7/11/2019	1172.47	1168.52	1169.38	1169.51	1166.63		1169.67	1170.40		
7/12/2019	1172.37	1168.44	1169.29	1169.42	1166.60		1169.67	1170.40		
7/13/2019	1172.26	1168.36	1169.20	1169.33	1166.50		1169.57	1170.20		
7/14/2019	1172.13	1168.23	1169.08	1169.21	1166.36		1169.47	1170.10		
7/15/2019	1172.01	1168.15	1168.99	1169.12	1166.35		1169.47	1170.10		
7/16/2019	1171.88	1168.07	1168.94	1169.04	1166.27		1169.37	1170.00		
7/17/2019	1171.76	1168.05	1168.89	1169.00	1166.29		1169.37	1170.10		
7/18/2019	1171.66	1168.02	1168.82	1168.95	1166.25		1169.27	1169.90		
7/19/2019	1171.56	1167.97	1168.76	1168.89	1166.23		1169.27	1170.00		
7/20/2019	1171.46	1167.91	1168.71	1168.83	1166.16		1169.07	1169.80		
7/21/2019	1171.38	1167.81	1168.60	1168.73	1166.03		1169.07	1169.70		
7/22/2019	1171.30	1167.75	1168.55	1168.67	1166.05		1167.47	1169.70		
7/23/2019	1171.22	1167.74	1168.52	1168.64	1165.99		1168.97	1169.50		
7/24/2019	1171.16	1167.69	1168.46	1168.58	1166.00		1169.07	1169.50		
7/25/2019	1171.07	1167.64	1168.40	1168.53	1165.93		1168.87	1169.10		
7/26/2019	1170.99	1167.56	1168.33	1168.45	1165.88		1168.87	1169.30		
7/27/2019	1170.91	1167.48	1168.25	1168.37	1165.77		1168.67	1169.30		
7/28/2019	1170.84	1167.35	1168.13	1168.26	1165.59		1168.57	1169.10		
7/29/2019	1170.75	1167.25	1168.04	1168.17	1165.56		1168.57	1168.70		
7/30/2019	1170.66	1167.16	1167.98	1168.08	1165.45		1168.37	1169.00		
7/31/2019	1170.55	1167.05	1167.85	1167.97	1165.33		1168.07	1169.00		
8/1/2019	1170.45	1166.95	1167.74	1167.86	1165.25		1168.27	1169.00		
8/2/2019	1170.34	1166.90	1167.68	1167.80	1165.28		1168.27	1169.00		
8/3/2019	1170.22	1166.84	1167.62	1167.74	1165.24		1168.17	1168.90		
8/4/2019	1170.12	1166.75	1167.53	1167.65	1165.13		1168.07	1168.80		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

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Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
8/5/2019	1170.02	1166.65	1167.43	1167.55	1165.07		1167.97	1168.70		
8/6/2019	1169.91	1166.56	1167.33	1167.46	1164.94		1167.77	1165.60		
8/7/2019	1169.81	1166.46	1167.23	1167.36	1164.88		1167.87	1168.50		
8/8/2019	1169.69	1166.37	1167.15	1167.27	1164.79		1167.67	1168.40		
8/9/2019	1169.59	1166.29	1167.06	1167.18	1164.75		1167.67	1168.40		
8/10/2019	1169.48	1166.21	1166.97	1167.09	1164.66		1167.47	1168.20		
8/11/2019	1169.36	1166.08	1166.83	1166.95	1164.49		1167.37	1168.20		
8/12/2019	1169.23	1165.98	1166.74	1166.86	1164.47		1167.37	1168.10		
8/13/2019	1169.12	1165.90	1166.65	1166.77	1164.37		1167.17	1168.10		
8/14/2019	1169.01	1165.77	1166.52	1166.64	1164.26		1167.17	1167.90		
8/15/2019	1168.89	1165.67	1166.42	1166.54	1164.15		1166.97	1167.90		
8/16/2019	1168.76	1165.58	1166.33	1166.45	1164.12		1166.97	1167.80		
8/17/2019	1168.66	1165.50	1166.24	1166.36	1164.02		1166.87	1167.80		
8/18/2019	1168.54	1165.38	1166.13	1166.24	1163.87		1166.77	1167.60		
8/19/2019	1168.45	1165.31	1166.05	1166.10	1163.87		1166.77	1167.50		
8/20/2019	1168.35	1165.24	1165.97	1165.94	1163.78		1166.47	1167.50		
8/21/2019	1168.22	1165.12	1165.86	1165.83	1163.67		1166.57	1167.20		
8/22/2019	1168.12	1165.03	1165.76	1165.74	1163.58		1166.37	1167.30		
8/23/2019	1168.01	1164.92	1165.65	1165.63	1163.50		1166.37	1167.10		
8/24/2019	1167.91	1164.82	1165.55	1165.53	1163.39		1166.17	1166.90		
8/25/2019	1167.80	1164.68	1165.40	1165.38	1163.20		1165.97	1166.70		
8/26/2019	1167.69	1164.58	1165.30	1165.29	1163.18		1165.97	1166.80		
8/27/2019	1167.59	1164.49	1165.20	1165.19	1163.06		1165.87	1166.60		
8/28/2019	1167.48	1164.39	1165.11	1165.10	1163.00		1165.87	1166.60		
8/29/2019	1167.37	1164.34	1165.04	1165.04	1162.94		1165.67	1166.50		
8/30/2019	1167.29	1164.25	1164.95	1164.95	1162.88		1165.67	1166.40		
8/31/2019	1167.19	1164.16	1164.85	1164.84	1162.76		1165.47	1166.20		
9/1/2019	1167.08	1164.02	1164.70	1164.70	1162.57		1165.37	1166.10		
9/2/2019	1166.97	1163.94	1164.58	1164.63	1162.57		1165.27	1166.10		
9/3/2019	1166.87	1163.87	1164.55	1164.54	1162.47		1165.07	1165.80		
9/4/2019	1166.79	1163.73	1164.43	1164.43	1162.35		1165.07	1165.80		
9/5/2019	1166.69	1163.62	1164.33	1164.33	1162.21		1164.97	1165.70		
9/6/2019	1166.55	1163.52	1164.23	1164.23	1162.16		1164.97	1165.70		
9/7/2019	1166.45	1163.45	1164.15	1164.15	1162.06		1164.47	1165.20		
9/8/2019	1166.35	1163.29	1164.00	1164.00	1161.88		1164.67	1165.40		
9/9/2019	1166.25	1163.22	1163.92	1163.92	1161.87		1164.67	1165.40		
9/10/2019	1166.15	1163.13	1163.83	1163.83	1161.74		1164.47	1165.20		
9/11/2019	1166.04	1163.01	1163.71	1163.71	1161.65		1164.37	1165.20		
9/12/2019	1165.94	1162.94	1163.62	1163.62	1161.53		1164.27	1165.00		
9/13/2019	1165.85	1162.85	1163.51	1163.51	1161.47		1164.27	1165.00		
9/14/2019	1165.77	1162.77	1163.42	1163.42	1161.35		1164.07	1164.80		
9/15/2019	1165.66	1162.61	1163.26	1163.26	1161.16		1163.87	1164.70		
9/16/2019	1165.57	1162.52	1163.18	1163.18	1161.14		1163.97	1164.70		
9/17/2019	1165.47	1162.45	1163.09	1163.10	1161.03		1163.67	1164.40		
9/18/2019	1165.36	1162.32	1162.97	1162.97	1160.93		1163.57	1164.40		
9/19/2019	1165.26	1162.22	1162.86	1162.86	1160.78		1163.47	1164.30		
9/20/2019	1165.15	1162.13	1162.77	1162.77	1160.74		1163.37	1164.20		
9/21/2019	1165.05	1161.99	1162.65	1162.65	1160.54		1163.27	1164.00		
9/22/2019	1164.95	1161.84	1162.49	1162.49	1160.39		1163.17	1163.90		
9/23/2019	1164.84	1161.76	1162.42	1162.42	1160.40		1162.67	1163.90		
9/24/2019	1164.74	1161.69	1162.33	1162.33	1160.27		1162.97	1163.70		
9/25/2019	1164.64	1161.58	1162.23	1162.22	1160.21		1162.97	1163.70		
9/26/2019	1164.53	1161.49	1162.13	1162.13	1160.08		1162.77	1163.50		
9/27/2019	1164.43	1161.39	1162.03	1162.03	1160.04		1162.77	1163.50		
9/28/2019	1164.32	1161.29	1161.93	1161.93	1159.89		1162.57	1163.10		
9/29/2019	1164.21	1161.14	1161.78	1161.78	1159.72		1162.47	1163.20		
9/30/2019	1164.11	1161.07	1161.71	1161.70	1159.74		1162.47	1163.30		
10/1/2019	1164.00	1161.00	1161.63	1161.63	1159.62		1162.27	1163.00		
10/2/2019	1163.90	1160.88	1161.52	1161.51	1159.55		1162.27	1163.00		
10/3/2019	1163.80	1160.81	1161.41	1161.44	1159.46		1162.17	1163.00		
10/4/2019	1163.70	1160.81	1161.48	1161.43	1159.52		1162.27	1163.10		
10/5/2019	1163.63	1160.77	1161.38	1161.37	1159.44		1162.07	1162.80		
10/6/2019	1163.55	1160.63	1161.24	1161.24	1159.27		1162.07	1162.80		
10/7/2019	1163.46	1160.64	1161.25	1161.24	1159.35		1162.07	1162.90		
10/8/2019	1163.38	1160.65	1161.25	1161.24	1159.33		1161.87	1162.70		
10/9/2019	1163.34	1160.55	1161.14	1161.14	1159.26		1161.97	1162.70		
10/10/2019	1163.27	1160.49	1161.08	1161.07	1159.16		1161.77	1162.60		
10/11/2019	1163.20	1160.42	1161.01	1161.00	1159.14		1161.77	1162.50		
10/12/2019	1163.13	1160.36	1160.94	1160.94	1159.02		1161.57	1162.40		
10/13/2019	1163.09	1160.22	1160.81	1160.80	1158.86		1161.57	1162.30		
10/14/2019	1163.09	1160.16	1160.75	1160.75	1158.87		1161.57	1162.40		
10/15/2019	1163.09	1160.10	1160.69	1160.69	1158.76		1161.27	1162.10		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

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Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
10/16/2019	1163.10	1160.01	1160.61	1160.60	1158.70		1161.37	1162.20		
10/17/2019	1163.09	1160.04	1160.80	1160.64	1158.72		1161.37	1162.20		
10/18/2019	1163.09	1160.15	1160.74	1160.70	1158.88		1161.57	1162.40		
10/19/2019	1163.14	1160.20	1160.74	1160.73	1158.90		1161.37	1162.20		
10/20/2019	1163.09	1160.14	1160.67	1160.66	1158.78		1161.37	1162.20		
10/21/2019	1163.10	1160.15	1160.69	1160.68	1158.87		1161.57	1162.40		
10/22/2019	1163.10	1160.15	1160.70	1160.69	1158.81		1161.37	1162.10		
10/23/2019	1163.10	1160.14	1160.70	1160.68	1158.83		1161.47	1162.30		
10/24/2019	1163.10	1160.15	1160.68	1160.67	1158.81		1161.37	1162.20		
10/25/2019	1163.10	1160.15	1160.69	1160.67	1158.86		1161.57	1162.30		
10/26/2019	1163.10	1160.17	1160.71	1160.70	1158.82		1161.37	1162.10		
10/27/2019	1163.10	1160.08	1160.59	1160.61	1158.66		1161.27	1162.10		
10/28/2019	1163.10	1160.12	1160.67	1160.65	1158.80		1161.47	1162.20		
10/29/2019	1163.10	1160.14	1160.68	1160.67	1158.76		1161.27	1162.10		
10/30/2019	1163.10	1160.12	1160.66	1160.65	1158.77		1161.37	1162.20		
10/31/2019	1163.10	1160.15	1160.69	1160.69	1158.77		1161.67	1162.40		
11/1/2019	1163.10	1160.56	1161.15	1161.10	1159.38		1162.27	1163.00		
11/2/2019	1163.09	1160.96	1161.40	1161.38	1159.90		1162.37	1163.10		
11/3/2019	1163.10	1161.20	1161.59	1161.56	1160.12		1162.67	1163.50		
11/4/2019	1163.11	1161.51	1161.88	1161.85	1160.47		1162.97	1163.80		
11/5/2019	1163.25	1161.78	1162.14	1162.12	1160.65		1163.07	1163.80		
11/6/2019	1163.47	1161.96	1162.33	1162.31	1160.82		1163.37	1164.10		
11/7/2019	1163.72	1162.16	1162.54	1162.51	1160.94		1163.47	1164.20		
11/8/2019	1163.95	1162.30	1162.70	1162.68	1161.11		1163.67	1164.50		
11/9/2019	1164.18	1162.43	1162.83	1162.81	1161.14		1163.37	1164.10		
11/10/2019	1164.38	1162.41	1162.83	1162.81	1161.03		1163.57	1164.30		
11/11/2019	1164.56	1162.53	1162.96	1162.94	1161.27		1163.97	1164.70		
11/12/2019	1164.73	1162.63	1163.07	1163.06	1161.31		1163.67	1164.50		
11/13/2019	1164.85	1162.65	1163.10	1163.08	1161.35		1163.67	1164.40		
11/14/2019	1164.96	1162.69	1163.14	1163.13	1161.32		1163.87	1164.60		
11/15/2019	1165.05	1162.73	1163.20	1163.18	1161.44		1163.87	1164.60		
11/16/2019	1165.13	1162.79	1163.26	1163.24	1161.45		1163.87	1164.70		
11/17/2019	1165.21	1162.77	1163.25	1163.24	1161.41		1163.97	1164.80		
11/18/2019	1165.26	1162.85	1163.34	1163.32	1161.59		1164.17	1164.90		
11/19/2019	1165.32	1162.91	1163.40	1163.38	1161.60		1164.07	1164.90		
11/20/2019	1165.37	1162.90	1163.43	1163.44	1161.65		1164.17	1165.00		
11/21/2019	1165.41	1162.93	1163.47	1163.52	1161.64		1164.27	1165.00		
11/22/2019	1165.41	1162.96	1163.52	1163.56	1161.74		1164.27	1165.00		
11/23/2019	1165.40	1163.00	1163.54	1163.59	1161.73		1164.27	1165.00		
11/24/2019	1165.44	1162.96	1163.51	1163.56	1161.65		1164.27	1165.00		
11/25/2019	1165.46	1163.01	1163.56	1163.61	1161.80		1164.37	1165.10		
11/26/2019	1165.50	1163.05	1163.59	1163.65	1161.79		1164.47	1165.00		
11/27/2019	1165.50	1163.08	1163.63	1163.68	1161.85		1164.57	1165.20		
11/28/2019	1165.50	1163.11	1163.65	1163.71	1161.84		1164.47	1165.20		
11/29/2019	1165.54	1163.16	1163.70	1163.76	1161.95		1164.57	1165.30		
11/30/2019	1165.57	1163.23	1163.76	1163.82	1161.95		1164.57	1165.30		
12/1/2019	1165.59	1163.22	1163.75	1163.81	1161.90		1164.57	1165.30		
12/2/2019	1165.63	1163.31	1163.84	1163.91	1162.08		1164.57	1165.30		
12/3/2019	1165.69	1163.36	1163.89	1163.95	1162.05		1164.57	1165.30		
12/4/2019	1165.75	1163.38	1163.92	1163.98	1162.12		1164.67	1165.50		
12/5/2019	1165.80	1163.46	1163.94	1164.00	1162.10		1164.67	1165.50		
12/6/2019	1165.85	1163.60	1163.99	1164.05	1162.19		1162.87	1165.60		
12/7/2019	1165.87	1163.68	1163.98	1164.04	1162.10		1164.47	1165.20		
12/8/2019	1165.90	1163.48	1163.92	1163.99	1161.98		1164.67	1165.40		
12/9/2019	1165.92	1163.21	1164.03	1164.09	1162.18		1162.77	1164.60		
12/10/2019	1165.95	1163.63	1164.24	1164.29	1162.31		1164.97	1165.40		
12/11/2019	1166.00	1163.86	1164.38	1164.43	1162.69		1165.27	1166.00		
12/12/2019	1166.14	1164.09	1164.56	1164.61	1162.93		1165.57	1166.30		
12/13/2019	1166.19	1164.35	1164.80	1164.85	1163.24		1165.87	1166.60		
12/14/2019	1166.26	1164.71	1165.07	1165.12	1163.44		1165.07	1159.10		
12/15/2019	1166.42	1165.02	1165.28	1165.32	1163.63		1166.27	1167.10		
12/16/2019	1166.69	1165.20	1165.52	1165.57	1164.02		1166.67	1167.40		
12/17/2019	1166.92	1165.41	1165.78	1165.82	1164.24		1166.77	1167.50		
12/18/2019	1167.11	1165.59	1165.99	1166.04	1164.45		1167.07	1167.80		
12/19/2019	1167.38	1165.75	1166.16	1166.21	1164.56		1167.17	1167.90		
12/20/2019	1167.64	1165.89	1166.31	1166.37	1164.71		1167.37	1168.00		
12/21/2019	1167.86	1166.02	1166.46	1166.51	1164.75		1166.47	1160.60		
12/22/2019	1168.05	1166.11	1166.56	1166.62	1164.78		1167.37	1168.10		
12/23/2019	1168.25	1166.21	1166.69	1166.74	1164.91		1167.67	1168.30		
12/24/2019	1168.44	1166.31	1166.80	1166.85	1164.97		1167.67	1168.30		
12/25/2019	1168.62	1166.40	1166.90	1166.96	1165.06		1167.77	1168.50		
12/26/2019	1168.77	1166.49	1167.00	1167.06	1165.10		1167.77	1168.50		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
12/27/2019	1168.90	1166.58	1167.12	1167.17	1165.21		1167.97	1168.60		
12/28/2019	1169.07	1166.67	1167.21	1167.26	1165.24		1166.97	1161.10		
12/29/2019	1169.20	1166.75	1167.29	1167.34	1165.29		1168.07	1168.20		
12/30/2019	1169.33	1166.94	1167.49	1167.54	1165.52		1166.57	1169.20		
12/31/2019	1169.45	1167.13	1167.66	1167.71	1165.71		1168.57	1161.20		
1/1/2020	1169.52	1167.29	1167.81	1167.86	1165.91		1167.57	1161.20		
1/2/2020	1169.79	1167.41	1167.93	1167.99	1165.95		1168.67	1169.30		
1/3/2020	1169.94	1167.51	1168.04	1168.10	1166.05		1168.87	1169.50		
1/4/2020	1170.09	1167.63	1168.17	1168.23	1166.12		1168.07	1162.10		
1/5/2020	1170.26	1167.71	1168.26	1168.31	1166.16		1168.97	1169.60		
1/6/2020	1170.39	1167.82	1168.38	1168.43	1166.30		1169.17	1169.80		
1/7/2020	1170.55	1167.93	1168.48	1168.54	1166.36		1169.17	1169.90		
1/8/2020	1170.68	1168.00	1168.58	1168.63	1166.47		1169.17	1169.80		
1/9/2020	1170.81	1168.03	1168.61	1168.66	1166.44		1169.27	1170.00		
1/10/2020	1170.95	1168.12	1168.71	1168.76	1166.56		1169.37	1170.00		
1/11/2020	1171.00	1168.27	1168.87	1168.91	1166.63		1168.47	1162.50		
1/12/2020	1171.11	1168.31	1168.90	1168.95	1166.66		1169.57	1170.30		
1/13/2020	1171.27	1168.41	1169.01	1169.05	1166.80		1167.67	1169.30		
1/14/2020	1171.40	1168.50	1169.10	1169.15	1166.83		1169.67	1170.40		
1/15/2020	1171.47	1168.58	1169.19	1169.24	1166.92		1169.87	1170.50		
1/16/2020	1171.60	1168.64	1169.27	1169.32	1166.95		1169.87	1170.50		
1/17/2020	1171.74	1168.66	1169.30	1169.35	1167.00		1169.97	1170.60		
1/18/2020	1171.85	1168.78	1169.41	1169.46	1167.02		1169.97	1170.60		
1/19/2020	1171.91	1168.79	1169.44	1169.50	1167.03		1169.97	1170.60		
1/20/2020	1171.99	1168.82	1169.48	1169.53	1167.09		1170.07	1170.70		
1/21/2020	1172.16	1168.88	1169.53	1169.59	1167.10		1170.07	1170.70		
1/22/2020	1172.18	1168.92	1169.59	1169.64	1167.15		1170.17	1170.80		
1/23/2020	1172.23	1168.94	1169.62	1169.68	1167.14		1170.07	1170.80		
1/24/2020	1172.31	1168.97	1169.65	1169.71	1167.19		1170.17	1170.90		
1/25/2020	1172.37	1169.03	1169.73	1169.78	1167.22		1170.27	1170.90		
1/26/2020	1172.42	1169.11	1169.81	1169.86	1167.29		1170.27	1171.00		
1/27/2020	1172.47	1169.20	1169.88	1169.94	1167.41		1170.37	1171.10		
1/28/2020	1172.54	1169.23	1169.92	1169.98	1167.42		1170.37	1171.00		
1/29/2020	1172.62	1169.23	1169.92	1169.98	1167.43		1170.37	1171.00		
1/30/2020	1172.67	1169.23	1169.92	1169.98	1167.41		1170.37	1171.10		
1/31/2020	1172.69	1169.22	1169.93	1169.99	1167.41		1170.37	1171.10		
2/1/2020	1172.71	1169.24	1169.95	1170.01	1167.39		1170.47	1171.10		
2/2/2020	1172.73	1169.25	1169.96	1170.03	1167.40		1170.37	1171.10		
2/3/2020	1172.77	1169.24	1169.96	1170.03	1167.45		1170.47	1171.20		
2/4/2020	1172.83	1169.26	1169.98	1170.04	1167.44		1170.57	1171.10		
2/5/2020	1172.84	1169.23	1169.96	1170.02	1167.44		1170.57	1171.20		
2/6/2020	1172.80	1169.30	1170.01	1170.08	1167.49		1169.47	1171.20		
2/7/2020		1169.37	1170.09		1167.59		1170.57	1171.20		
2/8/2020		1169.34	1170.06		1167.56		1170.67	1163.40		
2/9/2020		1169.32	1170.02		1167.48		1170.57	1171.20		
2/10/2020		1169.37	1170.08		1167.60		1170.67	1171.30		
2/11/2020		1169.44	1170.13		1167.61		1170.57	1171.20		
2/12/2020		1169.41	1170.12		1167.62		1170.67	1171.40		
2/13/2020		1169.48	1170.16		1167.62		1170.57	1171.30		
2/14/2020		1169.40	1170.12		1167.64		1170.67	1171.30		
2/15/2020		1169.44	1170.15		1167.62		1170.57	1171.20		
2/16/2020		1169.38	1170.10		1167.50		1170.57	1171.20		
2/17/2020		1169.35	1170.08		1167.56		1170.57	1171.20		
2/18/2020		1169.41	1170.13		1167.55		1170.47	1171.20		
2/19/2020		1169.34	1170.08		1167.54		1170.47	1171.10		
2/20/2020		1169.35	1170.08		1167.51		1170.47	1171.10		
2/21/2020		1169.31	1170.05		1167.50		1170.47	1171.10		
2/22/2020		1169.32	1170.06		1167.50		1170.37	1171.00		
2/23/2020		1169.27	1170.01		1167.38		1170.37	1171.00		
2/24/2020		1169.24	1169.99		1167.41		1170.37	1171.00		
2/25/2020		1169.25	1170.00		1167.42		1170.27	1171.00		
2/26/2020		1169.24	1170.00		1167.42		1170.47	1171.10		
2/27/2020		1169.45	1170.22		1167.63		1170.67	1171.30		
2/28/2020		1169.53	1170.24		1167.75		1170.77	1171.40		
2/29/2020		1169.60	1170.31		1167.79		1170.77	1171.40		
3/1/2020		1169.61	1170.33		1167.73		1170.77	1171.40		
3/2/2020		1169.69	1170.42		1167.83		1170.87	1171.50		
3/3/2020		1169.84	1170.57		1167.93		1170.97	1171.70		
3/4/2020		1169.94	1170.66		1168.12		1171.27	1171.90		
3/5/2020		1170.07	1170.79		1168.20		1171.37	1172.00		
3/6/2020		1170.22	1170.95		1168.32		1171.47	1172.10		
3/7/2020		1170.33	1171.07		1168.39		1168.37	1164.20		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
3/8/2020		1170.33	1171.09		1168.22		1171.47	1172.10		
3/9/2020		1170.49	1171.26		1168.46		1171.57	1172.20		
3/10/2020		1170.64	1171.42		1168.58		1171.67	1172.30		
3/11/2020		1170.70	1171.50		1168.65		1171.77	1172.40		
3/12/2020		1170.79	1171.60		1168.69		1171.87	1172.50		
3/13/2020		1170.85	1171.68		1168.77		1171.87	1172.50		
3/14/2020		1170.86	1171.72		1168.77		1171.87	1172.50		
3/15/2020		1170.86	1171.72		1168.71		1171.87	1172.50		
3/16/2020		1170.90	1171.77		1168.78		1171.97	1172.60		
3/17/2020		1170.94	1171.82		1168.79		1171.87	1172.50		
3/18/2020		1170.89	1171.79		1168.77		1171.97	1172.60		
3/19/2020		1170.93	1171.83		1168.78		1171.97	1172.60		
3/20/2020		1170.97	1171.87		1168.82		1171.97	1172.60		
3/21/2020		1170.90	1171.81		1168.76		1171.87	1172.50		
3/22/2020		1170.83	1171.74		1168.65		1171.87	1172.50		
3/23/2020		1170.84	1171.77		1168.70		1171.87	1172.50		
3/24/2020		1170.84	1171.76		1168.69		1171.77	1172.40		
3/25/2020		1170.81	1171.74		1168.67		1171.87	1172.50		
3/26/2020		1170.83	1171.74		1168.64		1171.77	1172.40		
3/27/2020		1170.75	1171.68		1168.63		1171.77	1172.40		
3/28/2020		1170.74	1171.60		1168.59		1171.67	1172.40		
3/29/2020		1170.78	1171.19		1168.58		1171.77	1172.40		
3/30/2020		1170.78	1171.66		1168.66		1171.87	1172.50		
3/31/2020		1170.82	1171.69		1168.68		1171.87	1172.50		
4/1/2020		1170.83	1171.69		1168.70		1171.87	1172.50		
4/2/2020		1170.81	1171.67		1168.66		1171.77	1172.50		
4/3/2020		1170.76	1171.63		1168.64		1171.77	1172.40		
4/4/2020		1170.74	1171.61		1168.60		1171.67	1172.30		
4/5/2020		1170.67	1171.53		1168.47		1171.67	1172.30		
4/6/2020		1170.64	1171.51		1168.49		1171.67	1172.30		
4/7/2020		1170.66	1171.51		1168.46		1171.67	1172.30		
4/8/2020		1170.62	1171.50		1168.47		1171.67	1172.30		
4/9/2020		1170.63	1171.49		1168.44		1171.67	1172.30		
4/10/2020		1170.58	1171.46		1168.45		1171.57	1172.30		
4/11/2020		1170.54	1171.41		1168.40		1171.47	1172.10		
4/12/2020		1170.48	1171.34		1168.29		1171.57	1172.20		
4/13/2020		1170.21	1170.95		1168.35		1171.47	1172.20		
4/14/2020		1170.43	1171.30		1168.28		1142.27	1172.00		
4/15/2020		1170.40	1171.25		1168.27		1171.37	1172.00		
4/16/2020		1170.34	1171.20		1168.20		1171.37	1172.00		
4/17/2020		1170.30	1171.16		1168.19		1171.37	1172.10		
4/18/2020		1170.28	1171.15		1168.17		1171.27	1171.90		
4/19/2020		1170.23	1171.08		1168.07		1171.27	1171.90		
4/20/2020		1170.19	1171.05		1168.10		1171.27	1172.00		
4/21/2020		1170.16	1171.01		1168.05		1171.17	1171.80		
4/22/2020		1170.08	1170.94		1168.00		1171.17	1171.80		
4/23/2020		1170.03	1170.88		1167.93		1171.07	1171.70		
4/24/2020		1169.98	1170.84		1167.92		1171.07	1171.70		
4/25/2020		1169.91	1170.77		1167.84		1170.97	1171.60		
4/26/2020		1169.86	1170.69		1167.73		1170.97	1171.70		
4/27/2020		1169.99	1170.82		1167.93		1171.07	1171.70		
4/28/2020		1169.97	1170.80		1167.94		1171.07	1171.70		
4/29/2020		1169.97	1170.79		1167.97		1171.17	1171.80		
4/30/2020		1170.01	1170.82		1167.95		1171.47	1172.10		
5/1/2020		1170.44	1171.25		1168.51		1171.47	1171.90		
5/2/2020		1170.65	1171.41		1168.63		1171.87	1172.50		
5/3/2020		1170.86	1171.59		1168.70		1171.97	1172.60		
5/4/2020		1171.01	1171.76		1168.84		1172.07	1172.70		
5/5/2020		1171.16	1171.92		1168.94		1172.17	1172.70		
5/6/2020		1171.24	1172.03		1169.01		1172.27	1172.80		
5/7/2020		1171.34	1172.14		1169.06		1172.27	1172.90		
5/8/2020		1171.38	1172.22		1169.11		1172.27	1172.90		
5/9/2020		1171.43	1172.28		1169.15		1172.27	1172.90		
5/10/2020		1171.41	1172.29		1169.07		1172.27	1172.90		
5/11/2020		1171.42	1172.32		1169.10		1172.37	1173.00		
5/12/2020		1171.43	1172.33		1169.11		1172.27	1172.90		
5/13/2020		1171.37	1172.30		1169.07		1172.27	1172.90		
5/14/2020		1171.39	1172.31		1169.03		1172.27	1172.90		
5/15/2020		1171.37	1172.31		1169.05		1172.27	1172.90		
5/16/2020		1171.37	1172.31		1169.08		1172.27	1172.90		
5/17/2020		1171.33	1172.25		1168.97		1172.27	1172.80		
5/18/2020		1171.31	1172.24		1168.99		1172.17	1172.80		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
5/19/2020		1171.29	1172.21		1168.94		1172.17	1172.70		
5/20/2020		1171.23	1172.15		1168.91		1172.07	1172.70		
5/21/2020		1171.19	1172.09		1168.82		1172.07	1172.70		
5/22/2020		1171.13	1172.05		1168.82		1171.97	1172.60		
5/23/2020		1171.09	1172.02		1168.80		1171.97	1172.60		
5/24/2020		1171.01	1171.92		1168.66		1171.97	1172.60		
5/25/2020		1170.95	1171.87		1168.67		1171.87	1172.50		
5/26/2020		1170.91	1171.82		1168.61		1171.77	1172.40		
5/27/2020		1170.83	1171.74		1168.58		1171.87	1172.50		
5/28/2020		1170.77	1171.68		1168.49		1171.77	1172.40		
5/29/2020		1170.69	1171.62		1168.47		1171.77	1172.30		
5/30/2020		1170.73	1171.64		1168.49		1171.67	1172.30		
5/31/2020		1170.59	1171.50		1168.29		1171.57	1172.20		
6/1/2020		1170.52	1171.43		1168.27		1170.47	1172.10		
6/2/2020		1170.47	1171.36		1168.18		1171.37	1172.00		
6/3/2020		1170.37	1171.27		1168.12		1171.27	1171.90		
6/4/2020		1170.26	1171.17		1167.98		1171.17	1171.90		
6/5/2020		1170.14	1171.06		1167.93		1170.97	1171.60		
6/6/2020		1170.04	1170.96		1167.83		1170.97	1171.60		
6/7/2020		1169.88	1170.79		1167.64		1170.87	1171.50		
6/8/2020		1169.77	1170.69		1167.61		1170.77	1171.40		
6/9/2020		1169.66	1170.58		1167.51		1170.67	1171.30		
6/10/2020		1169.54	1170.45		1167.43		1170.67	1171.30		
6/11/2020		1169.40	1170.31		1167.27		1170.47	1171.20		
6/12/2020		1169.28	1170.19		1167.24		1170.37	1171.00		
6/13/2020		1169.17	1170.06		1167.12		1170.17	1170.80		
6/14/2020		1168.99	1169.88		1166.91		1170.07	1170.70		
6/15/2020		1168.87	1169.76		1166.88		1169.87	1170.50		
6/16/2020		1168.76	1169.64		1166.77		1169.87	1170.50		
6/17/2020		1168.62	1169.50		1166.68		1169.77	1170.40		
6/18/2020		1168.50	1169.38		1166.54		1169.67	1170.30		
6/19/2020		1168.40	1169.26		1166.50		1169.47	1170.10		
6/20/2020		1168.29	1169.15		1166.43		1169.37	1170.10		
6/21/2020		1168.15	1168.99		1166.23		1169.27	1170.00		
6/22/2020		1168.02	1168.86		1166.21		1167.27	1169.00		
6/23/2020		1167.90	1168.74		1166.08		1169.07	1169.80		
6/24/2020		1167.78	1168.62		1166.03		1168.97	1169.70		
6/25/2020		1167.69	1168.50		1165.91		1168.97	1169.60		
6/26/2020		1167.57	1168.38		1165.86		1168.87	1169.50		
6/27/2020		1167.49	1168.30		1165.81		1168.77	1169.40		
6/28/2020		1167.37	1168.17		1165.64		1168.07	1168.80		
6/29/2020		1167.24	1168.02		1165.52		1168.57	1169.20		
6/30/2020		1167.17	1167.93		1165.46		1168.37	1169.00		
7/1/2020		1167.04	1167.81		1165.38		1168.37	1169.00		
7/2/2020		1166.93	1167.70		1165.25		1168.17	1168.90		
7/3/2020		1166.80	1167.57		1165.18		1168.17	1168.80		
7/4/2020		1166.70	1167.46		1165.07		1167.97	1158.60		
7/5/2020		1166.55	1167.30		1164.87		1167.87	1168.50		
7/6/2020		1166.42	1167.18		1164.84		1167.57	1168.30		
7/7/2020		1166.31	1167.07		1164.69		1167.57	1168.20		
7/8/2020		1166.18	1166.93		1164.61		1167.57	1168.30		
7/9/2020		1166.08	1166.82		1164.45		1167.37	1168.10		
7/10/2020		1165.95	1166.70		1164.42		1167.37	1168.10		
7/11/2020		1165.90	1166.64		1164.38		1167.27	1168.00		
7/12/2020		1165.92	1166.64		1164.35		1167.17	1167.90		
7/13/2020		1165.82	1166.53		1164.33		1167.27	1167.90		
7/14/2020		1165.76	1166.45		1164.21		1166.97	1167.70		
7/15/2020		1165.64	1166.33		1164.16		1166.97	1167.60		
7/16/2020		1165.56	1166.24		1164.03		1166.57	1167.50		
7/17/2020		1165.45	1166.14		1163.99		1166.77	1167.50		
7/18/2020		1165.36	1166.05		1163.88		1166.57	1167.30		
7/19/2020		1165.21	1165.90		1163.67		1166.57	1167.20		
7/20/2020		1165.11	1165.81		1163.68		1166.47	1167.20		
7/21/2020		1165.02	1165.70		1163.55		1166.27	1167.00		
7/22/2020		1164.89	1165.57		1163.46		1166.27	1167.00		
7/23/2020		1164.80	1165.48		1163.33		1166.07	1166.80		
7/24/2020		1164.68	1165.36		1163.27		1166.07	1166.80		
7/25/2020		1164.58	1165.26		1163.15		1165.87	1166.60		
7/26/2020		1164.42	1165.10		1162.92		1165.77	1166.50		
7/27/2020		1164.31	1164.99		1162.91		1165.67	1166.40		
7/28/2020		1164.21	1164.89		1162.78		1165.47	1166.10		
7/29/2020		1164.06	1164.74		1162.65		1165.47	1166.10		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
7/30/2020		1163.98	1164.64		1162.55		1165.27	1166.00		
7/31/2020		1163.83	1164.50		1162.45		1164.67	1165.90		
8/1/2020		1163.73	1164.40		1162.32		1165.47	1166.00		
8/2/2020		1163.57	1164.22		1162.12		1164.47	1166.00		
8/3/2020		1163.44	1164.10		1162.07		1164.47	1166.00		
8/4/2020		1163.40	1164.05		1162.05		1164.47	1165.00		
8/5/2020		1163.31	1163.94		1161.98		1164.47	1165.00		
8/6/2020		1163.26	1163.88		1161.86		1164.47	1165.00		
8/7/2020		1163.14	1163.76		1161.80		1164.47	1165.00		
8/8/2020		1163.05	1163.67		1161.67		1164.47	1165.00		
8/9/2020		1162.88	1163.49		1161.42		1164.47	1165.00		
8/10/2020		1162.76	1163.39		1161.42		1164.47	1165.00		
8/11/2020		1162.72	1163.34		1161.33		1164.47	1165.00		
8/12/2020		1162.61	1163.23		1161.27		1164.47	1165.00		
8/13/2020		1162.54	1163.15		1161.15		1163.47	1165.00		
8/14/2020		1162.42	1163.03		1161.07		1163.47	1165.00		
8/15/2020		1162.34	1162.96		1160.98		1163.47	1164.00		
8/16/2020		1162.17	1162.78		1160.72		1163.47	1164.00		
8/17/2020		1162.06	1162.67		1160.70		1163.47	1164.00		
8/18/2020		1161.99	1162.60		1160.61		1163.47	1164.00		
8/19/2020		1161.82	1162.45		1160.48		1163.47	1164.00		
8/20/2020		1161.74	1162.36		1160.33		1163.47	1164.00		
8/21/2020		1161.60	1162.23		1160.27		1163.47	1164.00		
8/22/2020		1161.51	1162.14		1160.12		1162.47	1163.00		
8/23/2020		1161.34	1161.95		1159.86		1162.47	1163.00		
8/24/2020		1161.23	1161.85		1159.89		1162.47	1163.00		
8/25/2020		1161.15	1161.77		1159.77		1162.47	1163.00		
8/26/2020		1161.02	1161.63		1159.68		1162.47	1163.00		
8/27/2020		1160.95	1161.56		1159.55		1162.47	1163.00		
8/28/2020		1160.83	1161.45		1159.51		1162.47	1163.00		
8/29/2020		1160.76	1161.37		1159.42		1162.47	1163.00		
8/30/2020		1160.62	1161.23		1159.22		1161.47	1163.00		
8/31/2020		1160.50	1161.11		1159.18		1161.47	1163.00		
9/1/2020		1160.42	1161.03		1159.04		1161.47	1162.00		
9/2/2020		1160.28	1160.89		1158.96		1161.47	1162.00		
9/3/2020		1160.21	1160.81		1158.83		1161.47	1162.00		
9/4/2020		1160.08	1160.70		1158.77		1161.47	1162.00		
9/5/2020		1160.01	1160.61		1158.66		1161.47	1162.00		
9/6/2020		1159.87	1160.47		1158.45		1161.47	1162.00		
9/7/2020		1159.76	1160.37		1158.46		1161.47	1162.00		
9/8/2020		1159.71	1160.30		1158.32		1160.47	1162.00		
9/9/2020		1159.55	1160.16		1158.25		1160.47	1162.00		
9/10/2020		1159.47	1160.07		1158.12		1160.47	1162.00		
9/11/2020		1159.34	1159.95		1158.05		1160.47	1161.00		
9/12/2020		1159.28	1159.88		1157.96		1160.47	1161.00		
9/13/2020		1159.15	1159.74		1157.76		1160.47	1161.00		
9/14/2020		1159.03	1159.63		1157.75		1160.47	1161.00		
9/15/2020		1158.96	1159.56		1157.64		1160.47	1161.00		
9/16/2020		1158.84	1159.44		1157.56		1160.47	1161.00		
9/17/2020		1158.77	1159.37		1157.44		1160.47	1161.00		
9/18/2020		1158.64	1159.24		1157.37		1159.47	1161.00		
9/19/2020		1158.57	1159.17		1157.29		1159.47	1161.00		
9/20/2020		1158.45	1159.03		1157.07		1159.47	1160.00		
9/21/2020		1158.32	1158.91		1157.06		1159.47	1160.00		
9/22/2020		1158.26	1158.85		1156.92		1159.47	1160.00		
9/23/2020		1158.18	1158.73		1156.88		1159.47	1160.00		
9/24/2020		1158.18	1158.65		1156.74		1159.47	1160.00		
9/25/2020		1158.18	1158.54		1156.68		1159.47	1160.00		
9/26/2020		1158.19	1158.45		1156.53		1159.47	1160.00		
9/27/2020		1158.19	1158.31		1156.33		1158.47	1160.00		
9/28/2020		1158.19	1158.20		1156.35		1158.47	1160.00		
9/29/2020		1158.19	1158.13		1156.27		1158.47	1160.00		
9/30/2020		1158.19	1158.06		1156.25		1159.47	1160.00		
10/1/2020		1158.19	1158.02		1156.10		1159.38	1159.94		
10/2/2020		1158.20	1157.94		1156.14		1159.28	1159.88		
10/3/2020		1158.19	1157.89		1156.08		1159.19	1159.81		
10/4/2020		1158.20	1157.76		1155.85		1159.10	1159.75		
10/5/2020		1158.19	1157.67		1155.87		1159.00	1159.69		
10/6/2020		1158.20	1157.61		1155.76		1158.91	1159.63		
10/7/2020		1158.19	1157.51		1155.71		1158.81	1159.56		
10/8/2020		1158.20	1157.45		1155.63		1158.72	1159.50		
10/9/2020		1158.19	1157.34		1155.55		1158.63	1159.44		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
10/10/2020		1158.20	1157.28		1155.46		1158.53	1159.38		
10/11/2020		1158.19	1157.16		1155.25		1158.44	1159.31		
10/12/2020		1158.19	1157.06		1155.26		1158.35	1159.25		
10/13/2020		1158.19	1157.01		1155.19		1158.25	1159.19		
10/14/2020		1158.19	1156.91		1155.12		1158.16	1159.13		
10/15/2020		1158.20	1156.88		1155.00		1158.06	1159.06		
10/16/2020		1158.19	1156.77		1155.00		1157.97	1159.00		
10/17/2020		1158.20	1156.73		1154.92		1157.88	1158.94		
10/18/2020		1158.20	1156.61		1154.71		1157.78	1158.88		
10/19/2020		1158.19	1156.52		1154.76		1157.69	1158.81		
10/20/2020		1158.19	1156.54		1154.73		1157.60	1158.75		
10/21/2020		1158.19	1156.46		1154.71		1157.50	1158.69		
10/22/2020		1158.19	1156.41		1154.52		1157.41	1158.63		
10/23/2020		1158.19	1156.37		1154.64		1157.31	1158.56		
10/24/2020		1158.20	1156.32		1154.43		1157.22	1158.50		
10/25/2020		1158.19	1156.19		1154.38		1157.13	1158.44		
10/26/2020		1158.19	1156.15		1154.42		1157.03	1158.38		
10/27/2020		1158.19	1156.12		1154.23		1156.94	1158.31		
10/28/2020		1158.19	1156.09		1154.38		1156.85	1158.25		
10/29/2020		1158.19	1156.04		1154.15		1156.75	1158.19		
10/30/2020		1158.20	1156.11		1154.42		1156.66	1158.13		
10/31/2020		1158.19	1156.07		1154.23		1156.56	1158.06		
11/1/2020		1158.19	1155.95		1154.18		1156.47	1158.00		
11/2/2020		1158.19	1155.94		1154.25		1157.47	1158.00		
11/3/2020		1158.20	1155.90		1154.05		1156.47	1158.00		
11/4/2020		1158.20	1155.90		1154.23		1156.47	1158.00		
11/5/2020		1158.19	1155.84		1154.00		1156.47	1158.00		
11/6/2020		1158.19	1155.80		1154.12		1156.47	1158.00		
11/7/2020		1158.19	1155.76		1153.92		1154.47	1156.00		
11/8/2020		1158.19	1155.63		1153.76		1156.47	1157.00		
11/9/2020		1158.20	1155.62		1153.91		1156.47	1157.00		
11/10/2020		1158.19	1155.58		1153.69		1156.47	1157.00		
11/11/2020		1158.19	1155.57		1153.85		1156.47	1157.00		
11/12/2020		1158.19	1155.65		1153.78		1156.47	1157.00		
11/13/2020		1158.19	1155.66		1154.00		1155.47	1157.00		
11/14/2020		1158.20	1155.67		1153.87		1154.47	1157.00		
11/15/2020		1158.20	1155.59		1153.82		1155.47	1156.00		
11/16/2020		1158.19	1155.64		1153.75		1154.47	1157.00		
11/17/2020		1158.20	1155.56		1153.60		1154.47	1156.00		
11/18/2020		1158.19	1155.55		1153.77		1156.47	1156.00		
11/19/2020		1158.19	1155.62		1153.80		1156.47	1157.00		
11/20/2020		1158.19	1155.58		1153.84		1156.47	1157.00		
11/21/2020		1158.20	1155.61		1153.84		1155.47	1157.00		
11/22/2020		1158.19	1155.50		1153.56		1156.47	1157.00		
11/23/2020		1158.19	1155.59		1153.63		1156.47	1157.00		
11/24/2020		1158.20	1155.63		1153.66		1156.47	1157.00		
11/25/2020		1158.20	1155.57		1153.80		1156.47	1157.00		
11/26/2020		1158.19	1155.68		1153.87		1156.47	1157.00		
11/27/2020		1158.19	1155.71		1153.97		1156.47	1157.00		
11/28/2020		1158.19	1155.84		1154.06		1156.47	1157.00		
11/29/2020		1158.20	1155.87		1153.99		1156.47	1157.00		
11/30/2020		1158.19	1155.99		1154.28		1156.47	1158.00		
12/1/2020		1158.20	1156.18		1154.34		1156.47	1158.00		
12/2/2020		1158.19	1156.29		1154.53		1157.47	1158.00		
12/3/2020		1158.20	1156.48		1154.65		1157.47	1158.00		
12/4/2020		1158.19	1156.60		1154.85		1157.47	1158.00		
12/5/2020		1158.20	1156.81		1154.98		1157.47	1158.00		
12/6/2020		1158.20	1156.88		1154.91		1157.47	1158.00		
12/7/2020		1158.19	1157.00		1155.19		1157.47	1158.00		
12/8/2020		1158.19	1157.15		1155.21		1157.47	1159.00		
12/9/2020		1158.20	1157.19		1155.34		1157.47	1159.00		
12/10/2020		1158.19	1157.29		1155.34		1157.47	1159.00		
12/11/2020		1158.19	1157.32		1155.44		1158.47	1159.00		
12/12/2020		1158.19	1157.41		1155.48		1158.47	1159.00		
12/13/2020		1158.20	1157.37		1155.31		1157.47	1159.00		
12/14/2020		1158.20	1157.43		1155.54		1158.47	1159.00		
12/15/2020		1158.20	1157.50		1155.53		1158.47	1159.00		
12/16/2020		1158.19	1157.51		1155.61		1158.47	1159.00		
12/17/2020		1158.20	1157.60		1155.63		1158.47	1159.00		
12/18/2020		1158.19	1157.57		1155.67		1158.47	1159.00		
12/19/2020		1158.20	1157.63		1155.65		1158.47	1159.00		
12/20/2020		1158.19	1157.59		1155.52		1158.47	1159.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
12/21/2020		1158.19	1157.63		1155.75		1158.47	1159.00		
12/22/2020		1158.20	1157.69		1155.72		1158.47	1159.00		
12/23/2020		1158.20	1157.66		1155.80		1158.47	1159.00		
12/24/2020		1158.18	1157.73		1155.84		1158.47	1160.00		
12/25/2020		1158.28	1158.46		1157.06		1160.47	1161.00		
12/26/2020		1159.07	1159.05		1158.31		1160.47	1162.00		
12/27/2020		1159.44	1159.61		1159.07		1161.47	1162.00		
12/28/2020		1160.16	1160.27		1159.88		1162.47	1163.00		
12/29/2020		1160.77	1160.84		1160.30		1162.47	1163.00		
12/30/2020		1161.26	1161.34		1160.76		1163.47	1164.00		
12/31/2020		1161.71	1161.80		1161.05		1163.47	1164.00		
1/1/2021		1162.03	1162.14		1161.35		1163.47	1165.00		
1/2/2021		1162.46	1162.63		1161.72		1164.47	1165.00		
1/3/2021		1162.75	1162.94		1161.94		1164.47	1165.00		
1/4/2021		1163.08	1163.29		1162.35		1164.47	1166.00		
1/5/2021		1163.50	1163.66		1162.59		1165.47	1166.00		
1/6/2021		1163.76	1163.95		1162.89		1165.47	1166.00		
1/7/2021		1164.06	1164.25		1163.03		1165.47	1166.00		
1/8/2021		1164.30	1164.53		1163.34		1165.47	1167.00		
1/9/2021		1164.53	1164.77		1163.44		1165.47	1167.00		
1/10/2021		1164.59	1164.86		1163.38		1166.47	1167.00		
1/11/2021		1164.77	1165.08		1163.69		1166.47	1167.00		
1/12/2021		1164.90	1165.22		1163.74		1166.47	1167.00		
1/13/2021		1165.00	1165.35		1163.88		1166.47	1167.00		
1/14/2021		1165.11	1165.46		1163.88		1166.47	1167.00		
1/15/2021		1165.19	1165.58		1164.05		1166.47	1167.00		
1/16/2021		1165.35	1165.73		1164.12		1166.47	1167.00		
1/17/2021		1165.34	1165.75		1164.01		1166.47	1168.00		
1/18/2021		1165.48	1165.90		1164.29		1166.47	1168.00		
1/19/2021		1165.59	1166.01		1164.31		1166.47	1168.00		
1/20/2021		1165.65	1166.09		1164.41		1167.47	1168.00		
1/21/2021		1165.81	1166.23		1164.45		1167.47	1168.00		
1/22/2021		1165.85	1166.30		1164.57		1167.47	1168.00		
1/23/2021		1165.90	1166.35		1164.53		1167.47	1168.00		
1/24/2021		1165.89	1166.36		1164.43		1167.47	1168.00		
1/25/2021		1165.97	1166.46		1164.66		1167.47	1168.00		
1/26/2021		1166.05	1166.54		1164.69		1167.47	1168.00		
1/27/2021		1166.01	1166.51		1164.68		1167.47	1168.00		
1/28/2021		1166.03	1166.54		1164.62		1167.47	1168.00		
1/29/2021		1166.05	1166.57		1164.71		1167.47	1168.00		
1/30/2021		1166.06	1166.58		1164.68		1167.47	1168.00		
1/31/2021		1166.01	1166.54		1164.55		1167.47	1168.00		
2/1/2021		1166.05	1166.59		1164.72		1167.47	1168.00		
2/2/2021		1166.11	1166.65		1164.72		1167.47	1168.00		
2/3/2021		1166.08	1166.63		1164.75		1167.47	1168.00		
2/4/2021		1166.04	1166.58		1164.63		1167.47	1168.00		
2/5/2021		1166.06	1166.62		1164.72		1167.47	1168.00		
2/6/2021		1166.00	1166.56		1164.61		1166.47	1161.00		
2/7/2021		1165.94	1166.49		1164.46		1167.47	1168.00		
2/8/2021		1165.90	1166.47		1164.56		1167.47	1168.00		
2/9/2021		1165.90	1166.46		1164.53		1167.47	1168.00		
2/10/2021		1165.84	1166.41		1164.48		1167.47	1168.00		
2/11/2021		1165.81	1166.37		1164.40		1167.47	1168.00		
2/12/2021		1165.77	1166.35		1164.44		1167.47	1168.00		
2/13/2021		1165.76	1166.34		1164.38		1167.47	1168.00		
2/14/2021		1165.65	1166.23		1164.19		1167.47	1168.00		
2/15/2021		1165.64	1166.24		1164.32		1167.47	1168.00		
2/16/2021		1165.69	1166.26		1164.31		1166.47	1168.00		
2/17/2021		1165.56	1166.14		1164.23		1166.47	1168.00		
2/18/2021		1165.54	1166.09		1164.12		1166.47	1168.00		
2/19/2021		1165.50	1166.09		1164.17		1166.47	1168.00		
2/20/2021		1165.46	1166.05		1164.09		1166.47	1168.00		
2/21/2021		1165.35	1165.92		1163.87		1166.47	1167.00		
2/22/2021		1165.42	1166.00		1164.06		1166.47	1167.00		
2/23/2021		1165.38	1165.97		1163.97		1166.47	1167.00		
2/24/2021		1165.32	1165.92		1163.95		1166.47	1167.00		
2/25/2021		1165.23	1165.82		1163.81		1166.47	1167.00		
2/26/2021		1165.20	1165.79		1163.82		1166.47	1167.00		
2/27/2021		1165.26	1165.84		1163.84		1166.47	1167.00		
2/28/2021		1165.24	1165.80		1163.70		1166.47	1167.00		
3/1/2021		1165.34	1165.92		1163.91		1166.47	1167.00		
3/2/2021		1165.43	1166.00		1163.96		1166.47	1167.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
3/3/2021		1165.57	1166.12		1164.13		1166.47	1167.00		
3/4/2021		1165.71	1166.23		1164.18		1166.47	1168.00		
3/5/2021		1165.84	1166.36		1164.33		1167.47	1168.00		
3/6/2021		1165.93	1166.45		1164.38		1167.47	1168.00		
3/7/2021		1165.94	1166.47		1164.29		1167.47	1168.00		
3/8/2021		1166.01	1166.56		1164.47		1167.47	1168.00		
3/9/2021		1166.07	1166.61		1164.49		1167.47	1168.00		
3/10/2021		1166.10	1166.67		1164.55		1167.47	1168.00		
3/11/2021		1166.27	1166.85		1164.64		1168.47	1168.00		
3/12/2021		1166.47	1167.02		1165.08		1168.47	1169.00		
3/13/2021		1166.81	1167.30		1165.43		1168.47	1169.00		
3/14/2021		1167.11	1167.56		1165.59		1168.47	1169.00		
3/15/2021		1167.40	1167.85		1165.92		1168.47	1169.00		
3/16/2021		1167.70	1168.13		1166.09		1169.47	1170.00		
3/17/2021		1167.90	1168.35		1166.30		1169.47	1170.00		
3/18/2021		1168.13	1168.58		1166.40		1169.47	1170.00		
3/19/2021		1168.30	1168.77		1166.63		1169.47	1170.00		
3/20/2021		1168.49	1168.96		1166.73		1169.47	1170.00		
3/21/2021		1168.62	1169.11		1166.76		1169.47	1170.00		
3/22/2021		1168.82	1169.33		1167.02		1170.47	1171.00		
3/23/2021		1168.98	1169.50		1167.07		1170.47	1171.00		
3/24/2021		1169.12	1169.67		1167.24		1170.47	1171.00		
3/25/2021		1169.26	1169.82		1167.25		1170.47	1171.00		
3/26/2021		1169.44	1170.01		1167.46		1170.47	1171.00		
3/27/2021		1169.51	1170.11		1167.46		1170.47	1164.00		
3/28/2021		1169.66	1170.27		1167.51		1170.47	1171.00		
3/29/2021		1169.71	1170.34		1167.65		1170.47	1171.00		
3/30/2021		1169.83	1170.46		1167.67		1170.47	1171.00		
3/31/2021		1169.91	1170.56		1167.78		1170.47	1171.00		
4/1/2021		1169.96	1170.62		1167.76		1170.47	1172.00		
4/2/2021		1169.99	1170.68		1167.85		1171.47	1172.00		
4/3/2021		1170.05	1170.73		1167.84		1170.47	1172.00		
4/4/2021		1170.02	1170.73		1167.78		1170.47	1172.00		
4/5/2021		1170.06	1170.79		1167.91		1170.47	1172.00		
4/6/2021		1170.06	1170.80		1167.87		1171.47	1172.00		
4/7/2021		1170.02	1170.78		1167.89		1170.47	1172.00		
4/8/2021		1169.97	1170.73		1167.79		1170.47	1172.00		
4/9/2021		1169.91	1170.71		1167.83		1170.47	1172.00		
4/10/2021		1169.87	1170.66		1167.76		1170.47	1171.00		
4/11/2021		1169.79	1170.59		1167.65		1170.47	1171.00		
4/12/2021		1169.73	1170.55		1167.71		1170.47	1171.00		
4/13/2021		1169.69	1170.50		1167.63		1170.47	1171.00		
4/14/2021		1169.69	1170.50		1167.65		1170.47	1171.00		
4/15/2021		1169.68	1170.47		1167.58		1170.47	1171.00		
4/16/2021		1169.66	1170.46		1167.63		1170.47	1171.00		
4/17/2021		1169.64	1170.44		1167.57		1169.47	1164.00		
4/18/2021		1169.58	1170.37		1167.45		1170.47	1171.00		
4/19/2021		1169.60	1170.41		1167.57		1170.47	1171.00		
4/20/2021		1169.55	1170.35		1167.50		1170.47	1171.00		
4/21/2021		1169.55	1170.36		1167.53		1170.47	1171.00		
4/22/2021		1169.53	1170.32		1167.47		1170.47	1171.00		
4/23/2021		1169.55	1170.34		1167.53		1170.47	1171.00		
4/24/2021		1169.57	1170.34		1167.49		1170.47	1171.00		
4/25/2021		1169.52	1170.29		1167.40		1170.47	1171.00		
4/26/2021		1169.50	1170.29		1167.48		1170.47	1171.00		
4/27/2021		1169.51	1170.29		1167.44		1170.47	1171.00		
4/28/2021		1169.45	1170.25		1167.44		1170.47	1171.00		
4/29/2021		1169.42	1170.23		1167.36		1170.47	1171.00		
4/30/2021		1169.51	1170.32		1167.54		1170.47	1171.00		
5/1/2021		1169.52	1170.32		1167.53		1170.47	1171.00		
5/2/2021		1169.52	1170.29		1167.46		1170.47	1171.00		
5/3/2021		1169.60	1170.38		1167.61		1170.47	1171.00		
5/4/2021		1169.67	1170.44		1167.62		1170.47	1171.00		
5/5/2021		1169.70	1170.47		1167.68		1170.47	1171.00		
5/6/2021		1169.74	1170.49		1167.65		1170.47	1171.00		
5/7/2021		1169.80	1170.56		1167.75		1170.47	1171.00		
5/8/2021		1169.91	1170.67		1167.82		1170.47	1171.00		
5/9/2021		1169.94	1170.68		1167.81		1171.47	1172.00		
5/10/2021		1170.08	1170.83		1168.03		1171.47	1172.00		
5/11/2021		1170.18	1170.90		1168.08		1171.47	1172.00		
5/12/2021		1170.23	1170.97		1168.16		1171.47	1172.00		
5/13/2021		1170.29	1171.03		1168.15		1171.47	1172.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
5/14/2021		1170.37	1171.11		1168.26		1171.47	1172.00		
5/15/2021		1170.41	1171.16		1168.25		1171.47	1172.00		
5/16/2021		1170.39	1171.14		1168.18		1171.47	1172.00		
5/17/2021		1170.41	1171.20		1168.29		1171.47	1172.00		
5/18/2021		1170.40	1171.19		1168.23		1171.47	1172.00		
5/19/2021		1170.33	1171.16		1168.22		1171.47	1172.00		
5/20/2021		1170.27	1171.10		1168.12		1171.47	1172.00		
5/21/2021		1170.16	1171.04		1168.08		1171.47	1172.00		
5/22/2021		1170.10	1170.99		1167.99		1171.47	1172.00		
5/23/2021		1169.99	1170.87		1167.85		1171.47	1172.00		
5/24/2021		1169.94	1170.82		1167.92		1169.47	1171.00		
5/25/2021		1169.86	1170.76		1167.84		1171.47	1172.00		
5/26/2021		1169.78	1170.67		1167.80		1170.47	1172.00		
5/27/2021		1169.71	1170.59		1167.70		1170.47	1172.00		
5/28/2021		1169.64	1170.53		1167.70		1171.47	1172.00		
5/29/2021		1169.62	1170.50		1167.67		1169.47	1164.00		
5/30/2021		1169.53	1170.39		1167.52		1170.47	1171.00		
5/31/2021		1169.56	1170.40		1167.62		1170.47	1171.00		
6/1/2021		1169.51	1170.35		1167.54		1170.47	1171.00		
6/2/2021		1169.43	1170.29		1167.51		1170.47	1171.00		
6/3/2021		1169.38	1170.21		1167.43		1170.47	1171.00		
6/4/2021		1169.47	1170.33		1167.57		1170.47	1171.00		
6/5/2021		1169.42	1170.25		1167.51		1170.47	1171.00		
6/6/2021		1169.31	1170.13		1167.36		1170.47	1171.00		
6/7/2021		1169.29	1170.11		1167.44		1170.47	1171.00		
6/8/2021		1169.23	1170.04		1167.36		1170.47	1171.00		
6/9/2021		1169.13	1169.96		1167.34		1170.47	1171.00		
6/10/2021		1169.04	1169.86		1167.21		1170.47	1171.00		
6/11/2021		1168.97	1169.79		1167.22		1170.47	1171.00		
6/12/2021		1168.89	1169.71		1167.13		1170.47	1171.00		
6/13/2021		1168.75	1169.57		1166.97		1170.47	1171.00		
6/14/2021		1168.67	1169.59		1167.03		1170.47	1171.00		
6/15/2021		1168.61	1169.41		1166.93		1170.47	1171.00		
6/16/2021		1168.50	1169.31		1166.88		1169.47	1170.00		
6/17/2021		1168.39	1169.18		1166.73		1169.47	1170.00		
6/18/2021		1168.29	1169.10		1166.72		1169.47	1170.00		
6/19/2021		1168.21	1169.00		1166.62		1169.47	1170.00		
6/20/2021		1168.08	1168.86		1166.46		1169.47	1170.00		
6/21/2021		1168.06	1168.83		1166.54		1169.47	1170.00		
6/22/2021		1167.97	1168.74		1166.44		1169.47	1170.00		
6/23/2021		1167.85	1168.61		1166.37		1169.47	1170.00		
6/24/2021		1167.76	1168.50		1166.21		1169.47	1170.00		
6/25/2021		1167.67	1168.42		1166.22		1169.47	1170.00		
6/26/2021		1167.59	1168.32		1166.09		1169.47	1170.00		
6/27/2021		1167.44	1168.17		1165.90		1169.47	1170.00		
6/28/2021		1167.35	1168.10		1165.94		1168.47	1169.00		
6/29/2021		1167.25	1167.99		1165.79		1168.47	1169.00		
6/30/2021		1167.15	1167.90		1165.74		1168.47	1169.00		
7/1/2021		1167.13	1167.84		1165.63		1168.47	1169.00		
7/2/2021		1167.16	1167.91		1165.73		1168.47	1169.00		
7/3/2021		1167.12	1167.82		1165.65		1168.47	1169.00		
7/4/2021		1167.01	1167.70		1165.47		1168.47	1169.00		
7/5/2021		1166.98	1167.68		1165.56		1168.47	1169.00		
7/6/2021		1166.93	1167.62		1165.46		1168.47	1169.00		
7/7/2021		1166.87	1167.56		1165.47		1168.47	1169.00		
7/8/2021		1166.90	1167.59		1165.44		1168.47	1169.00		
7/9/2021		1167.06	1167.78		1165.68		1168.47	1169.00		
7/10/2021		1167.04	1167.70		1165.61		1168.47	1169.00		
7/11/2021		1166.97	1167.62		1165.45		1168.47	1169.00		
7/12/2021		1167.07	1167.75		1165.68		1166.47	1168.00		
7/13/2021		1167.08	1167.73		1165.58		1168.47	1169.00		
7/14/2021		1167.21	1167.98		1165.84		1168.47	1169.00		
7/15/2021		1167.50	1168.11		1165.96		1169.47	1170.00		
7/16/2021		1167.59	1168.21		1166.13		1169.47	1170.00		
7/17/2021		1167.71	1168.32		1166.16		1168.47	1162.00		
7/18/2021		1167.78	1168.40		1166.18		1169.47	1170.00		
7/19/2021		1167.92	1168.53		1166.37		1169.47	1170.00		
7/20/2021		1168.00	1168.61		1166.36		1169.47	1170.00		
7/21/2021		1168.06	1168.69		1166.47		1169.47	1170.00		
7/22/2021		1168.11	1168.73		1166.43		1169.47	1170.00		
7/23/2021		1168.16	1168.80		1166.55		1169.47	1170.00		
7/24/2021		1168.19	1168.83		1166.49		1168.47	1162.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
7/25/2021		1168.11	1168.78		1166.38		1169.47	1170.00		
7/26/2021		1168.09	1168.79		1166.46		1169.47	1170.00		
7/27/2021		1168.07	1168.82		1166.39		1169.47	1170.00		
7/28/2021		1168.00	1168.71		1166.40		1169.47	1170.00		
7/29/2021		1168.00	1168.68		1166.32		1169.47	1170.00		
7/30/2021		1167.94	1168.65		1166.39		1169.47	1170.00		
7/31/2021		1167.90	1168.59		1166.26		1169.47	1170.00		
8/1/2021		1167.78	1168.59		1166.12		1169.47	1170.00		
8/2/2021		1167.95	1168.68		1166.33		1169.47	1170.00		
8/3/2021		1167.93	1168.61		1166.26		1169.47	1170.00		
8/4/2021		1167.91	1168.60		1166.31		1169.47	1170.00		
8/5/2021		1167.89	1168.57		1166.24		1169.47	1170.00		
8/6/2021		1167.85	1168.54		1166.29		1169.47	1170.00		
8/7/2021		1167.82	1168.50		1166.21		1169.47	1170.00		
8/8/2021		1167.73	1168.42		1166.08		1169.47	1170.00		
8/9/2021		1167.72	1168.42		1166.22		1169.47	1170.00		
8/10/2021		1167.68	1168.37		1166.15		1169.47	1170.00		
8/11/2021		1167.62	1168.32		1166.15		1169.47	1170.00		
8/12/2021		1167.56	1168.25		1166.04		1169.47	1170.00		
8/13/2021		1167.50	1168.20		1166.05		1169.47	1170.00		
8/14/2021		1167.41	1168.12		1165.91		1168.47	1162.00		
8/15/2021		1167.29	1167.98		1165.72		1168.47	1169.00		
8/16/2021		1167.24	1167.94		1165.81		1168.47	1169.00		
8/17/2021		1167.25	1168.00		1165.83		1168.47	1169.00		
8/18/2021		1167.53	1168.24		1166.19		1169.47	1170.00		
8/19/2021		1168.11	1168.50		1166.80		1170.47	1171.00		
8/20/2021		1168.45	1169.01		1167.07		1170.47	1171.00		
8/21/2021		1168.70	1169.22		1167.12		1170.47	1171.00		
8/22/2021		1168.88	1169.40		1167.11		1170.47	1171.00		
8/23/2021		1169.09	1169.63		1167.35		1170.47	1171.00		
8/24/2021		1169.25	1169.81		1167.38		1170.47	1171.00		
8/25/2021		1169.35	1169.95		1167.48		1170.47	1171.00		
8/26/2021		1169.44	1170.05		1167.49		1170.47	1171.00		
8/27/2021		1169.50	1170.16		1167.62		1170.47	1171.00		
8/28/2021		1169.70	1170.37		1167.77		1170.47	1171.00		
8/29/2021		1169.74	1170.41		1167.73		1171.47	1172.00		
8/30/2021		1169.85	1170.54		1167.94		1171.47	1172.00		
8/31/2021		1169.90	1170.60		1167.92		1171.47	1172.00		
9/1/2021		1169.90	1170.66		1167.97		1171.47	1172.00		
9/2/2021		1169.89	1170.64		1167.90		1171.47	1172.00		
9/3/2021		1169.89	1170.67		1167.93		1171.47	1172.00		
9/4/2021		1169.88	1170.66		1167.87		1170.47	1164.00		
9/5/2021		1169.81	1170.60		1167.77		1171.47	1172.00		
9/6/2021		1169.81	1170.61		1167.88		1171.47	1172.00		
9/7/2021		1169.77	1170.57		1167.79		1171.47	1172.00		
9/8/2021		1169.74	1170.54		1167.81		1171.47	1172.00		
9/9/2021		1169.76	1170.56		1167.78		1171.47	1172.00		
9/10/2021		1169.77	1170.56		1167.88		1171.47	1172.00		
9/11/2021		1169.78	1170.55		1167.83		1171.47	1172.00		
9/12/2021		1169.71	1170.48		1167.71		1171.47	1172.00		
9/13/2021		1169.77	1170.53		1167.87		1170.47	1171.00		
9/14/2021		1169.75	1170.52		1167.84		1171.47	1172.00		
9/15/2021		1169.73	1170.54		1167.84		1171.47	1172.00		
9/16/2021		1169.76	1170.52		1167.76		1171.47	1172.00		
9/17/2021		1169.76	1170.54		1167.82		1171.47	1172.00		
9/18/2021		1169.77	1170.54		1167.73		1170.47	1164.00		
9/19/2021		1169.67	1170.45		1167.54		1170.47	1171.00		
9/20/2021		1169.65	1170.44		1167.60		1170.47	1171.00		
9/21/2021		1169.60	1170.41		1167.51		1170.47	1171.00		
9/22/2021		1169.55	1170.37		1167.51		1170.47	1171.00		
9/23/2021		1169.51	1170.44		1167.48		1170.47	1171.00		
9/24/2021		1169.57	1170.40		1167.58		1170.47	1171.00		
9/25/2021		1169.57	1170.37		1167.51		1170.47	1171.00		
9/26/2021		1169.51	1170.30		1167.35		1170.47	1171.00		
9/27/2021		1169.53	1170.33		1167.48		1170.47	1171.00		
9/28/2021		1169.48	1170.28		1167.38		1170.47	1171.00		
9/29/2021		1169.41	1170.23		1167.39		1170.47	1171.00		
9/30/2021		1169.35	1170.16		1167.26		1170.47	1171.00		
10/1/2021		1169.28	1170.10		1167.26		1170.47	1171.00		
10/2/2021		1169.22	1170.04		1167.16		1170.47	1171.00		
10/3/2021		1169.10	1169.91		1166.98		1170.47	1171.00		
10/4/2021		1169.20	1170.06		1167.20		1170.47	1171.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
10/5/2021		1169.31	1170.40		1167.31		1170.47	1171.00		
10/6/2021		1169.36	1170.13		1167.39	1175.24	1170.47	1171.00		
10/7/2021		1169.43	1170.17		1167.34	1175.27	1170.47	1171.00		
10/8/2021		1169.51	1170.26		1167.46	1175.32	1170.47	1171.00		
10/9/2021		1169.57	1170.32		1167.49	1175.35	1169.47	1164.00		
10/10/2021		1169.59	1170.33		1167.41	1175.41	1170.47	1171.00		
10/11/2021		1169.66	1170.41		1167.54	1175.48	1170.47	1171.00		
10/12/2021		1169.68	1170.44		1167.58	1175.55	1170.47	1171.00		
10/13/2021		1169.67	1170.44		1167.56	1175.63	1170.47	1171.00		
10/14/2021		1169.66	1170.43		1167.55	1175.68	1170.47	1171.00		
10/15/2021		1169.66	1170.45		1167.60	1175.73	1170.47	1171.00		
10/16/2021		1169.66	1170.55		1167.63	1175.81	1169.47	1164.00		
10/17/2021		1169.65	1170.44		1167.54	1175.85	1170.47	1171.00		
10/18/2021		1169.69	1170.47		1167.67	1175.88	1170.47	1171.00		
10/19/2021		1169.74	1170.51		1167.68	1175.90	1170.47	1171.00		
10/20/2021		1169.75	1170.52		1167.70	1175.92	1170.47	1171.00		
10/21/2021		1169.78	1170.53		1167.69	1175.97	1171.47	1172.00		
10/22/2021		1169.82	1170.61		1167.80	1175.97	1171.47	1172.00		
10/23/2021		1169.87	1170.63		1167.84	1175.98	1171.47	1172.00		
10/24/2021		1169.84	1170.60		1167.72	1175.99	1171.47	1172.00		
10/25/2021		1169.96	1170.73		1167.93	1176.04	1171.47	1172.00		
10/26/2021		1170.07	1170.68		1167.98	1176.09	1172.47	1173.00		
10/27/2021		1170.96	1171.66		1168.98	1176.20	1172.47	1173.00		
10/28/2021		1171.38	1172.00		1169.18	1176.46	1172.47	1173.00		
10/29/2021		1171.71	1172.33		1169.43	1176.77	1172.47	1173.00		
10/30/2021		1172.03	1172.39		1169.71	1177.23	1173.47	1174.00		
10/31/2021		1172.23	1172.92		1169.82	1177.85	1173.47	1174.00		
11/1/2021		1172.40	1173.16		1170.04	1178.56	1173.47	1174.00		
11/2/2021		1172.61	1173.38		1170.19	1179.37	1173.47	1174.00		
11/3/2021		1172.74	1173.57		1170.30	1180.13	1173.47	1174.00		
11/4/2021		1172.90	1173.75		1170.43	1180.82	1173.47	1174.00		
11/5/2021		1173.01	1173.90		1170.55	1181.40	1173.47	1174.00		
11/6/2021		1173.13	1174.02		1170.66	1181.88	1173.47	1167.00		
11/7/2021		1173.17	1174.07		1170.66	1182.27	1174.47	1174.00		
11/8/2021		1173.23	1174.16		1170.78	1182.64	1174.47	1174.00		
11/9/2021		1173.28	1174.22		1170.84	1182.93	1174.47	1174.00		
11/10/2021		1173.26	1174.21		1170.83	1183.06	1174.47	1174.00		
11/11/2021		1173.24	1174.21		1170.79	1183.21	1174.47	1174.00		
11/12/2021		1173.44	1174.33		1171.05	1183.31	1174.47	1174.00		
11/13/2021		1173.61	1174.57		1171.16	1183.36	1173.47	1167.00		
11/14/2021		1173.61	1174.59		1171.11	1183.39	1174.47	1174.00		
11/15/2021		1173.66	1174.64		1171.20	1183.47	1174.47	1174.00		
11/16/2021		1173.68	1174.68		1171.22	1183.55	1174.47	1174.00		
11/17/2021		1173.72	1174.71		1171.20	1183.72	1174.47	1174.00		
11/18/2021		1173.74	1174.72		1171.24	1183.92	1174.47	1174.00		
11/19/2021		1173.73	1174.75		1171.26	1184.02	1174.47	1174.00		
11/20/2021		1173.78	1174.77		1171.26	1184.14	1174.47	1174.00		
11/21/2021		1173.78	1174.77		1171.18	1184.30	1174.47	1174.00		
11/22/2021		1173.78	1174.80		1171.26	1184.40	1174.47	1174.00		
11/23/2021		1173.75	1174.77		1171.25	1184.42	1174.47	1174.00		
11/24/2021		1173.71	1174.74		1171.17	1184.40	1174.47	1174.00		
11/25/2021		1173.73	1174.74		1171.19	1184.47	1174.47	1174.00		
11/26/2021		1173.73	1174.77		1171.21	1184.46	1174.47	1174.00		
11/27/2021		1173.68	1174.72		1171.17	1184.35	1173.47	1167.00		
11/28/2021		1173.64	1174.67		1171.05	1184.30	1174.47	1174.00		
11/29/2021		1173.58	1174.61		1171.05	1184.17	1174.47	1174.00		
11/30/2021		1173.55	1174.57		1171.02	1184.08	1174.47	1174.00		
12/1/2021		1173.44	1174.48		1170.94	1183.94	1174.47	1174.00		
12/2/2021						1183.88	1174.47	1174.00		
12/3/2021						1183.68	1174.47	1174.00		
12/4/2021						1183.52	1174.47	1174.00		
12/5/2021						1183.35	1174.47	1174.00		
12/6/2021						1183.28	1174.47	1174.00		
12/7/2021						1183.05	1172.47	1174.00		
12/8/2021						1182.92	1173.47	1174.00		
12/9/2021						1182.73	1173.47	1174.00		
12/10/2021						1182.58	1173.47	1174.00		
12/11/2021						1182.49	1173.47	1174.00		
12/12/2021						1182.25	1173.47	1174.00		
12/13/2021						1182.08	1173.47	1174.00		
12/14/2021						1181.88	1173.47	1174.00		
12/15/2021						1181.77	1173.47	1174.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
12/16/2021						1181.70	1173.47	1174.00		
12/17/2021						1181.53	1173.47	1174.00		
12/18/2021						1181.43	1173.47	1174.00		
12/19/2021						1181.28	1173.47	1174.00		
12/20/2021						1181.17	1173.47	1174.00		
12/21/2021						1181.11	1173.47	1174.00		
12/22/2021						1181.05	1173.47	1174.00		
12/23/2021						1180.91	1173.47	1174.00		
12/24/2021						1180.87	1173.47	1174.00		
12/25/2021						1180.85	1172.47	1166.00		
12/26/2021						1180.72	1173.47	1174.00		
12/27/2021						1180.69	1173.47	1174.00		
12/28/2021						1180.66	1173.47	1174.00		
12/29/2021						1180.64	1173.47	1174.00		
12/30/2021						1180.64	1173.47	1174.00		
12/31/2021						1180.66	1173.47	1174.00		
1/1/2022						1180.70	1172.47	1166.00		
1/2/2022						1180.68	1173.47	1174.00		
1/3/2022						1180.63	1173.47	1174.00		
1/4/2022		1172.26	1172.95			1180.64	1173.47	1174.00		
1/5/2022		1172.30	1172.97			1180.74	1173.47	1174.00		
1/6/2022		1172.22	1172.91			1180.64	1173.47	1174.00		
1/7/2022		1172.18	1172.88			1180.54	1173.47	1174.00		
1/8/2022		1172.11	1172.81			1180.44	1173.47	1174.00		
1/9/2022		1172.07	1172.76			1180.48	1173.47	1174.00		
1/10/2022		1172.03	1172.73			1180.40	1173.47	1173.00		
1/11/2022		1171.93	1172.64			1180.31	1173.47	1174.00		
1/12/2022		1171.88	1172.60			1180.31	1172.47	1173.00		
1/13/2022		1171.80	1172.52			1180.24	1172.47	1173.00		
1/14/2022		1171.69	1172.42			1180.14	1172.47	1173.00		
1/15/2022		1171.59	1172.32			1180.00	1171.47	1165.00		
1/16/2022		1171.48	1172.20			1179.95	1172.47	1173.00		
1/17/2022		1171.48	1172.22			1179.96	1172.47	1173.00		
1/18/2022		1171.31	1172.06			1179.72	1172.47	1173.00		
1/19/2022		1171.22	1171.97			1179.62	1172.47	1173.00		
1/20/2022		1171.07	1171.81			1179.44	1172.47	1173.00		
1/21/2022		1170.96	1171.70			1179.29	1172.47	1172.00		
1/22/2022		1170.90	1171.61			1179.20	1170.47	1165.00		
1/23/2022		1170.75	1171.48			1179.11	1172.47	1172.00		
1/24/2022		1170.65	1171.39			1178.96	1169.47	1171.00		
1/25/2022		1170.52	1171.25			1178.79	1171.47	1172.00		
1/26/2022		1170.40	1171.12			1178.60	1171.47	1172.00		
1/27/2022		1170.31	1171.02			1178.47	1171.47	1172.00		
1/28/2022		1170.19	1170.91			1178.32	1171.47	1172.00		
1/29/2022		1170.11	1170.82			1178.18	1171.47	1172.00		
1/30/2022		1169.95	1170.66			1178.02	1171.47	1172.00		
1/31/2022		1169.83	1170.56			1177.78	1171.47	1172.00		
2/1/2022		1169.72	1170.41			1177.55	1171.47	1171.00		
2/2/2022		1169.58	1170.29			1177.38	1171.47	1171.00		
2/3/2022		1169.49	1170.18			1177.22	1170.47	1171.00		
2/4/2022		1169.45	1170.13			1177.06	1170.47	1171.00		
2/5/2022		1169.33	1170.02			1176.86	1170.47	1171.00		
2/6/2022		1169.22	1169.88			1176.68	1170.47	1171.00		
2/7/2022		1169.14	1169.79			1176.54	1170.47	1171.00		
2/8/2022		1169.05	1169.71			1176.39	1170.47	1171.00		
2/9/2022		1168.95	1169.60			1176.23	1170.47	1171.00		
2/10/2022		1168.85	1169.50			1176.06	1170.47	1171.00		
2/11/2022		1168.78	1169.42			1175.90	1170.47	1171.00		
2/12/2022		1168.69	1169.33			1175.72	1170.47	1171.00		
2/13/2022		1168.60	1169.22			1175.55	1170.47	1171.00		
2/14/2022		1168.55	1169.16			1175.38	1170.47	1170.00		
2/15/2022		1168.48	1169.06			1175.17	1169.47	1170.00		
2/16/2022		1168.40	1168.98			1175.00	1169.47	1170.00		
2/17/2022		1168.35	1168.94			1174.89	1170.47	1171.00		
2/18/2022		1168.69	1169.29			1174.78	1170.47	1171.00		
2/19/2022		1168.77	1169.28			1174.73	1170.47	1171.00		
2/20/2022		1168.82	1169.32			1174.64	1170.47	1171.00		
2/21/2022		1168.90	1169.41			1174.57	1170.47	1171.00		
2/22/2022		1169.02	1169.53			1174.53	1170.47	1171.00		
2/23/2022		1169.19	1169.72			1174.48	1170.47	1171.00		
2/24/2022		1169.36	1169.86			1174.50	1170.47	1171.00		
2/25/2022		1169.54	1170.05			1174.63	1171.47	1171.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
2/26/2022		1169.72	1170.21			1174.76	1171.47	1172.00		
2/27/2022		1169.83	1170.34			1175.02	1171.47	1172.00		
2/28/2022		1169.92	1170.44			1175.26	1171.47	1172.00		
3/1/2022		1170.06	1170.57			1175.59	1171.47	1172.00		
3/2/2022		1170.10	1170.65			1175.87	1171.47	1172.00		
3/3/2022		1170.16	1170.72			1176.11	1171.47	1172.00		
3/4/2022		1170.21	1170.76			1176.32	1171.47	1172.00		
3/5/2022		1170.27	1170.83			1176.54	1171.47	1172.00		
3/6/2022		1170.28	1170.88			1176.75	1171.47	1172.00		
3/7/2022		1170.47	1171.08			1176.91	1172.47	1173.00		
3/8/2022		1170.79	1171.35			1177.01	1172.47	1173.00		
3/9/2022		1170.98	1171.54			1177.22	1172.47	1173.00		
3/10/2022		1171.13	1171.70			1177.47	1172.47	1173.00		
3/11/2022		1171.31	1171.89			1177.83	1172.47	1173.00		
3/12/2022		1171.51	1172.09			1178.25	1172.47	1173.00		
3/13/2022		1171.53	1172.14			1178.60	1172.47	1173.00		
3/14/2022		1171.61	1172.23			1178.96	1172.47	1173.00		
3/15/2022		1171.72	1172.35			1179.34	1172.47	1173.00		
3/16/2022		1171.81	1172.45			1179.66	1172.47	1173.00		
3/17/2022		1171.93	1172.57			1179.97	1173.47	1174.00		
3/18/2022		1172.05	1172.71			1180.24	1171.47	1173.00		
3/19/2022		1172.23	1172.88			1180.56	1173.47	1174.00		
3/20/2022		1172.38	1173.05			1180.84	1173.47	1174.00		
3/21/2022		1172.54	1173.23			1181.14	1171.47	1173.00		
3/22/2022		1172.64	1173.34			1181.48	1173.47	1174.00		
3/23/2022		1172.78	1173.50			1181.88	1173.47	1174.00		
3/24/2022		1172.86	1173.61			1182.27	1173.47	1174.00		
3/25/2022		1172.97	1173.74			1182.60	1173.47	1174.00		
3/26/2022		1173.04	1173.83			1182.85	1173.47	1174.00		
3/27/2022		1173.00	1173.82			1183.00	1174.47	1174.00		
3/28/2022		1173.04	1173.86			1183.10	1172.47	1174.00		
3/29/2022		1173.03	1173.87			1183.19	1174.47	1174.00		
3/30/2022		1173.03	1173.87			1183.30	1173.47	1174.00		
3/31/2022		1173.05	1173.89			1183.41	1174.47	1174.00		
4/1/2022		1173.02	1173.89			1183.34	1172.47	1173.00		
4/2/2022		1173.01	1173.86			1183.27	1173.47	1174.00		
4/3/2022		1172.96	1173.82			1183.29	1173.47	1174.00		
4/4/2022		1172.96	1173.82			1183.20	1174.47	1174.00		
4/5/2022		1172.92	1173.78			1183.18	1173.47	1174.00		
4/6/2022		1172.93	1173.79			1183.16	1172.47	1174.00		
4/7/2022		1172.92	1173.79			1183.12	1174.47	1174.00		
4/8/2022		1173.17	1174.01			1183.09	1172.47	1174.00		
4/9/2022		1173.23	1174.05			1183.06	1174.47	1174.00		
4/10/2022		1173.20	1174.04			1183.06	1174.47	1174.00		
4/11/2022		1173.30	1174.12			1183.19	1174.47	1174.00		
4/12/2022		1173.33	1174.16			1183.48	1174.47	1174.00		
4/13/2022		1173.42	1174.25			1183.74	1174.47	1174.00		
4/14/2022		1173.46	1174.29			1183.91	1174.47	1174.00		
4/15/2022		1173.52	1174.36			1184.03	1174.47	1174.00		
4/16/2022		1173.51	1174.40			1184.17	1174.47	1174.00		
4/17/2022		1173.48	1174.35			1184.23	1174.47	1174.00		
4/18/2022		1173.53	1174.40			1184.31	1174.47	1174.00		
4/19/2022		1173.59	1174.49			1184.41	1174.47	1174.00		
4/20/2022		1173.55	1174.47			1184.32	1174.47	1174.00		
4/21/2022		1173.64	1174.52			1184.37	1174.47	1174.00		
4/22/2022		1173.66	1174.54			1184.35	1174.47	1174.00		
4/23/2022		1173.73	1174.59			1184.42	1174.47	1174.00		
4/24/2022		1173.71	1174.60			1184.51	1174.47	1174.00		
4/25/2022		1173.76	1174.65			1184.59	1174.47	1174.00		
4/26/2022		1173.79	1174.68			1184.67	1174.47	1174.00		
4/27/2022		1173.76	1174.66			1184.74	1174.47	1174.00		
4/28/2022		1173.73	1174.64			1184.77	1174.47	1174.00		
4/29/2022		1173.70	1174.62			1184.78	1174.47	1174.00		
4/30/2022		1173.66	1174.58			1184.77	1174.47	1174.00		
5/1/2022		1173.58	1174.50			1184.73	1174.47	1174.00		
5/2/2022		1173.53	1174.47			1184.65	1174.47	1174.00		
5/3/2022		1173.49	1174.42			1184.55	1174.47	1174.00		
5/4/2022		1173.43	1174.36			1184.44	1174.47	1174.00		
5/5/2022		1173.37	1174.28			1184.28	1174.47	1174.00		
5/6/2022		1173.31	1174.23			1184.16	1174.47	1174.00		
5/7/2022		1173.23	1174.15			1183.99	1174.47	1174.00		
5/8/2022		1173.09	1174.01			1183.78	1174.47	1174.00		

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
5/9/2022		1173.00	1173.92			1183.58	1174.47	1174.00		
5/10/2022		1172.88	1173.80			1183.38	1174.47	1174.00		
5/11/2022		1172.41	1173.82		1170.32	1183.19	1173.47	1174.00	1185.06	1177.85
5/12/2022		1172.31	1173.71		1170.22	1182.99	1173.47	1174.00	1185.04	1177.77
5/13/2022		1172.18	1173.58		1170.15	1182.79	1173.47	1174.00	1184.95	1177.67
5/14/2022		1172.05	1173.45		1170.02	1182.60	1173.47	1174.00	1184.86	1177.60
5/15/2022		1171.87	1173.28		1169.83	1182.40	1173.47	1174.00	1184.69	1177.44
5/16/2022		1171.74	1173.15		1169.74	1182.13	1173.47	1174.00	1184.53	1177.36
5/17/2022		1171.67	1173.05		1169.66	1181.71	1173.47	1174.00	1184.46	1177.31
5/18/2022		1171.54	1172.90		1169.52	1181.39	1173.47	1174.00	1184.24	1177.18
5/19/2022		1171.46	1172.80		1169.43	1181.17	1173.47	1173.00	1184.09	1177.12
5/20/2022		1171.34	1172.68		1169.34	1180.91	1172.47	1173.00	1183.95	1176.87
5/21/2022		1171.22	1172.55		1169.24	1180.65	1172.47	1173.00	1183.81	1176.46
5/22/2022		1171.08	1172.40		1169.12	1180.42	1172.47	1173.00	1183.67	1176.50
5/23/2022		1170.95	1172.27		1169.04	1180.31	1172.47	1173.00	1183.53	1176.63
5/24/2022		1170.85	1172.15		1168.95	1180.25	1172.47	1173.00	1183.39	1176.50
5/25/2022		1170.72	1172.02		1168.86	1180.07	1172.47	1173.00	1183.24	1176.37
5/26/2022		1170.61	1171.90		1168.77	1179.91	1172.47	1173.00	1183.11	1176.37
5/27/2022		1170.50	1171.79		1168.71	1179.74	1172.47	1173.00	1183.00	1176.35
5/28/2022		1170.41	1171.69		1168.64	1179.54	1172.47	1173.00	1182.90	1176.39
5/29/2022		1170.26	1171.54		1168.50	1179.33	1172.47	1172.00	1182.76	1176.14
5/30/2022		1170.15	1171.42		1168.44	1179.14	1172.47	1172.00	1182.61	1176.03
5/31/2022		1170.05	1171.30		1168.34	1178.97	1171.47	1172.00	1182.48	1175.96
6/1/2022		1169.90	1171.17		1168.24	1178.79	1171.47	1172.00	1182.37	1175.83
6/2/2022		1169.82	1171.06		1168.18	1178.61	1171.47	1172.00	1182.25	1175.78
6/3/2022		1169.69	1170.93		1168.08	1178.42	1171.47	1172.00	1182.10	1175.64
6/4/2022		1169.55	1170.79		1167.92	1178.23	1171.47	1172.00	1181.96	1175.54
6/5/2022		1169.38	1170.61		1167.74	1178.04	1171.47	1172.00	1181.82	1175.35
6/6/2022		1169.24	1170.48		1167.67	1177.86	1171.47	1172.00	1181.66	1175.23
6/7/2022		1169.13	1170.35		1167.57	1177.70	1170.47	1171.00	1181.52	1175.18
6/8/2022		1169.00	1170.22		1167.51	1177.52	1170.47	1171.00	1181.38	1175.13
6/9/2022		1168.94	1170.14		1167.46	1177.35	1170.47	1171.00	1181.28	1174.97
6/10/2022		1168.87	1170.05		1167.43	1177.17	1170.47	1171.00	1181.15	1174.89
6/11/2022		1168.79	1169.95		1167.35	1176.99	1170.47	1171.00	1181.02	1174.82
6/12/2022		1168.68	1169.83		1167.25	1176.82	1170.47	1171.00	1180.90	1174.71
6/13/2022		1168.58	1169.73		1167.22	1176.65	1170.47	1171.00	1180.78	1174.64
6/14/2022		1168.49	1169.62		1167.13	1176.41	1170.47	1171.00	1180.65	1174.58
6/15/2022		1168.37	1169.50		1167.05	1176.19	1170.47	1171.00	1180.53	1174.47
6/16/2022		1168.31	1169.44		1167.01	1176.02	1170.47	1171.00	1180.46	1174.45
6/17/2022		1168.24	1169.36		1166.99	1175.86	1170.47	1171.00	1180.37	1174.37
6/18/2022		1168.16	1169.26		1166.89	1175.68	1170.47	1170.00	1180.27	1174.40
6/19/2022		1168.03	1169.13		1166.76	1175.50	1169.47	1170.00	1180.15	1174.14
6/20/2022		1167.93	1169.03		1166.71	1175.34	1169.47	1170.00	1180.04	1174.25
6/21/2022		1167.84	1168.93		1166.61	1175.19	1169.47	1170.00	1179.93	1174.20
6/22/2022		1167.72	1168.82		1166.53	1175.04	1169.47	1170.00	1179.82	1174.30
6/23/2022		1167.62	1168.71		1166.43	1174.88	1169.47	1170.00	1179.70	1174.49
6/24/2022		1167.51	1168.60		1166.36	1174.73	1169.47	1170.00	1179.58	1174.31
6/25/2022		1167.39	1168.48		1166.23	1174.58	1169.47	1170.00	1179.45	1174.09
6/26/2022		1167.26	1168.35		1166.11	1174.44	1169.47	1170.00	1179.35	1174.02
6/27/2022		1167.18	1168.27		1166.11	1174.29	1169.47	1170.00	1179.25	1174.12
6/28/2022		1167.09	1168.16		1165.99	1174.14	1169.47	1170.00	1179.12	1173.93
6/29/2022		1166.98	1168.04		1165.90	1173.97	1169.47	1170.00	1178.99	1173.95
6/30/2022		1166.87	1167.93		1165.78	1173.80	1168.47	1170.00	1178.87	1173.84
7/1/2022		1166.76	1167.82		1165.71	1173.66	1168.47	1169.00	1178.75	1173.74
7/2/2022		1166.65	1167.71		1165.59	1173.51	1168.47	1169.00	1178.64	1173.69
7/3/2022		1166.51	1167.57		1165.44	1173.36	1168.47	1169.00	1178.50	1173.62
7/4/2022		1166.40	1167.46		1165.38	1173.22	1168.47	1169.00	1178.36	1173.68
7/5/2022		1166.31	1167.36		1165.28	1173.10	1168.47	1169.00	1178.27	1173.66
7/6/2022		1166.19	1167.25		1165.18	1173.07	1168.47	1169.00	1178.17	1173.52
7/7/2022		1166.09	1167.14		1165.08	1173.07	1168.47	1169.00	1178.04	1173.49
7/8/2022		1165.97	1167.02		1164.98	1172.96	1168.47	1169.00	1177.92	1173.44
7/9/2022		1165.87	1166.91		1164.86	1172.85	1167.47	1168.00	1177.80	1173.39
7/10/2022		1165.73	1166.77		1164.69	1172.74	1167.47	1168.00	1177.68	1173.46
7/11/2022		1165.61	1166.65		1164.63	1172.63	1167.47	1168.00	1177.56	1173.41
7/12/2022		1165.50	1166.54		1164.50	1172.52	1167.47	1168.00	1177.45	1173.31
7/13/2022		1165.37	1166.41		1164.38	1172.39	1167.47	1168.00	1177.33	1173.23
7/14/2022		1165.25	1166.28		1164.24	1172.27	1167.47	1168.00	1177.21	1173.17
7/15/2022		1165.12	1166.15		1164.14	1172.16	1167.47	1167.00	1177.08	1173.12
7/16/2022		1165.00	1166.02		1163.98	1172.05	1167.47	1167.00	1176.96	1173.08
7/17/2022		1164.85	1165.88		1163.84	1171.94	1166.47	1167.00	1176.84	1172.97
7/18/2022		1164.75	1165.78		1163.80	1171.83	1166.47	1167.00	1176.74	1172.87
7/19/2022		1164.67	1165.69		1163.71	1171.71	1166.47	1167.00	1176.64	1172.75

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
7/20/2022		1164.55	1165.57		1163.60	1171.60	1166.47	1167.00	1176.68	1172.55
7/21/2022		1164.44	1165.45		1163.47	1171.49	1166.47	1167.00	1176.56	1172.35
7/22/2022		1164.31	1165.33		1163.38	1171.36	1166.47	1167.00	1176.45	1172.31
7/23/2022		1164.21	1165.22		1163.24	1171.25	1166.47	1167.00	1176.37	1172.38
7/24/2022		1164.05	1165.06		1163.06	1171.14	1166.47	1167.00	1176.38	1172.21
7/25/2022		1164.00	1165.02		1163.09	1171.09	1166.47	1167.00	1176.38	1172.22
7/26/2022		1163.96	1164.95		1163.03	1171.05	1165.47	1166.00	1176.38	1172.20
7/27/2022		1163.85	1164.84		1162.92	1171.02	1165.47	1166.00	1176.38	1172.22
7/28/2022		1163.89	1164.73		1162.72	1170.94	1165.47	1166.00	1176.44	1172.25
7/29/2022		1163.92	1164.62		1162.55	1170.85	1165.47	1166.00	1176.46	1173.44
7/30/2022		1163.81	1164.50		1162.41	1170.75	1165.47	1166.00	1176.40	1173.25
7/31/2022		1163.65	1164.34		1162.23	1170.66	1165.47	1166.00	1176.38	1173.12
8/1/2022		1163.55	1164.25		1162.20	1170.57			1176.38	1173.01
8/2/2022		1163.46	1164.16		1162.08	1170.48			1176.38	1172.91
8/3/2022		1163.32	1164.02		1161.95	1170.38			1176.38	1172.80
8/4/2022		1163.22	1163.92		1161.83	1170.28			1176.38	1172.76
8/5/2022		1163.15	1163.85		1161.83	1170.18			1176.38	1172.84
8/6/2022		1163.10	1163.78		1161.75	1170.09			1176.38	1172.77
8/7/2022		1162.97	1163.64		1161.57	1170.00			1176.38	1172.68
8/8/2022		1162.90	1163.57		1161.55	1169.91			1176.38	1172.58
8/9/2022		1162.84	1163.50		1161.48	1169.81			1176.38	1172.51
8/10/2022		1162.73	1163.39		1161.38	1169.71			1176.38	1172.43
8/11/2022		1162.65	1163.31		1161.29	1169.62			1176.38	1172.36
8/12/2022		1162.53	1163.20		1161.19	1169.53			1176.38	1172.27
8/13/2022		1162.42	1163.07		1161.02	1169.43			1176.38	1172.18
8/14/2022		1162.26	1162.92		1160.84	1169.34			1176.38	1172.09
8/15/2022		1162.16	1162.83		1160.82	1169.25			1176.38	1171.99
8/16/2022		1162.09	1162.75		1160.72	1169.16			1176.38	1171.91
8/17/2022		1161.96	1162.64		1160.61	1169.07			1176.38	1171.86
8/18/2022		1161.88	1162.55		1160.50	1168.97			1176.38	1171.89
8/19/2022		1161.76	1162.44		1160.43	1168.88			1176.38	1171.80
8/20/2022		1161.67	1162.34		1160.30	1168.79			1176.38	1171.72
8/21/2022		1161.52	1162.19		1160.12	1168.70			1176.38	1171.73
8/22/2022		1161.44	1162.11		1160.11	1168.61			1176.39	1171.73
8/23/2022		1161.38	1162.04		1160.03	1168.52			1176.39	1171.73
8/24/2022		1161.26	1161.93		1159.94	1168.43			1176.39	1171.73
8/25/2022		1161.17	1161.83		1159.81	1168.34			1176.39	1171.73
8/26/2022		1161.06	1161.73		1159.75	1168.25			1176.38	1171.73
8/27/2022		1160.98	1161.63		1159.63	1168.16			1176.38	1171.73
8/28/2022		1160.84	1161.49		1159.47	1168.07			1176.38	1171.72
8/29/2022		1160.74	1161.40		1159.44	1167.99			1176.38	1171.73
8/30/2022		1160.67	1161.33		1159.34	1167.90			1176.44	1171.73
8/31/2022		1160.57	1161.23		1159.27	1167.81			1176.44	1171.73
9/1/2022		1160.49	1161.13		1159.15	1167.72			1176.38	1171.72
9/2/2022		1160.38	1161.03		1159.08	1167.63			1176.38	1171.72
9/3/2022		1160.30	1160.94		1158.97	1167.54			1176.39	1171.72
9/4/2022		1160.17	1160.81		1158.81	1167.46			1176.39	1171.73
9/5/2022		1160.11	1160.78		1158.83	1167.38			1176.41	1171.75
9/6/2022		1160.22	1160.86		1158.93	1167.29			1176.40	1171.71
9/7/2022		1160.13	1160.75		1158.90	1167.21			1176.39	1171.62
9/8/2022		1160.12	1160.72		1158.86	1167.13			1176.39	1171.69
9/9/2022		1160.03	1160.64		1158.79	1167.04			1176.39	1171.72
9/10/2022		1159.99	1160.59		1158.73	1166.95			1176.39	1171.73
9/11/2022		1159.87	1160.48		1158.58	1166.88			1176.39	1171.72
9/12/2022		1159.79	1160.41		1158.55	1166.81			1176.40	1171.72
9/13/2022		1159.90	1160.46		1158.63	1166.61			1176.34	1171.74
9/14/2022		1159.90	1160.50		1158.66	1166.38			1176.38	1171.77
9/15/2022		1159.89	1160.47		1158.64	1166.27			1176.39	1171.72
9/16/2022		1159.82	1160.40		1158.58	1166.17			1176.39	1171.71
9/17/2022		1159.79	1160.37		1158.51	1166.07			1176.39	1171.72
9/18/2022		1159.67	1160.26		1158.35	1165.98			1176.39	1171.72
9/19/2022		1159.59	1160.19		1158.32	1165.89			1176.37	1171.86
9/20/2022		1159.56	1160.17		1158.28	1165.79			1176.38	1171.83
9/21/2022		1159.50	1160.10		1158.23	1165.70			1176.39	1171.73
9/22/2022		1159.46	1160.06		1158.17	1165.61			1176.41	1171.82
9/23/2022		1159.39	1160.01		1158.12	1165.52			1176.47	1171.72
9/24/2022		1159.38	1159.99		1158.09	1165.43			1176.39	1171.72
9/25/2022		1159.29	1159.90		1157.97	1165.36			1176.39	1171.72
9/26/2022		1159.25	1159.86		1157.99	1165.27			1176.39	1171.72
9/27/2022		1159.24	1159.84		1157.95	1165.18			1176.39	1171.72
9/28/2022		1159.18	1159.79		1157.93	1165.09			1176.39	1171.72
9/29/2022		1159.22	1159.80		1157.93	1165.01			1176.39	1171.72

Table 2.1.C
Average Daily Groundwater and Surface Water Elevations
Cortlandville Sand and Gravel

Indicates that the elevation of the Town's wells is less than both MW-3S and either MW-4S or MW-02. This implies that flow towards the Town's wells is more likely.

Indicates that the elevation of the Town's wells is less than MW-3S. It is not less than either MW-4S or MW-02, implying that flow towards the Town's wells is less likely.

Indicates that the elevation of the Town's wells is greater than MW-3S. This implies that flow towards the Town's wells is not possible.

Date	Cortlandville Sand and Gravel Monitoring Wells					USGS MW	Lime Hollow Rd Wells		Marl Ponds	
	MW-01	MW-02	MW-03S	MW-03D	MW-04		LH #2	LH #7	Middle Pond	North Pond
9/30/2022		1159.17	1159.76		1157.92	1164.94			1176.39	1171.72
10/1/2022		1159.16	1159.74		1157.85	1164.86			1176.39	1171.72
10/2/2022		1159.05	1159.64		1157.70	1164.78			1176.39	1171.72
10/3/2022		1159.01	1159.62		1157.73	1164.70			1176.39	1171.72
10/4/2022		1158.99	1159.60		1157.68	1164.63			1176.39	1171.72
10/5/2022		1158.91	1159.53		1157.61	1164.55			1176.39	1171.72
10/6/2022		1158.87	1159.49		1157.54	1164.48			1176.39	1171.72
10/7/2022			1159.42		1157.48	1164.40			1176.40	1171.73
10/8/2022						1164.33			1176.40	1171.75
10/9/2022						1164.26			1176.40	1171.75
10/10/2022						1164.18				
10/11/2022						1164.11				
10/12/2022						1164.05				
10/13/2022						1163.99				

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
2/5/2019	916069.59	936677.78	1171.4	915591.19	936527.54	1172.256226	916044.21	937509.77	1168.975725	389.1	1162.6	401837.1	-1162.6	389.1	18.5	0.0031	0.3	880	8.9	447
2/6/2019	916069.59	936677.78	1171.4	915591.19	936527.54	1172.286247	916044.21	937509.77	1169.06001	352	1158	401837	-1158	352	16.9	0.0030	0.3	880	8.8	450
2/7/2019	916069.59	936677.78	1171.6	915591.19	936527.54	1172.397209	916044.21	937509.77	1169.214093	337	1147	401837	-1147	337	16.4	0.0030	0.3	880	8.7	454
2/8/2019	916069.59	936677.78	1171.7	915591.19	936527.54	1172.513756	916044.21	937509.77	1169.401725	337	1118	401837	-1118	337	16.8	0.0029	0.3	880	8.5	460
2/9/2019	916069.59	936677.78	1171.8	915591.19	936527.54	1172.585403	916044.21	937509.77	1169.500359	338	1106	401837	-1106	338	17.0	0.0029	0.3	880	8.4	463
2/10/2019	916069.59	936677.78	1171.9	915591.19	936527.54	1172.703521	916044.21	937509.77	1169.590777	332	1120	401837	-1120	332	16.5	0.0029	0.3	880	8.5	461
2/11/2019	916069.59	936677.78	1172.0	915591.19	936527.54	1172.810687	916044.21	937509.77	1169.658822	339	1133	401837	-1133	339	16.7	0.0029	0.3	880	8.6	459
2/12/2019	916069.59	936677.78	1172.1	915591.19	936527.54	1172.900949	916044.21	937509.77	1169.693144	340	1155	401837	-1155	340	16.4	0.0030	0.3	880	8.8	456
2/13/2019	916069.59	936677.78	1172.1	915591.19	936527.54	1172.987369	916044.21	937509.77	1169.759264	368	1151	401837	-1151	368	17.7	0.0030	0.3	880	8.8	456
2/14/2019	916069.59	936677.78	1172.1	915591.19	936527.54	1172.983412	916044.21	937509.77	1169.732718	396	1147	401837	-1147	396	19.0	0.0030	0.3	880	8.9	455
2/15/2019	916069.59	936677.78	1172.1	915591.19	936527.54	1173.010491	916044.21	937509.77	1169.731169	405	1155	401837	-1155	405	19.3	0.0030	0.3	880	8.9	453
2/16/2019	916069.59	936677.78	1172.0	915591.19	936527.54	1172.975405	916044.21	937509.77	1169.694367	422	1148	401837	-1148	422	20.2	0.0030	0.3	880	8.9	453
2/17/2019	916069.59	936677.78	1172.00007	915591.19	936527.54	1172.933713	916044.21	937509.77	1169.639704	422	1153	401837	-1153	422	20.1	0.0031	0.3	880	9.0	452
2/18/2019	916069.59	936677.78	1172.0	915591.19	936527.54	1172.897671	916044.21	937509.77	1169.605511	434	1147	401837	-1147	434	20.7	0.0031	0.3	880	9.0	452
2/19/2019	916069.59	936677.78	1171.84574	915591.19	936527.54	1172.795577	916044.21	937509.77	1169.503537	438	1145	401837	-1145	438	21.0	0.0031	0.3	880	8.9	451
2/20/2019	916069.59	936677.78	1171.8	915591.19	936527.54	1172.739104	916044.21	937509.77	1169.425614	426	1159	401837	-1159	426	20.2	0.0031	0.3	880	9.0	449
2/21/2019	916069.59	936677.78	1171.74074	915591.19	936527.54	1172.690218	916044.21	937509.77	1169.371102	434	1158	401837	-1158	434	20.5	0.0031	0.3	880	9.0	448
2/22/2019	916069.59	936677.78	1171.6	915591.19	936527.54	1172.5847	916044.21	937509.77	1169.248587	434	1165	401837	-1165	434	20.5	0.0031	0.3	880	9.1	446
2/23/2019	916069.59	936677.78	1171.6	915591.19	936527.54	1172.50023	916044.21	937509.77	1169.132458	420	1184	401837	-1184	420	19.5	0.0031	0.3	880	9.2	444
2/24/2019	916069.59	936677.78	1171.5	915591.19	936527.54	1172.479542	916044.21	937509.77	1169.078728	414	1200	401837	-1200	414	19.0	0.0032	0.3	880	9.3	441
2/25/2019	916069.59	936677.78	1171.4458	915591.19	936527.54	1172.408403	916044.21	937509.77	1169.009868	435	1190	401837	-1190	435	20.1	0.0032	0.3	880	9.2	441
2/26/2019	916069.59	936677.78	1171.3	915591.19	936527.54	1172.285779	916044.21	937509.77	1168.918348	424	1182	401837	-1182	424	19.7	0.0031	0.3	880	9.2	442
2/27/2019	916069.59	936677.78	1171.27641	915591.19	936527.54	1172.203835	916044.21	937509.77	1168.861479	409	1179	401837	-1179	409	19.1	0.0031	0.3	880	9.1	443
2/28/2019	916069.59	936677.78	1171.19423	915591.19	936527.54	1172.124971	916044.21	937509.77	1168.803967	415	1167	401837	-1167	415	19.6	0.0031	0.3	880	9.0	444
3/1/2019	916069.59	936677.78	1171.1	915591.19	936527.54	1172.039825	916044.21	937509.77	1168.7318	410	1164	401837	-1164	410	19.4	0.0031	0.3	880	9.0	444
3/2/2019	916069.59	936677.78	1171.04628	915591.19	936527.54	1171.963184	916044.21	937509.77	1168.664439	405	1163	401837	-1163	405	19.2	0.0031	0.3	880	9.0	444
3/3/2019	916069.59	936677.78	1170.96581	915591.19	936527.54	1171.877103	916044.21	937509.77	1168.593012	402	1158	401837	-1158	402	19.1	0.0031	0.3	880	8.9	445
3/4/2019	916069.59	936677.78	1170.9	915591.19	936527.54	1171.801985	916044.21	937509.77	1168.532185	399	1154	401837	-1154	399	19.1	0.0030	0.3	880	8.9	445
3/5/2019	916069.59	936677.78	1170.8	915591.19	936527.54	1171.699448	916044.21	937509.77	1168.438465	396	1152	401837	-1152	396	19.0	0.0030	0.3	880	8.9	445
3/6/2019	916069.59	936677.78	1170.69317	915591.19	936527.54	1171.593813	916044.21	937509.77	1168.351333	397	1143	401837	-1143	397	19.2	0.0030	0.3	880	8.8	445
3/7/2019	916069.59	936677.78	1170.6	915591.19	936527.54	1171.480238	916044.21	937509.77	1168.246208	396	1141	401837	-1141	396	19.1	0.0030	0.3	880	8.8	445
3/8/2019	916069.59	936677.78	1170.48125	915591.19	936527.54	1171.372912	916044.21	937509.77	1168.144592	391	1140	401837	-1140	391	18.9	0.0030	0.3	880	8.8	445
3/9/2019	916069.59	936677.78	1170.4	915591.19	936527.54	1171.268898	916044.21	937509.77	1168.052873	391	1135	401837	-1135	391	19.0	0.0030	0.3	880	8.8	445
3/10/2019	916069.59	936677.78	1170.3	915591.19	936527.54	1171.199868	916044.21	937509.77	1168.012879	388	1125	401837	-1125	388	19.0	0.0030	0.3	880	8.7	446
3/11/2019	916069.59	936677.78	1170.2	915591.19	936527.54	1171.131933	916044.21	937509.77	1167.95006	392	1121	401837	-1121	392	19.3	0.0030	0.3	880	8.7	446
3/12/2019	916069.59	936677.78	1170.2	915591.19	936527.54	1171.052123	916044.21	937509.77	1167.891492	382	1117	401837	-1117	382	18.9	0.0029	0.3	880	8.6	447
3/13/2019	916069.59	936677.78	1170.1	915591.19	936527.54	1170.969889	916044.21	937509.77	1167.830191	366	1115	401837	-1115	366	18.2	0.0029	0.3	880	8.6	448
3/14/2019	916069.59	936677.78	1170.03014	915591.19	936527.54	1170.877183	916044.21	937509.77	1167.878809	382	1051	401837	-1051	382	20.0	0.0028	0.3	880	8.2	458
3/15/2019	916069.59	936677.78	1170.03485	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.907663	1529	1074	401837	-1074	1529	54.9	0.0046	0.3	880	13.6	362
3/16/2019	916069.59	936677.78	1169.99523	915591.19	936527.54	1170.798039	916044.21	937509.77	1167.91609	356	1015	401837	-1015	356	19.3	0.0027	0.3	880	7.9	467
3/17/2019	916069.59	936677.78	1169.98367	915591.19	936527.54	1170.771264	916044.21	937509.77	1167.939754	348	998	401837	-998	348	19.2	0.0026	0.3	880	7.7	471
3/18/2019	916069.59	936677.78	1169.95689	915591.19	936527.54	1170.738204	916044.21	937509.77	1167.905096	342	1001	401837	-1001	342	18.8	0.0026	0.3	880	7.7	470
3/19/2019	916069.59	936677.78	1169.91151	915591.19	936527.54	1170.691541	916044.21	937509.77	1167.852332	340	1005	401837	-1005	340	18.7	0.0026	0.3	880	7.7	469
3/20/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.659355	916044.21	937509.77	1167.840142	341	996	401837	-996	341	18.9	0.0026	0.3	880	7.7	471
3/21/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.623439	916044.21	937509.77	1167.798734	340	999	401837	-999	340	18.8	0.0026	0.3	880	7.7	470
3/22/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.679434	916044.21	937509.77	1167.88085	346	985	401837	-985	346	19.4	0.0026	0.3	880	7.6	473
3/23/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.656742	916044.21	937509.77	1167.901823	340	970	401837	-970	340	19.3	0.0026	0.3	880	7.5	476
3/24/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.654715	916044.21	937509.77	1167.910649	327	972	401837	-972	327	18.6	0.0026	0.3	880	7.5	477
3/25/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.646119	916044.21	937509.77	1167.901098	327	972	401837	-972	327	18.6	0.0026	0.3	880	7.5	477
3/26/2019	916069.59	936677.78	1169.9	915591.19	936527.54	1170.607692	916044.21	937509.77	1167.842451	327	981	401837	-981	327	18.4	0.0026	0.3	880	7.5	475
3/27/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.582221	916044.21	937509.77	1167.827485	327	976	401837	-976	327	18.5	0.0026	0.3	880	7.5	475
3/28/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.5687	916044.21	937509.77	1167.807372	325	980	401837	-980	325	18.4	0.0026	0.3	880	7.5	475
3/29/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.55682	916044.21	937509.77	1167.796773	329	977	401837	-977	329	18.6	0.0026	0.3	880	7.5	475
3/30/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.547286	916044.21	937509.77	1167.768801	320	989	401837	-989	320	17.9	0.0026	0.3	880	7.6	473

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
3/31/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.524676	916044.21	937509.77	1167.751398	324	985	401837	-985	324	18.2	0.0026	0.3	880	7.6	473
4/1/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.510892	916044.21	937509.77	1167.778552	329	966	401837	-966	329	18.8	0.0025	0.3	880	7.4	477
4/2/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.510135	916044.21	937509.77	1167.765509	316	977	401837	-977	316	17.9	0.0026	0.3	880	7.5	475
4/3/2019	916069.59	936677.78	1169.8	915591.19	936527.54	1170.500559	916044.21	937509.77	1167.779892	324	964	401837	-964	324	18.6	0.0025	0.3	880	7.4	478
4/4/2019	916069.59	936677.78	1169.7	915591.19	936527.54	1170.465909	916044.21	937509.77	1167.734659	323	969	401837	-969	323	18.4	0.0025	0.3	880	7.5	476
4/5/2019	916069.59	936677.78	1169.7	915591.19	936527.54	1170.463293	916044.21	937509.77	1167.752979	322	960	401837	-960	322	18.5	0.0025	0.3	880	7.4	478
4/6/2019	916069.59	936677.78	1169.7	915591.19	936527.54	1170.477197	916044.21	937509.77	1167.767402	322	960	401837	-960	322	18.6	0.0025	0.3	880	7.4	478
4/7/2019	916069.59	936677.78	1169.7	915591.19	936527.54	1170.434912	916044.21	937509.77	1167.683606	314	981	401837	-981	314	17.7	0.0026	0.3	880	7.5	474
4/8/2019	916069.59	936677.78	1169.71215	915591.19	936527.54	1170.452388	916044.21	937509.77	1167.753697	322	956	401837	-956	322	18.6	0.0025	0.3	880	7.4	479
4/9/2019	916069.59	936677.78	1169.71622	915591.19	936527.54	1170.453516	916044.21	937509.77	1167.742516	317	963	401837	-963	317	18.2	0.0025	0.3	880	7.4	478
4/10/2019	916069.59	936677.78	1169.67127	915591.19	936527.54	1170.41306	916044.21	937509.77	1167.724384	325	950	401837	-950	325	18.9	0.0025	0.3	880	7.3	480
4/11/2019	916069.59	936677.78	1169.64377	915591.19	936527.54	1170.381198	916044.21	937509.77	1167.680107	319	958	401837	-958	319	18.4	0.0025	0.3	880	7.4	478
4/12/2019	916069.59	936677.78	1169.63589	915591.19	936527.54	1170.371918	916044.21	937509.77	1167.704161	322	943	401837	-943	322	18.9	0.0025	0.3	880	7.3	481
4/13/2019	916069.59	936677.78	1169.6196	915591.19	936527.54	1170.357661	916044.21	937509.77	1167.688944	324	942	401837	-942	324	19.0	0.0025	0.3	880	7.3	481
4/14/2019	916069.59	936677.78	1169.5863	915591.19	936527.54	1170.319829	916044.21	937509.77	1167.612557	314	963	401837	-963	314	18.0	0.0025	0.3	880	7.4	477
4/15/2019	916069.59	936677.78	1169.64148	915591.19	936527.54	1170.382078	916044.21	937509.77	1167.734598	330	931	401837	-931	330	19.5	0.0025	0.3	880	7.2	484
4/16/2019	916069.59	936677.78	1169.65867	915591.19	936527.54	1170.376581	916044.21	937509.77	1167.749081	310	932	401837	-932	310	18.4	0.0024	0.3	880	7.2	485
4/17/2019	916069.59	936677.78	1169.67298	915591.19	936527.54	1170.382013	916044.21	937509.77	1167.790966	307	918	401837	-918	307	18.5	0.0024	0.3	880	7.1	488
4/18/2019	916069.59	936677.78	1169.69022	915591.19	936527.54	1170.399549	916044.21	937509.77	1167.77313	302	935	401837	-935	302	17.9	0.0024	0.3	880	7.2	485
4/19/2019	916069.59	936677.78	1169.70012	915591.19	936527.54	1170.418294	916044.21	937509.77	1167.81452	314	920	401837	-920	314	18.9	0.0024	0.3	880	7.1	488
4/20/2019	916069.59	936677.78	1169.82718	915591.19	936527.54	1170.556501	916044.21	937509.77	1167.939934	323	921	401837	-921	323	19.3	0.0024	0.3	880	7.1	488
4/21/2019	916069.59	936677.78	1169.83954	915591.19	936527.54	1170.545757	916044.21	937509.77	1167.946089	303	924	401837	-924	303	18.2	0.0024	0.3	880	7.1	489
4/22/2019	916069.59	936677.78	1169.88465	915591.19	936527.54	1170.590172	916044.21	937509.77	1167.991319	303	924	401837	-924	303	18.1	0.0024	0.3	880	7.1	489
4/23/2019	916069.59	936677.78	1169.95833	915591.19	936527.54	1170.661428	916044.21	937509.77	1168.009656	292	950	401837	-950	292	17.1	0.0025	0.3	880	7.3	484
4/24/2019	916069.59	936677.78	1169.98952	915591.19	936527.54	1170.699593	916044.21	937509.77	1168.033886	297	954	401837	-954	297	17.3	0.0025	0.3	880	7.3	483
4/25/2019	916069.59	936677.78	1170.02081	915591.19	936527.54	1170.733252	916044.21	937509.77	1168.018384	292	976	401837	-976	292	16.7	0.0025	0.3	880	7.4	479
4/26/2019	916069.59	936677.78	1170.07559	915591.19	936527.54	1170.79272	916044.21	937509.77	1168.069211	295	978	401837	-978	295	16.8	0.0025	0.3	880	7.5	479
4/27/2019	916069.59	936677.78	1170.1413	915591.19	936527.54	1170.866608	916044.21	937509.77	1168.14017	303	976	401837	-976	303	17.2	0.0025	0.3	880	7.5	479
4/28/2019	916069.59	936677.78	1170.12729	915591.19	936527.54	1170.853785	916044.21	937509.77	1168.098162	300	989	401837	-989	300	16.8	0.0026	0.3	880	7.5	476
4/29/2019	916069.59	936677.78	1170.14745	915591.19	936527.54	1172.256226	916044.21	937509.77	1168.133718	1452	1017	401837	-1017	1452	55.0	0.0044	0.3	880	12.9	372
4/30/2019	916069.59	936677.78	1170.16384	915591.19	936527.54	1170.904319	916044.21	937509.77	1168.119815	309	997	401837	-997	309	17.2	0.0026	0.3	880	7.6	475
5/1/2019	916069.59	936677.78	1170.17211	915591.19	936527.54	1170.919727	916044.21	937509.77	1168.124054	314	999	401837	-999	314	17.5	0.0026	0.3	880	7.6	474
5/2/2019	916069.59	936677.78	1170.18584	915591.19	936527.54	1170.94483	916044.21	937509.77	1168.128857	322	1003	401837	-1003	322	17.8	0.0026	0.3	880	7.7	472
5/3/2019	916069.59	936677.78	1170.19742	915591.19	936527.54	1170.962469	916044.21	937509.77	1168.145742	328	1001	401837	-1001	328	18.2	0.0026	0.3	880	7.7	473
5/4/2019	916069.59	936677.78	1170.21216	915591.19	936527.54	1170.979865	916044.21	937509.77	1168.15025	329	1006	401837	-1006	329	18.1	0.0026	0.3	880	7.7	472
5/5/2019	916069.59	936677.78	1170.17851	915591.19	936527.54	1170.952129	916044.21	937509.77	1168.082576	329	1022	401837	-1022	329	17.8	0.0027	0.3	880	7.8	468
5/6/2019	916069.59	936677.78	1170.17994	915591.19	936527.54	1170.957434	916044.21	937509.77	1168.136615	340	997	401837	-997	340	18.8	0.0026	0.3	880	7.7	473
5/7/2019	916069.59	936677.78	1170.1729	915591.19	936527.54	1170.947433	916044.21	937509.77	1168.117884	336	1003	401837	-1003	336	18.5	0.0026	0.3	880	7.7	472
5/8/2019	916069.59	936677.78	1170.14906	915591.19	936527.54	1170.922655	916044.21	937509.77	1168.113979	338	993	401837	-993	338	18.8	0.0026	0.3	880	7.7	473
5/9/2019	916069.59	936677.78	1170.14602	915591.19	936527.54	1170.914391	916044.21	937509.77	1168.103414	332	997	401837	-997	332	18.4	0.0026	0.3	880	7.7	473
5/10/2019	916069.59	936677.78	1170.17399	915591.19	936527.54	1170.946568	916044.21	937509.77	1168.184589	344	971	401837	-971	344	19.5	0.0026	0.3	880	7.5	478
5/11/2019	916069.59	936677.78	1170.21681	915591.19	936527.54	1170.977046	916044.21	937509.77	1168.210449	331	979	401837	-979	331	18.7	0.0026	0.3	880	7.5	477
5/12/2019	916069.59	936677.78	1170.21296	915591.19	936527.54	1170.968775	916044.21	937509.77	1168.188419	325	988	401837	-988	325	18.2	0.0026	0.3	880	7.6	476
5/13/2019	916069.59	936677.78	1170.29698	915591.19	936527.54	1171.052743	916044.21	937509.77	1168.333041	334	959	401837	-959	334	19.2	0.0025	0.3	880	7.4	482
5/14/2019	916069.59	936677.78	1170.49447	915591.19	936527.54	1171.231498	916044.21	937509.77	1168.563815	323	942	401837	-942	323	18.9	0.0025	0.3	880	7.3	488
5/15/2019	916069.59	936677.78	1170.61938	915591.19	936527.54	1171.340311	916044.21	937509.77	1168.705609	312	934	401837	-934	312	18.5	0.0025	0.3	880	7.2	492
5/16/2019	916069.59	936677.78	1170.71032	915591.19	936527.54	1171.430913	916044.21	937509.77	1168.760414	307	951	401837	-951	307	17.9	0.0025	0.3	880	7.3	489
5/17/2019	916069.59	936677.78	1170.79898	915591.19	936527.54	1171.52321	916044.21	937509.77	1168.832468	307	959	401837	-959	307	17.8	0.0025	0.3	880	7.4	488
5/18/2019	916069.59	936677.78	1170.8632	915591.19	936527.54	1171.591676	916044.21	937509.77	1168.853678	304	980	401837	-980	304	17.2	0.0026	0.3	880	7.5	484
5/19/2019	916069.59	936677.78	1170.90868	915591.19	936527.54	1171.644494	916044.21	937509.77	1168.852035	303	1003	401837	-1003	303	16.8	0.0026	0.3	880	7.6	479
5/20/2019	916069.59	936677.78	1170.95391	915591.19	936527.54	1171.739018	916044.21	937509.77	1168.926625	349	990	401837	-990	349	19.4	0.0026	0.3	880	7.7	480
5/21/2019	916069.59	936677.78	1170.92444	915591.19	936527.54	1171.783781	916044.21	937509.77	1168.805006	397	1036	401837	-1036	397	20.9	0.0028	0.3	880	8.1	467
5/22/2019	916069.59	936677.78	1170.93824	915591.19	936527.54	1171.797226	916044.21	937509.77	1168.799762	393	1045	401837	-1045	393	20.6	0.0028	0.3	880	8.1	465
5/23/2019	916069.59	936677.78	1170.97943	915591.19	936527.54	1171.841395	916044.21	937509.77	1168.823764	393	1053	401837	-1053	393	20.5	0.0028	0.3	880	8.2	464

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
5/24/2019	916069.59	936677.78	1170.96541	915591.19	936527.54	1171.845441	916044.21	937509.77	1168.837489	412	1040	401837	-1040	412	21.6	0.0028	0.3	880	8.2	465
5/25/2019	916069.59	936677.78	1170.96714	915591.19	936527.54	1171.85129	916044.21	937509.77	1168.79997	410	1059	401837	-1059	410	21.2	0.0028	0.3	880	8.3	462
5/26/2019	916069.59	936677.78	1170.96767	915591.19	936527.54	1171.862762	916044.21	937509.77	1168.798097	419	1061	401837	-1061	419	21.5	0.0028	0.3	880	8.3	461
5/27/2019	916069.59	936677.78	1170.97072	915591.19	936527.54	1171.867844	916044.21	937509.77	1168.82307	424	1050	401837	-1050	424	22.0	0.0028	0.3	880	8.3	463
5/28/2019	916069.59	936677.78	1170.99265	915591.19	936527.54	1171.886947	916044.21	937509.77	1168.827635	419	1058	401837	-1058	419	21.6	0.0028	0.3	880	8.3	461
5/29/2019	916069.59	936677.78	1170.97922	915591.19	936527.54	1171.87612	916044.21	937509.77	1168.835755	424	1048	401837	-1048	424	22.0	0.0028	0.3	880	8.3	463
5/30/2019	916069.59	936677.78	1170.97373	915591.19	936527.54	1171.867564	916044.21	937509.77	1168.817863	420	1054	401837	-1054	420	21.7	0.0028	0.3	880	8.3	462
5/31/2019	916069.59	936677.78	1170.94113	915591.19	936527.54	1171.841304	916044.21	937509.77	1168.813377	429	1041	401837	-1041	429	22.4	0.0028	0.3	880	8.2	464
6/1/2019	916069.59	936677.78	1170.9087	915591.19	936527.54	1171.812047	916044.21	937509.77	1168.742976	426	1059	401837	-1059	426	21.9	0.0028	0.3	880	8.3	460
6/2/2019	916069.59	936677.78	1170.8193	915591.19	936527.54	1171.736416	916044.21	937509.77	1168.609083	431	1081	401837	-1081	431	21.7	0.0029	0.3	880	8.5	455
6/3/2019	916069.59	936677.78	1170.76764	915591.19	936527.54	1171.685705	916044.21	937509.77	1168.591671	437	1064	401837	-1064	437	22.3	0.0029	0.3	880	8.4	458
6/4/2019	916069.59	936677.78	1170.72487	915591.19	936527.54	1171.63397	916044.21	937509.77	1168.526694	426	1075	401837	-1075	426	21.6	0.0029	0.3	880	8.4	456
6/5/2019	916069.59	936677.78	1170.68654	915591.19	936527.54	1171.594327	916044.21	937509.77	1168.528816	431	1055	401837	-1055	431	22.2	0.0028	0.3	880	8.3	459
6/6/2019	916069.59	936677.78	1170.66211	915591.19	936527.54	1171.569571	916044.21	937509.77	1168.510279	432	1052	401837	-1052	432	22.3	0.0028	0.3	880	8.3	459
6/7/2019	916069.59	936677.78	1170.62286	915591.19	936527.54	1171.520355	916044.21	937509.77	1168.504046	428	1036	401837	-1036	428	22.5	0.0028	0.3	880	8.2	462
6/8/2019	916069.59	936677.78	1170.5749	915591.19	936527.54	1171.465264	916044.21	937509.77	1168.455434	422	1037	401837	-1037	422	22.2	0.0028	0.3	880	8.2	462
6/9/2019	916069.59	936677.78	1170.48607	915591.19	936527.54	1171.375584	916044.21	937509.77	1168.364951	421	1037	401837	-1037	421	22.1	0.0028	0.3	880	8.2	462
6/10/2019	916069.59	936677.78	1170.44418	915591.19	936527.54	1171.329803	916044.21	937509.77	1168.379745	427	1010	401837	-1010	427	22.9	0.0027	0.3	880	8.0	466
6/11/2019	916069.59	936677.78	1170.38455	915591.19	936527.54	1171.271669	916044.21	937509.77	1168.322206	428	1009	401837	-1009	428	23.0	0.0027	0.3	880	8.0	466
6/12/2019	916069.59	936677.78	1170.2896	915591.19	936527.54	1171.181003	916044.21	937509.77	1168.212	430	1017	401837	-1017	430	22.9	0.0027	0.3	880	8.1	463
6/13/2019	916069.59	936677.78	1170.19948	915591.19	936527.54	1171.102561	916044.21	937509.77	1168.067241	431	1043	401837	-1043	431	22.5	0.0028	0.3	880	8.2	458
6/14/2019	916069.59	936677.78	1170.08892	915591.19	936527.54	1171.006856	916044.21	937509.77	1167.974821	446	1035	401837	-1035	446	23.3	0.0028	0.3	880	8.2	457
6/15/2019	916069.59	936677.78	1170.00237	915591.19	936527.54	1170.915872	916044.21	937509.77	1167.870029	440	1043	401837	-1043	440	22.9	0.0028	0.3	880	8.3	456
6/16/2019	916069.59	936677.78	1169.91198	915591.19	936527.54	1170.833052	916044.21	937509.77	1167.771772	445	1047	401837	-1047	445	23.0	0.0028	0.3	880	8.3	454
6/17/2019	916069.59	936677.78	1169.90193	915591.19	936527.54	1170.810705	916044.21	937509.77	1167.796537	440	1030	401837	-1030	440	23.1	0.0028	0.3	880	8.2	457
6/18/2019	916069.59	936677.78	1169.85833	915591.19	936527.54	1170.747286	916044.21	937509.77	1167.735349	421	1038	401837	-1038	421	22.1	0.0028	0.3	880	8.2	457
6/19/2019	916069.59	936677.78	1169.8052	915591.19	936527.54	1170.688746	916044.21	937509.77	1167.723709	422	1018	401837	-1018	422	22.5	0.0027	0.3	880	8.0	460
6/20/2019	916069.59	936677.78	1169.77726	915591.19	936527.54	1170.665381	916044.21	937509.77	1167.675612	423	1028	401837	-1028	423	22.4	0.0028	0.3	880	8.1	458
6/21/2019	916069.59	936677.78	1169.795	915591.19	936527.54	1170.680809	916044.21	937509.77	1167.708888	424	1020	401837	-1020	424	22.5	0.0027	0.3	880	8.1	459
6/22/2019	916069.59	936677.78	1169.75538	915591.19	936527.54	1170.626226	916044.21	937509.77	1167.638362	406	1035	401837	-1035	406	21.4	0.0028	0.3	880	8.1	458
6/23/2019	916069.59	936677.78	1169.67531	915591.19	936527.54	1170.544784	916044.21	937509.77	1167.522603	400	1052	401837	-1052	400	20.8	0.0028	0.3	880	8.2	454
6/24/2019	916069.59	936677.78	1169.63066	915591.19	936527.54	1170.503081	916044.21	937509.77	1167.514419	408	1035	401837	-1035	408	21.5	0.0028	0.3	880	8.1	457
6/25/2019	916069.59	936677.78	1169.58225	915591.19	936527.54	1170.457617	916044.21	937509.77	1167.435637	406	1049	401837	-1049	406	21.1	0.0028	0.3	880	8.2	454
6/26/2019	916069.59	936677.78	1169.53297	915591.19	936527.54	1170.408445	916044.21	937509.77	1167.430538	413	1028	401837	-1028	413	21.9	0.0028	0.3	880	8.1	457
6/27/2019	916069.59	936677.78	1169.48865	915591.19	936527.54	1170.35862	916044.21	937509.77	1167.370027	406	1036	401837	-1036	406	21.4	0.0028	0.3	880	8.1	456
6/28/2019	916069.59	936677.78	1169.4	915591.19	936527.54	1170.312418	916044.21	937509.77	1167.368356	408	1016	401837	-1016	408	21.9	0.0027	0.3	880	8.0	459
6/29/2019	916069.59	936677.78	1169.41416	915591.19	936527.54	1170.276438	916044.21	937509.77	1167.322216	403	1023	401837	-1023	403	21.5	0.0027	0.3	880	8.0	458
6/30/2019	916069.59	936677.78	1169.33397	915591.19	936527.54	1170.200671	916044.21	937509.77	1167.237007	406	1025	401837	-1025	406	21.6	0.0027	0.3	880	8.0	456
7/1/2019	916069.59	936677.78	1169.26987	915591.19	936527.54	1170.139279	916044.21	937509.77	1167.235872	418	995	401837	-995	418	22.8	0.0027	0.3	880	7.9	461
7/2/2019	916069.59	936677.78	1169.21677	915591.19	936527.54	1170.086327	916044.21	937509.77	1167.174567	417	999	401837	-999	417	22.6	0.0027	0.3	880	7.9	460
7/3/2019	916069.59	936677.78	1169.1338	915591.19	936527.54	1170.009476	916044.21	937509.77	1167.130743	428	980	401837	-980	428	23.6	0.0027	0.3	880	7.8	462
7/4/2019	916069.59	936677.78	1169.1	915591.19	936527.54	1169.935815	916044.21	937509.77	1167.061966	428	978	401837	-978	428	23.6	0.0027	0.3	880	7.8	462
7/5/2019	916069.59	936677.78	1168.98635	915591.19	936527.54	1169.861389	916044.21	937509.77	1167.036499	435	955	401837	-955	435	24.5	0.0026	0.3	880	7.7	465
7/6/2019	916069.59	936677.78	1168.93041	915591.19	936527.54	1169.802566	916044.21	937509.77	1166.977674	432	956	401837	-956	432	24.3	0.0026	0.3	880	7.7	465
7/7/2019	916069.59	936677.78	1168.8314	915591.19	936527.54	1169.70117	916044.21	937509.77	1166.869831	429	960	401837	-960	429	24.1	0.0026	0.3	880	7.7	464
7/8/2019	916069.59	936677.78	1168.8	915591.19	936527.54	1169.626095	916044.21	937509.77	1166.861611	434	931	401837	-931	434	25.0	0.0026	0.3	880	7.5	469
7/9/2019	916069.59	936677.78	1168.6895	915591.19	936527.54	1169.547593	916044.21	937509.77	1166.77966	427	935	401837	-935	427	24.5	0.0026	0.3	880	7.5	468
7/10/2019	916069.59	936677.78	1168.6	915591.19	936527.54	1169.460126	916044.21	937509.77	1166.71815	429	924	401837	-924	429	24.9	0.0025	0.3	880	7.4	469
7/11/2019	916069.59	936677.78	1168.52384	915591.19	936527.54	1169.376691	916044.21	937509.77	1166.626839	425	929	401837	-929	425	24.6	0.0025	0.3	880	7.5	468
7/12/2019	916069.59	936677.78	1168.44002	915591.19	936527.54	1169.293331	916044.21	937509.77	1166.60085	434	902	401837	-902	434	25.7	0.0025	0.3	880	7.3	472
7/13/2019	916069.59	936677.78	1168.35693	915591.19	936527.54	1169.20278	916044.21	937509.77	1166.498763	425	910	401837	-910	425	25.0	0.0025	0.3	880	7.3	470
7/14/2019	916069.59	936677.78	1168.2	915591.19	936527.54	1169.077198	916044.21	937509.77	1166.360586	423	916	401837	-916	423	24.8	0.0025	0.3	880	7.4	468
7/15/2019	916069.59	936677.78	1168.1	915591.19	936527.54	1168.987045	916044.21	937509.77	1166.352873	431	879	401837	-879	431	26.1	0.0024	0.3	880	7.1	475
7/16/2019	916069.59	936677.78	1168.07277	915591.19	936527.54	1172.256226	916044.21	937509.77	1166.268403	3210	969	401837	-969	3210	73.2	0.0083	0.3	880	24.5	270

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
7/17/2019	916069.59	936677.78	1168.1	915591.19	936527.54	1168.888189	916044.21	937509.77	1166.292174	432	863	401837	-863	432	26.6	0.0024	0.3	880	7.0	478
7/18/2019	916069.59	936677.78	1168.0	915591.19	936527.54	1168.823201	916044.21	937509.77	1166.250191	405	866	401837	-866	405	25.1	0.0024	0.3	880	7.0	479
7/19/2019	916069.59	936677.78	1167.96563	915591.19	936527.54	1168.763247	916044.21	937509.77	1166.232831	403	849	401837	-849	403	25.4	0.0023	0.3	880	6.9	483
7/20/2019	916069.59	936677.78	1167.9	915591.19	936527.54	1168.707623	916044.21	937509.77	1166.159706	396	860	401837	-860	396	24.7	0.0024	0.3	880	6.9	481
7/21/2019	916069.59	936677.78	1167.81088	915591.19	936527.54	1168.60479	916044.21	937509.77	1166.031435	393	871	401837	-871	393	24.3	0.0024	0.3	880	7.0	477
7/22/2019	916069.59	936677.78	1167.8	915591.19	936527.54	1168.549826	916044.21	937509.77	1166.046592	405	837	401837	-837	405	25.8	0.0023	0.3	880	6.8	484
7/23/2019	916069.59	936677.78	1167.73611	915591.19	936527.54	1168.521993	916044.21	937509.77	1165.930375	383	884	401837	-884	383	23.4	0.0024	0.3	880	7.0	475
7/24/2019	916069.59	936677.78	1167.68592	915591.19	936527.54	1168.461019	916044.21	937509.77	1165.592849	330	1021	401837	-1021	330	17.9	0.0027	0.3	880	7.8	450
7/25/2019	916069.59	936677.78	1167.63546	915591.19	936527.54	1168.404021	916044.21	937509.77	1165.52183	322	1031	401837	-1031	322	17.3	0.0027	0.3	880	7.9	448
7/26/2019	916069.59	936677.78	1167.6	915591.19	936527.54	1168.32762	916044.21	937509.77	1165.883913	391	820	401837	-820	391	25.5	0.0023	0.3	880	6.6	488
7/27/2019	916069.59	936677.78	1167.47893	915591.19	936527.54	1168.251245	916044.21	937509.77	1165.770728	386	837	401837	-837	386	24.8	0.0023	0.3	880	6.7	483
7/28/2019	916069.59	936677.78	1167.34728	915591.19	936527.54	1168.132222	916044.21	937509.77	1165.952267	443	687	401837	-687	443	32.8	0.0020	0.3	880	6.0	512
7/29/2019	916069.59	936677.78	1167.24958	915591.19	936527.54	1168.042556	916044.21	937509.77	1165.556724	405	830	401837	-830	405	26.0	0.0023	0.3	880	6.7	481
7/30/2019	916069.59	936677.78	1167.15766	915591.19	936527.54	1167.983953	916044.21	937509.77	1165.446604	430	840	401837	-840	430	27.1	0.0023	0.3	880	6.9	476
7/31/2019	916069.59	936677.78	1167.0503	915591.19	936527.54	1167.852631	916044.21	937509.77	1165.327133	409	845	401837	-845	409	25.8	0.0023	0.3	880	6.8	476
8/1/2019	916069.59	936677.78	1166.9481	915591.19	936527.54	1167.737104	916044.21	937509.77	1165.248737	401	833	401837	-833	401	25.7	0.0023	0.3	880	6.7	479
8/2/2019	916069.59	936677.78	1166.9	915591.19	936527.54	1167.679399	916044.21	937509.77	1165.279043	407	795	401837	-795	407	27.1	0.0022	0.3	880	6.5	487
8/3/2019	916069.59	936677.78	1166.83929	915591.19	936527.54	1167.616816	916044.21	937509.77	1165.243645	407	783	401837	-783	407	27.5	0.0022	0.3	880	6.4	489
8/4/2019	916069.59	936677.78	1166.74978	915591.19	936527.54	1167.525642	916044.21	937509.77	1165.129453	402	795	401837	-795	402	26.8	0.0022	0.3	880	6.5	486
8/5/2019	916069.59	936677.78	1166.7	915591.19	936527.54	1167.42985	916044.21	937509.77	1165.066644	406	780	401837	-780	406	27.5	0.0022	0.3	880	6.4	488
8/6/2019	916069.59	936677.78	1166.55902	915591.19	936527.54	1167.332634	916044.21	937509.77	1164.943285	401	793	401837	-793	401	26.8	0.0022	0.3	880	6.5	485
8/7/2019	916069.59	936677.78	1166.45667	915591.19	936527.54	1167.233148	916044.21	937509.77	1164.875975	409	776	401837	-776	409	27.8	0.0022	0.3	880	6.4	487
8/8/2019	916069.59	936677.78	1166.37435	915591.19	936527.54	1167.145868	916044.21	937509.77	1164.786566	403	779	401837	-779	403	27.4	0.0022	0.3	880	6.4	486
8/9/2019	916069.59	936677.78	1166.29162	915591.19	936527.54	1167.059958	916044.21	937509.77	1164.752256	408	756	401837	-756	408	28.4	0.0021	0.3	880	6.3	491
8/10/2019	916069.59	936677.78	1166.20976	915591.19	936527.54	1166.969519	916044.21	937509.77	1164.655022	399	763	401837	-763	399	27.6	0.0021	0.3	880	6.3	490
8/11/2019	916069.59	936677.78	1166.07583	915591.19	936527.54	1166.833545	916044.21	937509.77	1164.490861	392	777	401837	-777	392	26.8	0.0022	0.3	880	6.4	486
8/12/2019	916069.59	936677.78	1165.98381	915591.19	936527.54	1166.739182	916044.21	937509.77	1164.470933	401	743	401837	-743	401	28.4	0.0021	0.3	880	6.2	492
8/13/2019	916069.59	936677.78	1165.89531	915591.19	936527.54	1166.64728	916044.21	937509.77	1164.3678	396	750	401837	-750	396	27.8	0.0021	0.3	880	6.2	490
8/14/2019	916069.59	936677.78	1165.77017	915591.19	936527.54	1166.523942	916044.21	937509.77	1164.259317	400	742	401837	-742	400	28.3	0.0021	0.3	880	6.2	491
8/15/2019	916069.59	936677.78	1165.66858	915591.19	936527.54	1166.420663	916044.21	937509.77	1164.152441	398	744	401837	-744	398	28.1	0.0021	0.3	880	6.2	490
8/16/2019	916069.59	936677.78	1165.58165	915591.19	936527.54	1166.331285	916044.21	937509.77	1164.11974	404	718	401837	-718	404	29.4	0.0021	0.3	880	6.0	495
8/17/2019	916069.59	936677.78	1165.49879	915591.19	936527.54	1166.236221	916044.21	937509.77	1164.018479	391	727	401837	-727	391	28.3	0.0021	0.3	880	6.0	494
8/18/2019	916069.59	936677.78	1165.3833	915591.19	936527.54	1166.130823	916044.21	937509.77	1163.869144	394	743	401837	-743	394	28.0	0.0021	0.3	880	6.1	488
8/19/2019	916069.59	936677.78	1165.31221	915591.19	936527.54	1166.05203	916044.21	937509.77	1163.87371	399	707	401837	-707	399	29.5	0.0020	0.3	880	5.9	496
8/20/2019	916069.59	936677.78	1165.23581	915591.19	936527.54	1165.970929	916044.21	937509.77	1163.778281	393	716	401837	-716	393	28.7	0.0020	0.3	880	6.0	494
8/21/2019	916069.59	936677.78	1165.11822	915591.19	936527.54	1172.256226	916044.21	937509.77	1163.672973	5722	873	401837	-873	5722	81.3	0.0033	0.3	880	9.8	428
8/22/2019	916069.59	936677.78	1165.02826	915591.19	936527.54	1165.759262	916044.21	937509.77	1163.576209	390	713	401837	-713	390	28.7	0.0020	0.3	880	5.9	493
8/23/2019	916069.59	936677.78	1164.91621	915591.19	936527.54	1165.651822	916044.21	937509.77	1163.496694	399	698	401837	-698	399	29.7	0.0020	0.3	880	5.9	495
8/24/2019	916069.59	936677.78	1164.82393	915591.19	936527.54	1165.548792	916044.21	937509.77	1163.385571	387	707	401837	-707	387	28.7	0.0020	0.3	880	5.9	494
8/25/2019	916069.59	936677.78	1164.6763	915591.19	936527.54	1165.398323	916044.21	937509.77	1163.202028	379	724	401837	-724	379	27.7	0.0020	0.3	880	6.0	489
8/26/2019	916069.59	936677.78	1164.58154	915591.19	936527.54	1165.304111	916044.21	937509.77	1163.176597	390	690	401837	-690	390	29.5	0.0020	0.3	880	5.8	495
8/27/2019	916069.59	936677.78	1164.49085	915591.19	936527.54	1165.200067	916044.21	937509.77	1163.058527	375	703	401837	-703	375	28.1	0.0020	0.3	880	5.8	493
8/28/2019	916069.59	936677.78	1164.3904	915591.19	936527.54	1165.111519	916044.21	937509.77	1163.002141	391	682	401837	-682	391	29.8	0.0020	0.3	880	5.7	496
8/29/2019	916069.59	936677.78	1164.34144	915591.19	936527.54	1165.043682	916044.21	937509.77	1162.943211	374	687	401837	-687	374	28.6	0.0019	0.3	880	5.7	497
8/30/2019	916069.59	936677.78	1164.25178	915591.19	936527.54	1164.95148	916044.21	937509.77	1162.884898	377	672	401837	-672	377	29.3	0.0019	0.3	880	5.6	500
8/31/2019	916069.59	936677.78	1164.16128	915591.19	936527.54	1164.848524	916044.21	937509.77	1162.75676	361	689	401837	-689	361	27.6	0.0019	0.3	880	5.7	496
9/1/2019	916069.59	936677.78	1164.01531	915591.19	936527.54	1164.702505	916044.21	937509.77	1162.57494	355	707	401837	-707	355	26.7	0.0020	0.3	880	5.8	491
9/2/2019	916069.59	936677.78	1163.93886	915591.19	936527.54	1164.57895	916044.21	937509.77	1162.574309	328	669	401837	-669	328	26.1	0.0019	0.3	880	5.4	505
9/3/2019	916069.59	936677.78	1163.86694	915591.19	936527.54	1164.548186	916044.21	937509.77	1162.472085	357	685	401837	-685	357	27.6	0.0019	0.3	880	5.6	495
9/4/2019	916069.59	936677.78	1163.73379	915591.19	936527.54	1164.42974	916044.21	937509.77	1162.349706	371	680	401837	-680	371	28.6	0.0019	0.3	880	5.7	494
9/5/2019	916069.59	936677.78	1163.62175	915591.19	936527.54	1164.327102	916044.21	937509.77	1162.207318	374	695	401837	-695	374	28.3	0.0020	0.3	880	5.8	488
9/6/2019	916069.59	936677.78	1163.52177	915591.19	936527.54	1164.229	916044.21	937509.77	1162.159259	384	670	401837	-670	384	29.8	0.0019	0.3	880	5.6	493
9/7/2019	916069.59	936677.78	1163.44601	915591.19	936527.54	1164.148974	916044.21	937509.77	1162.060999	377	680	401837	-680	377	29.0	0.0019	0.3	880	5.7	490
9/8/2019	916069.59	936677.78	1163.29186	915591.19	936527.54	1163.997099	916044.21	937509.77	1161.884666	375	691	401837	-691	375	28.5	0.0020	0.3	880	5.7	486

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
9/9/2019	916069.59	936677.78	1163.21547	915591.19	936527.54	1163.919176	916044.21	937509.77	1161.867336	383	663	401837	-663	383	30.0	0.0019	0.3	880	5.6	492
9/10/2019	916069.59	936677.78	1163.12777	915591.19	936527.54	1163.827205	916044.21	937509.77	1161.743974	374	680	401837	-680	374	28.8	0.0019	0.3	880	5.7	488
9/11/2019	916069.59	936677.78	1163.01041	915591.19	936527.54	1163.712053	916044.21	937509.77	1161.649791	379	669	401837	-669	379	29.6	0.0019	0.3	880	5.6	489
9/12/2019	916069.59	936677.78	1162.94153	915591.19	936527.54	1163.615012	916044.21	937509.77	1161.534732	349	690	401837	-690	349	26.8	0.0019	0.3	880	5.6	487
9/13/2019	916069.59	936677.78	1162.85245	915591.19	936527.54	1163.509383	916044.21	937509.77	1161.469987	339	678	401837	-678	339	26.6	0.0019	0.3	880	5.5	491
9/14/2019	916069.59	936677.78	1162.77227	915591.19	936527.54	1163.423229	916044.21	937509.77	1161.354928	329	695	401837	-695	329	25.3	0.0019	0.3	880	5.6	487
9/15/2019	916069.59	936677.78	1162.61011	915591.19	936527.54	1163.263273	916044.21	937509.77	1161.15551	325	712	401837	-712	325	24.5	0.0019	0.3	880	5.7	481
9/16/2019	916069.59	936677.78	1162.52384	915591.19	936527.54	1163.179483	916044.21	937509.77	1161.14097	338	678	401837	-678	338	26.5	0.0019	0.3	880	5.5	488
9/17/2019	916069.59	936677.78	1162.4451	915591.19	936527.54	1163.094715	916044.21	937509.77	1161.025555	327	696	401837	-696	327	25.2	0.0019	0.3	880	5.6	484
9/18/2019	916069.59	936677.78	1162.31894	915591.19	936527.54	1162.971992	916044.21	937509.77	1160.93371	335	679	401837	-679	335	26.3	0.0019	0.3	880	5.5	486
9/19/2019	916069.59	936677.78	1162.21725	915591.19	936527.54	1162.862191	916044.21	937509.77	1160.784396	321	702	401837	-702	321	24.6	0.0019	0.3	880	5.6	481
9/20/2019	916069.59	936677.78	1162.12795	915591.19	936527.54	1162.772455	916044.21	937509.77	1160.740143	328	680	401837	-680	328	25.7	0.0019	0.3	880	5.5	485
9/21/2019	916069.59	936677.78	1161.99415	915591.19	936527.54	1162.650763	916044.21	937509.77	1160.544421	328	710	401837	-710	328	24.8	0.0019	0.3	880	5.7	476
9/22/2019	916069.59	936677.78	1161.83645	915591.19	936527.54	1162.494195	916044.21	937509.77	1160.385993	329	711	401837	-711	329	24.9	0.0019	0.3	880	5.7	474
9/23/2019	916069.59	936677.78	1161.76189	915591.19	936527.54	1162.41843	916044.21	937509.77	1160.395434	341	670	401837	-670	341	27.0	0.0019	0.3	880	5.5	483
9/24/2019	916069.59	936677.78	1161.68682	915591.19	936527.54	1162.334799	916044.21	937509.77	1160.270498	326	694	401837	-694	326	25.2	0.0019	0.3	880	5.6	478
9/25/2019	916069.59	936677.78	1161.57782	915591.19	936527.54	1162.22508	916044.21	937509.77	1160.210827	333	670	401837	-670	333	26.4	0.0019	0.3	880	5.5	482
9/26/2019	916069.59	936677.78	1161.48864	915591.19	936527.54	1162.130791	916044.21	937509.77	1160.081638	323	689	401837	-689	323	25.1	0.0019	0.3	880	5.6	477
9/27/2019	916069.59	936677.78	1161.39035	915591.19	936527.54	1162.030645	916044.21	937509.77	1160.035685	329	664	401837	-664	329	26.4	0.0018	0.3	880	5.4	483
9/28/2019	916069.59	936677.78	1161.29316	915591.19	936527.54	1161.934627	916044.21	937509.77	1159.8883	323	688	401837	-688	323	25.1	0.0019	0.3	880	5.5	476
9/29/2019	916069.59	936677.78	1161.14188	915591.19	936527.54	1161.780091	916044.21	937509.77	1159.723805	318	695	401837	-695	318	24.6	0.0019	0.3	880	5.6	474
9/30/2019	916069.59	936677.78	1161.07021	915591.19	936527.54	1161.707904	916044.21	937509.77	1159.744256	331	651	401837	-651	331	27.0	0.0018	0.3	880	5.3	484
10/1/2019	916069.59	936677.78	1160.99719	915591.19	936527.54	1172.256226	916044.21	937509.77	1159.623059	9161	943	401837	-943	9161	84.1	0.0033	0.3	880	9.6	431
10/2/2019	916069.59	936677.78	1160.88069	915591.19	936527.54	1161.51579	916044.21	937509.77	1159.554455	329	651	401837	-651	329	26.8	0.0018	0.3	880	5.3	482
10/3/2019	916069.59	936677.78	1160.81349	915591.19	936527.54	1161.414631	916044.21	937509.77	1159.455683	296	665	401837	-665	296	24.0	0.0018	0.3	880	5.3	482
10/4/2019	916069.59	936677.78	1160.81214	915591.19	936527.54	1161.48249	916044.21	937509.77	1159.521271	364	635	401837	-635	364	29.8	0.0018	0.3	880	5.3	481
10/5/2019	916069.59	936677.78	1160.76627	915591.19	936527.54	1161.376574	916044.21	937509.77	1159.435447	308	652	401837	-652	308	25.3	0.0018	0.3	880	5.3	484
10/6/2019	916069.59	936677.78	1160.63451	915591.19	936527.54	1161.240104	916044.21	937509.77	1159.267646	298	669	401837	-669	298	24.0	0.0018	0.3	880	5.3	479
10/7/2019	916069.59	936677.78	1160.6364	915591.19	936527.54	1161.254514	916044.21	937509.77	1159.350586	321	631	401837	-631	321	27.0	0.0018	0.3	880	5.2	487
10/8/2019	916069.59	936677.78	1160.65289	915591.19	936527.54	1161.252108	916044.21	937509.77	1159.325738	299	650	401837	-650	299	24.7	0.0018	0.3	880	5.2	484
10/9/2019	916069.59	936677.78	1160.55084	915591.19	936527.54	1161.1437	916044.21	937509.77	1159.256535	299	634	401837	-634	299	25.2	0.0017	0.3	880	5.1	488
10/10/2019	916069.59	936677.78	1160.49436	915591.19	936527.54	1161.079894	916044.21	937509.77	1159.159967	287	653	401837	-653	287	23.7	0.0018	0.3	880	5.2	484
10/11/2019	916069.59	936677.78	1160.41931	915591.19	936527.54	1161.008715	916044.21	937509.77	1159.140993	298	627	401837	-627	298	25.5	0.0017	0.3	880	5.1	490
10/12/2019	916069.59	936677.78	1160.35661	915591.19	936527.54	1160.942744	916044.21	937509.77	1159.024094	287	652	401837	-652	287	23.8	0.0018	0.3	880	5.2	482
10/13/2019	916069.59	936677.78	1160.22363	915591.19	936527.54	1160.810934	916044.21	937509.77	1158.85587	283	669	401837	-669	283	22.9	0.0018	0.3	880	5.3	477
10/14/2019	916069.59	936677.78	1160.15933	915591.19	936527.54	1160.753957	916044.21	937509.77	1158.873325	302	630	401837	-630	302	25.6	0.0017	0.3	880	5.1	486
10/15/2019	916069.59	936677.78	1160.1013	915591.19	936527.54	1160.692641	916044.21	937509.77	1158.75936	290	657	401837	-657	290	23.8	0.0018	0.3	880	5.2	478
10/16/2019	916069.59	936677.78	1160.00897	915591.19	936527.54	1160.608843	916044.21	937509.77	1158.704183	303	639	401837	-639	303	25.4	0.0018	0.3	880	5.2	481
10/17/2019	916069.59	936677.78	1160.04158	915591.19	936527.54	1160.798264	916044.21	937509.77	1158.717122	431	653	401837	-653	431	33.4	0.0019	0.3	880	5.7	459
10/18/2019	916069.59	936677.78	1160.14579	915591.19	936527.54	1160.735383	916044.21	937509.77	1158.875088	300	623	401837	-623	300	25.7	0.0017	0.3	880	5.0	488
10/19/2019	916069.59	936677.78	1160.20023	915591.19	936527.54	1160.744788	916044.21	937509.77	1158.904692	258	634	401837	-634	258	22.2	0.0017	0.3	880	5.0	491
10/20/2019	916069.59	936677.78	1160.13629	915591.19	936527.54	1160.666409	916044.21	937509.77	1158.783971	238	660	401837	-660	238	19.8	0.0017	0.3	880	5.1	484
10/21/2019	916069.59	936677.78	1160.1541	915591.19	936527.54	1160.690743	916044.21	937509.77	1158.8731	254	626	401837	-626	254	22.1	0.0017	0.3	880	4.9	493
10/22/2019	916069.59	936677.78	1160.1542	915591.19	936527.54	1160.696887	916044.21	937509.77	1158.814673	250	655	401837	-655	250	20.9	0.0017	0.3	880	5.1	484
10/23/2019	916069.59	936677.78	1160.13599	915591.19	936527.54	1160.699358	916044.21	937509.77	1158.827793	272	640	401837	-640	272	23.0	0.0017	0.3	880	5.1	486
10/24/2019	916069.59	936677.78	1160.14727	915591.19	936527.54	1160.684773	916044.21	937509.77	1158.806947	246	655	401837	-655	246	20.6	0.0017	0.3	880	5.1	485
10/25/2019	916069.59	936677.78	1160.15039	915591.19	936527.54	1160.685301	916044.21	937509.77	1158.856853	251	632	401837	-632	251	21.6	0.0017	0.3	880	5.0	492
10/26/2019	916069.59	936677.78	1160.1721	915591.19	936527.54	1160.705593	916044.21	937509.77	1158.820713	241	660	401837	-660	241	20.0	0.0017	0.3	880	5.1	484
10/27/2019	916069.59	936677.78	1160.08006	915591.19	936527.54	1160.586991	916044.21	937509.77	1158.659805	208	692	401837	-692	208	16.8	0.0018	0.3	880	5.3	476
10/28/2019	916069.59	936677.78	1160.11581	915591.19	936527.54	1160.666566	916044.21	937509.77	1158.799692	260	644	401837	-644	260	22.0	0.0017	0.3	880	5.1	486
10/29/2019	916069.59	936677.78	1160.14113	915591.19	936527.54	1160.681729	916044.21	937509.77	1158.758215	242	675	401837	-675	242	19.7	0.0018	0.3	880	5.2	479
10/30/2019	916069.59	936677.78	1160.11617	915591.19	936527.54	1160.661161	916044.21	937509.77	1158.770705	251	658	401837	-658	251	20.9	0.0018	0.3	880	5.1	483
10/31/2019	916069.59	936677.78	1160.1467	915591.19	936527.54	1160.688882	916044.21	937509.77	1158.766377	244	674	401837	-674	244	19.9	0.0018	0.3	880	5.2	479
11/1/2019	916069.59	936677.78	1160.56477	915591.19	936527.54	1161.153755	916044.21	937509.77	1159.38325	313	580	401837	-580	313	28.3	0.0016	0.3	880	4.8	504

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
11/2/2019	916069.59	936677.78	1160.95867	915591.19	936527.54	1161.40082	916044.21	937509.77	1159.901491	209	517	401837	-517	209	22.0	0.0014	0.3	880	4.1	550
11/3/2019	916069.59	936677.78	1161.19907	915591.19	936527.54	1172.256226	916044.21	937509.77	1160.118394	9037	798	401837	-798	9037	85.0	0.0030	0.3	880	8.8	451
11/4/2019	916069.59	936677.78	1161.50541	915591.19	936527.54	1161.876076	916044.21	937509.77	1160.472821	153	503	401837	-503	153	16.9	0.0013	0.3	880	3.8	572
11/5/2019	916069.59	936677.78	1161.78041	915591.19	936527.54	1162.144806	916044.21	937509.77	1160.652831	134	549	401837	-549	134	13.7	0.0014	0.3	880	4.1	555
11/6/2019	916069.59	936677.78	1161.95825	915591.19	936527.54	1162.331873	916044.21	937509.77	1160.815619	139	556	401837	-556	139	14.1	0.0014	0.3	880	4.2	552
11/7/2019	916069.59	936677.78	1162.15637	915591.19	936527.54	1162.53564	916044.21	937509.77	1160.943654	133	590	401837	-590	133	12.7	0.0015	0.3	880	4.4	540
11/8/2019	916069.59	936677.78	1162.30379	915591.19	936527.54	1162.698486	916044.21	937509.77	1161.11473	150	579	401837	-579	150	14.5	0.0015	0.3	880	4.4	544
11/9/2019	916069.59	936677.78	1162.4316	915591.19	936527.54	1162.833307	916044.21	937509.77	1161.139753	140	628	401837	-628	140	12.6	0.0016	0.3	880	4.7	526
11/10/2019	916069.59	936677.78	1162.40709	915591.19	936527.54	1162.825195	916044.21	937509.77	1161.026305	140	671	401837	-671	140	11.8	0.0017	0.3	880	5.0	510
11/11/2019	916069.59	936677.78	1162.52968	915591.19	936527.54	1162.964804	916044.21	937509.77	1161.270563	173	613	401837	-613	173	15.7	0.0016	0.3	880	4.7	530
11/12/2019	916069.59	936677.78	1162.63187	915591.19	936527.54	1163.07166	916044.21	937509.77	1161.310824	167	643	401837	-643	167	14.6	0.0017	0.3	880	4.9	520
11/13/2019	916069.59	936677.78	1162.64517	915591.19	936527.54	1163.100425	916044.21	937509.77	1161.350509	184	631	401837	-631	184	16.3	0.0016	0.3	880	4.8	523
11/14/2019	916069.59	936677.78	1162.68584	915591.19	936527.54	1163.142769	916044.21	937509.77	1161.318663	175	666	401837	-666	175	14.7	0.0017	0.3	880	5.0	512
11/15/2019	916069.59	936677.78	1162.72936	915591.19	936527.54	1163.200655	916044.21	937509.77	1161.439748	198	629	401837	-629	198	17.5	0.0016	0.3	880	4.8	523
11/16/2019	916069.59	936677.78	1162.78638	915591.19	936527.54	1163.258917	916044.21	937509.77	1161.454615	193	649	401837	-649	193	16.6	0.0017	0.3	880	4.9	517
11/17/2019	916069.59	936677.78	1162.77209	915591.19	936527.54	1163.249496	916044.21	937509.77	1161.406951	192	665	401837	-665	192	16.1	0.0017	0.3	880	5.1	511
11/18/2019	916069.59	936677.78	1162.85295	915591.19	936527.54	1163.340079	916044.21	937509.77	1161.588014	215	618	401837	-618	215	19.2	0.0016	0.3	880	4.8	527
11/19/2019	916069.59	936677.78	1162.9104	915591.19	936527.54	1163.397097	916044.21	937509.77	1161.602748	208	638	401837	-638	208	18.1	0.0017	0.3	880	4.9	521
11/20/2019	916069.59	936677.78	1162.90446	915591.19	936527.54	1163.428535	916044.21	937509.77	1161.650276	248	613	401837	-613	248	22.0	0.0016	0.3	880	4.8	525
11/21/2019	916069.59	936677.78	1162.92975	915591.19	936527.54	1163.474625	916044.21	937509.77	1161.644815	260	629	401837	-629	260	22.5	0.0017	0.3	880	5.0	518
11/22/2019	916069.59	936677.78	1162.96298	915591.19	936527.54	1163.515075	916044.21	937509.77	1161.744543	276	597	401837	-597	276	24.8	0.0016	0.3	880	4.8	527
11/23/2019	916069.59	936677.78	1162.99604	915591.19	936527.54	1163.540789	916044.21	937509.77	1161.725385	262	622	401837	-622	262	22.9	0.0017	0.3	880	4.9	520
11/24/2019	916069.59	936677.78	1162.95834	915591.19	936527.54	1163.505099	916044.21	937509.77	1161.650677	258	639	401837	-639	258	22.0	0.0017	0.3	880	5.0	514
11/25/2019	916069.59	936677.78	1163.0057	915591.19	936527.54	1163.555435	916044.21	937509.77	1161.795628	276	593	401837	-593	276	24.9	0.0016	0.3	880	4.8	529
11/26/2019	916069.59	936677.78	1163.05281	915591.19	936527.54	1163.593546	916044.21	937509.77	1161.786685	260	619	401837	-619	260	22.7	0.0017	0.3	880	4.9	522
11/27/2019	916069.59	936677.78	1163.08412	915591.19	936527.54	1163.626562	916044.21	937509.77	1161.850356	266	604	401837	-604	266	23.8	0.0016	0.3	880	4.8	527
11/28/2019	916069.59	936677.78	1163.10979	915591.19	936527.54	1163.651063	916044.21	937509.77	1161.840614	260	621	401837	-621	260	22.7	0.0017	0.3	880	4.9	522
11/29/2019	916069.59	936677.78	1163.15635	915591.19	936527.54	1172.256226	916044.21	937509.77	1161.945297	7389	810	401837	-810	7389	83.7	0.0032	0.3	880	9.3	439
11/30/2019	916069.59	936677.78	1163.22735	915591.19	936527.54	1163.755489	916044.21	937509.77	1161.952158	248	623	401837	-623	248	21.7	0.0017	0.3	880	4.9	524
12/1/2019	916069.59	936677.78	1163.22499	915591.19	936527.54	1163.751744	916044.21	937509.77	1161.896285	239	649	401837	-649	239	20.2	0.0017	0.3	880	5.0	516
12/2/2019	916069.59	936677.78	1163.3115	915591.19	936527.54	1163.84494	916044.21	937509.77	1162.077224	258	604	401837	-604	258	23.2	0.0016	0.3	880	4.8	530
12/3/2019	916069.59	936677.78	1163.35745	915591.19	936527.54	1163.887484	916044.21	937509.77	1162.054275	245	637	401837	-637	245	21.1	0.0017	0.3	880	5.0	521
12/4/2019	916069.59	936677.78	1163.37877	915591.19	936527.54	1163.920473	916044.21	937509.77	1162.117591	261	617	401837	-617	261	22.9	0.0017	0.3	880	4.9	526
12/5/2019	916069.59	936677.78	1163.4625	915591.19	936527.54	1163.937708	916044.21	937509.77	1162.097266	190	665	401837	-665	190	16.0	0.0017	0.3	880	5.1	518
12/6/2019	916069.59	936677.78	1163.60256	915591.19	936527.54	1163.985305	916044.21	937509.77	1162.189519	106	686	401837	-686	106	8.8	0.0017	0.3	880	5.1	517
12/7/2019	916069.59	936677.78	1163.67796	915591.19	936527.54	1163.980623	916044.21	937509.77	1162.101532	15	762	401837	-762	15	1.1	0.0019	0.3	880	5.6	494
12/8/2019	916069.59	936677.78	1163.47868	915591.19	936527.54	1163.924003	916044.21	937509.77	1161.980319	145	728	401837	-728	145	11.3	0.0018	0.3	880	5.4	500
12/9/2019	916069.59	936677.78	1163.20993	915591.19	936527.54	1164.031871	916044.21	937509.77	1162.18117	529	513	401837	-513	529	45.9	0.0018	0.3	880	5.4	502
12/10/2019	916069.59	936677.78	1163.62724	915591.19	936527.54	1164.243485	916044.21	937509.77	1162.313475	315	644	401837	-644	315	26.1	0.0018	0.3	880	5.2	511
12/11/2019	916069.59	936677.78	1163.8576	915591.19	936527.54	1164.381235	916044.21	937509.77	1162.694009	261	570	401837	-570	261	24.6	0.0016	0.3	880	4.6	548
12/12/2019	916069.59	936677.78	1164.0927	915591.19	936527.54	1164.559213	916044.21	937509.77	1162.929532	213	568	401837	-568	213	20.6	0.0015	0.3	880	4.4	559
12/13/2019	916069.59	936677.78	1164.34686	915591.19	936527.54	1164.800638	916044.21	937509.77	1163.244772	212	539	401837	-539	212	21.5	0.0014	0.3	880	4.2	575
12/14/2019	916069.59	936677.78	1164.70915	915591.19	936527.54	1165.070508	916044.21	937509.77	1163.43559	109	618	401837	-618	109	10.0	0.0016	0.3	880	4.6	555
12/15/2019	916069.59	936677.78	1165.02224	915591.19	936527.54	1165.278478	916044.21	937509.77	1163.633684	5	671	401837	-671	5	0.4	0.0017	0.3	880	4.9	539
12/16/2019	916069.59	936677.78	1165.20353	915591.19	936527.54	1165.51739	916044.21	937509.77	1164.01817	83	575	401837	-575	83	8.2	0.0014	0.3	880	4.2	581
12/17/2019	916069.59	936677.78	1165.40979	915591.19	936527.54	1165.77527	916044.21	937509.77	1164.240844	128	569	401837	-569	128	12.7	0.0015	0.3	880	4.3	583
12/18/2019	916069.59	936677.78	1165.59348	915591.19	936527.54	1165.986347	916044.21	937509.77	1164.453415	156	555	401837	-555	156	15.6	0.0014	0.3	880	4.2	588
12/19/2019	916069.59	936677.78	1165.74611	915591.19	936527.54	1166.15761	916044.21	937509.77	1164.561918	164	577	401837	-577	164	15.9	0.0015	0.3	880	4.4	578
12/20/2019	916069.59	936677.78	1165.88813	915591.19	936527.54	1166.31338	916044.21	937509.77	1164.705979	176	576	401837	-576	176	17.0	0.0015	0.3	880	4.4	578
12/21/2019	916069.59	936677.78	1166.02256	915591.19	936527.54	1166.459404	916044.21	937509.77	1164.75349	173	618	401837	-618	173	15.6	0.0016	0.3	880	4.7	562
12/22/2019	916069.59	936677.78	1166.10664	915591.19	936527.54	1166.562331	916044.21	937509.77	1164.780871	180	646	401837	-646	180	15.6	0.0017	0.3	880	4.9	551
12/23/2019	916069.59	936677.78	1166.21226	915591.19	936527.54	1166.689394	916044.21	937509.77	1164.913286	202	634	401837	-634	202	17.7	0.0017	0.3	880	4.9	554
12/24/2019	916069.59	936677.78	1166.30659	915591.19	936527.54	1166.797673	916044.21	937509.77	1164.965209	207	654	401837	-654	207	17.6	0.0017	0.3	880	5.0	547
12/25/2019	916069.59	936677.78	1166.40052	915591.19	936527.54	1166.9033	916044.21	937509.77	1165.057809	217	655	401837	-655	217	18.3	0.0017	0.3	880	5.0	546

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
12/26/2019	916069.59	936677.78	1166.487	915591.19	936527.54	1166.999778	916044.21	937509.77	1165.09999	218	677	401837	-677	218	17.9	0.0018	0.3	880	5.2	539
12/27/2019	916069.59	936677.78	1166.58327	915591.19	936527.54	1167.116029	916044.21	937509.77	1165.211105	237	670	401837	-670	237	19.5	0.0018	0.3	880	5.2	540
12/28/2019	916069.59	936677.78	1166.67033	915591.19	936527.54	1167.207092	916044.21	937509.77	1165.243061	232	696	401837	-696	232	18.4	0.0018	0.3	880	5.4	532
12/29/2019	916069.59	936677.78	1166.75099	915591.19	936527.54	1167.288296	916044.21	937509.77	1165.29297	228	711	401837	-711	228	17.8	0.0019	0.3	880	5.5	528
12/30/2019	916069.59	936677.78	1166.94035	915591.19	936527.54	1167.486437	916044.21	937509.77	1165.517154	241	695	401837	-695	241	19.1	0.0018	0.3	880	5.4	534
12/31/2019	916069.59	936677.78	1167.13224	915591.19	936527.54	1167.657692	916044.21	937509.77	1165.710525	224	693	401837	-693	224	17.9	0.0018	0.3	880	5.3	538
1/1/2020	916069.59	936677.78	1167.28727	915591.19	936527.54	1167.808396	916044.21	937509.77	1165.909679	227	672	401837	-672	227	18.6	0.0018	0.3	880	5.2	547
1/2/2020	916069.59	936677.78	1167.40936	915591.19	936527.54	1167.93213	916044.21	937509.77	1165.80646	194	780	401837	-780	194	14.0	0.0020	0.3	880	5.9	515
1/3/2020	916069.59	936677.78	1167.5059	915591.19	936527.54	1168.04392	916044.21	937509.77	1165.990959	220	738	401837	-738	220	16.6	0.0019	0.3	880	5.6	527
1/4/2020	916069.59	936677.78	1167.62927	915591.19	936527.54	1172.256226	916044.21	937509.77	1166.117567	3622	841	401837	-841	3622	76.9	0.0093	0.3	880	27.1	257
1/5/2020	916069.59	936677.78	1167.70597	915591.19	936527.54	1168.256826	916044.21	937509.77	1166.156485	226	755	401837	-755	226	16.6	0.0020	0.3	880	5.8	523
1/6/2020	916069.59	936677.78	1167.81948	915591.19	936527.54	1168.375846	916044.21	937509.77	1166.298263	234	742	401837	-742	234	17.5	0.0019	0.3	880	5.7	527
1/7/2020	916069.59	936677.78	1167.92525	915591.19	936527.54	1168.483611	916044.21	937509.77	1166.36471	230	761	401837	-761	230	16.8	0.0020	0.3	880	5.8	523
1/8/2020	916069.59	936677.78	1168.00396	915591.19	936527.54	1168.575011	916044.21	937509.77	1166.473707	245	747	401837	-747	245	18.2	0.0020	0.3	880	5.7	526
1/9/2020	916069.59	936677.78	1168.0258	915591.19	936527.54	1168.605977	916044.21	937509.77	1166.43885	244	774	401837	-774	244	17.5	0.0020	0.3	880	5.9	518
1/10/2020	916069.59	936677.78	1168.1176	915591.19	936527.54	1168.712258	916044.21	937509.77	1166.55718	260	762	401837	-762	260	18.9	0.0020	0.3	880	5.9	521
1/11/2020	916069.59	936677.78	1168.26883	915591.19	936527.54	1168.869486	916044.21	937509.77	1166.628988	253	800	401837	-800	253	17.6	0.0021	0.3	880	6.1	512
1/12/2020	916069.59	936677.78	1168.30509	915591.19	936527.54	1168.903873	916044.21	937509.77	1166.656877	251	804	401837	-804	251	17.3	0.0021	0.3	880	6.1	511
1/13/2020	916069.59	936677.78	1168.40601	915591.19	936527.54	1169.0058	916044.21	937509.77	1166.798918	258	784	401837	-784	258	18.2	0.0021	0.3	880	6.0	517
1/14/2020	916069.59	936677.78	1168.50219	915591.19	936527.54	1169.104029	916044.21	937509.77	1166.832183	250	814	401837	-814	250	17.1	0.0021	0.3	880	6.2	510
1/15/2020	916069.59	936677.78	1168.57677	915591.19	936527.54	1169.193171	916044.21	937509.77	1166.92218	264	807	401837	-807	264	18.1	0.0021	0.3	880	6.2	512
1/16/2020	916069.59	936677.78	1168.6432	915591.19	936527.54	1169.269469	916044.21	937509.77	1166.949259	267	826	401837	-826	267	17.9	0.0022	0.3	880	6.3	507
1/17/2020	916069.59	936677.78	1168.66301	915591.19	936527.54	1169.301795	916044.21	937509.77	1166.999742	282	812	401837	-812	282	19.1	0.0021	0.3	880	6.3	509
1/18/2020	916069.59	936677.78	1168.77572	915591.19	936527.54	1169.4075	916044.21	937509.77	1167.023531	262	854	401837	-854	262	17.1	0.0022	0.3	880	6.5	500
1/19/2020	916069.59	936677.78	1168.79344	915591.19	936527.54	1169.443343	916044.21	937509.77	1167.025784	275	862	401837	-862	275	17.7	0.0023	0.3	880	6.6	498
1/20/2020	916069.59	936677.78	1168.81603	915591.19	936527.54	1169.47678	916044.21	937509.77	1167.09111	291	842	401837	-842	291	19.0	0.0022	0.3	880	6.5	502
1/21/2020	916069.59	936677.78	1168.87521	915591.19	936527.54	1169.534183	916044.21	937509.77	1167.099297	281	866	401837	-866	281	18.0	0.0023	0.3	880	6.6	497
1/22/2020	916069.59	936677.78	1168.91862	915591.19	936527.54	1169.585781	916044.21	937509.77	1167.154847	290	861	401837	-861	290	18.6	0.0023	0.3	880	6.6	498
1/23/2020	916069.59	936677.78	1168.94443	915591.19	936527.54	1169.619443	916044.21	937509.77	1167.143912	291	879	401837	-879	291	18.3	0.0023	0.3	880	6.8	493
1/24/2020	916069.59	936677.78	1168.96663	915591.19	936527.54	1169.653999	916044.21	937509.77	1167.187248	305	869	401837	-869	305	19.3	0.0023	0.3	880	6.7	495
1/25/2020	916069.59	936677.78	1169.02951	915591.19	936527.54	1169.725667	916044.21	937509.77	1167.22248	308	882	401837	-882	308	19.2	0.0023	0.3	880	6.8	492
1/26/2020	916069.59	936677.78	1169.11177	915591.19	936527.54	1169.80714	916044.21	937509.77	1167.293162	305	888	401837	-888	305	19.0	0.0023	0.3	880	6.9	492
1/27/2020	916069.59	936677.78	1169.19553	915591.19	936527.54	1169.884957	916044.21	937509.77	1167.413845	306	870	401837	-870	306	19.4	0.0023	0.3	880	6.7	497
1/28/2020	916069.59	936677.78	1169.23188	915591.19	936527.54	1169.920406	916044.21	937509.77	1167.420226	301	884	401837	-884	301	18.8	0.0023	0.3	880	6.8	494
1/29/2020	916069.59	936677.78	1169.22582	915591.19	936527.54	1169.922594	916044.21	937509.77	1167.433816	310	875	401837	-875	310	19.5	0.0023	0.3	880	6.8	495
1/30/2020	916069.59	936677.78	1169.22577	915591.19	936527.54	1169.92322	916044.21	937509.77	1167.407979	307	887	401837	-887	307	19.1	0.0023	0.3	880	6.9	492
1/31/2020	916069.59	936677.78	1169.22451	915591.19	936527.54	1169.929813	916044.21	937509.77	1167.412684	315	885	401837	-885	315	19.6	0.0023	0.3	880	6.9	492
2/1/2020	916069.59	936677.78	1169.23875	915591.19	936527.54	1169.945403	916044.21	937509.77	1167.391467	310	902	401837	-902	310	19.0	0.0024	0.3	880	7.0	489
2/2/2020	916069.59	936677.78	1169.25463	915591.19	936527.54	1169.964993	916044.21	937509.77	1167.400049	312	905	401837	-905	312	19.0	0.0024	0.3	880	7.0	488
2/3/2020	916069.59	936677.78	1169.23961	915591.19	936527.54	1169.963552	916044.21	937509.77	1167.447229	333	876	401837	-876	333	20.8	0.0023	0.3	880	6.8	493
2/4/2020	916069.59	936677.78	1169.25744	915591.19	936527.54	1169.97773	916044.21	937509.77	1167.438549	326	888	401837	-888	326	20.2	0.0024	0.3	880	6.9	491
2/5/2020	916069.59	936677.78	1169.23187	915591.19	936527.54	1169.958029	916044.21	937509.77	1167.438273	335	876	401837	-876	335	20.9	0.0023	0.3	880	6.8	493
2/6/2020	916069.59	936677.78	1169.29679	915591.19	936527.54	1170.014146	916044.21	937509.77	1167.487267	325	884	401837	-884	325	20.2	0.0023	0.3	880	6.9	492
2/7/2020	916069.59	936677.78	1169.3706	915591.19	936527.54	1170.09412	916044.21	937509.77	1167.58729	334	871	401837	-871	334	21.0	0.0023	0.3	880	6.8	495
2/8/2020	916069.59	936677.78	1169.341	915591.19	936527.54	1170.05795	916044.21	937509.77	1167.56456	330	868	401837	-868	330	20.8	0.0023	0.3	880	6.8	496
2/9/2020	916069.59	936677.78	1169.3157	915591.19	936527.54	1170.01505	916044.21	937509.77	1167.48152	306	895	401837	-895	306	18.9	0.0024	0.3	880	6.9	491
2/10/2020	916069.59	936677.78	1169.3714	915591.19	936527.54	1170.07665	916044.21	937509.77	1167.59516	320	868	401837	-868	320	20.2	0.0023	0.3	880	6.8	497
2/11/2020	916069.59	936677.78	1169.4364	915591.19	936527.54	1170.12744	916044.21	937509.77	1167.6058	300	893	401837	-893	300	18.6	0.0023	0.3	880	6.9	493
2/12/2020	916069.59	936677.78	1169.4134	915591.19	936527.54	1170.11547	916044.21	937509.77	1167.61634	314	878	401837	-878	314	19.7	0.0023	0.3	880	6.8	496
2/13/2020	916069.59	936677.78	1169.4791	915591.19	936527.54	1170.16349	916044.21	937509.77	1167.62146	290	906	401837	-906	290	17.8	0.0024	0.3	880	6.9	491
2/14/2020	916069.59	936677.78	1169.3993	915591.19	936527.54	1170.1165	916044.21	937509.77	1167.63792	332	861	401837	-861	332	21.1	0.0023	0.3	880	6.7	498
2/15/2020	916069.59	936677.78	1169.4373	915591.19	936527.54	1170.14866	916044.21	937509.77	1167.61686	318	889	401837	-889	318	19.7	0.0023	0.3	880	6.9	493
2/16/2020	916069.59	936677.78	1169.378	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.50002	2113	971	401837	-971	2113	65.3	0.0058	0.3	880	17.0	325
2/17/2020	916069.59	936677.78	1169.3455	915591.19	936527.54	1170.08257	916044.21	937509.77	1167.56321	345	871	401837	-871	345	21.6	0.0023	0.3	880	6.8	494

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
2/18/2020	916069.59	936677.78	1169.4138	915591.19	936527.54	1170.13256	916044.21	937509.77	1167.55381	319	908	401837	-908	319	19.3	0.0024	0.3	880	7.0	488
2/19/2020	916069.59	936677.78	1169.3355	915591.19	936527.54	1170.07561	916044.21	937509.77	1167.54363	347	876	401837	-876	347	21.6	0.0023	0.3	880	6.9	493
2/20/2020	916069.59	936677.78	1169.3514	915591.19	936527.54	1170.08369	916044.21	937509.77	1167.51415	333	898	401837	-898	333	20.4	0.0024	0.3	880	7.0	489
2/21/2020	916069.59	936677.78	1169.3103	915591.19	936527.54	1170.05485	916044.21	937509.77	1167.49561	347	887	401837	-887	347	21.4	0.0024	0.3	880	7.0	490
2/22/2020	916069.59	936677.78	1169.32	915591.19	936527.54	1170.0613	916044.21	937509.77	1167.50089	343	889	401837	-889	343	21.1	0.0024	0.3	880	7.0	490
2/23/2020	916069.59	936677.78	1169.2658	915591.19	936527.54	1170.00572	916044.21	937509.77	1167.38476	333	919	401837	-919	333	19.9	0.0024	0.3	880	7.1	483
2/24/2020	916069.59	936677.78	1169.2373	915591.19	936527.54	1169.98963	916044.21	937509.77	1167.40945	351	894	401837	-894	351	21.5	0.0024	0.3	880	7.0	487
2/25/2020	916069.59	936677.78	1169.247	915591.19	936527.54	1170.00428	916044.21	937509.77	1167.41608	355	895	401837	-895	355	21.6	0.0024	0.3	880	7.0	487
2/26/2020	916069.59	936677.78	1169.2449	915591.19	936527.54	1170.004	916044.21	937509.77	1167.42439	358	890	401837	-890	358	21.9	0.0024	0.3	880	7.0	488
2/27/2020	916069.59	936677.78	1169.45	915591.19	936527.54	1170.22191	916044.21	937509.77	1167.6262	368	892	401837	-892	368	22.4	0.0024	0.3	880	7.0	488
2/28/2020	916069.59	936677.78	1169.5291	915591.19	936527.54	1170.24469	916044.21	937509.77	1167.74588	327	871	401837	-871	327	20.6	0.0023	0.3	880	6.8	497
2/29/2020	916069.59	936677.78	1169.5956	915591.19	936527.54	1170.30662	916044.21	937509.77	1167.7894	320	882	401837	-882	320	19.9	0.0023	0.3	880	6.9	496
3/1/2020	916069.59	936677.78	1169.605	915591.19	936527.54	1170.3256	916044.21	937509.77	1167.72915	318	916	401837	-916	318	19.1	0.0024	0.3	880	7.1	488
3/2/2020	916069.59	936677.78	1169.6948	915591.19	936527.54	1170.41743	916044.21	937509.77	1167.833209	322	909	401837	-909	322	19.5	0.0024	0.3	880	7.0	490
3/3/2020	916069.59	936677.78	1169.8368	915591.19	936527.54	1170.56846	916044.21	937509.77	1167.929329	322	931	401837	-931	322	19.1	0.0025	0.3	880	7.2	486
3/4/2020	916069.59	936677.78	1169.9409	915591.19	936527.54	1170.66107	916044.21	937509.77	1168.116617	325	891	401837	-891	325	20.0	0.0024	0.3	880	6.9	496
3/5/2020	916069.59	936677.78	1170.0744	915591.19	936527.54	1170.7918	916044.21	937509.77	1168.202761	316	914	401837	-914	316	19.1	0.0024	0.3	880	7.1	492
3/6/2020	916069.59	936677.78	1170.2191	915591.19	936527.54	1170.95052	916044.21	937509.77	1168.320865	323	927	401837	-927	323	19.2	0.0024	0.3	880	7.2	490
3/7/2020	916069.59	936677.78	1170.3321	915591.19	936527.54	1171.07416	916044.21	937509.77	1168.3927	326	947	401837	-947	326	19.0	0.0025	0.3	880	7.3	486
3/8/2020	916069.59	936677.78	1170.3313	915591.19	936527.54	1171.09433	916044.21	937509.77	1168.215623	317	1032	401837	-1032	317	17.1	0.0027	0.3	880	7.9	468
3/9/2020	916069.59	936677.78	1170.4873	915591.19	936527.54	1171.25891	916044.21	937509.77	1168.458856	337	990	401837	-990	337	18.8	0.0026	0.3	880	7.6	477
3/10/2020	916069.59	936677.78	1170.6372	915591.19	936527.54	1171.41972	916044.21	937509.77	1168.581818	342	1003	401837	-1003	342	18.8	0.0026	0.3	880	7.7	475
3/11/2020	916069.59	936677.78	1170.6983	915591.19	936527.54	1171.49805	916044.21	937509.77	1168.64739	357	1001	401837	-1001	357	19.6	0.0026	0.3	880	7.8	475
3/12/2020	916069.59	936677.78	1170.7882	915591.19	936527.54	1171.60093	916044.21	937509.77	1168.685658	360	1026	401837	-1026	360	19.3	0.0027	0.3	880	7.9	470
3/13/2020	916069.59	936677.78	1170.8466	915591.19	936527.54	1171.68168	916044.21	937509.77	1168.771408	383	1014	401837	-1014	383	20.7	0.0027	0.3	880	7.9	471
3/14/2020	916069.59	936677.78	1170.8627	915591.19	936527.54	1171.71635	916044.21	937509.77	1168.77182	396	1022	401837	-1022	396	21.2	0.0027	0.3	880	8.0	469
3/15/2020	916069.59	936677.78	1170.857	915591.19	936527.54	1171.71906	916044.21	937509.77	1168.707629	394	1050	401837	-1050	394	20.6	0.0028	0.3	880	8.2	464
3/16/2020	916069.59	936677.78	1170.9017	915591.19	936527.54	1171.7721	916044.21	937509.77	1168.77738	405	1038	401837	-1038	405	21.3	0.0028	0.3	880	8.1	466
3/17/2020	916069.59	936677.78	1170.9359	915591.19	936527.54	1171.81814	916044.21	937509.77	1168.78928	412	1049	401837	-1049	412	21.4	0.0028	0.3	880	8.2	463
3/18/2020	916069.59	936677.78	1170.8925	915591.19	936527.54	1171.7919	916044.21	937509.77	1168.767894	429	1039	401837	-1039	429	22.4	0.0028	0.3	880	8.2	464
3/19/2020	916069.59	936677.78	1170.9336	915591.19	936527.54	1171.8283	916044.21	937509.77	1168.782355	421	1052	401837	-1052	421	21.8	0.0028	0.3	880	8.3	462
3/20/2020	916069.59	936677.78	1170.9699	915591.19	936527.54	1171.87311	916044.21	937509.77	1168.821108	429	1051	401837	-1051	429	22.2	0.0028	0.3	880	8.3	462
3/21/2020	916069.59	936677.78	1170.9008	915591.19	936527.54	1171.80686	916044.21	937509.77	1168.761299	432	1047	401837	-1047	432	22.4	0.0028	0.3	880	8.3	462
3/22/2020	916069.59	936677.78	1170.8278	915591.19	936527.54	1171.7444	916044.21	937509.77	1168.646907	435	1067	401837	-1067	435	22.2	0.0029	0.3	880	8.4	458
3/23/2020	916069.59	936677.78	1170.8384	915591.19	936527.54	1171.76857	916044.21	937509.77	1168.69527	452	1049	401837	-1049	452	23.3	0.0028	0.3	880	8.3	460
3/24/2020	916069.59	936677.78	1170.8416	915591.19	936527.54	1171.75975	916044.21	937509.77	1168.685438	440	1055	401837	-1055	440	22.6	0.0028	0.3	880	8.3	460
3/25/2020	916069.59	936677.78	1170.814	915591.19	936527.54	1171.73775	916044.21	937509.77	1168.670746	447	1049	401837	-1049	447	23.1	0.0028	0.3	880	8.3	460
3/26/2020	916069.59	936677.78	1170.8274	915591.19	936527.54	1171.73807	916044.21	937509.77	1168.640002	429	1070	401837	-1070	429	21.9	0.0029	0.3	880	8.4	458
3/27/2020	916069.59	936677.78	1170.7538	915591.19	936527.54	1171.68133	916044.21	937509.77	1168.634396	453	1037	401837	-1037	453	23.6	0.0028	0.3	880	8.3	461
3/28/2020	916069.59	936677.78	1170.7368	915591.19	936527.54	1171.60314	916044.21	937509.77	1168.592298	399	1048	401837	-1048	399	20.8	0.0028	0.3	880	8.2	463
3/29/2020	916069.59	936677.78	1170.777	915591.19	936527.54	1172.256226	916044.21	937509.77	1168.579994	901	1089	401837	-1089	901	39.6	0.0035	0.3	880	10.3	417
3/30/2020	916069.59	936677.78	1170.7846	915591.19	936527.54	1171.66381	916044.21	937509.77	1168.662964	413	1037	401837	-1037	413	21.7	0.0028	0.3	880	8.1	464
3/31/2020	916069.59	936677.78	1170.8172	915591.19	936527.54	1171.68674	916044.21	937509.77	1168.684205	403	1042	401837	-1042	403	21.1	0.0028	0.3	880	8.2	464
4/1/2020	916069.59	936677.78	1170.8252	915591.19	936527.54	1171.69108	916044.21	937509.77	1168.697509	401	1040	401837	-1040	401	21.1	0.0028	0.3	880	8.1	465
4/2/2020	916069.59	936677.78	1170.8061	915591.19	936527.54	1171.66913	916044.21	937509.77	1168.65501	395	1051	401837	-1051	395	20.6	0.0028	0.3	880	8.2	463
4/3/2020	916069.59	936677.78	1170.758	915591.19	936527.54	1171.63397	916044.21	937509.77	1168.64153	411	1035	401837	-1035	411	21.7	0.0028	0.3	880	8.1	465
4/4/2020	916069.59	936677.78	1170.7424	915591.19	936527.54	1171.60593	916044.21	937509.77	1168.599123	396	1047	401837	-1047	396	20.7	0.0028	0.3	880	8.2	463
4/5/2020	916069.59	936677.78	1170.6653	915591.19	936527.54	1171.53238	916044.21	937509.77	1168.465539	391	1074	401837	-1074	391	20.0	0.0028	0.3	880	8.3	458
4/6/2020	916069.59	936677.78	1170.6407	915591.19	936527.54	1171.51289	916044.21	937509.77	1168.49267	403	1050	401837	-1050	403	21.0	0.0028	0.3	880	8.2	462
4/7/2020	916069.59	936677.78	1170.661	915591.19	936527.54	1171.50981	916044.21	937509.77	1168.464557	376	1072	401837	-1072	376	19.3	0.0028	0.3	880	8.3	459
4/8/2020	916069.59	936677.78	1170.6238	915591.19	936527.54	1171.49511	916044.21	937509.77	1168.469318	401	1053	401837	-1053	401	20.9	0.0028	0.3	880	8.2	461
4/9/2020	916069.59	936677.78	1170.6333	915591.19	936527.54	1171.48964	916044.21	937509.77	1168.437845	383	1072	401837	-1072	383	19.6	0.0028	0.3	880	8.3	459
4/10/2020	916069.59	936677.78	1170.5844	915591.19	936527.54	1171.45739	916044.21	937509.77	1168.446712	405	1045	401837	-1045	405	21.2	0.0028	0.3	880	8.2	462
4/11/2020	916069.59	936677.78	1170.5445	915591.19	936527.54	1171.41417	916044.21	937509.77	1168.40223	402	1047	401837	-1047	402	21.0	0.0028	0.3	880	8.2	461

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
4/12/2020	916069.59	936677.78	1170.4764	915591.19	936527.54	1171.3353	916044.21	937509.77	1168.285867	385	1070	401837	-1070	385	19.8	0.0028	0.3	880	8.3	458
4/13/2020	916069.59	936677.78	1170.2132	915591.19	936527.54	1170.94689	916044.21	937509.77	1168.347338	330	911	401837	-911	330	19.9	0.0024	0.3	880	7.1	493
4/14/2020	916069.59	936677.78	1170.4311	915591.19	936527.54	1171.295	916044.21	937509.77	1168.277557	395	1052	401837	-1052	395	20.6	0.0038	0.3	880	11.3	393
4/15/2020	916069.59	936677.78	1170.4045	915591.19	936527.54	1171.2516	916044.21	937509.77	1168.267302	384	1044	401837	-1044	384	20.2	0.0028	0.3	880	8.1	462
4/16/2020	916069.59	936677.78	1170.3447	915591.19	936527.54	1171.19803	916044.21	937509.77	1168.196126	387	1050	401837	-1050	387	20.2	0.0028	0.3	880	8.2	460
4/17/2020	916069.59	936677.78	1170.3027	915591.19	936527.54	1171.15856	916044.21	937509.77	1168.186279	394	1034	401837	-1034	394	20.9	0.0028	0.3	880	8.1	463
4/18/2020	916069.59	936677.78	1170.2847	915591.19	936527.54	1171.14689	916044.21	937509.77	1168.167187	399	1035	401837	-1035	399	21.1	0.0028	0.3	880	8.1	462
4/19/2020	916069.59	936677.78	1170.2348	915591.19	936527.54	1171.08105	916044.21	937509.77	1168.070198	379	1057	401837	-1057	379	19.7	0.0028	0.3	880	8.2	459
4/20/2020	916069.59	936677.78	1170.1928	915591.19	936527.54	1171.04853	916044.21	937509.77	1168.09771	397	1024	401837	-1024	397	21.2	0.0027	0.3	880	8.0	464
4/21/2020	916069.59	936677.78	1170.1613	915591.19	936527.54	1171.01266	916044.21	937509.77	1168.049416	391	1032	401837	-1032	391	20.8	0.0027	0.3	880	8.1	462
4/22/2020	916069.59	936677.78	1170.0771	915591.19	936527.54	1170.93513	916044.21	937509.77	1168.000394	402	1015	401837	-1015	402	21.6	0.0027	0.3	880	8.0	464
4/23/2020	916069.59	936677.78	1170.0305	915591.19	936527.54	1170.88219	916044.21	937509.77	1167.92527	392	1029	401837	-1029	392	20.9	0.0027	0.3	880	8.0	462
4/24/2020	916069.59	936677.78	1169.9754	915591.19	936527.54	1170.83666	916044.21	937509.77	1167.918048	407	1006	401837	-1006	407	22.0	0.0027	0.3	880	7.9	465
4/25/2020	916069.59	936677.78	1169.9096	915591.19	936527.54	1170.76965	916044.21	937509.77	1167.844651	405	1010	401837	-1010	405	21.9	0.0027	0.3	880	7.9	464
4/26/2020	916069.59	936677.78	1169.8587	915591.19	936527.54	1170.68826	916044.21	937509.77	1167.72688	370	1041	401837	-1041	370	19.6	0.0027	0.3	880	8.1	460
4/27/2020	916069.59	936677.78	1169.9869	915591.19	936527.54	1170.81801	916044.21	937509.77	1167.92912	382	1006	401837	-1006	382	20.8	0.0027	0.3	880	7.9	467
4/28/2020	916069.59	936677.78	1169.9691	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.936241	1597	1031	401837	-1031	1597	57.2	0.0047	0.3	880	13.9	359
4/29/2020	916069.59	936677.78	1169.968	915591.19	936527.54	1170.79206	916044.21	937509.77	1167.967553	385	978	401837	-978	385	21.5	0.0026	0.3	880	7.7	472
4/30/2020	916069.59	936677.78	1170.0139	915591.19	936527.54	1170.81698	916044.21	937509.77	1167.94512	357	1010	401837	-1010	357	19.5	0.0027	0.3	880	7.8	468
5/1/2020	916069.59	936677.78	1170.4404	915591.19	936527.54	1171.24617	916044.21	937509.77	1168.505133	380	946	401837	-946	380	21.9	0.0025	0.3	880	7.4	483
5/2/2020	916069.59	936677.78	1170.6463	915591.19	936527.54	1171.41092	916044.21	937509.77	1168.632874	334	983	401837	-983	334	18.8	0.0026	0.3	880	7.6	480
5/3/2020	916069.59	936677.78	1170.8621	915591.19	936527.54	1171.59322	916044.21	937509.77	1168.695746	283	1055	401837	-1055	283	15.0	0.0027	0.3	880	8.0	469
5/4/2020	916069.59	936677.78	1171.0072	915591.19	936527.54	1171.76105	916044.21	937509.77	1168.83949	302	1056	401837	-1056	302	15.9	0.0027	0.3	880	8.0	469
5/5/2020	916069.59	936677.78	1171.1614	915591.19	936527.54	1171.91511	916044.21	937509.77	1168.942883	294	1080	401837	-1080	294	15.2	0.0028	0.3	880	8.2	466
5/6/2020	916069.59	936677.78	1171.2428	915591.19	936527.54	1172.03027	916044.21	937509.77	1169.008538	319	1089	401837	-1089	319	16.4	0.0028	0.3	880	8.3	463
5/7/2020	916069.59	936677.78	1171.3391	915591.19	936527.54	1172.14014	916044.21	937509.77	1169.056436	324	1112	401837	-1112	324	16.2	0.0029	0.3	880	8.5	459
5/8/2020	916069.59	936677.78	1171.3802	915591.19	936527.54	1172.22004	916044.21	937509.77	1169.110757	358	1107	401837	-1107	358	17.9	0.0029	0.3	880	8.5	459
5/9/2020	916069.59	936677.78	1171.4331	915591.19	936527.54	1172.28052	916044.21	937509.77	1169.148828	362	1114	401837	-1114	362	18.0	0.0029	0.3	880	8.6	458
5/10/2020	916069.59	936677.78	1171.4137	915591.19	936527.54	1172.28529	916044.21	937509.77	1169.068309	373	1144	401837	-1144	373	18.0	0.0030	0.3	880	8.8	452
5/11/2020	916069.59	936677.78	1171.4189	915591.19	936527.54	1172.32477	916044.21	937509.77	1169.103944	406	1130	401837	-1130	406	19.7	0.0030	0.3	880	8.8	452
5/12/2020	916069.59	936677.78	1171.427	915591.19	936527.54	1172.33241	916044.21	937509.77	1169.109689	405	1132	401837	-1132	405	19.7	0.0030	0.3	880	8.8	452
5/13/2020	916069.59	936677.78	1171.3742	915591.19	936527.54	1172.3004	916044.21	937509.77	1169.068028	424	1127	401837	-1127	424	20.6	0.0030	0.3	880	8.8	452
5/14/2020	916069.59	936677.78	1171.3878	915591.19	936527.54	1172.30616	916044.21	937509.77	1169.026147	409	1153	401837	-1153	409	19.5	0.0030	0.3	880	8.9	448
5/15/2020	916069.59	936677.78	1171.3675	915591.19	936527.54	1172.30551	916044.21	937509.77	1169.048548	432	1133	401837	-1133	432	20.9	0.0030	0.3	880	8.9	450
5/16/2020	916069.59	936677.78	1171.3737	915591.19	936527.54	1172.30591	916044.21	937509.77	1169.083639	432	1119	401837	-1119	432	21.1	0.0030	0.3	880	8.8	453
5/17/2020	916069.59	936677.78	1171.3331	915591.19	936527.54	1172.25171	916044.21	937509.77	1168.966744	409	1155	401837	-1155	409	19.5	0.0030	0.3	880	8.9	447
5/18/2020	916069.59	936677.78	1171.3098	915591.19	936527.54	1172.23916	916044.21	937509.77	1168.994423	425	1131	401837	-1131	425	20.6	0.0030	0.3	880	8.8	450
5/19/2020	916069.59	936677.78	1171.2916	915591.19	936527.54	1172.20565	916044.21	937509.77	1168.944163	408	1146	401837	-1146	408	19.6	0.0030	0.3	880	8.9	449
5/20/2020	916069.59	936677.78	1171.2273	915591.19	936527.54	1172.14616	916044.21	937509.77	1168.907766	416	1133	401837	-1133	416	20.2	0.0030	0.3	880	8.8	450
5/21/2020	916069.59	936677.78	1171.1852	915591.19	936527.54	1172.09369	916044.21	937509.77	1168.816226	400	1156	401837	-1156	400	19.1	0.0030	0.3	880	8.9	447
5/22/2020	916069.59	936677.78	1171.1326	915591.19	936527.54	1172.05304	916044.21	937509.77	1168.816704	418	1131	401837	-1131	418	20.3	0.0030	0.3	880	8.8	450
5/23/2020	916069.59	936677.78	1171.0945	915591.19	936527.54	1172.0164	916044.21	937509.77	1168.802842	423	1120	401837	-1120	423	20.7	0.0030	0.3	880	8.7	451
5/24/2020	916069.59	936677.78	1171.012	915591.19	936527.54	1171.92288	916044.21	937509.77	1168.658794	404	1149	401837	-1149	404	19.4	0.0030	0.3	880	8.9	446
5/25/2020	916069.59	936677.78	1170.9542	915591.19	936527.54	1171.87192	916044.21	937509.77	1168.66686	420	1118	401837	-1118	420	20.6	0.0030	0.3	880	8.7	451
5/26/2020	916069.59	936677.78	1170.9066	915591.19	936527.54	1171.82434	916044.21	937509.77	1168.608636	418	1123	401837	-1123	418	20.4	0.0030	0.3	880	8.7	449
5/27/2020	916069.59	936677.78	1170.8262	915591.19	936527.54	1171.74255	916044.21	937509.77	1168.584859	426	1096	401837	-1096	426	21.2	0.0029	0.3	880	8.6	453
5/28/2020	916069.59	936677.78	1170.7734	915591.19	936527.54	1171.67927	916044.21	937509.77	1168.488892	410	1116	401837	-1116	410	20.2	0.0030	0.3	880	8.7	450
5/29/2020	916069.59	936677.78	1170.6949	915591.19	936527.54	1171.61595	916044.21	937509.77	1168.471459	432	1087	401837	-1087	432	21.7	0.0029	0.3	880	8.5	453
5/30/2020	916069.59	936677.78	1170.7313	915591.19	936527.54	1171.64117	916044.21	937509.77	1168.490684	420	1095	401837	-1095	420	21.0	0.0029	0.3	880	8.6	453
5/31/2020	916069.59	936677.78	1170.5903	915591.19	936527.54	1171.4966	916044.21	937509.77	1168.292482	409	1122	401837	-1122	409	20.0	0.0030	0.3	880	8.7	448
6/1/2020	916069.59	936677.78	1170.5222	915591.19	936527.54	1171.43078	916044.21	937509.77	1168.268594	417	1101	401837	-1101	417	20.8	0.0029	0.3	880	8.6	450
6/2/2020	916069.59	936677.78	1170.474	915591.19	936527.54	1171.3638	916044.21	937509.77	1168.184579	396	1118	401837	-1118	396	19.5	0.0030	0.3	880	8.7	448
6/3/2020	916069.59	936677.78	1170.369	915591.19	936527.54	1171.27138	916044.21	937509.77	1168.118884	413	1099	401837	-1099	413	20.6	0.0029	0.3	880	8.6	450
6/4/2020	916069.59	936677.78	1170.2577	915591.19	936527.54	1171.16573	916044.21	937509.77	1167.976058	413	1115	401837	-1115	413	20.3	0.0030	0.3	880	8.7	446

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
6/5/2020	916069.59	936677.78	1170.1426	915591.19	936527.54	1171.05865	916044.21	937509.77	1167.927211	429	1083	401837	-1083	429	21.6	0.0029	0.3	880	8.5	450
6/6/2020	916069.59	936677.78	1170.0397	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.826374	1512	1115	401837	-1115	1512	53.6	0.0047	0.3	880	13.7	361
6/7/2020	916069.59	936677.78	1169.8819	915591.19	936527.54	1170.79365	916044.21	937509.77	1167.64	422	1096	401837	-1096	422	21.1	0.0029	0.3	880	8.6	447
6/8/2020	916069.59	936677.78	1169.7691	915591.19	936527.54	1170.6853	916044.21	937509.77	1167.60904	438	1057	401837	-1057	438	22.5	0.0028	0.3	880	8.3	452
6/9/2020	916069.59	936677.78	1169.6592	915591.19	936527.54	1170.57786	916044.21	937509.77	1167.50836	441	1052	401837	-1052	441	22.7	0.0028	0.3	880	8.3	451
6/10/2020	916069.59	936677.78	1169.536	915591.19	936527.54	1170.44787	916044.21	937509.77	1167.42912	442	1031	401837	-1031	442	23.2	0.0028	0.3	880	8.2	454
6/11/2020	916069.59	936677.78	1169.4008	915591.19	936527.54	1170.30941	916044.21	937509.77	1167.27153	436	1042	401837	-1042	436	22.7	0.0028	0.3	880	8.2	452
6/12/2020	916069.59	936677.78	1169.2832	915591.19	936527.54	1170.18888	916044.21	937509.77	1167.24248	447	999	401837	-999	447	24.1	0.0027	0.3	880	8.0	458
6/13/2020	916069.59	936677.78	1169.1725	915591.19	936527.54	1170.05856	916044.21	937509.77	1167.11831	429	1005	401837	-1005	429	23.1	0.0027	0.3	880	8.0	457
6/14/2020	916069.59	936677.78	1168.993	915591.19	936527.54	1169.87944	916044.21	937509.77	1166.91032	425	1019	401837	-1019	425	22.6	0.0027	0.3	880	8.1	454
6/15/2020	916069.59	936677.78	1168.8733	915591.19	936527.54	1169.75712	916044.21	937509.77	1166.88137	436	975	401837	-975	436	24.1	0.0027	0.3	880	7.8	460
6/16/2020	916069.59	936677.78	1168.7649	915591.19	936527.54	1169.63867	916044.21	937509.77	1166.77479	428	974	401837	-974	428	23.7	0.0026	0.3	880	7.8	460
6/17/2020	916069.59	936677.78	1168.6246	915591.19	936527.54	1169.50233	916044.21	937509.77	1166.68273	439	951	401837	-951	439	24.7	0.0026	0.3	880	7.6	463
6/18/2020	916069.59	936677.78	1168.5034	915591.19	936527.54	1169.37653	916044.21	937509.77	1166.5395	431	962	401837	-962	431	24.2	0.0026	0.3	880	7.7	461
6/19/2020	916069.59	936677.78	1168.3968	915591.19	936527.54	1169.26108	916044.21	937509.77	1166.50284	435	928	401837	-928	435	25.1	0.0026	0.3	880	7.5	466
6/20/2020	916069.59	936677.78	1168.2891	915591.19	936527.54	1169.1454	916044.21	937509.77	1166.42834	433	912	401837	-912	433	25.4	0.0025	0.3	880	7.4	469
6/21/2020	916069.59	936677.78	1168.1476	915591.19	936527.54	1168.98651	916044.21	937509.77	1166.23414	410	937	401837	-937	410	23.7	0.0025	0.3	880	7.5	465
6/22/2020	916069.59	936677.78	1168.0223	915591.19	936527.54	1168.86171	916044.21	937509.77	1166.20571	425	890	401837	-890	425	25.5	0.0025	0.3	880	7.2	472
6/23/2020	916069.59	936677.78	1167.9002	915591.19	936527.54	1168.74063	916044.21	937509.77	1166.08171	426	891	401837	-891	426	25.5	0.0025	0.3	880	7.2	471
6/24/2020	916069.59	936677.78	1167.7833	915591.19	936527.54	1168.62012	916044.21	937509.77	1166.02665	432	862	401837	-862	432	26.6	0.0024	0.3	880	7.0	476
6/25/2020	916069.59	936677.78	1167.6885	915591.19	936527.54	1168.49568	916044.21	937509.77	1165.90517	404	874	401837	-874	404	24.8	0.0024	0.3	880	7.0	475
6/26/2020	916069.59	936677.78	1167.5735	915591.19	936527.54	1168.38407	916044.21	937509.77	1165.9984	438	774	401837	-774	438	29.5	0.0022	0.3	880	6.5	493
6/27/2020	916069.59	936677.78	1167.4872	915591.19	936527.54	1168.29847	916044.21	937509.77	1166.048859	459	709	401837	-709	459	32.9	0.0021	0.3	880	6.2	506
6/28/2020	916069.59	936677.78	1167.3735	915591.19	936527.54	1168.16974	916044.21	937509.77	1165.63818	402	850	401837	-850	402	25.3	0.0023	0.3	880	6.9	478
6/29/2020	916069.59	936677.78	1167.2394	915591.19	936527.54	1168.01885	916044.21	937509.77	1165.86411	442	678	401837	-678	442	33.1	0.0020	0.3	880	5.9	514
6/30/2020	916069.59	936677.78	1167.1661	915591.19	936527.54	1167.93489	916044.21	937509.77	1165.45774	383	837	401837	-837	383	24.6	0.0023	0.3	880	6.7	481
7/1/2020	916069.59	936677.78	1167.0362	915591.19	936527.54	1167.81282	916044.21	937509.77	1165.38172	398	811	401837	-811	398	26.1	0.0022	0.3	880	6.6	485
7/2/2020	916069.59	936677.78	1166.931	915591.19	936527.54	1167.69784	916044.21	937509.77	1165.24621	385	825	401837	-825	385	25.0	0.0023	0.3	880	6.6	482
7/3/2020	916069.59	936677.78	1166.8002	915591.19	936527.54	1167.56914	916044.21	937509.77	1165.18139	397	794	401837	-794	397	26.5	0.0022	0.3	880	6.5	487
7/4/2020	916069.59	936677.78	1166.6989	915591.19	936527.54	1167.46198	916044.21	937509.77	1165.07486	391	796	401837	-796	391	26.1	0.0022	0.3	880	6.5	486
7/5/2020	916069.59	936677.78	1166.5468	915591.19	936527.54	1167.30181	916044.21	937509.77	1164.8712	376	821	401837	-821	376	24.6	0.0022	0.3	880	6.6	481
7/6/2020	916069.59	936677.78	1166.4193	915591.19	936527.54	1167.18089	916044.21	937509.77	1164.837	396	776	401837	-776	396	27.0	0.0022	0.3	880	6.4	488
7/7/2020	916069.59	936677.78	1166.314	915591.19	936527.54	1167.06625	916044.21	937509.77	1164.69139	382	795	401837	-795	382	25.7	0.0022	0.3	880	6.4	484
7/8/2020	916069.59	936677.78	1166.1792	915591.19	936527.54	1166.93201	916044.21	937509.77	1164.60566	390	772	401837	-772	390	26.8	0.0022	0.3	880	6.3	488
7/9/2020	916069.59	936677.78	1166.0766	915591.19	936527.54	1166.8233	916044.21	937509.77	1164.45074	377	797	401837	-797	377	25.3	0.0022	0.3	880	6.4	483
7/10/2020	916069.59	936677.78	1165.9512	915591.19	936527.54	1166.7027	916044.21	937509.77	1164.42112	395	751	401837	-751	395	27.8	0.0021	0.3	880	6.2	491
7/11/2020	916069.59	936677.78	1165.9001	915591.19	936527.54	1166.63595	916044.21	937509.77	1164.3763	383	748	401837	-748	383	27.1	0.0021	0.3	880	6.1	493
7/12/2020	916069.59	936677.78	1165.9236	915591.19	936527.54	1166.6423	916044.21	937509.77	1164.35477	362	769	401837	-769	362	25.2	0.0021	0.3	880	6.2	490
7/13/2020	916069.59	936677.78	1165.8198	915591.19	936527.54	1166.52586	916044.21	937509.77	1164.33342	364	729	401837	-729	364	26.5	0.0020	0.3	880	5.9	499
7/14/2020	916069.59	936677.78	1165.7555	915591.19	936527.54	1166.45225	916044.21	937509.77	1164.20558	347	759	401837	-759	347	24.6	0.0021	0.3	880	6.1	493
7/15/2020	916069.59	936677.78	1165.6424	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.15761	5280	878	401837	-878	5280	80.6	0.0032	0.3	880	9.4	437
7/16/2020	916069.59	936677.78	1165.557	915591.19	936527.54	1166.24356	916044.21	937509.77	1164.02943	342	748	401837	-748	342	24.5	0.0020	0.3	880	6.0	495
7/17/2020	916069.59	936677.78	1165.445	915591.19	936527.54	1166.13551	916044.21	937509.77	1163.98783	356	715	401837	-715	356	26.5	0.0020	0.3	880	5.8	501
7/18/2020	916069.59	936677.78	1165.3631	915591.19	936527.54	1166.04651	916044.21	937509.77	1163.87917	346	727	401837	-727	346	25.4	0.0020	0.3	880	5.9	498
7/19/2020	916069.59	936677.78	1165.2142	915591.19	936527.54	1165.89661	916044.21	937509.77	1163.66688	335	758	401837	-758	335	23.9	0.0021	0.3	880	6.0	490
7/20/2020	916069.59	936677.78	1165.1078	915591.19	936527.54	1165.80599	916044.21	937509.77	1163.6769	366	702	401837	-702	366	27.5	0.0020	0.3	880	5.8	500
7/21/2020	916069.59	936677.78	1165.0201	915591.19	936527.54	1165.70155	916044.21	937509.77	1163.55444	347	718	401837	-718	347	25.8	0.0020	0.3	880	5.8	497
7/22/2020	916069.59	936677.78	1164.8852	915591.19	936527.54	1165.57404	916044.21	937509.77	1163.45677	359	701	401837	-701	359	27.1	0.0020	0.3	880	5.7	500
7/23/2020	916069.59	936677.78	1164.8043	915591.19	936527.54	1165.47902	916044.21	937509.77	1163.33466	341	720	401837	-720	341	25.3	0.0020	0.3	880	5.8	496
7/24/2020	916069.59	936677.78	1164.6769	915591.19	936527.54	1165.35689	916044.21	937509.77	1163.27387	355	688	401837	-688	355	27.3	0.0019	0.3	880	5.7	502
7/25/2020	916069.59	936677.78	1164.579	915591.19	936527.54	1165.25898	916044.21	937509.77	1163.1477	351	702	401837	-702	351	26.5	0.0020	0.3	880	5.7	498
7/26/2020	916069.59	936677.78	1164.4232	915591.19	936527.54	1165.09722	916044.21	937509.77	1162.92148	335	736	401837	-736	335	24.5	0.0020	0.3	880	5.9	489
7/27/2020	916069.59	936677.78	1164.3104	915591.19	936527.54	1164.98964	916044.21	937509.77	1162.91157	355	686	401837	-686	355	27.3	0.0019	0.3	880	5.6	499
7/28/2020	916069.59	936677.78	1164.2141	915591.19	936527.54	1164.88557	916044.21	937509.77	1162.77881	343	704	401837	-704	343	26.0	0.0019	0.3	880	5.7	495

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
7/29/2020	916069.59	936677.78	1164.0595	915591.19	936527.54	1164.73598	916044.21	937509.77	1162.64936	351	692	401837	-692	351	26.9	0.0019	0.3	880	5.7	496
7/30/2020	916069.59	936677.78	1163.9767	915591.19	936527.54	1164.6403	916044.21	937509.77	1162.54738	337	701	401837	-701	337	25.7	0.0019	0.3	880	5.7	495
7/31/2020	916069.59	936677.78	1163.8278	915591.19	936527.54	1164.49688	916044.21	937509.77	1162.45145	350	675	401837	-675	350	27.4	0.0019	0.3	880	5.6	499
8/1/2020	916069.59	936677.78	1163.7305	915591.19	936527.54	1164.39584	916044.21	937509.77	1162.32444	342	690	401837	-690	342	26.4	0.0019	0.3	880	5.6	495
8/2/2020	916069.59	936677.78	1163.5728	915591.19	936527.54	1164.22379	916044.21	937509.77	1162.12197	324	711	401837	-711	324	24.5	0.0019	0.3	880	5.7	490
8/3/2020	916069.59	936677.78	1163.4364	915591.19	936527.54	1164.09655	916044.21	937509.77	1162.07192	344	670	401837	-670	344	27.2	0.0019	0.3	880	5.5	498
8/4/2020	916069.59	936677.78	1163.4	915591.19	936527.54	1164.05361	916044.21	937509.77	1162.04935	341	663	401837	-663	341	27.2	0.0019	0.3	880	5.4	500
8/5/2020	916069.59	936677.78	1163.3076	915591.19	936527.54	1163.94443	916044.21	937509.77	1161.97586	330	653	401837	-653	330	26.8	0.0018	0.3	880	5.3	503
8/6/2020	916069.59	936677.78	1163.2599	915591.19	936527.54	1163.87528	916044.21	937509.77	1161.85636	301	687	401837	-687	301	23.7	0.0019	0.3	880	5.5	497
8/7/2020	916069.59	936677.78	1163.136	915591.19	936527.54	1163.76232	916044.21	937509.77	1161.79852	320	656	401837	-656	320	26.0	0.0018	0.3	880	5.3	503
8/8/2020	916069.59	936677.78	1163.0491	915591.19	936527.54	1163.6704	916044.21	937509.77	1161.67268	310	674	401837	-674	310	24.7	0.0018	0.3	880	5.4	497
8/9/2020	916069.59	936677.78	1162.8835	915591.19	936527.54	1163.49322	916044.21	937509.77	1161.42084	288	715	401837	-715	288	21.9	0.0019	0.3	880	5.6	487
8/10/2020	916069.59	936677.78	1162.7592	915591.19	936527.54	1163.3922	916044.21	937509.77	1161.41759	325	658	401837	-658	325	26.3	0.0018	0.3	880	5.4	498
8/11/2020	916069.59	936677.78	1162.7234	915591.19	936527.54	1163.33812	916044.21	937509.77	1161.32934	302	683	401837	-683	302	23.9	0.0019	0.3	880	5.4	493
8/12/2020	916069.59	936677.78	1162.6055	915591.19	936527.54	1163.23378	916044.21	937509.77	1161.26968	322	655	401837	-655	322	26.2	0.0018	0.3	880	5.3	498
8/13/2020	916069.59	936677.78	1162.5443	915591.19	936527.54	1163.14918	916044.21	937509.77	1161.15137	294	682	401837	-682	294	23.3	0.0018	0.3	880	5.4	493
8/14/2020	916069.59	936677.78	1162.4204	915591.19	936527.54	1163.03009	916044.21	937509.77	1161.07434	305	659	401837	-659	305	24.8	0.0018	0.3	880	5.3	497
8/15/2020	916069.59	936677.78	1162.3383	915591.19	936527.54	1162.95523	916044.21	937509.77	1160.97952	309	666	401837	-666	309	24.9	0.0018	0.3	880	5.4	494
8/16/2020	916069.59	936677.78	1162.1705	915591.19	936527.54	1162.77684	916044.21	937509.77	1160.71989	287	709	401837	-709	287	22.0	0.0019	0.3	880	5.6	482
8/17/2020	916069.59	936677.78	1162.0569	915591.19	936527.54	1162.67455	916044.21	937509.77	1160.69848	310	666	401837	-666	310	25.0	0.0018	0.3	880	5.4	491
8/18/2020	916069.59	936677.78	1161.9922	915591.19	936527.54	1162.60495	916044.21	937509.77	1160.61114	302	676	401837	-676	302	24.1	0.0018	0.3	880	5.4	488
8/19/2020	916069.59	936677.78	1161.8245	915591.19	936527.54	1162.45001	916044.21	937509.77	1160.48465	319	657	401837	-657	319	25.9	0.0018	0.3	880	5.3	490
8/20/2020	916069.59	936677.78	1161.7433	915591.19	936527.54	1162.36036	916044.21	937509.77	1160.32908	301	692	401837	-692	301	23.5	0.0019	0.3	880	5.5	482
8/21/2020	916069.59	936677.78	1161.6009	915591.19	936527.54	1162.22936	916044.21	937509.77	1160.27181	323	652	401837	-652	323	26.4	0.0018	0.3	880	5.3	489
8/22/2020	916069.59	936677.78	1161.5117	915591.19	936527.54	1162.13556	916044.21	937509.77	1160.1189	310	682	401837	-682	310	24.4	0.0019	0.3	880	5.5	481
8/23/2020	916069.59	936677.78	1161.3369	915591.19	936527.54	1172.256226	916044.21	937509.77	1159.85716	8862	985	401837	-985	8862	83.7	0.0029	0.3	880	8.5	459
8/24/2020	916069.59	936677.78	1161.2317	915591.19	936527.54	1161.85356	916044.21	937509.77	1159.89172	316	657	401837	-657	316	25.7	0.0018	0.3	880	5.3	485
8/25/2020	916069.59	936677.78	1161.1511	915591.19	936527.54	1161.77353	916044.21	937509.77	1159.77237	311	675	401837	-675	311	24.7	0.0019	0.3	880	5.4	480
8/26/2020	916069.59	936677.78	1161.0237	915591.19	936527.54	1161.63284	916044.21	937509.77	1159.67818	305	659	401837	-659	305	24.8	0.0018	0.3	880	5.3	484
8/27/2020	916069.59	936677.78	1160.9518	915591.19	936527.54	1161.56188	916044.21	937509.77	1159.55385	298	684	401837	-684	298	23.5	0.0019	0.3	880	5.4	477
8/28/2020	916069.59	936677.78	1160.8343	915591.19	936527.54	1161.45221	916044.21	937509.77	1159.51235	315	648	401837	-648	315	26.0	0.0018	0.3	880	5.3	484
8/29/2020	916069.59	936677.78	1160.7579	915591.19	936527.54	1161.366	916044.21	937509.77	1159.42166	305	655	401837	-655	305	25.0	0.0018	0.3	880	5.3	483
8/30/2020	916069.59	936677.78	1160.6185	915591.19	936527.54	1161.22697	916044.21	937509.77	1159.22436	297	682	401837	-682	297	23.5	0.0019	0.3	880	5.4	475
8/31/2020	916069.59	936677.78	1160.5046	915591.19	936527.54	1161.11015	916044.21	937509.77	1159.18198	305	648	401837	-648	305	25.2	0.0018	0.3	880	5.2	483
9/1/2020	916069.59	936677.78	1160.4244	915591.19	936527.54	1161.03106	916044.21	937509.77	1159.04313	297	676	401837	-676	297	23.7	0.0018	0.3	880	5.4	475
9/2/2020	916069.59	936677.78	1160.2833	915591.19	936527.54	1160.89254	916044.21	937509.77	1158.95538	307	651	401837	-651	307	25.3	0.0018	0.3	880	5.3	480
9/3/2020	916069.59	936677.78	1160.2109	915591.19	936527.54	1160.81356	916044.21	937509.77	1158.82751	294	677	401837	-677	294	23.4	0.0018	0.3	880	5.4	473
9/4/2020	916069.59	936677.78	1160.0846	915591.19	936527.54	1160.69621	916044.21	937509.77	1158.77387	312	643	401837	-643	312	25.9	0.0018	0.3	880	5.2	480
9/5/2020	916069.59	936677.78	1160.0138	915591.19	936527.54	1160.61358	916044.21	937509.77	1158.66207	296	662	401837	-662	296	24.1	0.0018	0.3	880	5.3	475
9/6/2020	916069.59	936677.78	1159.8742	915591.19	936527.54	1160.46821	916044.21	937509.77	1158.45204	281	695	401837	-695	281	22.0	0.0019	0.3	880	5.5	466
9/7/2020	916069.59	936677.78	1159.7617	915591.19	936527.54	1160.36882	916044.21	937509.77	1158.45863	309	639	401837	-639	309	25.8	0.0018	0.3	880	5.2	478
9/8/2020	916069.59	936677.78	1159.7071	915591.19	936527.54	1160.30271	916044.21	937509.77	1158.31999	287	679	401837	-679	287	22.9	0.0018	0.3	880	5.4	469
9/9/2020	916069.59	936677.78	1159.5535	915591.19	936527.54	1160.15971	916044.21	937509.77	1158.25237	309	638	401837	-638	309	25.8	0.0018	0.3	880	5.2	477
9/10/2020	916069.59	936677.78	1159.4702	915591.19	936527.54	1160.07001	916044.21	937509.77	1158.12035	296	661	401837	-661	296	24.1	0.0018	0.3	880	5.3	471
9/11/2020	916069.59	936677.78	1159.3429	915591.19	936527.54	1159.9504	916044.21	937509.77	1158.04894	311	634	401837	-634	311	26.1	0.0018	0.3	880	5.2	475
9/12/2020	916069.59	936677.78	1159.2768	915591.19	936527.54	1159.87642	916044.21	937509.77	1157.96189	301	644	401837	-644	301	25.1	0.0018	0.3	880	5.2	473
9/13/2020	916069.59	936677.78	1159.1467	915591.19	936527.54	1159.74128	916044.21	937509.77	1157.76213	287	677	401837	-677	287	22.9	0.0018	0.3	880	5.4	464
9/14/2020	916069.59	936677.78	1159.0294	915591.19	936527.54	1159.63291	916044.21	937509.77	1157.7462	309	629	401837	-629	309	26.2	0.0017	0.3	880	5.1	474
9/15/2020	916069.59	936677.78	1158.9635	915591.19	936527.54	1159.55928	916044.21	937509.77	1157.63955	297	648	401837	-648	297	24.6	0.0018	0.3	880	5.2	470
9/16/2020	916069.59	936677.78	1158.8437	915591.19	936527.54	1159.44184	916044.21	937509.77	1157.56257	305	628	401837	-628	305	25.9	0.0017	0.3	880	5.1	474
9/17/2020	916069.59	936677.78	1158.7681	915591.19	936527.54	1159.36635	916044.21	937509.77	1157.44145	298	650	401837	-650	298	24.7	0.0018	0.3	880	5.2	467
9/18/2020	916069.59	936677.78	1158.6437	915591.19	936527.54	1159.24438	916044.21	937509.77	1157.37381	309	623	401837	-623	309	26.4	0.0017	0.3	880	5.1	473
9/19/2020	916069.59	936677.78	1158.5746	915591.19	936527.54	1159.16754	916044.21	937509.77	1157.29426	301	628	401837	-628	301	25.6	0.0017	0.3	880	5.1	472
9/20/2020	916069.59	936677.78	1158.4472	915591.19	936527.54	1159.03054	916044.21	937509.77	1157.06664	278	675	401837	-675	278	22.4	0.0018	0.3	880	5.3	459

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
9/21/2020	916069.59	936677.78	1158.3247	915591.19	936527.54	1158.91499	916044.21	937509.77	1157.0594	301	620	401837	-620	301	25.9	0.0017	0.3	880	5.0	472
9/22/2020	916069.59	936677.78	1158.2632	915591.19	936527.54	1158.84818	916044.21	937509.77	1156.9248	286	655	401837	-655	286	23.6	0.0018	0.3	880	5.2	463
9/23/2020	916069.59	936677.78	1158.1792	915591.19	936527.54	1158.73276	916044.21	937509.77	1156.87561	265	638	401837	-638	265	22.5	0.0017	0.3	880	5.0	470
9/24/2020	916069.59	936677.78	1158.1843	915591.19	936527.54	1158.65457	916044.21	937509.77	1156.73952	174	703	401837	-703	174	13.9	0.0018	0.3	880	5.3	458
9/25/2020	916069.59	936677.78	1158.1776	915591.19	936527.54	1172.256226	916044.21	937509.77	1156.68081	11488	1073	401837	-1073	11488	84.7	0.0032	0.3	880	9.4	437
9/26/2020	916069.59	936677.78	1158.186	915591.19	936527.54	1158.45339	916044.21	937509.77	1156.53399	-26	797	401837	-797	-26	358.2	0.0020	0.3	880	5.8	435
9/27/2020	916069.59	936677.78	1158.1921	915591.19	936527.54	1158.31306	916044.21	937509.77	1156.33151	-179	893	401837	-893	-179	348.7	0.0023	0.3	880	6.6	405
9/28/2020	916069.59	936677.78	1158.1938	915591.19	936527.54	1158.20112	916044.21	937509.77	1156.34574	-272	884	401837	-884	-272	342.9	0.0023	0.3	880	6.8	401
9/29/2020	916069.59	936677.78	1158.1906	915591.19	936527.54	1158.129	916044.21	937509.77	1156.27182	-340	916	401837	-916	-340	339.7	0.0024	0.3	880	7.1	390
9/30/2020	916069.59	936677.78	1158.1921	915591.19	936527.54	1158.06095	916044.21	937509.77	1156.24563	-402	928	401837	-928	-402	336.6	0.0025	0.3	880	7.4	383
10/1/2020	916069.59	936677.78	1158.1912	915591.19	936527.54	1158.02392	916044.21	937509.77	1156.10106	-453	996	401837	-996	-453	335.5	0.0027	0.3	880	8.0	368
10/2/2020	916069.59	936677.78	1158.1968	915591.19	936527.54	1157.93526	916044.21	937509.77	1156.14174	-526	977	401837	-977	-526	331.7	0.0028	0.3	880	8.1	365
10/3/2020	916069.59	936677.78	1158.1943	915591.19	936527.54	1157.89269	916044.21	937509.77	1156.07915	-569	1004	401837	-1004	-569	330.5	0.0029	0.3	880	8.4	357
10/4/2020	916069.59	936677.78	1158.2001	915591.19	936527.54	1157.75947	916044.21	937509.77	1155.85143	-719	1112	401837	-1112	-719	327.1	0.0033	0.3	880	9.7	332
10/5/2020	916069.59	936677.78	1158.1915	915591.19	936527.54	1157.66744	916044.21	937509.77	1155.86899	-785	1098	401837	-1098	-785	324.4	0.0034	0.3	880	9.9	329
10/6/2020	916069.59	936677.78	1158.1952	915591.19	936527.54	1157.60913	916044.21	937509.77	1155.75561	-854	1152	401837	-1152	-854	323.5	0.0036	0.3	880	10.5	319
10/7/2020	916069.59	936677.78	1158.1885	915591.19	936527.54	1157.5129	916044.21	937509.77	1155.7102	-934	1168	401837	-1168	-934	321.4	0.0037	0.3	880	10.9	311
10/8/2020	916069.59	936677.78	1158.195	915591.19	936527.54	1157.44889	916044.21	937509.77	1155.62917	-1006	1209	401837	-1209	-1006	320.2	0.0039	0.3	880	11.5	303
10/9/2020	916069.59	936677.78	1158.1936	915591.19	936527.54	1157.34418	916044.21	937509.77	1155.55175	-1104	1242	401837	-1242	-1104	318.4	0.0041	0.3	880	12.1	294
10/10/2020	916069.59	936677.78	1158.1983	915591.19	936527.54	1157.28092	916044.21	937509.77	1155.45815	-1175	1288	401837	-1288	-1175	317.6	0.0043	0.3	880	12.7	287
10/11/2020	916069.59	936677.78	1158.1928	915591.19	936527.54	1157.15538	916044.21	937509.77	1155.24887	-1305	1382	401837	-1382	-1305	316.6	0.0047	0.3	880	13.9	274
10/12/2020	916069.59	936677.78	1158.1915	915591.19	936527.54	1157.05876	916044.21	937509.77	1155.26345	-1382	1372	401837	-1372	-1382	314.8	0.0048	0.3	880	14.2	270
10/13/2020	916069.59	936677.78	1158.1942	915591.19	936527.54	1157.00753	916044.21	937509.77	1155.18903	-1439	1408	401837	-1408	-1439	314.4	0.0050	0.3	880	14.7	266
10/14/2020	916069.59	936677.78	1158.1949	915591.19	936527.54	1156.90508	916044.21	937509.77	1155.12455	-1534	1436	401837	-1436	-1534	313.1	0.0052	0.3	880	15.3	259
10/15/2020	916069.59	936677.78	1158.1995	915591.19	936527.54	1156.88126	916044.21	937509.77	1154.99672	-1578	1499	401837	-1499	-1578	313.5	0.0054	0.3	880	15.9	255
10/16/2020	916069.59	936677.78	1158.1933	915591.19	936527.54	1156.77106	916044.21	937509.77	1154.99711	-1663	1493	401837	-1493	-1663	311.9	0.0056	0.3	880	16.3	251
10/17/2020	916069.59	936677.78	1158.1956	915591.19	936527.54	1156.73125	916044.21	937509.77	1154.92215	-1710	1529	401837	-1529	-1710	311.8	0.0057	0.3	880	16.7	247
10/18/2020	916069.59	936677.78	1158.1974	915591.19	936527.54	1156.60735	916044.21	937509.77	1154.70655	-1847	1630	401837	-1630	-1847	311.4	0.0061	0.3	880	18.0	238
10/19/2020	916069.59	936677.78	1158.1925	915591.19	936527.54	1156.52186	916044.21	937509.77	1154.76214	-1905	1599	401837	-1599	-1905	310.0	0.0062	0.3	880	18.2	237
10/20/2020	916069.59	936677.78	1158.1939	915591.19	936527.54	1156.54254	916044.21	937509.77	1154.72867	-1895	1616	401837	-1616	-1895	310.5	0.0062	0.3	880	18.2	237
10/21/2020	916069.59	936677.78	1158.1893	915591.19	936527.54	1156.45622	916044.21	937509.77	1154.71136	-1964	1620	401837	-1620	-1964	309.5	0.0063	0.3	880	18.6	233
10/22/2020	916069.59	936677.78	1158.1902	915591.19	936527.54	1156.40842	916044.21	937509.77	1154.52428	-2033	1709	401837	-1709	-2033	310.0	0.0066	0.3	880	19.4	228
10/23/2020	916069.59	936677.78	1158.1874	915591.19	936527.54	1156.36723	916044.21	937509.77	1154.64001	-2047	1651	401837	-1651	-2047	308.9	0.0065	0.3	880	19.2	229
10/24/2020	916069.59	936677.78	1158.1989	915591.19	936527.54	1156.31805	916044.21	937509.77	1154.4287	-2131	1756	401837	-1756	-2131	309.5	0.0069	0.3	880	20.2	224
10/25/2020	916069.59	936677.78	1158.1939	915591.19	936527.54	1156.19471	916044.21	937509.77	1154.38046	-2236	1774	401837	-1774	-2236	308.4	0.0071	0.3	880	20.8	219
10/26/2020	916069.59	936677.78	1158.1936	915591.19	936527.54	1156.15191	916044.21	937509.77	1154.42391	-2265	1752	401837	-1752	-2265	307.7	0.0071	0.3	880	20.9	219
10/27/2020	916069.59	936677.78	1158.193	915591.19	936527.54	1156.11867	916044.21	937509.77	1154.23395	-2321	1841	401837	-1841	-2321	308.4	0.0074	0.3	880	21.6	215
10/28/2020	916069.59	936677.78	1158.1907	915591.19	936527.54	1156.08938	916044.21	937509.77	1154.38396	-2320	1768	401837	-1768	-2320	307.3	0.0073	0.3	880	21.3	216
10/29/2020	916069.59	936677.78	1158.1934	915591.19	936527.54	1156.04212	916044.21	937509.77	1154.15305	-2397	1878	401837	-1878	-2397	308.1	0.0076	0.3	880	22.2	212
10/30/2020	916069.59	936677.78	1158.1962	915591.19	936527.54	1156.1131	916044.21	937509.77	1154.41659	-2301	1755	401837	-1755	-2301	307.3	0.0072	0.3	880	21.1	217
10/31/2020	916069.59	936677.78	1158.1868	915591.19	936527.54	1156.07	916044.21	937509.77	1154.23457	-2355	1837	401837	-1837	-2355	308.0	0.0074	0.3	880	21.8	214
11/1/2020	916069.59	936677.78	1158.193	915591.19	936527.54	1155.94714	916044.21	937509.77	1154.17653	-2472	1864	401837	-1864	-2472	307.0	0.0077	0.3	880	22.6	209
11/2/2020	916069.59	936677.78	1158.1942	915591.19	936527.54	1155.9386	916044.21	937509.77	1154.25351	-2469	1828	401837	-1828	-2469	306.5	0.0028	0.3	880	8.1	351
11/3/2020	916069.59	936677.78	1158.1987	915591.19	936527.54	1172.256226	916044.21	937509.77	1154.04824	11072	2342	401837	-2342	11072	78.1	0.0027	0.3	880	8.0	473
11/4/2020	916069.59	936677.78	1158.199	915591.19	936527.54	1155.89504	916044.21	937509.77	1154.23213	-2513	1839	401837	-1839	-2513	306.2	0.0077	0.3	880	22.7	209
11/5/2020	916069.59	936677.78	1158.19	915591.19	936527.54	1155.83946	916044.21	937509.77	1154.00098	-2585	1944	401837	-1944	-2585	306.9	0.0080	0.3	880	23.6	204
11/6/2020	916069.59	936677.78	1158.1924	915591.19	936527.54	1155.80205	916044.21	937509.77	1154.12347	-2600	1886	401837	-1886	-2600	306.0	0.0080	0.3	880	23.4	205
11/7/2020	916069.59	936677.78	1158.1939	915591.19	936527.54	1155.75607	916044.21	937509.77	1153.91731	-2671	1984	401837	-1984	-2671	306.6	0.0083	0.3	880	24.3	201
11/8/2020	916069.59	936677.78	1158.1917	915591.19	936527.54	1155.62865	916044.21	937509.77	1153.76206	-2798	2054	401837	-2054	-2798	306.3	0.0086	0.3	880	25.3	197
11/9/2020	916069.59	936677.78	1158.1998	915591.19	936527.54	1155.62089	916044.21	937509.77	1153.91091	-2790	1986	401837	-1986	-2790	305.4	0.0085	0.3	880	25.0	198
11/10/2020	916069.59	936677.78	1158.1885	915591.19	936527.54	1155.58375	916044.21	937509.77	1153.69109	-2843	2085	401837	-2085	-2843	306.3	0.0088	0.3	880	25.7	195
11/11/2020	916069.59	936677.78	1158.1945	915591.19	936527.54	1155.57342	916044.21	937509.77	1153.85292	-2833	2010	401837	-2010	-2833	305.4	0.0086	0.3	880	25.4	196
11/12/2020	916069.59	936677.78	1158.1932	915591.19	936527.54	1155.65048	916044.21	937509.77	1153.7846	-2778	2045	401837	-2045	-2778	306.4	0.0086	0.3	880	25.2	197
11/13/2020	916069.59	936677.78	1158.1891	915591.19	936527.54	1155.6576	916044.21	937509.77	1154.00103	-2735	1939	401837	-1939	-2735	305.3	0.0083	0.3	880	24.5	200

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
11/14/2020	916069.59	936677.78	1158.1972	915591.19	936527.54	1155.67386	916044.21	937509.77	1153.86548	-2750	2008	401837	-2008	-2750	306.1	0.0085	0.3	880	24.9	199
11/15/2020	916069.59	936677.78	1158.1974	915591.19	936527.54	1155.59484	916044.21	937509.77	1153.82007	-2823	2028	401837	-2028	-2823	305.7	0.0086	0.3	880	25.4	196
11/16/2020	916069.59	936677.78	1158.19	915591.19	936527.54	1155.63975	916044.21	937509.77	1153.74909	-2789	2060	401837	-2060	-2789	306.4	0.0086	0.3	880	25.3	197
11/17/2020	916069.59	936677.78	1158.1985	915591.19	936527.54	1155.55555	916044.21	937509.77	1153.5992	-2890	2133	401837	-2133	-2890	306.4	0.0089	0.3	880	26.2	193
11/18/2020	916069.59	936677.78	1158.1918	915591.19	936527.54	1155.54577	916044.21	937509.77	1153.77256	-2865	2047	401837	-2047	-2865	305.5	0.0088	0.3	880	25.7	195
11/19/2020	916069.59	936677.78	1158.1927	915591.19	936527.54	1155.61682	916044.21	937509.77	1153.80314	-2803	2035	401837	-2035	-2803	306.0	0.0086	0.3	880	25.3	197
11/20/2020	916069.59	936677.78	1158.1916	915591.19	936527.54	1155.58145	916044.21	937509.77	1153.8373	-2826	2017	401837	-2017	-2826	305.5	0.0086	0.3	880	25.3	196
11/21/2020	916069.59	936677.78	1158.1964	915591.19	936527.54	1155.61126	916044.21	937509.77	1153.83962	-2805	2019	401837	-2019	-2805	305.7	0.0086	0.3	880	25.2	197
11/22/2020	916069.59	936677.78	1158.1912	915591.19	936527.54	1155.49966	916044.21	937509.77	1153.55624	-2936	2149	401837	-2149	-2936	306.2	0.0091	0.3	880	26.6	191
11/23/2020	916069.59	936677.78	1158.1929	915591.19	936527.54	1155.58787	916044.21	937509.77	1153.6326	-2852	2116	401837	-2116	-2852	306.6	0.0088	0.3	880	25.9	194
11/24/2020	916069.59	936677.78	1158.1957	915591.19	936527.54	1155.62731	916044.21	937509.77	1153.66155	-2818	2104	401837	-2104	-2818	306.7	0.0088	0.3	880	25.7	195
11/25/2020	916069.59	936677.78	1158.1951	915591.19	936527.54	1155.57169	916044.21	937509.77	1153.79759	-2843	2037	401837	-2037	-2843	305.6	0.0087	0.3	880	25.5	196
11/26/2020	916069.59	936677.78	1158.1891	915591.19	936527.54	1155.67683	916044.21	937509.77	1153.8675	-2739	2004	401837	-2004	-2739	306.2	0.0084	0.3	880	24.8	199
11/27/2020	916069.59	936677.78	1158.1944	915591.19	936527.54	1155.70937	916044.21	937509.77	1153.97183	-2702	1957	401837	-1957	-2702	305.9	0.0083	0.3	880	24.4	201
11/28/2020	916069.59	936677.78	1158.193	915591.19	936527.54	1155.84065	916044.21	937509.77	1154.05867	-2578	1918	401837	-1918	-2578	306.6	0.0080	0.3	880	23.5	205
11/29/2020	916069.59	936677.78	1158.1951	915591.19	936527.54	1155.87395	916044.21	937509.77	1153.99075	-2563	1952	401837	-1952	-2563	307.3	0.0080	0.3	880	23.5	205
11/30/2020	916069.59	936677.78	1158.1911	915591.19	936527.54	1155.98635	916044.21	937509.77	1154.28486	-2421	1813	401837	-1813	-2421	306.8	0.0075	0.3	880	22.1	212
12/1/2020	916069.59	936677.78	1158.2006	915591.19	936527.54	1156.17653	916044.21	937509.77	1154.34096	-2264	1795	401837	-1795	-2264	308.4	0.0072	0.3	880	21.1	218
12/2/2020	916069.59	936677.78	1158.191	915591.19	936527.54	1156.28728	916044.21	937509.77	1154.53421	-2133	1701	401837	-1701	-2133	308.6	0.0068	0.3	880	19.9	225
12/3/2020	916069.59	936677.78	1158.198	915591.19	936527.54	1172.256226	916044.21	937509.77	1154.65366	11164	2052	401837	-2052	11164	79.6	0.0033	0.3	880	9.7	430
12/4/2020	916069.59	936677.78	1158.1911	915591.19	936527.54	1156.60289	916044.21	937509.77	1154.84623	-1824	1560	401837	-1560	-1824	310.5	0.0060	0.3	880	17.5	241
12/5/2020	916069.59	936677.78	1158.1961	915591.19	936527.54	1156.81086	916044.21	937509.77	1154.97813	-1636	1504	401837	-1504	-1636	312.6	0.0055	0.3	880	16.2	252
12/6/2020	916069.59	936677.78	1158.199	915591.19	936527.54	1156.87728	916044.21	937509.77	1154.91126	-1594	1539	401837	-1539	-1594	314.0	0.0055	0.3	880	16.2	252
12/7/2020	916069.59	936677.78	1158.1943	915591.19	936527.54	1156.99686	916044.21	937509.77	1155.18568	-1448	1409	401837	-1409	-1448	314.2	0.0050	0.3	880	14.7	265
12/8/2020	916069.59	936677.78	1158.1934	915591.19	936527.54	1157.15068	916044.21	937509.77	1155.2147	-1315	1399	401837	-1399	-1315	316.8	0.0048	0.3	880	14.0	273
12/9/2020	916069.59	936677.78	1158.1975	915591.19	936527.54	1157.18724	916044.21	937509.77	1155.33551	-1271	1344	401837	-1344	-1271	316.6	0.0046	0.3	880	13.5	278
12/10/2020	916069.59	936677.78	1158.1947	915591.19	936527.54	1157.28731	916044.21	937509.77	1155.33842	-1184	1343	401837	-1343	-1184	318.6	0.0045	0.3	880	13.1	283
12/11/2020	916069.59	936677.78	1158.1921	915591.19	936527.54	1157.31538	916044.21	937509.77	1155.44136	-1143	1294	401837	-1294	-1143	318.5	0.0043	0.3	880	12.6	289
12/12/2020	916069.59	936677.78	1158.193	915591.19	936527.54	1157.4103	916044.21	937509.77	1155.48341	-1058	1276	401837	-1276	-1058	320.3	0.0041	0.3	880	12.1	295
12/13/2020	916069.59	936677.78	1158.197	915591.19	936527.54	1157.36783	916044.21	937509.77	1155.31096	-1123	1360	401837	-1360	-1123	320.4	0.0044	0.3	880	12.9	286
12/14/2020	916069.59	936677.78	1158.1951	915591.19	936527.54	1157.4252	916044.21	937509.77	1155.53544	-1040	1253	401837	-1253	-1040	320.3	0.0041	0.3	880	11.9	298
12/15/2020	916069.59	936677.78	1158.195	915591.19	936527.54	1157.50322	916044.21	937509.77	1155.5306	-976	1257	401837	-1257	-976	322.2	0.0040	0.3	880	11.6	302
12/16/2020	916069.59	936677.78	1158.1927	915591.19	936527.54	1157.51423	916044.21	937509.77	1155.60669	-953	1220	401837	-1220	-953	322.0	0.0039	0.3	880	11.3	306
12/17/2020	916069.59	936677.78	1158.1951	915591.19	936527.54	1157.59508	916044.21	937509.77	1155.6313	-884	1211	401837	-1211	-884	323.9	0.0037	0.3	880	10.9	311
12/18/2020	916069.59	936677.78	1158.1919	915591.19	936527.54	1157.57177	916044.21	937509.77	1155.6709	-895	1190	401837	-1190	-895	323.1	0.0037	0.3	880	10.9	312
12/19/2020	916069.59	936677.78	1158.1951	915591.19	936527.54	1157.63129	916044.21	937509.77	1155.65315	-851	1202	401837	-1202	-851	324.7	0.0037	0.3	880	10.7	315
12/20/2020	916069.59	936677.78	1158.1944	915591.19	936527.54	1157.58508	916044.21	937509.77	1155.52234	-908	1263	401837	-1263	-908	324.3	0.0039	0.3	880	11.4	306
12/21/2020	916069.59	936677.78	1158.1945	915591.19	936527.54	1157.6323	916044.21	937509.77	1155.7549	-834	1153	401837	-1153	-834	324.1	0.0035	0.3	880	10.4	320
12/22/2020	916069.59	936677.78	1158.1957	915591.19	936527.54	1157.68629	916044.21	937509.77	1155.72011	-796	1171	401837	-1171	-796	325.8	0.0035	0.3	880	10.3	321
12/23/2020	916069.59	936677.78	1158.1957	915591.19	936527.54	1157.66163	916044.21	937509.77	1155.80248	-804	1131	401837	-1131	-804	324.6	0.0035	0.3	880	10.1	324
12/24/2020	916069.59	936677.78	1158.1838	915591.19	936527.54	1157.7274	916044.21	937509.77	1155.84052	-732	1109	401837	-1109	-732	326.6	0.0033	0.3	880	9.7	332
12/25/2020	916069.59	936677.78	1158.2829	915591.19	936527.54	1158.45881	916044.21	937509.77	1157.05815	-38	590	401837	-590	-38	356.4	0.0015	0.3	880	4.3	505
12/26/2020	916069.59	936677.78	1159.071	915591.19	936527.54	1159.04707	916044.21	937509.77	1158.30838	-134	364	401837	-364	-134	339.7	0.0010	0.3	880	2.8	630
12/27/2020	916069.59	936677.78	1159.4358	915591.19	936527.54	1159.60533	916044.21	937509.77	1159.06948	86	180	401837	-180	86	25.6	0.0005	0.3	880	1.5	890
12/28/2020	916069.59	936677.78	1160.1586	915591.19	936527.54	1160.27482	916044.21	937509.77	1159.87725	54	138	401837	-138	54	21.6	0.0004	0.3	880	1.1	1046
12/29/2020	916069.59	936677.78	1160.7739	915591.19	936527.54	1160.84463	916044.21	937509.77	1160.3005	-12	228	401837	-228	-12	356.9	0.0006	0.3	880	1.7	850
12/30/2020	916069.59	936677.78	1161.264	915591.19	936527.54	1161.3423	916044.21	937509.77	1160.755	-11	245	401837	-245	-11	357.4	0.0006	0.3	880	1.8	828
12/31/2020	916069.59	936677.78	1161.7118	915591.19	936527.54	1161.79581	916044.21	937509.77	1161.04532	-30	321	401837	-321	-30	354.6	0.0008	0.3	880	2.4	729
1/1/2021	916069.59	936677.78	1162.0283	915591.19	936527.54	1162.1411	916044.21	937509.77	1161.34712	-8	329	401837	-329	-8	358.5	0.0008	0.3	880	2.4	727
1/2/2021	916069.59	936677.78	1162.4608	915591.19	936527.54	1172.256226	916044.21	937509.77	1161.71628	8038	605	401837	-605	8038	85.7	0.0029	0.3	880	8.5	459
1/3/2021	916069.59	936677.78	1162.7464	915591.19	936527.54	1162.93834	916044.21	937509.77	1161.94039	39	390	401837	-390	39	5.6	0.0010	0.3	880	2.9	675
1/4/2021	916069.59	936677.78	1163.0794	915591.19	936527.54	1163.28638	916044.21	937509.77	1162.34737	62	355	401837	-355	62	9.9	0.0009	0.3	880	2.6	708
1/5/2021	916069.59	936677.78	1163.5032	915591.19	936527.54	1163.66418	916044.21	937509.77	1162.5914	-3	440	401837	-440	-3	359.6	0.0011	0.3	880	3.2	646
1/6/2021	916069.59	936677.78	1163.7573	915591.19	936527.54	1163.95322	916044.21	937509.77	1162.89135	33	419	401837	-419	33	4.5	0.0010	0.3	880	3.1	664

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
1/7/2021	916069.59	936677.78	1164.0554	915591.19	936527.54	1164.24565	916044.21	937509.77	1163.0349	5	493	401837	-493	5	0.6	0.0012	0.3	880	3.6	617
1/8/2021	916069.59	936677.78	1164.295	915591.19	936527.54	1164.52653	916044.21	937509.77	1163.33594	49	465	401837	-465	49	6.0	0.0012	0.3	880	3.4	637
1/9/2021	916069.59	936677.78	1164.5309	915591.19	936527.54	1164.76872	916044.21	937509.77	1163.4363	33	530	401837	-530	33	3.6	0.0013	0.3	880	3.9	600
1/10/2021	916069.59	936677.78	1164.5941	915591.19	936527.54	1164.85697	916044.21	937509.77	1163.3771	36	589	401837	-589	36	3.5	0.0015	0.3	880	4.3	570
1/11/2021	916069.59	936677.78	1164.7658	915591.19	936527.54	1165.07631	916044.21	937509.77	1163.69255	97	521	401837	-521	97	10.6	0.0013	0.3	880	3.9	604
1/12/2021	916069.59	936677.78	1164.9019	915591.19	936527.54	1165.22388	916044.21	937509.77	1163.74016	93	564	401837	-564	93	9.4	0.0014	0.3	880	4.2	583
1/13/2021	916069.59	936677.78	1164.9972	915591.19	936527.54	1165.3487	916044.21	937509.77	1163.88475	125	541	401837	-541	125	13.0	0.0014	0.3	880	4.1	593
1/14/2021	916069.59	936677.78	1165.1146	915591.19	936527.54	1165.45902	916044.21	937509.77	1163.87869	101	600	401837	-600	101	9.5	0.0015	0.3	880	4.4	567
1/15/2021	916069.59	936677.78	1165.1944	915591.19	936527.54	1165.58225	916044.21	937509.77	1164.05	151	557	401837	-557	151	15.1	0.0014	0.3	880	4.2	584
1/16/2021	916069.59	936677.78	1165.3512	915591.19	936527.54	1165.73458	916044.21	937509.77	1164.12031	134	599	401837	-599	134	12.6	0.0015	0.3	880	4.5	568
1/17/2021	916069.59	936677.78	1165.3409	915591.19	936527.54	1165.75267	916044.21	937509.77	1164.00955	143	647	401837	-647	143	12.4	0.0016	0.3	880	4.8	546
1/18/2021	916069.59	936677.78	1165.4756	915591.19	936527.54	1165.89716	916044.21	937509.77	1164.28643	172	580	401837	-580	172	16.5	0.0015	0.3	880	4.4	573
1/19/2021	916069.59	936677.78	1165.588	915591.19	936527.54	1166.00704	916044.21	937509.77	1164.30941	157	622	401837	-622	157	14.1	0.0016	0.3	880	4.7	558
1/20/2021	916069.59	936677.78	1165.6538	915591.19	936527.54	1166.09355	916044.21	937509.77	1164.40667	178	608	401837	-608	178	16.4	0.0016	0.3	880	4.6	562
1/21/2021	916069.59	936677.78	1165.8096	915591.19	936527.54	1166.23075	916044.21	937509.77	1164.45158	146	660	401837	-660	146	12.5	0.0017	0.3	880	4.9	545
1/22/2021	916069.59	936677.78	1165.8499	915591.19	936527.54	1166.30355	916044.21	937509.77	1164.5667	185	625	401837	-625	185	16.4	0.0016	0.3	880	4.8	556
1/23/2021	916069.59	936677.78	1165.9032	915591.19	936527.54	1166.35418	916044.21	937509.77	1164.5346	170	666	401837	-666	170	14.3	0.0017	0.3	880	5.0	542
1/24/2021	916069.59	936677.78	1165.8913	915591.19	936527.54	1166.36091	916044.21	937509.77	1164.43382	172	709	401837	-709	172	13.6	0.0018	0.3	880	5.3	526
1/25/2021	916069.59	936677.78	1165.9713	915591.19	936527.54	1166.46234	916044.21	937509.77	1164.66143	212	639	401837	-639	212	18.3	0.0017	0.3	880	4.9	549
1/26/2021	916069.59	936677.78	1166.0465	915591.19	936527.54	1166.53735	916044.21	937509.77	1164.68536	204	664	401837	-664	204	17.1	0.0017	0.3	880	5.1	541
1/27/2021	916069.59	936677.78	1166.0074	915591.19	936527.54	1166.51245	916044.21	937509.77	1164.67943	221	648	401837	-648	221	18.8	0.0017	0.3	880	5.0	545
1/28/2021	916069.59	936677.78	1166.0269	915591.19	936527.54	1166.53521	916044.21	937509.77	1164.62165	212	685	401837	-685	212	17.2	0.0018	0.3	880	5.2	532
1/29/2021	916069.59	936677.78	1166.0467	915591.19	936527.54	1166.56939	916044.21	937509.77	1164.71442	235	651	401837	-651	235	19.8	0.0017	0.3	880	5.0	542
1/30/2021	916069.59	936677.78	1166.0577	915591.19	936527.54	1166.57784	916044.21	937509.77	1164.67532	225	675	401837	-675	225	18.5	0.0018	0.3	880	5.2	535
1/31/2021	916069.59	936677.78	1166.0137	915591.19	936527.54	1166.54234	916044.21	937509.77	1164.55348	220	712	401837	-712	220	17.2	0.0019	0.3	880	5.4	522
2/1/2021	916069.59	936677.78	1166.054	915591.19	936527.54	1166.59472	916044.21	937509.77	1164.71637	249	654	401837	-654	249	20.8	0.0017	0.3	880	5.1	540
2/2/2021	916069.59	936677.78	1166.113	915591.19	936527.54	1166.6451	916044.21	937509.77	1164.71858	233	681	401837	-681	233	18.9	0.0018	0.3	880	5.3	532
2/3/2021	916069.59	936677.78	1166.0756	915591.19	936527.54	1166.63197	916044.21	937509.77	1164.74878	264	649	401837	-649	264	22.1	0.0017	0.3	880	5.1	540
2/4/2021	916069.59	936677.78	1166.0351	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.63252	4965	829	401837	-829	4965	80.5	0.0033	0.3	880	9.7	430
2/5/2021	916069.59	936677.78	1166.0631	915591.19	936527.54	1166.62099	916044.21	937509.77	1164.72332	263	655	401837	-655	263	21.9	0.0018	0.3	880	5.2	537
2/6/2021	916069.59	936677.78	1165.9975	915591.19	936527.54	1166.56037	916044.21	937509.77	1164.60682	259	680	401837	-680	259	20.9	0.0018	0.3	880	5.3	529
2/7/2021	916069.59	936677.78	1165.9353	915591.19	936527.54	1166.48794	916044.21	937509.77	1164.46362	239	718	401837	-718	239	18.4	0.0019	0.3	880	5.5	518
2/8/2021	916069.59	936677.78	1165.9012	915591.19	936527.54	1166.46826	916044.21	937509.77	1164.56289	271	655	401837	-655	271	22.5	0.0018	0.3	880	5.2	535
2/9/2021	916069.59	936677.78	1165.8983	915591.19	936527.54	1166.46298	916044.21	937509.77	1164.5264	264	671	401837	-671	264	21.5	0.0018	0.3	880	5.3	530
2/10/2021	916069.59	936677.78	1165.8376	915591.19	936527.54	1166.40767	916044.21	937509.77	1164.47678	270	665	401837	-665	270	22.1	0.0018	0.3	880	5.2	531
2/11/2021	916069.59	936677.78	1165.8127	915591.19	936527.54	1166.37216	916044.21	937509.77	1164.39804	253	691	401837	-691	253	20.1	0.0018	0.3	880	5.4	524
2/12/2021	916069.59	936677.78	1165.7681	915591.19	936527.54	1166.346	916044.21	937509.77	1164.43621	281	652	401837	-652	281	23.3	0.0018	0.3	880	5.2	533
2/13/2021	916069.59	936677.78	1165.7631	915591.19	936527.54	1166.33601	916044.21	937509.77	1164.38306	269	675	401837	-675	269	21.8	0.0018	0.3	880	5.3	527
2/14/2021	916069.59	936677.78	1165.6536	915591.19	936527.54	1166.22817	916044.21	937509.77	1164.19059	258	714	401837	-714	258	19.9	0.0019	0.3	880	5.5	514
2/15/2021	916069.59	936677.78	1165.6446	915591.19	936527.54	1166.24439	916044.21	937509.77	1164.32465	301	647	401837	-647	301	24.9	0.0018	0.3	880	5.2	531
2/16/2021	916069.59	936677.78	1165.6932	915591.19	936527.54	1166.2581	916044.21	937509.77	1164.30685	262	678	401837	-678	262	21.1	0.0018	0.3	880	5.3	526
2/17/2021	916069.59	936677.78	1165.5575	915591.19	936527.54	1166.14081	916044.21	937509.77	1164.2286	286	651	401837	-651	286	23.7	0.0018	0.3	880	5.2	531
2/18/2021	916069.59	936677.78	1165.5393	915591.19	936527.54	1166.09447	916044.21	937509.77	1164.11609	248	695	401837	-695	248	19.6	0.0018	0.3	880	5.4	521
2/19/2021	916069.59	936677.78	1165.5009	915591.19	936527.54	1166.09398	916044.21	937509.77	1164.1726	294	651	401837	-651	294	24.3	0.0018	0.3	880	5.2	530
2/20/2021	916069.59	936677.78	1165.4623	915591.19	936527.54	1166.04923	916044.21	937509.77	1164.08896	282	672	401837	-672	282	22.8	0.0018	0.3	880	5.3	524
2/21/2021	916069.59	936677.78	1165.3452	915591.19	936527.54	1165.92012	916044.21	937509.77	1163.87301	257	719	401837	-719	257	19.7	0.0019	0.3	880	5.6	510
2/22/2021	916069.59	936677.78	1165.4184	915591.19	936527.54	1165.99569	916044.21	937509.77	1164.06135	276	664	401837	-664	276	22.6	0.0018	0.3	880	5.2	527
2/23/2021	916069.59	936677.78	1165.3848	915591.19	936527.54	1165.9711	916044.21	937509.77	1163.97436	276	690	401837	-690	276	21.8	0.0018	0.3	880	5.4	518
2/24/2021	916069.59	936677.78	1165.3205	915591.19	936527.54	1165.91934	916044.21	937509.77	1163.95126	293	670	401837	-670	293	23.6	0.0018	0.3	880	5.3	522
2/25/2021	916069.59	936677.78	1165.2342	915591.19	936527.54	1165.81751	916044.21	937509.77	1163.80506	271	699	401837	-699	271	21.2	0.0019	0.3	880	5.5	514
2/26/2021	916069.59	936677.78	1165.1963	915591.19	936527.54	1165.79183	916044.21	937509.77	1163.81888	289	674	401837	-674	289	23.2	0.0018	0.3	880	5.4	520
2/27/2021	916069.59	936677.78	1165.257	915591.19	936527.54	1165.83714	916044.21	937509.77	1163.83878	270	693	401837	-693	270	21.3	0.0019	0.3	880	5.4	516
2/28/2021	916069.59	936677.78	1165.2384	915591.19	936527.54	1165.80326	916044.21	937509.77	1163.7009	239	750	401837	-750	239	17.7	0.0020	0.3	880	5.7	502
3/1/2021	916069.59	936677.78	1165.3419	915591.19	936527.54	1165.92361	916044.21	937509.77	1163.90987	269	700	401837	-700	269	21.0	0.0019	0.3	880	5.5	515

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
3/2/2021	916069.59	936677.78	1165.4323	915591.19	936527.54	1166.00277	916044.21	937509.77	1163.95648	253	721	401837	-721	253	19.3	0.0019	0.3	880	5.6	511
3/3/2021	916069.59	936677.78	1165.5716	915591.19	936527.54	1166.115	916044.21	937509.77	1164.12944	235	704	401837	-704	235	18.5	0.0018	0.3	880	5.4	520
3/4/2021	916069.59	936677.78	1165.7069	915591.19	936527.54	1166.22943	916044.21	937509.77	1164.18215	206	743	401837	-743	206	15.5	0.0019	0.3	880	5.6	511
3/5/2021	916069.59	936677.78	1165.8439	915591.19	936527.54	1166.36009	916044.21	937509.77	1164.33121	202	737	401837	-737	202	15.3	0.0019	0.3	880	5.6	514
3/6/2021	916069.59	936677.78	1165.9324	915591.19	936527.54	1166.45468	916044.21	937509.77	1164.38066	201	756	401837	-756	201	14.9	0.0019	0.3	880	5.7	509
3/7/2021	916069.59	936677.78	1165.9407	915591.19	936527.54	1166.471	916044.21	937509.77	1164.29012	193	803	401837	-803	193	13.5	0.0021	0.3	880	6.0	495
3/8/2021	916069.59	936677.78	1166.0134	915591.19	936527.54	1166.56071	916044.21	937509.77	1164.47082	224	752	401837	-752	224	16.6	0.0020	0.3	880	5.7	509
3/9/2021	916069.59	936677.78	1166.0733	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.49031	4906	914	401837	-914	4906	79.4	0.0036	0.3	880	10.5	413
3/10/2021	916069.59	936677.78	1166.1046	915591.19	936527.54	1166.67024	916044.21	937509.77	1164.54881	237	759	401837	-759	237	17.3	0.0020	0.3	880	5.8	507
3/11/2021	916069.59	936677.78	1166.2674	915591.19	936527.54	1166.85358	916044.21	937509.77	1164.64075	243	793	401837	-793	243	17.1	0.0021	0.3	880	6.1	498
3/12/2021	916069.59	936677.78	1166.4727	915591.19	936527.54	1167.02462	916044.21	937509.77	1165.08195	250	679	401837	-679	250	20.2	0.0018	0.3	880	5.3	534
3/13/2021	916069.59	936677.78	1166.8053	915591.19	936527.54	1167.29943	916044.21	937509.77	1165.43146	205	670	401837	-670	205	17.0	0.0017	0.3	880	5.1	546
3/14/2021	916069.59	936677.78	1167.1115	915591.19	936527.54	1167.56482	916044.21	937509.77	1165.58543	148	742	401837	-742	148	11.3	0.0019	0.3	880	5.5	528
3/15/2021	916069.59	936677.78	1167.3971	915591.19	936527.54	1167.85141	916044.21	937509.77	1165.9247	157	716	401837	-716	157	12.4	0.0018	0.3	880	5.3	539
3/16/2021	916069.59	936677.78	1167.6969	915591.19	936527.54	1168.13017	916044.21	937509.77	1166.08999	119	780	401837	-780	119	8.7	0.0020	0.3	880	5.8	522
3/17/2021	916069.59	936677.78	1167.8962	915591.19	936527.54	1168.35226	916044.21	937509.77	1166.29804	139	776	401837	-776	139	10.2	0.0020	0.3	880	5.8	524
3/18/2021	916069.59	936677.78	1168.126	915591.19	936527.54	1168.58433	916044.21	937509.77	1166.39707	122	839	401837	-839	122	8.2	0.0021	0.3	880	6.2	507
3/19/2021	916069.59	936677.78	1168.3006	915591.19	936527.54	1168.77325	916044.21	937509.77	1166.62728	142	813	401837	-813	142	9.9	0.0021	0.3	880	6.0	516
3/20/2021	916069.59	936677.78	1168.4927	915591.19	936527.54	1168.96493	916044.21	937509.77	1166.72953	128	855	401837	-855	128	8.5	0.0022	0.3	880	6.3	505
3/21/2021	916069.59	936677.78	1168.6234	915591.19	936527.54	1169.11161	916044.21	937509.77	1166.75815	126	905	401837	-905	126	7.9	0.0023	0.3	880	6.7	493
3/22/2021	916069.59	936677.78	1168.8207	915591.19	936527.54	1169.33257	916044.21	937509.77	1167.02375	156	873	401837	-873	156	10.1	0.0022	0.3	880	6.5	502
3/23/2021	916069.59	936677.78	1168.9792	915591.19	936527.54	1169.49519	916044.21	937509.77	1167.0689	142	927	401837	-927	142	8.7	0.0023	0.3	880	6.8	489
3/24/2021	916069.59	936677.78	1169.1226	915591.19	936527.54	1169.6748	916044.21	937509.77	1167.2412	177	914	401837	-914	177	10.9	0.0023	0.3	880	6.8	492
3/25/2021	916069.59	936677.78	1169.2599	915591.19	936527.54	1169.81841	916044.21	937509.77	1167.25272	163	974	401837	-974	163	9.5	0.0025	0.3	880	7.2	479
3/26/2021	916069.59	936677.78	1169.4386	915591.19	936527.54	1170.01465	916044.21	937509.77	1167.45579	181	963	401837	-963	181	10.7	0.0024	0.3	880	7.2	483
3/27/2021	916069.59	936677.78	1169.5144	915591.19	936527.54	1170.11326	916044.21	937509.77	1167.45694	189	999	401837	-999	189	10.7	0.0025	0.3	880	7.4	475
3/28/2021	916069.59	936677.78	1169.6633	915591.19	936527.54	1170.26962	916044.21	937509.77	1167.5094	181	1046	401837	-1046	181	9.8	0.0026	0.3	880	7.7	466
3/29/2021	916069.59	936677.78	1169.707	915591.19	936527.54	1170.3428	916044.21	937509.77	1167.65121	220	1000	401837	-1000	220	12.4	0.0025	0.3	880	7.5	475
3/30/2021	916069.59	936677.78	1169.8263	915591.19	936527.54	1170.45677	916044.21	937509.77	1167.67126	201	1047	401837	-1047	201	10.9	0.0027	0.3	880	7.8	466
3/31/2021	916069.59	936677.78	1169.9072	915591.19	936527.54	1170.56103	916044.21	937509.77	1167.7809	225	1034	401837	-1034	225	12.3	0.0026	0.3	880	7.7	469
4/1/2021	916069.59	936677.78	1169.9561	915591.19	936527.54	1170.61991	916044.21	937509.77	1167.76147	223	1067	401837	-1067	223	11.8	0.0027	0.3	880	8.0	462
4/2/2021	916069.59	936677.78	1169.9923	915591.19	936527.54	1170.67657	916044.21	937509.77	1167.854225	248	1040	401837	-1040	248	13.4	0.0027	0.3	880	7.8	467
4/3/2021	916069.59	936677.78	1170.0458	915591.19	936527.54	1170.73372	916044.21	937509.77	1167.84462	242	1071	401837	-1071	242	12.7	0.0027	0.3	880	8.0	461
4/4/2021	916069.59	936677.78	1170.0216	915591.19	936527.54	1170.73313	916044.21	937509.77	1167.77605	255	1092	401837	-1092	255	13.1	0.0028	0.3	880	8.2	456
4/5/2021	916069.59	936677.78	1170.0636	915591.19	936527.54	1170.79197	916044.21	937509.77	1167.913847	283	1047	401837	-1047	283	15.1	0.0027	0.3	880	7.9	465
4/6/2021	916069.59	936677.78	1170.0597	915591.19	936527.54	1170.79755	916044.21	937509.77	1167.874189	286	1064	401837	-1064	286	15.0	0.0027	0.3	880	8.0	461
4/7/2021	916069.59	936677.78	1170.0151	915591.19	936527.54	1170.7752	916044.21	937509.77	1167.889867	313	1036	401837	-1036	313	16.8	0.0027	0.3	880	7.9	465
4/8/2021	916069.59	936677.78	1169.9745	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.79482	1571	1101	401837	-1101	1571	55.0	0.0048	0.3	880	14.0	358
4/9/2021	916069.59	936677.78	1169.9108	915591.19	936527.54	1170.70623	916044.21	937509.77	1167.832597	350	1014	401837	-1014	350	19.0	0.0027	0.3	880	7.8	466
4/10/2021	916069.59	936677.78	1169.8668	915591.19	936527.54	1170.66346	916044.21	937509.77	1167.75572	346	1030	401837	-1030	346	18.5	0.0027	0.3	880	7.9	463
4/11/2021	916069.59	936677.78	1169.7859	915591.19	936527.54	1170.59176	916044.21	937509.77	1167.64718	349	1044	401837	-1044	349	18.5	0.0027	0.3	880	8.0	460
4/12/2021	916069.59	936677.78	1169.7253	915591.19	936527.54	1170.54923	916044.21	937509.77	1167.7091	383	985	401837	-985	383	21.2	0.0026	0.3	880	7.7	469
4/13/2021	916069.59	936677.78	1169.6894	915591.19	936527.54	1170.49585	916044.21	937509.77	1167.62684	361	1007	401837	-1007	361	19.7	0.0027	0.3	880	7.8	466
4/14/2021	916069.59	936677.78	1169.6947	915591.19	936527.54	1170.50066	916044.21	937509.77	1167.65442	364	997	401837	-997	364	20.1	0.0026	0.3	880	7.7	468
4/15/2021	916069.59	936677.78	1169.679	915591.19	936527.54	1170.47127	916044.21	937509.77	1167.58327	344	1023	401837	-1023	344	18.6	0.0027	0.3	880	7.9	463
4/16/2021	916069.59	936677.78	1169.6614	915591.19	936527.54	1170.46244	916044.21	937509.77	1167.62953	361	992	401837	-992	361	20.0	0.0026	0.3	880	7.7	468
4/17/2021	916069.59	936677.78	1169.6437	915591.19	936527.54	1170.43651	916044.21	937509.77	1167.57256	348	1011	401837	-1011	348	19.0	0.0027	0.3	880	7.8	465
4/18/2021	916069.59	936677.78	1169.5829	915591.19	936527.54	1170.37362	916044.21	937509.77	1167.45048	337	1040	401837	-1040	337	18.0	0.0027	0.3	880	8.0	460
4/19/2021	916069.59	936677.78	1169.6012	915591.19	936527.54	1170.40857	916044.21	937509.77	1167.56675	366	994	401837	-994	366	20.2	0.0026	0.3	880	7.7	467
4/20/2021	916069.59	936677.78	1169.5547	915591.19	936527.54	1170.35171	916044.21	937509.77	1167.49727	354	1005	401837	-1005	354	19.4	0.0027	0.3	880	7.8	466
4/21/2021	916069.59	936677.78	1169.5535	915591.19	936527.54	1170.35573	916044.21	937509.77	1167.53235	364	987	401837	-987	364	20.2	0.0026	0.3	880	7.7	468
4/22/2021	916069.59	936677.78	1169.5343	915591.19	936527.54	1170.32273	916044.21	937509.77	1167.46603	345	1009	401837	-1009	345	18.9	0.0027	0.3	880	7.8	465
4/23/2021	916069.59	936677.78	1169.5502	915591.19	936527.54	1170.34158	916044.21	937509.77	1167.53086	355	986	401837	-986	355	19.8	0.0026	0.3	880	7.7	469
4/24/2021	916069.59	936677.78	1169.5656	915591.19	936527.54	1170.34055	916044.21	937509.77	1167.48592	332	1015	401837	-1015	332	18.1	0.0027	0.3	880	7.8	465

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
4/25/2021	916069.59	936677.78	1169.5159	915591.19	936527.54	1170.2933	916044.21	937509.77	1167.40085	329	1032	401837	-1032	329	17.7	0.0027	0.3	880	7.9	461
4/26/2021	916069.59	936677.78	1169.5028	915591.19	936527.54	1170.28565	916044.21	937509.77	1167.48133	348	987	401837	-987	348	19.4	0.0026	0.3	880	7.6	469
4/27/2021	916069.59	936677.78	1169.5112	915591.19	936527.54	1170.28567	916044.21	937509.77	1167.44213	333	1009	401837	-1009	333	18.3	0.0026	0.3	880	7.8	465
4/28/2021	916069.59	936677.78	1169.452	915591.19	936527.54	1170.25399	916044.21	937509.77	1167.43644	364	985	401837	-985	364	20.3	0.0026	0.3	880	7.7	468
4/29/2021	916069.59	936677.78	1169.4215	915591.19	936527.54	1170.22707	916044.21	937509.77	1167.35699	360	1008	401837	-1008	360	19.7	0.0027	0.3	880	7.8	463
4/30/2021	916069.59	936677.78	1169.5074	915591.19	936527.54	1170.32045	916044.21	937509.77	1167.54333	381	960	401837	-960	381	21.7	0.0026	0.3	880	7.5	472
5/1/2021	916069.59	936677.78	1169.5216	915591.19	936527.54	1170.31513	916044.21	937509.77	1167.5338	362	971	401837	-971	362	20.4	0.0026	0.3	880	7.6	472
5/2/2021	916069.59	936677.78	1169.519	915591.19	936527.54	1170.28914	916044.21	937509.77	1167.45783	331	1006	401837	-1006	331	18.2	0.0026	0.3	880	7.7	466
5/3/2021	916069.59	936677.78	1169.5988	915591.19	936527.54	1170.38339	916044.21	937509.77	1167.60624	353	973	401837	-973	353	20.0	0.0026	0.3	880	7.6	472
5/4/2021	916069.59	936677.78	1169.6666	915591.19	936527.54	1170.43529	916044.21	937509.77	1167.61976	332	999	401837	-999	332	18.4	0.0026	0.3	880	7.7	469
5/5/2021	916069.59	936677.78	1169.7013	915591.19	936527.54	1170.4707	916044.21	937509.77	1167.67602	336	988	401837	-988	336	18.8	0.0026	0.3	880	7.6	471
5/6/2021	916069.59	936677.78	1169.742	915591.19	936527.54	1170.49197	916044.21	937509.77	1167.65428	310	1018	401837	-1018	310	17.0	0.0026	0.3	880	7.8	467
5/7/2021	916069.59	936677.78	1169.7976	915591.19	936527.54	1170.55651	916044.21	937509.77	1167.74784	323	1000	401837	-1000	323	17.9	0.0026	0.3	880	7.7	470
5/8/2021	916069.59	936677.78	1169.9065	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.824433	1642	1056	401837	-1056	1642	57.3	0.0049	0.3	880	14.3	354
5/9/2021	916069.59	936677.78	1169.9423	915591.19	936527.54	1170.68405	916044.21	937509.77	1167.80616	296	1041	401837	-1041	296	15.9	0.0027	0.3	880	7.9	464
5/10/2021	916069.59	936677.78	1170.0787	915591.19	936527.54	1170.8327	916044.21	937509.77	1168.031088	320	999	401837	-999	320	17.7	0.0026	0.3	880	7.7	473
5/11/2021	916069.59	936677.78	1170.1794	915591.19	936527.54	1170.90251	916044.21	937509.77	1168.080864	286	1022	401837	-1022	286	15.6	0.0026	0.3	880	7.7	470
5/12/2021	916069.59	936677.78	1170.2275	915591.19	936527.54	1170.96766	916044.21	937509.77	1168.161861	305	1007	401837	-1007	305	16.9	0.0026	0.3	880	7.7	473
5/13/2021	916069.59	936677.78	1170.2921	915591.19	936527.54	1171.02754	916044.21	937509.77	1168.148814	290	1044	401837	-1044	290	15.5	0.0027	0.3	880	7.9	467
5/14/2021	916069.59	936677.78	1170.3664	915591.19	936527.54	1171.1107	916044.21	937509.77	1168.257945	302	1028	401837	-1028	302	16.4	0.0027	0.3	880	7.8	470
5/15/2021	916069.59	936677.78	1170.4092	915591.19	936527.54	1171.15941	916044.21	937509.77	1168.252446	300	1051	401837	-1051	300	15.9	0.0027	0.3	880	8.0	466
5/16/2021	916069.59	936677.78	1170.3887	915591.19	936527.54	1171.14442	916044.21	937509.77	1168.177035	296	1077	401837	-1077	296	15.4	0.0028	0.3	880	8.2	460
5/17/2021	916069.59	936677.78	1170.4131	915591.19	936527.54	1171.19785	916044.21	937509.77	1168.286347	333	1037	401837	-1037	333	17.8	0.0027	0.3	880	8.0	467
5/18/2021	916069.59	936677.78	1170.3964	915591.19	936527.54	1171.18964	916044.21	937509.77	1168.22965	334	1057	401837	-1057	334	17.6	0.0028	0.3	880	8.1	463
5/19/2021	916069.59	936677.78	1170.3347	915591.19	936527.54	1171.15679	916044.21	937509.77	1168.218679	366	1033	401837	-1033	366	19.5	0.0027	0.3	880	8.0	465
5/20/2021	916069.59	936677.78	1170.2717	915591.19	936527.54	1171.10347	916044.21	937509.77	1168.121786	369	1050	401837	-1050	369	19.4	0.0028	0.3	880	8.1	461
5/21/2021	916069.59	936677.78	1170.1554	915591.19	936527.54	1171.04023	916044.21	937509.77	1168.075822	424	1017	401837	-1017	424	22.6	0.0027	0.3	880	8.0	463
5/22/2021	916069.59	936677.78	1170.1039	915591.19	936527.54	1170.98502	916044.21	937509.77	1167.994859	416	1031	401837	-1031	416	22.0	0.0028	0.3	880	8.1	460
5/23/2021	916069.59	936677.78	1169.987	915591.19	936527.54	1170.87332	916044.21	937509.77	1167.854017	417	1043	401837	-1043	417	21.8	0.0028	0.3	880	8.2	457
5/24/2021	916069.59	936677.78	1169.938	915591.19	936527.54	1170.82424	916044.21	937509.77	1167.918132	434	989	401837	-989	434	23.7	0.0027	0.3	880	7.9	466
5/25/2021	916069.59	936677.78	1169.8631	915591.19	936527.54	1170.75698	916044.21	937509.77	1167.841977	440	990	401837	-990	440	24.0	0.0027	0.3	880	7.9	465
5/26/2021	916069.59	936677.78	1169.7771	915591.19	936527.54	1170.66846	916044.21	937509.77	1167.80088	445	968	401837	-968	445	24.7	0.0027	0.3	880	7.8	468
5/27/2021	916069.59	936677.78	1169.714	915591.19	936527.54	1170.59265	916044.21	937509.77	1167.70491	429	983	401837	-983	429	23.6	0.0027	0.3	880	7.8	466
5/28/2021	916069.59	936677.78	1169.6354	915591.19	936527.54	1170.52723	916044.21	937509.77	1167.70255	452	947	401837	-947	452	25.5	0.0026	0.3	880	7.7	470
5/29/2021	916069.59	936677.78	1169.622	915591.19	936527.54	1170.50008	916044.21	937509.77	1167.66533	437	958	401837	-958	437	24.5	0.0026	0.3	880	7.7	469
5/30/2021	916069.59	936677.78	1169.5341	915591.19	936527.54	1170.39417	916044.21	937509.77	1167.52146	413	985	401837	-985	413	22.8	0.0027	0.3	880	7.8	465
5/31/2021	916069.59	936677.78	1169.5551	915591.19	936527.54	1170.39998	916044.21	937509.77	1167.62319	413	946	401837	-946	413	23.6	0.0026	0.3	880	7.5	473
6/1/2021	916069.59	936677.78	1169.5127	915591.19	936527.54	1170.34957	916044.21	937509.77	1167.54199	400	964	401837	-964	400	22.5	0.0026	0.3	880	7.6	470
6/2/2021	916069.59	936677.78	1169.4317	915591.19	936527.54	1170.28825	916044.21	937509.77	1167.50919	424	941	401837	-941	424	24.2	0.0026	0.3	880	7.5	472
6/3/2021	916069.59	936677.78	1169.3835	915591.19	936527.54	1170.21384	916044.21	937509.77	1167.42932	397	956	401837	-956	397	22.6	0.0026	0.3	880	7.6	471
6/4/2021	916069.59	936677.78	1169.4699	915591.19	936527.54	1170.32828	916044.21	937509.77	1167.56916	429	931	401837	-931	429	24.7	0.0026	0.3	880	7.5	474
6/5/2021	916069.59	936677.78	1169.4207	915591.19	936527.54	1170.24917	916044.21	937509.77	1167.51047	402	935	401837	-935	402	23.3	0.0025	0.3	880	7.4	475
6/6/2021	916069.59	936677.78	1169.3066	915591.19	936527.54	1170.13468	916044.21	937509.77	1167.36271	397	951	401837	-951	397	22.7	0.0026	0.3	880	7.5	472
6/7/2021	916069.59	936677.78	1169.2883	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.44182	2192	959	401837	-959	2192	66.4	0.0060	0.3	880	17.5	320
6/8/2021	916069.59	936677.78	1169.2273	915591.19	936527.54	1170.04475	916044.21	937509.77	1167.36396	400	912	401837	-912	400	23.7	0.0025	0.3	880	7.3	479
6/9/2021	916069.59	936677.78	1169.1346	915591.19	936527.54	1169.95953	916044.21	937509.77	1167.339	417	880	401837	-880	417	25.3	0.0024	0.3	880	7.1	484
6/10/2021	916069.59	936677.78	1169.0413	915591.19	936527.54	1169.86097	916044.21	937509.77	1167.20725	406	898	401837	-898	406	24.3	0.0025	0.3	880	7.2	480
6/11/2021	916069.59	936677.78	1168.9678	915591.19	936527.54	1169.79088	916044.21	937509.77	1167.22248	423	856	401837	-856	423	26.3	0.0024	0.3	880	7.0	487
6/12/2021	916069.59	936677.78	1168.8912	915591.19	936527.54	1169.71329	916044.21	937509.77	1167.13295	420	862	401837	-862	420	26.0	0.0024	0.3	880	7.0	486
6/13/2021	916069.59	936677.78	1168.7509	915591.19	936527.54	1169.56562	916044.21	937509.77	1166.96737	410	874	401837	-874	410	25.1	0.0024	0.3	880	7.0	483
6/14/2021	916069.59	936677.78	1168.6668	915591.19	936527.54	1169.58743	916044.21	937509.77	1167.03183	520	806	401837	-806	520	32.9	0.0024	0.3	880	7.0	485
6/15/2021	916069.59	936677.78	1168.6063	915591.19	936527.54	1169.41356	916044.21	937509.77	1166.92686	419	824	401837	-824	419	27.0	0.0023	0.3	880	6.7	492
6/16/2021	916069.59	936677.78	1168.4961	915591.19	936527.54	1169.30551	916044.21	937509.77	1166.87789	430	795	401837	-795	430	28.4	0.0022	0.3	880	6.6	497
6/17/2021	916069.59	936677.78	1168.3922	915591.19	936527.54	1169.1797	916044.21	937509.77	1166.73236	406	814	401837	-814	406	26.5	0.0023	0.3	880	6.6	494

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
6/18/2021	916069.59	936677.78	1168.2938	915591.19	936527.54	1169.09892	916044.21	937509.77	1166.72167	434	773	401837	-773	434	29.3	0.0022	0.3	880	6.5	500
6/19/2021	916069.59	936677.78	1168.2103	915591.19	936527.54	1169.00116	916044.21	937509.77	1166.61536	418	783	401837	-783	418	28.1	0.0022	0.3	880	6.5	499
6/20/2021	916069.59	936677.78	1168.0831	915591.19	936527.54	1168.86377	916044.21	937509.77	1166.45675	405	798	401837	-798	405	26.9	0.0022	0.3	880	6.5	496
6/21/2021	916069.59	936677.78	1168.0559	915591.19	936527.54	1168.83395	916044.21	937509.77	1166.54339	420	743	401837	-743	420	29.5	0.0021	0.3	880	6.2	507
6/22/2021	916069.59	936677.78	1167.9718	915591.19	936527.54	1168.73916	916044.21	937509.77	1166.44025	408	752	401837	-752	408	28.5	0.0021	0.3	880	6.2	506
6/23/2021	916069.59	936677.78	1167.852	915591.19	936527.54	1168.61201	916044.21	937509.77	1166.3675	409	729	401837	-729	409	29.3	0.0021	0.3	880	6.1	511
6/24/2021	916069.59	936677.78	1167.758	915591.19	936527.54	1168.49696	916044.21	937509.77	1166.2138	383	758	401837	-758	383	26.8	0.0021	0.3	880	6.2	506
6/25/2021	916069.59	936677.78	1167.6717	915591.19	936527.54	1168.41601	916044.21	937509.77	1166.21811	401	714	401837	-714	401	29.3	0.0020	0.3	880	6.0	514
6/26/2021	916069.59	936677.78	1167.5861	915591.19	936527.54	1168.32348	916044.21	937509.77	1166.08785	388	735	401837	-735	388	27.8	0.0021	0.3	880	6.1	510
6/27/2021	916069.59	936677.78	1167.435	915591.19	936527.54	1168.16801	916044.21	937509.77	1165.89595	379	755	401837	-755	379	26.6	0.0021	0.3	880	6.2	504
6/28/2021	916069.59	936677.78	1167.3541	915591.19	936527.54	1168.09938	916044.21	937509.77	1165.93665	407	697	401837	-697	407	30.3	0.0020	0.3	880	5.9	515
6/29/2021	916069.59	936677.78	1167.2535	915591.19	936527.54	1167.99483	916044.21	937509.77	1165.7903	397	719	401837	-719	397	28.9	0.0020	0.3	880	6.0	510
6/30/2021	916069.59	936677.78	1167.1528	915591.19	936527.54	1167.89868	916044.21	937509.77	1165.73956	408	695	401837	-695	408	30.4	0.0020	0.3	880	5.9	514
7/1/2021	916069.59	936677.78	1167.1262	915591.19	936527.54	1167.84283	916044.21	937509.77	1165.62832	371	735	401837	-735	371	26.8	0.0020	0.3	880	6.0	508
7/2/2021	916069.59	936677.78	1167.1592	915591.19	936527.54	1167.91441	916044.21	937509.77	1165.72802	413	704	401837	-704	413	30.4	0.0020	0.3	880	6.0	511
7/3/2021	916069.59	936677.78	1167.1181	915591.19	936527.54	1167.81626	916044.21	937509.77	1165.64847	360	721	401837	-721	360	26.5	0.0020	0.3	880	5.9	513
7/4/2021	916069.59	936677.78	1167.0104	915591.19	936527.54	1167.70464	916044.21	937509.77	1165.47346	347	753	401837	-753	347	24.7	0.0021	0.3	880	6.1	505
7/5/2021	916069.59	936677.78	1166.9805	915591.19	936527.54	1167.67812	916044.21	937509.77	1165.56318	367	696	401837	-696	367	27.8	0.0020	0.3	880	5.7	518
7/6/2021	916069.59	936677.78	1166.9271	915591.19	936527.54	1167.61595	916044.21	937509.77	1165.46207	353	718	401837	-718	353	26.2	0.0020	0.3	880	5.8	513
7/7/2021	916069.59	936677.78	1166.8656	915591.19	936527.54	1167.56481	916044.21	937509.77	1165.47371	373	684	401837	-684	373	28.6	0.0019	0.3	880	5.7	520
7/8/2021	916069.59	936677.78	1166.9003	915591.19	936527.54	1167.59349	916044.21	937509.77	1165.4405	357	716	401837	-716	357	26.5	0.0020	0.3	880	5.8	513
7/9/2021	916069.59	936677.78	1167.0611	915591.19	936527.54	1167.77826	916044.21	937509.77	1165.67528	388	681	401837	-681	388	29.7	0.0020	0.3	880	5.7	520
7/10/2021	916069.59	936677.78	1167.0403	915591.19	936527.54	1172.256226	916044.21	937509.77	1165.60982	4125	817	401837	-817	4125	78.8	0.0036	0.3	880	10.5	413
7/11/2021	916069.59	936677.78	1166.9683	915591.19	936527.54	1167.62036	916044.21	937509.77	1165.45001	314	743	401837	-743	314	22.9	0.0020	0.3	880	5.9	511
7/12/2021	916069.59	936677.78	1167.0717	915591.19	936527.54	1167.74529	916044.21	937509.77	1165.67529	351	685	401837	-685	351	27.1	0.0019	0.3	880	5.6	525
7/13/2021	916069.59	936677.78	1167.0751	915591.19	936527.54	1167.73007	916044.21	937509.77	1165.58071	320	732	401837	-732	320	23.7	0.0020	0.3	880	5.8	515
7/14/2021	916069.59	936677.78	1167.2113	915591.19	936527.54	1167.97736	916044.21	937509.77	1165.839	431	676	401837	-676	431	32.5	0.0020	0.3	880	5.9	516
7/15/2021	916069.59	936677.78	1167.498	915591.19	936527.54	1168.11158	916044.21	937509.77	1165.96081	280	751	401837	-751	280	20.4	0.0020	0.3	880	5.8	517
7/16/2021	916069.59	936677.78	1167.5866	915591.19	936527.54	1168.20737	916044.21	937509.77	1166.12794	297	714	401837	-714	297	22.6	0.0019	0.3	880	5.6	527
7/17/2021	916069.59	936677.78	1167.7149	915591.19	936527.54	1168.32376	916044.21	937509.77	1166.15968	273	759	401837	-759	273	19.8	0.0020	0.3	880	5.9	517
7/18/2021	916069.59	936677.78	1167.7791	915591.19	936527.54	1168.39522	916044.21	937509.77	1166.18113	273	780	401837	-780	273	19.3	0.0021	0.3	880	6.0	512
7/19/2021	916069.59	936677.78	1167.9237	915591.19	936527.54	1168.53149	916044.21	937509.77	1166.36613	272	761	401837	-761	272	19.7	0.0020	0.3	880	5.9	519
7/20/2021	916069.59	936677.78	1167.9999	915591.19	936527.54	1168.61101	916044.21	937509.77	1166.36224	262	799	401837	-799	262	18.2	0.0021	0.3	880	6.1	509
7/21/2021	916069.59	936677.78	1168.0621	915591.19	936527.54	1168.69213	916044.21	937509.77	1166.46676	284	779	401837	-779	284	20.1	0.0021	0.3	880	6.1	513
7/22/2021	916069.59	936677.78	1168.1082	915591.19	936527.54	1168.72955	916044.21	937509.77	1166.42654	264	820	401837	-820	264	17.9	0.0021	0.3	880	6.3	504
7/23/2021	916069.59	936677.78	1168.1607	915591.19	936527.54	1168.79531	916044.21	937509.77	1166.54571	285	789	401837	-789	285	19.9	0.0021	0.3	880	6.1	511
7/24/2021	916069.59	936677.78	1168.1949	915591.19	936527.54	1168.83374	916044.21	937509.77	1166.49259	276	831	401837	-831	276	18.4	0.0022	0.3	880	6.4	501
7/25/2021	916069.59	936677.78	1168.1122	915591.19	936527.54	1168.7831	916044.21	937509.77	1166.37508	297	848	401837	-848	297	19.3	0.0022	0.3	880	6.6	494
7/26/2021	916069.59	936677.78	1168.0937	915591.19	936527.54	1168.78647	916044.21	937509.77	1166.45955	331	799	401837	-799	331	22.5	0.0022	0.3	880	6.3	503
7/27/2021	916069.59	936677.78	1168.0728	915591.19	936527.54	1168.82168	916044.21	937509.77	1166.39162	370	823	401837	-823	370	24.2	0.0022	0.3	880	6.6	493
7/28/2021	916069.59	936677.78	1167.9981	915591.19	936527.54	1168.71217	916044.21	937509.77	1166.39671	354	784	401837	-784	354	24.3	0.0021	0.3	880	6.3	504
7/29/2021	916069.59	936677.78	1168.0001	915591.19	936527.54	1168.68227	916044.21	937509.77	1166.31835	315	822	401837	-822	315	21.0	0.0022	0.3	880	6.4	498
7/30/2021	916069.59	936677.78	1167.9412	915591.19	936527.54	1168.65024	916044.21	937509.77	1166.38977	357	760	401837	-760	357	25.1	0.0021	0.3	880	6.1	510
7/31/2021	916069.59	936677.78	1167.8952	915591.19	936527.54	1168.59385	916044.21	937509.77	1166.25557	335	802	401837	-802	335	22.7	0.0022	0.3	880	6.3	501
8/1/2021	916069.59	936677.78	1167.7845	915591.19	936527.54	1168.59374	916044.21	937509.77	1166.11589	423	819	401837	-819	423	27.3	0.0023	0.3	880	6.7	486
8/2/2021	916069.59	936677.78	1167.9466	915591.19	936527.54	1168.67504	916044.21	937509.77	1166.33294	364	790	401837	-790	364	24.7	0.0022	0.3	880	6.4	501
8/3/2021	916069.59	936677.78	1167.9279	915591.19	936527.54	1168.60903	916044.21	937509.77	1166.26468	317	813	401837	-813	317	21.3	0.0022	0.3	880	6.4	500
8/4/2021	916069.59	936677.78	1167.9052	915591.19	936527.54	1168.59845	916044.21	937509.77	1166.31305	338	779	401837	-779	338	23.4	0.0021	0.3	880	6.2	507
8/5/2021	916069.59	936677.78	1167.8911	915591.19	936527.54	1168.56953	916044.21	937509.77	1166.24077	317	807	401837	-807	317	21.4	0.0022	0.3	880	6.3	501
8/6/2021	916069.59	936677.78	1167.8478	915591.19	936527.54	1168.54353	916044.21	937509.77	1166.28721	344	764	401837	-764	344	24.3	0.0021	0.3	880	6.1	509
8/7/2021	916069.59	936677.78	1167.8204	915591.19	936527.54	1168.50472	916044.21	937509.77	1166.21449	328	786	401837	-786	328	22.7	0.0021	0.3	880	6.2	505
8/8/2021	916069.59	936677.78	1167.7315	915591.19	936527.54	1168.42426	916044.21	937509.77	1166.08215	329	807	401837	-807	329	22.2	0.0022	0.3	880	6.4	499
8/9/2021	916069.59	936677.78	1167.7187	915591.19	936527.54	1168.41582	916044.21	937509.77	1166.21726	354	736	401837	-736	354	25.7	0.0020	0.3	880	6.0	515
8/10/2021	916069.59	936677.78	1167.6832	915591.19	936527.54	1168.36696	916044.21	937509.77	1166.14568	338	753	401837	-753	338	24.2	0.0021	0.3	880	6.0	512

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
8/11/2021	916069.59	936677.78	1167.6179	915591.19	936527.54	1168.317	916044.21	937509.77	1166.14869	361	721	401837	-721	361	26.6	0.0020	0.3	880	5.9	518
8/12/2021	916069.59	936677.78	1167.5576	915591.19	936527.54	1168.25205	916044.21	937509.77	1166.03751	349	745	401837	-745	349	25.1	0.0020	0.3	880	6.0	512
8/13/2021	916069.59	936677.78	1167.5012	915591.19	936527.54	1168.20299	916044.21	937509.77	1166.05151	366	711	401837	-711	366	27.2	0.0020	0.3	880	5.8	518
8/14/2021	916069.59	936677.78	1167.4142	915591.19	936527.54	1168.11766	916044.21	937509.77	1165.91287	360	736	401837	-736	360	26.0	0.0020	0.3	880	6.0	512
8/15/2021	916069.59	936677.78	1167.2875	915591.19	936527.54	1167.97793	916044.21	937509.77	1165.71534	338	770	401837	-770	338	23.7	0.0021	0.3	880	6.1	504
8/16/2021	916069.59	936677.78	1167.2371	915591.19	936527.54	1167.93859	916044.21	937509.77	1165.81224	370	699	401837	-699	370	27.8	0.0020	0.3	880	5.8	519
8/17/2021	916069.59	936677.78	1167.2526	915591.19	936527.54	1167.9967	916044.21	937509.77	1165.83114	406	699	401837	-699	406	30.1	0.0020	0.3	880	5.9	514
8/18/2021	916069.59	936677.78	1167.5279	915591.19	936527.54	1168.24078	916044.21	937509.77	1166.18564	391	660	401837	-660	391	30.7	0.0019	0.3	880	5.6	530
8/19/2021	916069.59	936677.78	1168.1095	915591.19	936527.54	1168.50396	916044.21	937509.77	1166.80329	132	635	401837	-635	132	11.7	0.0016	0.3	880	4.7	579
8/20/2021	916069.59	936677.78	1168.4481	915591.19	936527.54	1169.01102	916044.21	937509.77	1167.07333	262	672	401837	-672	262	21.3	0.0018	0.3	880	5.3	553
8/21/2021	916069.59	936677.78	1168.6982	915591.19	936527.54	1169.22444	916044.21	937509.77	1167.12392	201	766	401837	-766	201	14.7	0.0020	0.3	880	5.8	530
8/22/2021	916069.59	936677.78	1168.8763	915591.19	936527.54	1169.40141	916044.21	937509.77	1167.10551	171	860	401837	-860	171	11.2	0.0022	0.3	880	6.4	505
8/23/2021	916069.59	936677.78	1169.0896	915591.19	936527.54	1169.62865	916044.21	937509.77	1167.34721	187	847	401837	-847	187	12.4	0.0022	0.3	880	6.3	510
8/24/2021	916069.59	936677.78	1169.2452	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.37782	2225	970	401837	-970	2225	66.4	0.0060	0.3	880	17.7	318
8/25/2021	916069.59	936677.78	1169.3511	915591.19	936527.54	1169.94897	916044.21	937509.77	1167.4835	217	909	401837	-909	217	13.4	0.0023	0.3	880	6.8	494
8/26/2021	916069.59	936677.78	1169.4433	915591.19	936527.54	1170.05402	916044.21	937509.77	1167.48938	215	950	401837	-950	215	12.7	0.0024	0.3	880	7.1	484
8/27/2021	916069.59	936677.78	1169.5046	915591.19	936527.54	1170.15822	916044.21	937509.77	1167.62427	261	916	401837	-916	261	15.9	0.0024	0.3	880	7.0	491
8/28/2021	916069.59	936677.78	1169.6988	915591.19	936527.54	1170.36627	916044.21	937509.77	1167.76796	265	941	401837	-941	265	15.7	0.0024	0.3	880	7.1	486
8/29/2021	916069.59	936677.78	1169.7357	915591.19	936527.54	1170.41042	916044.21	937509.77	1167.73424	261	975	401837	-975	261	15.0	0.0025	0.3	880	7.4	479
8/30/2021	916069.59	936677.78	1169.8544	915591.19	936527.54	1170.54408	916044.21	937509.77	1167.939181	286	934	401837	-934	286	17.0	0.0024	0.3	880	7.1	488
8/31/2021	916069.59	936677.78	1169.9016	915591.19	936527.54	1170.6025	916044.21	937509.77	1167.924927	286	963	401837	-963	286	16.5	0.0025	0.3	880	7.3	481
9/1/2021	916069.59	936677.78	1169.8962	915591.19	936527.54	1170.65989	916044.21	937509.77	1167.971685	346	940	401837	-940	346	20.2	0.0025	0.3	880	7.3	482
9/2/2021	916069.59	936677.78	1169.8942	915591.19	936527.54	1170.6413	916044.21	937509.77	1167.899089	322	973	401837	-973	322	18.3	0.0026	0.3	880	7.5	477
9/3/2021	916069.59	936677.78	1169.8857	915591.19	936527.54	1170.6661	916044.21	937509.77	1167.93233	356	954	401837	-954	356	20.4	0.0025	0.3	880	7.4	478
9/4/2021	916069.59	936677.78	1169.8796	915591.19	936527.54	1170.66157	916044.21	937509.77	1167.870654	349	981	401837	-981	349	19.6	0.0026	0.3	880	7.6	473
9/5/2021	916069.59	936677.78	1169.8093	915591.19	936527.54	1170.60383	916044.21	937509.77	1167.76936	355	996	401837	-996	355	19.6	0.0026	0.3	880	7.7	469
9/6/2021	916069.59	936677.78	1169.8101	915591.19	936527.54	1170.6102	916044.21	937509.77	1167.88426	376	942	401837	-942	376	21.8	0.0025	0.3	880	7.4	479
9/7/2021	916069.59	936677.78	1169.7673	915591.19	936527.54	1170.56998	916044.21	937509.77	1167.78936	371	967	401837	-967	371	21.0	0.0026	0.3	880	7.6	474
9/8/2021	916069.59	936677.78	1169.7362	915591.19	936527.54	1170.54132	916044.21	937509.77	1167.81056	381	942	401837	-942	381	22.0	0.0025	0.3	880	7.4	478
9/9/2021	916069.59	936677.78	1169.7604	915591.19	936527.54	1170.55643	916044.21	937509.77	1167.78354	365	966	401837	-966	365	20.7	0.0026	0.3	880	7.5	474
9/10/2021	916069.59	936677.78	1169.765	915591.19	936527.54	1170.55689	916044.21	937509.77	1167.879311	376	922	401837	-922	376	22.2	0.0025	0.3	880	7.3	483
9/11/2021	916069.59	936677.78	1169.7832	915591.19	936527.54	1170.54753	916044.21	937509.77	1167.832683	343	953	401837	-953	343	19.8	0.0025	0.3	880	7.4	479
9/12/2021	916069.59	936677.78	1169.7111	915591.19	936527.54	1170.48431	916044.21	937509.77	1167.70768	342	978	401837	-978	342	19.3	0.0026	0.3	880	7.6	473
9/13/2021	916069.59	936677.78	1169.7667	915591.19	936527.54	1170.53164	916044.21	937509.77	1167.869107	351	927	401837	-927	351	20.8	0.0025	0.3	880	7.2	484
9/14/2021	916069.59	936677.78	1169.7475	915591.19	936527.54	1170.52435	916044.21	937509.77	1167.840293	360	932	401837	-932	360	21.1	0.0025	0.3	880	7.3	482
9/15/2021	916069.59	936677.78	1169.7315	915591.19	936527.54	1170.54036	916044.21	937509.77	1167.842233	389	924	401837	-924	389	22.8	0.0025	0.3	880	7.3	481
9/16/2021	916069.59	936677.78	1169.7573	915591.19	936527.54	1170.5234	916044.21	937509.77	1167.76184	338	974	401837	-974	338	19.1	0.0026	0.3	880	7.5	474
9/17/2021	916069.59	936677.78	1169.7643	915591.19	936527.54	1170.53825	916044.21	937509.77	1167.81717	351	951	401837	-951	351	20.3	0.0025	0.3	880	7.4	479
9/18/2021	916069.59	936677.78	1169.7681	915591.19	936527.54	1170.54318	916044.21	937509.77	1167.72942	339	995	401837	-995	339	18.8	0.0026	0.3	880	7.7	470
9/19/2021	916069.59	936677.78	1169.6701	915591.19	936527.54	1170.45295	916044.21	937509.77	1167.53555	331	1041	401837	-1041	331	17.6	0.0027	0.3	880	8.0	460
9/20/2021	916069.59	936677.78	1169.6511	915591.19	936527.54	1170.4449	916044.21	937509.77	1167.60415	353	999	401837	-999	353	19.4	0.0026	0.3	880	7.7	467
9/21/2021	916069.59	936677.78	1169.5957	915591.19	936527.54	1170.405	916044.21	937509.77	1167.5116	360	1018	401837	-1018	360	19.5	0.0027	0.3	880	7.9	463
9/22/2021	916069.59	936677.78	1169.5545	915591.19	936527.54	1170.36725	916044.21	937509.77	1167.51477	370	996	401837	-996	370	20.4	0.0026	0.3	880	7.8	466
9/23/2021	916069.59	936677.78	1169.5054	915591.19	936527.54	1170.44199	916044.21	937509.77	1167.48047	475	992	401837	-992	475	25.6	0.0027	0.3	880	8.0	459
9/24/2021	916069.59	936677.78	1169.5714	915591.19	936527.54	1170.40181	916044.21	937509.77	1167.57756	391	975	401837	-975	391	21.9	0.0026	0.3	880	7.7	469
9/25/2021	916069.59	936677.78	1169.5668	915591.19	936527.54	1170.36582	916044.21	937509.77	1167.50623	355	1006	401837	-1006	355	19.4	0.0027	0.3	880	7.8	465
9/26/2021	916069.59	936677.78	1169.5055	915591.19	936527.54	1170.3022	916044.21	937509.77	1167.35208	339	1050	401837	-1050	339	17.9	0.0027	0.3	880	8.1	457
9/27/2021	916069.59	936677.78	1169.5336	915591.19	936527.54	1170.33147	916044.21	937509.77	1167.47749	355	1004	401837	-1004	355	19.5	0.0026	0.3	880	7.8	465
9/28/2021	916069.59	936677.78	1169.4757	915591.19	936527.54	1170.28296	916044.21	937509.77	1167.38433	357	1021	401837	-1021	357	19.3	0.0027	0.3	880	7.9	461
9/29/2021	916069.59	936677.78	1169.4149	915591.19	936527.54	1170.23374	916044.21	937509.77	1167.38781	377	991	401837	-991	377	20.8	0.0026	0.3	880	7.7	466
9/30/2021	916069.59	936677.78	1169.351	915591.19	936527.54	1170.16	916044.21	937509.77	1167.25835	359	1022	401837	-1022	359	19.3	0.0027	0.3	880	7.9	460
10/1/2021	916069.59	936677.78	1169.2763	915591.19	936527.54	1170.10417	916044.21	937509.77	1167.26396	386	984	401837	-984	386	21.4	0.0026	0.3	880	7.7	465
10/2/2021	916069.59	936677.78	1169.2172	915591.19	936527.54	1170.04228	916044.21	937509.77	1167.1565	377	1007	401837	-1007	377	20.5	0.0027	0.3	880	7.8	461
10/3/2021	916069.59	936677.78	1169.0964	915591.19	936527.54	1169.91282	916044.21	937509.77	1166.9839	362	1031	401837	-1031	362	19.3	0.0027	0.3	880	8.0	456

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
10/4/2021	916069.59	936677.78	1169.2023	915591.19	936527.54	1170.05584	916044.21	937509.77	1167.20468	410	977	401837	-977	410	22.8	0.0026	0.3	880	7.7	464
10/5/2021	916069.59	936677.78	1169.3071	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.31335	2154	1029	401837	-1029	2154	64.5	0.0059	0.3	880	17.4	321
10/6/2021	916069.59	936677.78	1169.359	915591.19	936527.54	1170.12878	916044.21	937509.77	1167.38762	344	963	401837	-963	344	19.7	0.0025	0.3	880	7.5	473
10/7/2021	916069.59	936677.78	1169.4294	915591.19	936527.54	1170.17468	916044.21	937509.77	1167.34484	307	1016	401837	-1016	307	16.8	0.0026	0.3	880	7.7	465
10/8/2021	916069.59	936677.78	1169.5098	915591.19	936527.54	1170.25607	916044.21	937509.77	1167.45882	313	1000	401837	-1000	313	17.4	0.0026	0.3	880	7.6	469
10/9/2021	916069.59	936677.78	1169.5727	915591.19	936527.54	1170.32211	916044.21	937509.77	1167.49368	311	1014	401837	-1014	311	17.1	0.0026	0.3	880	7.7	466
10/10/2021	916069.59	936677.78	1169.5865	915591.19	936527.54	1170.32704	916044.21	937509.77	1167.40519	288	1062	401837	-1062	288	15.2	0.0027	0.3	880	8.0	458
10/11/2021	916069.59	936677.78	1169.6585	915591.19	936527.54	1170.41312	916044.21	937509.77	1167.5442	310	1031	401837	-1031	310	16.7	0.0027	0.3	880	7.9	464
10/12/2021	916069.59	936677.78	1169.6828	915591.19	936527.54	1170.44236	916044.21	937509.77	1167.5806	316	1025	401837	-1025	316	17.1	0.0027	0.3	880	7.8	465
10/13/2021	916069.59	936677.78	1169.6707	915591.19	936527.54	1170.44307	916044.21	937509.77	1167.56441	326	1027	401837	-1027	326	17.6	0.0027	0.3	880	7.9	463
10/14/2021	916069.59	936677.78	1169.6577	915591.19	936527.54	1170.43026	916044.21	937509.77	1167.54558	325	1030	401837	-1030	325	17.5	0.0027	0.3	880	7.9	463
10/15/2021	916069.59	936677.78	1169.6594	915591.19	936527.54	1170.45242	916044.21	937509.77	1167.59786	350	1006	401837	-1006	350	19.2	0.0027	0.3	880	7.8	466
10/16/2021	916069.59	936677.78	1169.6595	915591.19	936527.54	1170.55393	916044.21	937509.77	1167.63395	440	992	401837	-992	440	23.9	0.0027	0.3	880	7.9	463
10/17/2021	916069.59	936677.78	1169.6482	915591.19	936527.54	1170.43799	916044.21	937509.77	1167.54287	341	1027	401837	-1027	341	18.4	0.0027	0.3	880	7.9	462
10/18/2021	916069.59	936677.78	1169.6944	915591.19	936527.54	1170.47339	916044.21	937509.77	1167.67106	344	988	401837	-988	344	19.2	0.0026	0.3	880	7.6	471
10/19/2021	916069.59	936677.78	1169.7437	915591.19	936527.54	1170.51202	916044.21	937509.77	1167.67925	329	1007	401837	-1007	329	18.1	0.0026	0.3	880	7.7	468
10/20/2021	916069.59	936677.78	1169.7511	915591.19	936527.54	1170.52477	916044.21	937509.77	1167.70181	336	1000	401837	-1000	336	18.6	0.0026	0.3	880	7.7	469
10/21/2021	916069.59	936677.78	1169.7809	915591.19	936527.54	1170.5316	916044.21	937509.77	1167.68823	310	1020	401837	-1020	310	16.9	0.0027	0.3	880	7.8	467
10/22/2021	916069.59	936677.78	1169.8202	915591.19	936527.54	1170.60929	916044.21	937509.77	1167.79816	353	987	401837	-987	353	19.7	0.0026	0.3	880	7.7	471
10/23/2021	916069.59	936677.78	1169.8697	915591.19	936527.54	1170.63124	916044.21	937509.77	1167.839553	329	991	401837	-991	329	18.4	0.0026	0.3	880	7.6	472
10/24/2021	916069.59	936677.78	1169.8402	915591.19	936527.54	1170.59735	916044.21	937509.77	1167.72384	312	1032	401837	-1032	312	16.8	0.0027	0.3	880	7.9	465
10/25/2021	916069.59	936677.78	1169.9633	915591.19	936527.54	1170.72812	916044.21	937509.77	1167.92742	330	993	401837	-993	330	18.4	0.0026	0.3	880	7.6	472
10/26/2021	916069.59	936677.78	1170.0701	915591.19	936527.54	1170.67936	916044.21	937509.77	1167.983496	193	1014	401837	-1014	193	10.8	0.0026	0.3	880	7.5	475
10/27/2021	916069.59	936677.78	1170.9584	915591.19	936527.54	1171.66427	916044.21	937509.77	1168.983689	291	963	401837	-963	291	16.8	0.0025	0.3	880	7.3	489
10/28/2021	916069.59	936677.78	1171.3843	915591.19	936527.54	1172.00149	916044.21	937509.77	1169.184007	183	1068	401837	-1068	183	9.7	0.0027	0.3	880	7.9	474
10/29/2021	916069.59	936677.78	1171.7067	915591.19	936527.54	1172.33324	916044.21	937509.77	1169.428326	179	1106	401837	-1106	179	9.2	0.0028	0.3	880	8.2	468
10/30/2021	916069.59	936677.78	1172.0287	915591.19	936527.54	1172.3881	916044.21	937509.77	1169.708165	-50	1119	401837	-1119	-50	357.5	0.0028	0.3	880	8.2	469
10/31/2021	916069.59	936677.78	1172.2312	915591.19	936527.54	1172.91919	916044.21	937509.77	1169.816	210	1173	401837	-1173	210	10.1	0.0030	0.3	880	8.7	458
11/1/2021	916069.59	936677.78	1172.4043	915591.19	936527.54	1173.15558	916044.21	937509.77	1170.038429	270	1151	401837	-1151	270	13.2	0.0029	0.3	880	8.6	462
11/2/2021	916069.59	936677.78	1172.6137	915591.19	936527.54	1173.38162	916044.21	937509.77	1170.191842	275	1178	401837	-1178	275	13.1	0.0030	0.3	880	8.8	458
11/3/2021	916069.59	936677.78	1172.7426	915591.19	936527.54	1173.57449	916044.21	937509.77	1170.304616	326	1187	401837	-1187	326	15.3	0.0031	0.3	880	9.0	456
11/4/2021	916069.59	936677.78	1172.9012	915591.19	936527.54	1173.750712	916044.21	937509.77	1170.425576	335	1206	401837	-1206	335	15.5	0.0031	0.3	880	9.1	453
11/5/2021	916069.59	936677.78	1173.0145	915591.19	936527.54	1173.902332	916044.21	937509.77	1170.546057	368	1203	401837	-1203	368	17.0	0.0031	0.3	880	9.2	453
11/6/2021	916069.59	936677.78	1173.1318	915591.19	936527.54	1174.024935	916044.21	937509.77	1170.655122	371	1208	401837	-1208	371	17.1	0.0031	0.3	880	9.2	453
11/7/2021	916069.59	936677.78	1173.1687	915591.19	936527.54	1174.071345	916044.21	937509.77	1170.656426	374	1225	401837	-1225	374	17.0	0.0032	0.3	880	9.3	450
11/8/2021	916069.59	936677.78	1173.233	915591.19	936527.54	1174.161125	916044.21	937509.77	1170.782823	404	1196	401837	-1196	404	18.7	0.0031	0.3	880	9.2	454
11/9/2021	916069.59	936677.78	1173.2776	915591.19	936527.54	1174.218517	916044.21	937509.77	1170.843986	417	1188	401837	-1188	417	19.3	0.0031	0.3	880	9.2	455
11/10/2021	916069.59	936677.78	1173.2592	915591.19	936527.54	1174.212599	916044.21	937509.77	1170.829671	428	1186	401837	-1186	428	19.8	0.0031	0.3	880	9.2	454
11/11/2021	916069.59	936677.78	1173.2446	915591.19	936527.54	1174.213335	916044.21	937509.77	1170.791559	437	1198	401837	-1198	437	20.1	0.0032	0.3	880	9.3	452
11/12/2021	916069.59	936677.78	1173.4385	915591.19	936527.54	1174.331587	916044.21	937509.77	1171.048204	384	1166	401837	-1166	384	18.2	0.0031	0.3	880	9.0	461
11/13/2021	916069.59	936677.78	1173.6126	915591.19	936527.54	1174.565849	916044.21	937509.77	1171.163309	425	1196	401837	-1196	425	19.6	0.0032	0.3	880	9.3	455
11/14/2021	916069.59	936677.78	1173.6094	915591.19	936527.54	1174.585627	916044.21	937509.77	1171.111091	437	1220	401837	-1220	437	19.7	0.0032	0.3	880	9.5	451
11/15/2021	916069.59	936677.78	1173.6604	915591.19	936527.54	1174.639537	916044.21	937509.77	1171.200273	445	1202	401837	-1202	445	20.3	0.0032	0.3	880	9.4	454
11/16/2021	916069.59	936677.78	1173.6819	915591.19	936527.54	1174.675786	916044.21	937509.77	1171.224869	458	1201	401837	-1201	458	20.9	0.0032	0.3	880	9.4	453
11/17/2021	916069.59	936677.78	1173.7172	915591.19	936527.54	1174.712203	916044.21	937509.77	1171.203796	450	1228	401837	-1228	450	20.1	0.0033	0.3	880	9.5	450
11/18/2021	916069.59	936677.78	1173.7409	915591.19	936527.54	1174.719567	916044.21	937509.77	1171.24067	439	1221	401837	-1221	439	19.8	0.0032	0.3	880	9.5	452
11/19/2021	916069.59	936677.78	1173.7296	915591.19	936527.54	1172.256226	916044.21	937509.77	1171.257133	-1597	1145	401837	-1145	-1597	305.6	0.0049	0.3	880	14.3	353
11/20/2021	916069.59	936677.78	1173.7758	915591.19	936527.54	1174.771543	916044.21	937509.77	1171.264355	451	1227	401837	-1227	451	20.2	0.0033	0.3	880	9.5	450
11/21/2021	916069.59	936677.78	1173.7757	915591.19	936527.54	1174.765465	916044.21	937509.77	1171.181965	434	1266	401837	-1266	434	18.9	0.0033	0.3	880	9.8	445
11/22/2021	916069.59	936677.78	1173.7801	915591.19	936527.54	1174.804644	916044.21	937509.77	1171.26107	474	1231	401837	-1231	474	21.1	0.0033	0.3	880	9.6	448
11/23/2021	916069.59	936677.78	1173.7519	915591.19	936527.54	1174.771137	916044.21	937509.77	1171.252645	473	1222	401837	-1222	473	21.1	0.0033	0.3	880	9.6	450
11/24/2021	916069.59	936677.78	1173.7083	915591.19	936527.54	1174.74079	916044.21	937509.77	1171.166057	477	1242	401837	-1242	477	21.0	0.0033	0.3	880	9.7	446
11/25/2021	916069.59	936677.78	1173.727	915591.19	936527.54	1174.742833	916044.21	937509.77	1171.186503	463	1241	401837	-1241	463	20.5	0.0033	0.3	880	9.7	447
11/26/2021	916069.59	936677.78	1173.7317	915591.19	936527.54	1174.770116	916044.21	937509.77	1171.209855	485	1233	401837	-1233	485	21.5	0.0033	0.3	880	9.7	447

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
11/27/2021	916069.59	936677.78	1173.6815	915591.19	936527.54	1174.716595	916044.21	937509.77	1171.171254	484	1227	401837	-1227	484	21.5	0.0033	0.3	880	9.6	448
11/28/2021	916069.59	936677.78	1173.641	915591.19	936527.54	1174.673153	916044.21	937509.77	1171.05455	470	1264	401837	-1264	470	20.4	0.0034	0.3	880	9.8	443
11/29/2021	916069.59	936677.78	1173.5773	915591.19	936527.54	1174.609374	916044.21	937509.77	1171.049821	479	1235	401837	-1235	479	21.2	0.0033	0.3	880	9.7	446
11/30/2021	916069.59	936677.78	1173.5505	915591.19	936527.54	1174.574816	916044.21	937509.77	1171.021183	472	1236	401837	-1236	472	20.9	0.0033	0.3	880	9.7	446
12/1/2021	916069.59	936677.78	1173.43925	915591.19	936527.54	1174.476675	916044.21	937509.77	1170.940559	488	1222	401837	-1222	488	21.8	0.0033	0.3	880	9.6	447
5/11/2022	916069.59	936677.78	1172.4148	915591.19	936527.54	1173.815198	916044.21	937509.77	1170.320908	851	1037	401837	-1037	851	39.4	0.0033	0.3	880	9.8	438
5/12/2022	916069.59	936677.78	1172.31011	915591.19	936527.54	1173.705558	916044.21	937509.77	1170.220385	847	1035	401837	-1035	847	39.3	0.0033	0.3	881	9.8	438
5/13/2022	916069.59	936677.78	1172.18025	915591.19	936527.54	1173.578959	916044.21	937509.77	1170.148233	858	1008	401837	-1008	858	40.4	0.0033	0.3	882	9.7	439
5/14/2022	916069.59	936677.78	1172.05131	915591.19	936527.54	1173.449028	916044.21	937509.77	1170.02101	858	1007	401837	-1007	858	40.4	0.0033	0.3	883	9.7	439
5/15/2022	916069.59	936677.78	1171.87235	915591.19	936527.54	1173.277158	916044.21	937509.77	1169.831601	862	1012	401837	-1012	862	40.4	0.0033	0.3	884	9.7	436
5/16/2022	916069.59	936677.78	1171.73991	915591.19	936527.54	1173.149195	916044.21	937509.77	1169.741093	872	992	401837	-992	872	41.3	0.0033	0.3	885	9.7	437
5/17/2022	916069.59	936677.78	1171.66794	915591.19	936527.54	1173.050753	916044.21	937509.77	1169.656915	848	997	401837	-997	848	40.4	0.0033	0.3	886	9.6	438
5/18/2022	916069.59	936677.78	1171.54168	915591.19	936527.54	1172.900527	916044.21	937509.77	1169.522175	827	1001	401837	-1001	827	39.6	0.0032	0.3	887	9.6	439
5/19/2022	916069.59	936677.78	1171.46233	915591.19	936527.54	1172.800898	916044.21	937509.77	1169.429183	808	1007	401837	-1007	808	38.8	0.0032	0.3	888	9.5	440
5/20/2022	916069.59	936677.78	1171.34067	915591.19	936527.54	1172.675827	916044.21	937509.77	1169.342096	811	990	401837	-990	811	39.3	0.0032	0.3	889	9.4	441
5/21/2022	916069.59	936677.78	1171.22214	915591.19	936527.54	1172.550014	916044.21	937509.77	1169.242693	807	981	401837	-981	807	39.5	0.0032	0.3	890	9.4	441
5/22/2022	916069.59	936677.78	1171.0756	915591.19	936527.54	1172.400472	916044.21	937509.77	1169.115589	808	971	401837	-971	808	39.7	0.0031	0.3	891	9.3	442
5/23/2022	916069.59	936677.78	1170.95125	915591.19	936527.54	1172.271202	916044.21	937509.77	1169.044016	812	946	401837	-946	812	40.6	0.0031	0.3	892	9.2	444
5/24/2022	916069.59	936677.78	1170.84867	915591.19	936527.54	1172.153317	916044.21	937509.77	1168.948454	800	942	401837	-942	800	40.3	0.0031	0.3	893	9.2	445
5/25/2022	916069.59	936677.78	1170.72107	915591.19	936527.54	1172.02102	916044.21	937509.77	1168.859949	802	923	401837	-923	802	41.0	0.0030	0.3	894	9.1	446
5/26/2022	916069.59	936677.78	1170.61351	915591.19	936527.54	1171.90168	916044.21	937509.77	1168.769108	795	915	401837	-915	795	41.0	0.0030	0.3	895	9.0	447
5/27/2022	916069.59	936677.78	1170.50358	915591.19	936527.54	1171.792195	916044.21	937509.77	1168.711051	803	890	401837	-890	803	42.0	0.0030	0.3	896	8.9	449
5/28/2022	916069.59	936677.78	1170.4086	915591.19	936527.54	1171.690997	916044.21	937509.77	1168.642029	802	878	401837	-878	802	42.4	0.0030	0.3	897	8.8	450
5/29/2022	916069.59	936677.78	1170.26314	915591.19	936527.54	1171.538084	916044.21	937509.77	1168.49998	796	876	401837	-876	796	42.3	0.0029	0.3	898	8.8	450
5/30/2022	916069.59	936677.78	1170.15422	915591.19	936527.54	1171.420115	916044.21	937509.77	1168.436085	795	854	401837	-854	795	43.0	0.0029	0.3	899	8.7	452
5/31/2022	916069.59	936677.78	1170.046	915591.19	936527.54	1171.302641	916044.21	937509.77	1168.338131	789	849	401837	-849	789	42.9	0.0029	0.3	900	8.7	453
6/1/2022	916069.59	936677.78	1169.90463	915591.19	936527.54	1171.167474	916044.21	937509.77	1168.242044	801	827	401837	-827	801	44.1	0.0029	0.3	901	8.6	454
6/2/2022	916069.59	936677.78	1169.81515	915591.19	936527.54	1171.062492	916044.21	937509.77	1168.178426	792	815	401837	-815	792	44.2	0.0028	0.3	902	8.5	456
6/3/2022	916069.59	936677.78	1169.6908	915591.19	936527.54	1170.932992	916044.21	937509.77	1168.082659	792	801	401837	-801	792	44.7	0.0028	0.3	903	8.4	457
6/4/2022	916069.59	936677.78	1169.55042	915591.19	936527.54	1170.787225	916044.21	937509.77	1167.91894	784	812	401837	-812	784	44.0	0.0028	0.3	904	8.5	455
6/5/2022	916069.59	936677.78	1169.37636	915591.19	936527.54	1170.613817	916044.21	937509.77	1167.744208	784	812	401837	-812	784	44.0	0.0028	0.3	905	8.5	454
6/6/2022	916069.59	936677.78	1169.24339	915591.19	936527.54	1170.477189	916044.21	937509.77	1167.67409	791	782	401837	-782	791	45.3	0.0028	0.3	906	8.4	456
6/7/2022	916069.59	936677.78	1169.12655	915591.19	936527.54	1170.347428	916044.21	937509.77	1167.569594	782	776	401837	-776	782	45.2	0.0027	0.3	907	8.3	458
6/8/2022	916069.59	936677.78	1169.00395	915591.19	936527.54	1170.222033	916044.21	937509.77	1167.507679	789	747	401837	-747	789	46.6	0.0027	0.3	908	8.2	460
6/9/2022	916069.59	936677.78	1168.93681	915591.19	936527.54	1170.141147	916044.21	937509.77	1167.456559	780	739	401837	-739	780	46.5	0.0027	0.3	909	8.1	462
6/10/2022	916069.59	936677.78	1168.86649	915591.19	936527.54	1170.048477	916044.21	937509.77	1167.43126	768	717	401837	-717	768	47.0	0.0026	0.3	910	7.9	467
6/11/2022	916069.59	936677.78	1168.78551	915591.19	936527.54	1169.946464	916044.21	937509.77	1167.350081	750	716	401837	-716	750	46.3	0.0026	0.3	911	7.8	469
6/12/2022	916069.59	936677.78	1168.67634	915591.19	936527.54	1169.829376	916044.21	937509.77	1167.254512	746	709	401837	-709	746	46.4	0.0026	0.3	912	7.8	470
6/13/2022	916069.59	936677.78	1168.57809	915591.19	936527.54	1169.728275	916044.21	937509.77	1167.216697	752	680	401837	-680	752	47.9	0.0025	0.3	913	7.7	472
6/14/2022	916069.59	936677.78	1168.48558	915591.19	936527.54	1169.623656	916044.21	937509.77	1167.130506	743	677	401837	-677	743	47.7	0.0025	0.3	914	7.6	473
6/15/2022	916069.59	936677.78	1168.36527	915591.19	936527.54	1169.501345	916044.21	937509.77	1167.052704	748	657	401837	-657	748	48.7	0.0025	0.3	915	7.6	475
6/16/2022	916069.59	936677.78	1168.31131	915591.19	936527.54	1169.442507	916044.21	937509.77	1167.010689	746	651	401837	-651	746	48.9	0.0025	0.3	916	7.5	476
6/17/2022	916069.59	936677.78	1168.24187	915591.19	936527.54	1169.360904	916044.21	937509.77	1166.987439	743	629	401837	-629	743	49.8	0.0024	0.3	917	7.4	479
6/18/2022	916069.59	936677.78	1168.15577	915591.19	936527.54	1169.261844	916044.21	937509.77	1166.892215	730	633	401837	-633	730	49.1	0.0024	0.3	918	7.4	480
6/19/2022	916069.59	936677.78	1168.03127	915591.19	936527.54	1169.133086	916044.21	937509.77	1166.757523	725	637	401837	-637	725	48.7	0.0024	0.3	919	7.4	479
6/20/2022	916069.59	936677.78	1167.93073	915591.19	936527.54	1169.030865	916044.21	937509.77	1166.713235	732	610	401837	-610	732	50.2	0.0024	0.3	920	7.3	482
6/21/2022	916069.59	936677.78	1167.83682	915591.19	936527.54	1168.928696	916044.21	937509.77	1166.605779	723	617	401837	-617	723	49.6	0.0024	0.3	921	7.3	481
6/22/2022	916069.59	936677.78	1167.72331	915591.19	936527.54	1168.818519	916044.21	937509.77	1166.528974	732	599	401837	-599	732	50.7	0.0024	0.3	922	7.2	482
6/23/2022	916069.59	936677.78	1167.62098	915591.19	936527.54	1168.710931	916044.21	937509.77	1166.430619	728	597	401837	-597	728	50.6	0.0023	0.3	923	7.2	482
6/24/2022	916069.59	936677.78	1167.50526	915591.19	936527.54	1168.598132	916044.21	937509.77	1166.358521	737	576	401837	-576	737	52.0	0.0023	0.3	924	7.2	483
6/25/2022	916069.59	936677.78	1167.39112	915591.19	936527.54	1168.476407	916044.21	937509.77	1166.226847	728	585	401837	-585	728	51.2	0.0023	0.3	925	7.2	482
6/26/2022	916069.59	936677.78	1167.25913	915591.19	936527.54	1168.346447	916044.21	937509.77	1166.111968	732	576	401837	-576	732	51.8	0.0023	0.3	926	7.2	482
6/27/2022	916069.59	936677.78	1167.18203	915591.19	936527.54	1168.268965	916044.21	937509.77	1166.108583	743	541	401837	-541	743	53.9	0.0023	0.3	927	7.1	484

Table 2.1.D
Groundwater Flow Calculations Using Onsite Well Data
Cortlandville Sand and Gravel - DEIS

	MW-02			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	MW-3S Radius of Influence, ft
6/28/2022	916069.59	936677.78	1167.09195	915591.19	936527.54	1168.162448	916044.21	937509.77	1165.989266	725	555	401837	-555	725	52.6	0.0023	0.3	928	7.0	485
6/29/2022	916069.59	936677.78	1166.97595	915591.19	936527.54	1168.044768	916044.21	937509.77	1165.897763	727	543	401837	-543	727	53.3	0.0023	0.3	929	7.0	486
6/30/2022	916069.59	936677.78	1166.86937	915591.19	936527.54	1167.930733	916044.21	937509.77	1165.778631	719	549	401837	-549	719	52.7	0.0023	0.3	930	7.0	485
7/1/2022	916069.59	936677.78	1166.75705	915591.19	936527.54	1167.8211	916044.21	937509.77	1165.7071	728	529	401837	-529	728	54.0	0.0022	0.3	931	6.9	486
7/2/2022	916069.59	936677.78	1166.65236	915591.19	936527.54	1167.712421	916044.21	937509.77	1165.58615	722	537	401837	-537	722	53.4	0.0022	0.3	932	7.0	485
7/3/2022	916069.59	936677.78	1166.51332	915591.19	936527.54	1167.573172	916044.21	937509.77	1165.438893	720	541	401837	-541	720	53.1	0.0022	0.3	933	7.0	483
7/4/2022	916069.59	936677.78	1166.39964	915591.19	936527.54	1167.459563	916044.21	937509.77	1165.376026	728	517	401837	-517	728	54.6	0.0022	0.3	934	6.9	485
7/5/2022	916069.59	936677.78	1166.30732	915591.19	936527.54	1167.360892	916044.21	937509.77	1165.278725	722	519	401837	-519	722	54.3	0.0022	0.3	935	6.9	485
7/6/2022	916069.59	936677.78	1166.19244	915591.19	936527.54	1167.250086	916044.21	937509.77	1165.184217	728	509	401837	-509	728	55.0	0.0022	0.3	936	6.9	484
7/7/2022	916069.59	936677.78	1166.09304	915591.19	936527.54	1167.140745	916044.21	937509.77	1165.077275	719	513	401837	-513	719	54.5	0.0022	0.3	937	6.9	485
7/8/2022	916069.59	936677.78	1165.97447	915591.19	936527.54	1167.022986	916044.21	937509.77	1164.982831	723	501	401837	-501	723	55.3	0.0022	0.3	938	6.8	485
7/9/2022	916069.59	936677.78	1165.86749	915591.19	936527.54	1166.909912	916044.21	937509.77	1164.86166	716	508	401837	-508	716	54.7	0.0022	0.3	939	6.8	484
7/10/2022	916069.59	936677.78	1165.72754	915591.19	936527.54	1166.767732	916044.21	937509.77	1164.693498	710	521	401837	-521	710	53.7	0.0022	0.3	940	6.9	482
7/11/2022	916069.59	936677.78	1165.61258	915591.19	936527.54	1166.653645	916044.21	937509.77	1164.625764	718	499	401837	-499	718	55.2	0.0022	0.3	941	6.8	483
7/12/2022	916069.59	936677.78	1165.50469	915591.19	936527.54	1166.539418	916044.21	937509.77	1164.496317	709	509	401837	-509	709	54.4	0.0022	0.3	942	6.8	483
7/13/2022	916069.59	936677.78	1165.36862	915591.19	936527.54	1166.407905	916044.21	937509.77	1164.375228	715	502	401837	-502	715	55.0	0.0022	0.3	943	6.8	481
7/14/2022	916069.59	936677.78	1165.25071	915591.19	936527.54	1166.282517	916044.21	937509.77	1164.241354	707	509	401837	-509	707	54.2	0.0022	0.3	944	6.8	481
7/15/2022	916069.59	936677.78	1165.11862	915591.19	936527.54	1166.153118	916044.21	937509.77	1164.143745	714	493	401837	-493	714	55.4	0.0022	0.3	945	6.8	481
7/16/2022	916069.59	936677.78	1164.99674	915591.19	936527.54	1166.022542	916044.21	937509.77	1163.9777	700	514	401837	-514	700	53.7	0.0022	0.3	946	6.8	479
7/17/2022	916069.59	936677.78	1164.85341	915591.19	936527.54	1165.882026	916044.21	937509.77	1163.836032	703	513	401837	-513	703	53.9	0.0022	0.3	947	6.8	478
7/18/2022	916069.59	936677.78	1164.7509	915591.19	936527.54	1165.782292	916044.21	937509.77	1163.799746	715	481	401837	-481	715	56.1	0.0021	0.3	948	6.8	479
7/19/2022	916069.59	936677.78	1164.66767	915591.19	936527.54	1165.689426	916044.21	937509.77	1163.70614	706	486	401837	-486	706	55.4	0.0021	0.3	949	6.7	480
7/20/2022	916069.59	936677.78	1164.54567	915591.19	936527.54	1165.566438	916044.21	937509.77	1163.595866	707	480	401837	-480	707	55.8	0.0021	0.3	950	6.7	480
7/21/2022	916069.59	936677.78	1164.43926	915591.19	936527.54	1165.451737	916044.21	937509.77	1163.47341	697	488	401837	-488	697	55.0	0.0021	0.3	951	6.7	480
7/22/2022	916069.59	936677.78	1164.31401	915591.19	936527.54	1165.331215	916044.21	937509.77	1163.378155	706	474	401837	-474	706	56.1	0.0021	0.3	952	6.7	479
7/23/2022	916069.59	936677.78	1164.20742	915591.19	936527.54	1165.21561	916044.21	937509.77	1163.243995	694	486	401837	-486	694	55.0	0.0021	0.3	953	6.7	479
7/24/2022	916069.59	936677.78	1164.05358	915591.19	936527.54	1165.062808	916044.21	937509.77	1163.059054	690	501	401837	-501	690	54.0	0.0021	0.3	954	6.8	476
7/25/2022	916069.59	936677.78	1164.00487	915591.19	936527.54	1165.024015	916044.21	937509.77	1163.094479	711	461	401837	-461	711	57.0	0.0021	0.3	955	6.7	477
7/26/2022	916069.59	936677.78	1163.96429	915591.19	936527.54	1164.953479	916044.21	937509.77	1163.032563	683	471	401837	-471	683	55.4	0.0021	0.3	956	6.6	481
7/27/2022	916069.59	936677.78	1163.84903	915591.19	936527.54	1164.838139	916044.21	937509.77	1162.922646	684	468	401837	-468	684	55.6	0.0021	0.3	957	6.6	481
7/28/2022	916069.59	936677.78	1163.88685	915591.19	936527.54	1164.732736	916044.21	937509.77	1162.723128	529	578	401837	-578	529	42.5	0.0020	0.3	958	6.2	493
7/29/2022	916069.59	936677.78	1163.9165	915591.19	936527.54	1164.61985	916044.21	937509.77	1162.548253	380	672	401837	-672	380	29.4	0.0019	0.3	959	6.1	496
7/30/2022	916069.59	936677.78	1163.80947	915591.19	936527.54	1164.503096	916044.21	937509.77	1162.410112	367	687	401837	-687	367	28.1	0.0019	0.3	960	6.2	493
7/31/2022	916069.59	936677.78	1163.64867	915591.19	936527.54	1164.344325	916044.21	937509.77	1162.227329	365	698	401837	-698	365	27.6	0.0020	0.3	961	6.3	489

$$\boldsymbol{U_1 i} = \big((y_1 - y_2) * (z_3 - z_2) - (y_3 - y_2) * (z_1 - z_2)\big)\boldsymbol{i}$$

$$\boldsymbol{-U_2 j} = -\big((x_1 - x_2) * (z_3 - z_2) - (x_3 - x_2) * (z_1 - z_2)\big)\boldsymbol{j}$$

$$\boldsymbol{U_3 k} = \big((x_1 - x_2) * (y_3 - y_2) - (x_3 - x_2) * (y_1 - y_2)\big)\boldsymbol{k}$$

$$S = \{(U_2 * 1 - 0 * U_3), -(U_1 * 1 - 0 * U_3), (U_1 * 0 - 0 * U_2)\} = \{U_2, -U_1, 0\} = \{E, N, 0\}$$

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
2/5/2019	1171.3	1172.9	TRUE
2/6/2019	1170.9	1165.7	FALSE
2/7/2019	1171.0	1173.3	TRUE
2/8/2019	1171.2	1173.2	TRUE
2/9/2019	1171.3	1173.5	TRUE
2/10/2019	1171.4	1172.6	TRUE
2/11/2019	1171.5	1173.2	TRUE
2/12/2019	1171.6	1173.7	TRUE
2/13/2019	1171.6	1173.5	TRUE
2/14/2019	1171.5	1173.0	TRUE
2/15/2019	1171.5	1173.4	TRUE
2/16/2019	1171.4	1166.0	FALSE
2/17/2019	1171.4	1172.5	TRUE
2/18/2019	1171.3	1173.1	TRUE
2/19/2019	1171.2	1173.3	TRUE
2/20/2019	1171.2	1165.6	FALSE
2/21/2019	1171.1	1173.2	TRUE
2/22/2019	1171.0	1172.2	TRUE
2/23/2019	1170.9	1173.0	TRUE
2/24/2019	1170.9	1172.1	TRUE
2/25/2019	1170.8	1172.7	TRUE
2/26/2019	1170.7	1172.9	TRUE
2/27/2019	1170.7	1172.6	TRUE
2/28/2019	1170.6	1172.0	TRUE
3/1/2019	1170.5	1171.0	TRUE
3/2/2019	1170.4	1172.6	TRUE
3/3/2019	1170.4	1171.6	TRUE
3/4/2019	1170.3	1169.6	FALSE
3/5/2019	1170.2	1164.6	FALSE
3/6/2019	1170.1	1164.4	FALSE
3/7/2019	1170.0	1170.1	TRUE
3/8/2019	1169.9	1171.2	TRUE
3/9/2019	1169.8	1164.6	FALSE
3/10/2019	1169.7	1171.9	TRUE
3/11/2019	1169.6	1171.1	TRUE
3/12/2019	1169.6	1164.1	FALSE
3/13/2019	1169.5	1171.7	TRUE
3/14/2019	1169.5	1170.8	TRUE
3/15/2019	1169.5	1171.6	TRUE
3/16/2019	1169.5	1171.7	TRUE
3/17/2019	1169.5	1171.7	TRUE
3/18/2019	1169.5	1170.6	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
3/19/2019	1169.4	1171.6	TRUE
3/20/2019	1169.4	1171.4	TRUE
3/21/2019	1169.4	1171.0	TRUE
3/22/2019	1169.4	1171.2	TRUE
3/23/2019	1169.4	1171.6	TRUE
3/24/2019	1169.4	1170.7	TRUE
3/25/2019	1169.4	1170.6	TRUE
3/26/2019	1169.4	1171.5	TRUE
3/27/2019	1169.4	1164.0	FALSE
3/28/2019	1169.4	1171.6	TRUE
3/29/2019	1169.3	1170.5	TRUE
3/30/2019	1169.3	1171.5	TRUE
3/31/2019	1169.3	1170.6	TRUE
4/1/2019	1169.3	1171.5	TRUE
4/2/2019	1169.3	1171.5	TRUE
4/3/2019	1169.3	1171.5	TRUE
4/4/2019	1169.3	1171.5	TRUE
4/5/2019	1169.3	1171.6	TRUE
4/6/2019	1169.3	1171.4	TRUE
4/7/2019	1169.2	1171.5	TRUE
4/8/2019	1169.2	1171.5	TRUE
4/9/2019	1169.2	1171.4	TRUE
4/10/2019	1169.2	1171.4	TRUE
4/11/2019	1169.2	1171.4	TRUE
4/12/2019	1169.2	1171.5	TRUE
4/13/2019	1169.1	1171.4	TRUE
4/14/2019	1169.1	1171.4	TRUE
4/15/2019	1169.2	1171.5	TRUE
4/16/2019	1169.2	1171.4	TRUE
4/17/2019	1169.2	1171.5	TRUE
4/18/2019	1169.2	1171.5	TRUE
4/19/2019	1169.2	1171.6	TRUE
4/20/2019	1169.3	1171.6	TRUE
4/21/2019	1169.4	1171.7	TRUE
4/22/2019	1169.4	1171.8	TRUE
4/23/2019	1169.5	1171.7	TRUE
4/24/2019	1169.5	1171.8	TRUE
4/25/2019	1169.6	1171.8	TRUE
4/26/2019	1169.6	1171.9	TRUE
4/27/2019	1169.7	1171.8	TRUE
4/28/2019	1169.6	1171.8	TRUE
4/29/2019	1169.7	1171.9	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
4/30/2019	1169.7	1171.8	TRUE
5/1/2019	1169.7	1171.8	TRUE
5/2/2019	1169.7	1171.9	TRUE
5/3/2019	1169.7	1171.9	TRUE
5/4/2019	1169.7	1172.0	TRUE
5/5/2019	1169.7	1171.9	TRUE
5/6/2019	1169.7	1171.9	TRUE
5/7/2019	1169.7	1171.9	TRUE
5/8/2019	1169.6	1171.8	TRUE
5/9/2019	1169.6	1171.8	TRUE
5/10/2019	1169.6	1172.0	TRUE
5/11/2019	1169.7	1164.4	FALSE
5/12/2019	1169.7	1172.0	TRUE
5/13/2019	1169.8	1172.2	TRUE
5/14/2019	1170.0	1172.3	TRUE
5/15/2019	1170.1	1172.5	TRUE
5/16/2019	1170.2	1172.5	TRUE
5/17/2019	1170.3	1172.6	TRUE
5/18/2019	1170.4	1172.6	TRUE
5/19/2019	1170.4	1172.6	TRUE
5/20/2019	1170.4	1172.7	TRUE
5/21/2019	1170.3	1172.6	TRUE
5/22/2019	1170.3	1172.7	TRUE
5/23/2019	1170.4	1172.7	TRUE
5/24/2019	1170.3	1172.8	TRUE
5/25/2019	1170.3	1165.2	FALSE
5/26/2019	1170.3	1172.7	TRUE
5/27/2019	1170.3	1172.8	TRUE
5/28/2019	1170.3	1172.7	TRUE
5/29/2019	1170.3	1172.8	TRUE
5/30/2019	1170.3	1172.7	TRUE
5/31/2019	1170.3	1172.7	TRUE
6/1/2019	1170.2	1172.6	TRUE
6/2/2019	1170.1	1172.5	TRUE
6/3/2019	1170.1	1172.6	TRUE
6/4/2019	1170.0	1172.5	TRUE
6/5/2019	1170.0	1172.5	TRUE
6/6/2019	1170.0	1172.4	TRUE
6/7/2019	1169.9	1172.4	TRUE
6/8/2019	1169.9	1172.3	TRUE
6/9/2019	1169.8	1172.3	TRUE
6/10/2019	1169.8	1172.2	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
6/11/2019	1169.7	1172.1	TRUE
6/12/2019	1169.6	1172.1	TRUE
6/13/2019	1169.5	1172.0	TRUE
6/14/2019	1169.4	1171.9	TRUE
6/15/2019	1169.3	1171.8	TRUE
6/16/2019	1169.2	1171.7	TRUE
6/17/2019	1169.2	1171.8	TRUE
6/18/2019	1169.2	1171.6	TRUE
6/19/2019	1169.1	1171.7	TRUE
6/20/2019	1169.1	1171.6	TRUE
6/21/2019	1169.1	1171.6	TRUE
6/22/2019	1169.1	1171.4	TRUE
6/23/2019	1169.0	1171.4	TRUE
6/24/2019	1169.0	1171.4	TRUE
6/25/2019	1168.9	1171.3	TRUE
6/26/2019	1168.9	1171.3	TRUE
6/27/2019	1168.8	1171.2	TRUE
6/28/2019	1168.8	1171.3	TRUE
6/29/2019	1168.7	1171.2	TRUE
6/30/2019	1168.7	1171.1	TRUE
7/1/2019	1168.6	1171.1	TRUE
7/2/2019	1168.5	1171.0	TRUE
7/3/2019	1168.5	1171.0	TRUE
7/4/2019	1168.4	1170.9	TRUE
7/5/2019	1168.3	1170.9	TRUE
7/6/2019	1168.2	1170.8	TRUE
7/7/2019	1168.1	1170.7	TRUE
7/8/2019	1168.1	1170.0	TRUE
7/9/2019	1168.0	1170.5	TRUE
7/10/2019	1167.9	1170.5	TRUE
7/11/2019	1167.8	1170.4	TRUE
7/12/2019	1167.8	1170.4	TRUE
7/13/2019	1167.7	1170.2	TRUE
7/14/2019	1167.6	1170.1	TRUE
7/15/2019	1167.5	1170.1	TRUE
7/16/2019	1167.4	1170.0	TRUE
7/17/2019	1167.4	1170.1	TRUE
7/18/2019	1167.4	1169.9	TRUE
7/19/2019	1167.3	1170.0	TRUE
7/20/2019	1167.3	1169.8	TRUE
7/21/2019	1167.2	1169.7	TRUE
7/22/2019	1167.1	1169.7	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
7/23/2019	1167.1	1169.5	TRUE
7/24/2019	1167.1	1169.5	TRUE
7/25/2019	1167.0	1169.1	TRUE
7/26/2019	1166.9	1169.3	TRUE
7/27/2019	1166.8	1169.3	TRUE
7/28/2019	1166.7	1169.1	TRUE
7/29/2019	1166.6	1168.7	TRUE
7/30/2019	1166.5	1169.0	TRUE
7/31/2019	1166.4	1169.0	TRUE
8/1/2019	1166.3	1169.0	TRUE
8/2/2019	1166.3	1169.0	TRUE
8/3/2019	1166.2	1168.9	TRUE
8/4/2019	1166.1	1168.8	TRUE
8/5/2019	1166.0	1168.7	TRUE
8/6/2019	1165.9	1165.6	FALSE
8/7/2019	1165.8	1168.5	TRUE
8/8/2019	1165.7	1168.4	TRUE
8/9/2019	1165.6	1168.4	TRUE
8/10/2019	1165.6	1168.2	TRUE
8/11/2019	1165.4	1168.2	TRUE
8/12/2019	1165.4	1168.1	TRUE
8/13/2019	1165.3	1168.1	TRUE
8/14/2019	1165.1	1167.9	TRUE
8/15/2019	1165.0	1167.9	TRUE
8/16/2019	1165.0	1167.8	TRUE
8/17/2019	1164.9	1167.8	TRUE
8/18/2019	1164.8	1167.6	TRUE
8/19/2019	1164.7	1167.5	TRUE
8/20/2019	1164.6	1167.5	TRUE
8/21/2019	1163.4	1167.2	TRUE
8/22/2019	1164.4	1167.3	TRUE
8/23/2019	1164.3	1167.1	TRUE
8/24/2019	1164.2	1166.9	TRUE
8/25/2019	1164.1	1166.7	TRUE
8/26/2019	1164.0	1166.8	TRUE
8/27/2019	1163.9	1166.6	TRUE
8/28/2019	1163.8	1166.6	TRUE
8/29/2019	1163.8	1166.5	TRUE
8/30/2019	1163.7	1166.4	TRUE
8/31/2019	1163.6	1166.2	TRUE
9/1/2019	1163.5	1166.1	TRUE
9/2/2019	1163.4	1166.1	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
9/3/2019	1163.3	1165.8	TRUE
9/4/2019	1163.2	1165.8	TRUE
9/5/2019	1163.0	1165.7	TRUE
9/6/2019	1162.9	1165.7	TRUE
9/7/2019	1162.9	1165.2	TRUE
9/8/2019	1162.7	1165.4	TRUE
9/9/2019	1162.6	1165.4	TRUE
9/10/2019	1162.5	1165.2	TRUE
9/11/2019	1162.4	1165.2	TRUE
9/12/2019	1162.4	1165.0	TRUE
9/13/2019	1162.3	1165.0	TRUE
9/14/2019	1162.3	1164.8	TRUE
9/15/2019	1162.1	1164.7	TRUE
9/16/2019	1162.0	1164.7	TRUE
9/17/2019	1161.9	1164.4	TRUE
9/18/2019	1161.8	1164.4	TRUE
9/19/2019	1161.7	1164.3	TRUE
9/20/2019	1161.6	1164.2	TRUE
9/21/2019	1161.5	1164.0	TRUE
9/22/2019	1161.3	1163.9	TRUE
9/23/2019	1161.2	1163.9	TRUE
9/24/2019	1161.2	1163.7	TRUE
9/25/2019	1161.1	1163.7	TRUE
9/26/2019	1161.0	1163.5	TRUE
9/27/2019	1160.9	1163.5	TRUE
9/28/2019	1160.8	1163.1	TRUE
9/29/2019	1160.7	1163.2	TRUE
9/30/2019	1160.6	1163.3	TRUE
10/1/2019	1160.5	1163.0	TRUE
10/2/2019	1160.4	1163.0	TRUE
10/3/2019	1160.4	1163.0	TRUE
10/4/2019	1160.3	1163.1	TRUE
10/5/2019	1160.3	1162.8	TRUE
10/6/2019	1160.2	1162.8	TRUE
10/7/2019	1160.1	1162.9	TRUE
10/8/2019	1160.2	1162.7	TRUE
10/9/2019	1160.1	1162.7	TRUE
10/10/2019	1160.0	1162.6	TRUE
10/11/2019	1160.0	1162.5	TRUE
10/12/2019	1159.9	1162.4	TRUE
10/13/2019	1159.8	1162.3	TRUE
10/14/2019	1159.7	1162.4	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
10/15/2019	1159.7	1162.1	TRUE
10/16/2019	1159.6	1162.2	TRUE
10/17/2019	1159.4	1162.2	TRUE
10/18/2019	1159.7	1162.4	TRUE
10/19/2019	1159.8	1162.2	TRUE
10/20/2019	1159.8	1162.2	TRUE
10/21/2019	1159.8	1162.4	TRUE
10/22/2019	1159.8	1162.1	TRUE
10/23/2019	1159.7	1162.3	TRUE
10/24/2019	1159.8	1162.2	TRUE
10/25/2019	1159.8	1162.3	TRUE
10/26/2019	1159.8	1162.1	TRUE
10/27/2019	1159.8	1162.1	TRUE
10/28/2019	1159.7	1162.2	TRUE
10/29/2019	1159.8	1162.1	TRUE
10/30/2019	1159.7	1162.2	TRUE
10/31/2019	1159.8	1162.4	TRUE
11/1/2019	1160.1	1163.0	TRUE
11/2/2019	1160.6	1163.1	TRUE
11/3/2019	1160.9	1163.5	TRUE
11/4/2019	1161.2	1163.8	TRUE
11/5/2019	1161.5	1163.8	TRUE
11/6/2019	1161.6	1164.1	TRUE
11/7/2019	1161.8	1164.2	TRUE
11/8/2019	1162.0	1164.5	TRUE
11/9/2019	1162.1	1164.1	TRUE
11/10/2019	1162.1	1164.3	TRUE
11/11/2019	1162.2	1164.7	TRUE
11/12/2019	1162.3	1164.5	TRUE
11/13/2019	1162.3	1164.4	TRUE
11/14/2019	1162.3	1164.6	TRUE
11/15/2019	1162.4	1164.6	TRUE
11/16/2019	1162.4	1164.7	TRUE
11/17/2019	1162.4	1164.8	TRUE
11/18/2019	1162.5	1164.9	TRUE
11/19/2019	1162.5	1164.9	TRUE
11/20/2019	1162.5	1165.0	TRUE
11/21/2019	1162.5	1165.0	TRUE
11/22/2019	1162.5	1165.0	TRUE
11/23/2019	1162.5	1165.0	TRUE
11/24/2019	1162.5	1165.0	TRUE
11/25/2019	1162.6	1165.1	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
11/26/2019	1162.6	1165.0	TRUE
11/27/2019	1162.6	1165.2	TRUE
11/28/2019	1162.7	1165.2	TRUE
11/29/2019	1161.4	1165.3	TRUE
11/30/2019	1162.8	1165.3	TRUE
12/1/2019	1162.8	1165.3	TRUE
12/2/2019	1162.9	1165.3	TRUE
12/3/2019	1162.9	1165.3	TRUE
12/4/2019	1162.9	1165.5	TRUE
12/5/2019	1163.1	1165.5	TRUE
12/6/2019	1163.4	1165.6	TRUE
12/7/2019	1163.5	1165.2	TRUE
12/8/2019	1163.2	1165.4	TRUE
12/9/2019	1162.4	1164.6	TRUE
12/10/2019	1163.1	1165.4	TRUE
12/11/2019	1163.4	1166.0	TRUE
12/12/2019	1163.7	1166.3	TRUE
12/13/2019	1164.0	1166.6	TRUE
12/14/2019	1164.4	1159.1	FALSE
12/15/2019	1164.8	1167.1	TRUE
12/16/2019	1165.0	1167.4	TRUE
12/17/2019	1165.1	1167.5	TRUE
12/18/2019	1165.2	1167.8	TRUE
12/19/2019	1165.4	1167.9	TRUE
12/20/2019	1165.5	1168.0	TRUE
12/21/2019	1165.7	1160.6	FALSE
12/22/2019	1165.7	1168.1	TRUE
12/23/2019	1165.8	1168.3	TRUE
12/24/2019	1165.9	1168.3	TRUE
12/25/2019	1166.0	1168.5	TRUE
12/26/2019	1166.1	1168.5	TRUE
12/27/2019	1166.1	1168.6	TRUE
12/28/2019	1166.2	1161.1	FALSE
12/29/2019	1166.3	1168.2	TRUE
12/30/2019	1166.5	1169.2	TRUE
12/31/2019	1166.7	1161.2	FALSE
1/1/2020	1166.9	1161.2	FALSE
1/2/2020	1167.0	1169.3	TRUE
1/3/2020	1167.1	1169.5	TRUE
1/4/2020	1167.2	1162.1	FALSE
1/5/2020	1167.3	1169.6	TRUE
1/6/2020	1167.4	1169.8	TRUE

Table 2.1.E
Lime Hollow Rd Wells vs Proposed Mine Pond Surface Elevations
Cortlandville Sand and Gravel - DEIS

	MP Elevation, ft amsl	LH #7 GW Elevation, ft amsl	LH > MP
1/7/2020	1167.5	1169.9	TRUE
1/8/2020	1167.6	1169.8	TRUE
1/9/2020	1167.6	1170.0	TRUE
1/10/2020	1167.7	1170.0	TRUE
1/11/2020	1167.8	1162.5	FALSE
1/12/2020	1167.8	1170.3	TRUE
1/13/2020	1167.9	1169.3	TRUE
1/14/2020	1168.0	1170.4	TRUE
1/15/2020	1168.1	1170.5	TRUE
1/16/2020	1168.2	1170.5	TRUE
1/17/2020	1168.2	1170.6	TRUE
1/18/2020	1168.3	1170.6	TRUE
1/19/2020	1168.3	1170.6	TRUE
1/20/2020	1168.3	1170.7	TRUE
1/21/2020	1168.4	1170.7	TRUE
1/22/2020	1168.4	1170.8	TRUE
1/23/2020	1168.4	1170.8	TRUE
1/24/2020	1168.4	1170.9	TRUE
1/25/2020	1168.5	1170.9	TRUE
1/26/2020	1168.6	1171.0	TRUE
1/27/2020	1168.7	1171.1	TRUE
1/28/2020	1168.7	1171.0	TRUE
1/29/2020	1168.7	1171.0	TRUE
1/30/2020	1168.7	1171.1	TRUE
1/31/2020	1168.7	1171.1	TRUE
2/1/2020	1168.7	1171.1	TRUE
2/2/2020	1168.7	1171.1	TRUE
2/3/2020	1168.7	1171.2	TRUE
2/4/2020	1168.7	1171.1	TRUE
2/5/2020	1168.7	1171.2	TRUE
2/6/2020	1168.8	1171.2	TRUE

TRUE	348
Total	367
% True	95%

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
2/5/2019	915232.23	937366.04	1156.1	915591.19	936527.54	1155.7	916044.21	937509.77	1153.9	-1902.2	-464.9	-732438.6	-464.9	1902.2	76.3	0.0027	0.3	880	7.8	357
2/6/2019	915218.27	937430.38	1171.0	915591.19	936527.54	1172.286247	916044.21	937509.77	1169.06001	-1620	-1799	-775298	-1799	1620	42.0	0.0031	0.3	880	9.2	433
2/7/2019	915218.27	937430.38	1172.6	915591.19	936527.54	1172.397209	916044.21	937509.77	1169.214093	-3044	-1109	-775298	-1109	3044	70.0	0.0042	0.3	880	12.3	384
2/8/2019	915218.27	937430.38	1172.6	915591.19	936527.54	1172.513756	916044.21	937509.77	1169.401725	-2865	-1135	-775298	-1135	2865	68.4	0.0040	0.3	880	11.7	394
2/9/2019	915218.27	937430.38	1172.9	915591.19	936527.54	1172.585403	916044.21	937509.77	1169.500359	-3065	-1022	-775298	-1022	3065	71.6	0.0042	0.3	880	12.2	386
2/10/2019	915218.27	937430.38	1171.0	915591.19	936527.54	1172.703521	916044.21	937509.77	1169.590777	-1108	-1946	-775298	-1946	1108	29.6	0.0029	0.3	880	8.5	450
2/11/2019	915218.27	937430.38	1172.6	915591.19	936527.54	1172.810687	916044.21	937509.77	1169.658822	-2609	-1284	-775298	-1284	2609	63.8	0.0038	0.3	880	11.0	405
2/12/2019	915218.27	937430.38	1173.0	915591.19	936527.54	1172.900949	916044.21	937509.77	1169.693144	-2964	-1165	-775298	-1165	2964	68.5	0.0041	0.3	880	12.0	390
2/13/2019	915218.27	937430.38	1172.8	915591.19	936527.54	1172.987369	916044.21	937509.77	1169.759264	-2701	-1302	-775298	-1302	2701	64.3	0.0039	0.3	880	11.3	400
2/14/2019	915218.27	937430.38	1171.4	915591.19	936527.54	1172.983412	916044.21	937509.77	1169.732718	-1350	-1943	-775298	-1943	1350	34.8	0.0031	0.3	880	9.0	441
2/15/2019	915218.27	937430.38	1172.7	915591.19	936527.54	1173.010491	916044.21	937509.77	1169.731169	-2626	-1377	-775298	-1377	2626	62.3	0.0038	0.3	880	11.2	402
2/16/2019	915218.27	937430.38	1172.0	915591.19	936527.54	1172.975405	916044.21	937509.77	1169.694367	-1975	-1679	-775298	-1679	1975	49.6	0.0033	0.3	880	9.8	425
2/17/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1172.933713	916044.21	937509.77	1169.639704	-947	-2163	-775298	-2163	947	23.6	0.0030	0.3	880	8.9	438
2/18/2019	915218.27	937430.38	1172.4	915591.19	936527.54	1172.897671	916044.21	937509.77	1169.605511	-2454	-1467	-775298	-1467	2454	59.1	0.0037	0.3	880	10.8	408
2/19/2019	915218.27	937430.38	1172.67	915591.19	936527.54	1172.795577	916044.21	937509.77	1169.503537	-2849	-1285	-775298	-1285	2849	65.7	0.0040	0.3	880	11.8	392
2/20/2019	915218.27	937430.38	1171.5	915591.19	936527.54	1172.739104	916044.21	937509.77	1169.425614	-1745	-1811	-775298	-1811	1745	43.9	0.0032	0.3	880	9.5	428
2/21/2019	915218.27	937430.38	1172.57	915591.19	936527.54	1172.690218	916044.21	937509.77	1169.371102	-2879	-1292	-775298	-1292	2879	65.8	0.0041	0.3	880	11.9	389
2/22/2019	915218.27	937430.38	1170.6	915591.19	936527.54	1172.5847	916044.21	937509.77	1169.248587	-1033	-2157	-775298	-2157	1033	25.6	0.0031	0.3	880	9.0	433
2/23/2019	915218.27	937430.38	1172.0	915591.19	936527.54	1172.50023	916044.21	937509.77	1169.132458	-2520	-1496	-775298	-1496	2520	59.3	0.0038	0.3	880	11.1	400
2/24/2019	915218.27	937430.38	1170.6	915591.19	936527.54	1172.479542	916044.21	937509.77	1169.078728	-1195	-2133	-775298	-2133	1195	29.3	0.0032	0.3	880	9.3	428
2/25/2019	915218.27	937430.38	1171.97	915591.19	936527.54	1172.408403	916044.21	937509.77	1169.009868	-2638	-1466	-775298	-1466	2638	60.9	0.0039	0.3	880	11.4	394
2/26/2019	915218.27	937430.38	1172.2	915591.19	936527.54	1172.285779	916044.21	937509.77	1168.918348	-2927	-1308	-775298	-1308	2927	65.9	0.0041	0.3	880	12.1	384
2/27/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1172.203835	916044.21	937509.77	1168.861479	-2690	-1398	-775298	-1398	2690	62.5	0.0039	0.3	880	11.5	393
2/28/2019	915218.27	937430.38	1170.37	915591.19	936527.54	1172.124971	916044.21	937509.77	1168.803967	-1275	-2034	-775298	-2034	1275	32.1	0.0031	0.3	880	9.1	431
3/1/2019	915218.27	937430.38	1170.1	915591.19	936527.54	1172.039825	916044.21	937509.77	1168.7318	-1052	-2126	-775298	-2126	1052	26.3	0.0031	0.3	880	9.0	431
3/2/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.963184	916044.21	937509.77	1168.664439	-2887	-1272	-775298	-1272	2887	66.2	0.0041	0.3	880	11.9	385
3/3/2019	915218.27	937430.38	1169.87	915591.19	936527.54	1171.877103	916044.21	937509.77	1168.593012	-994	-2134	-775298	-2134	994	25.0	0.0030	0.3	880	8.9	432
3/4/2019	915218.27	937430.38	1170.0	915591.19	936527.54	1171.801985	916044.21	937509.77	1168.532185	-1153	-2049	-775298	-2049	1153	29.4	0.0030	0.3	880	8.9	433
3/5/2019	915218.27	937430.38	1170.7	915591.19	936527.54	1171.699448	916044.21	937509.77	1168.438465	-1933	-1682	-775298	-1682	1933	49.0	0.0033	0.3	880	9.7	419
3/6/2019	915218.27	937430.38	1170.57	915591.19	936527.54	1171.593813	916044.21	937509.77	1168.351333	-1922	-1673	-775298	-1673	1922	49.0	0.0033	0.3	880	9.6	420
3/7/2019	915218.27	937430.38	1171.5	915591.19	936527.54	1171.480238	916044.21	937509.77	1168.246208	-2910	-1211	-775298	-1211	2910	67.4	0.0041	0.3	880	11.9	383
3/8/2019	915218.27	937430.38	1169.57	915591.19	936527.54	1171.372912	916044.21	937509.77	1168.144592	-1144	-2021	-775298	-2021	1144	29.5	0.0030	0.3	880	8.8	432
3/9/2019	915218.27	937430.38	1169.7	915591.19	936527.54	1171.268898	916044.21	937509.77	1168.052873	-1333	-1924	-775298	-1924	1333	34.7	0.0030	0.3	880	8.9	431
3/10/2019	915218.27	937430.38	1171.3	915591.19	936527.54	1171.199868	916044.21	937509.77	1168.012879	-2946	-1157	-775298	-1157	2946	68.6	0.0041	0.3	880	12.0	381
3/11/2019	915218.27	937430.38	1169.5	915591.19	936527.54	1171.131933	916044.21	937509.77	1167.95006	-1240	-1939	-775298	-1939	1240	32.6	0.0030	0.3	880	8.7	434
3/12/2019	915218.27	937430.38	1169.9	915591.19	936527.54	1171.052123	916044.21	937509.77	1167.891492	-1692	-1714	-775298	-1714	1692	44.6	0.0031	0.3	880	9.1	427
3/13/2019	915218.27	937430.38	1171.0	915591.19	936527.54	1170.969889	916044.21	937509.77	1167.830191	-2835	-1171	-775298	-1171	2835	67.6	0.0040	0.3	880	11.6	385
3/14/2019	915218.27	937430.38	1169.07	915591.19	936527.54	1170.877183	916044.21	937509.77	1167.878809	-932	-1937	-775298	-1937	932	25.7	0.0028	0.3	880	8.1	446
3/15/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.907663	-2564	-2250	-775298	-2250	2564	48.7	0.0044	0.3	880	12.9	364
3/16/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.798039	916044.21	937509.77	1167.91609	-2869	-952	-775298	-952	2869	71.7	0.0039	0.3	880	11.4	388
3/17/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.771264	916044.21	937509.77	1167.939754	-2850	-921	-775298	-921	2850	72.1	0.0039	0.3	880	11.3	390
3/18/2019	915218.27	937430.38	1168.97	915591.19	936527.54	1170.738204	916044.21	937509.77	1167.905096	-821	-1858	-775298	-1858	821	23.8	0.0026	0.3	880	7.7	458
3/19/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.691541	916044.21	937509.77	1167.852332	-2837	-933	-775298	-933	2837	71.8	0.0039	0.3	880	11.3	390
3/20/2019	915218.27	937430.38	1170.7	915591.19	936527.54	1170.659355	916044.21	937509.77	1167.840142	-2556	-1047	-775298	-1047	2556	67.7	0.0036	0.3	880	10.4	404
3/21/2019	915218.27	937430.38	1169.3	915591.19	936527.54	1170.623439	916044.21	937509.77	1167.798734	-1221	-1667	-775298	-1667	1221	36.2	0.0027	0.3	880	7.8	456
3/22/2019	915218.27	937430.38	1170.6	915591.19	936527.54	1170.679434	916044.21	937509.77	1167.88085	-2419	-1093	-775298	-1093	2419	65.7	0.0034	0.3	880	10.0	411
3/23/2019	915218.27	937430.38	1171.0	915591.19	936527.54	1170.656742	916044.21	937509.77	1167.901823	-2795	-885	-775298	-885	2795	72.4	0.0038	0.3	880	11.1	394
3/24/2019	915218.27	937430.38	1169.0	915591.19	936527.54	1170.654715	916044.21	937509.77	1167.910649	-823	-1787	-775298	-1787	823	24.7	0.0025	0.3	880	7.4	465
3/25/2019	915218.27	937430.38	1168.8	915591.19	936527.54	1170.646119	916044.21	937509.77	1167.901098	-636	-1874	-775298	-1874	636	18.7	0.0026	0.3	880	7.5	462
3/26/2019	915218.27	937430.38	1170.9	915591.19	936527.54	1170.607692	916044.21	937509.77	1167.842451	-2754	-912	-775298	-912	2754	71.7	0.0037	0.3	880	11.0	395
3/27/2019	915218.27	937430.38	1169.7	915591.19	936527.54	1170.582221	916044.21	937509.77	1167.827485	-1591	-1441	-775298	-1441	1591	47.8	0.0028	0.3	880	8.1	450
3/28/2019	915218.27	937430.38	1170.9	915591.19	936527.54	1170.5687	916044.21	937509.77	1167.807372	-2789	-893	-775298	-893	2789	72.2	0.0038	0.3	880	11.1	393
3/29/2019	915218.27	937430.38	1168.9	915591.19	936527.54	1170.55682	916044.21	937509.77	1167.796773	-835	-1793	-775298	-1793	835	25.0	0.0026	0.3	880	7.5	463
3/30/2019	915218.27	937430.38	1170.9	915591.19	936527.54	1170.547286	916044.21	937509.77	1167.768801	-2826	-890	-775298	-890	2826	72.5	0.0038	0.3	880	11.2	391

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
3/31/2019	915218.27	937430.38	1168.9	915591.19	936527.54	1170.524676	916044.21	937509.77	1167.751398	-879	-1784	-775298	-1784	879	26.2	0.0026	0.3	880	7.5	462
4/1/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.510892	916044.21	937509.77	1167.778552	-2721	-902	-775298	-902	2721	71.7	0.0037	0.3	880	10.8	397
4/2/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.510135	916044.21	937509.77	1167.765509	-2733	-906	-775298	-906	2733	71.7	0.0037	0.3	880	10.9	396
4/3/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.500559	916044.21	937509.77	1167.779892	-2721	-893	-775298	-893	2721	71.8	0.0037	0.3	880	10.8	397
4/4/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.465909	916044.21	937509.77	1167.734659	-2765	-881	-775298	-881	2765	72.3	0.0037	0.3	880	11.0	394
4/5/2019	915218.27	937430.38	1170.9	915591.19	936527.54	1170.463293	916044.21	937509.77	1167.752979	-2846	-826	-775298	-826	2846	73.8	0.0038	0.3	880	11.2	391
4/6/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.477197	916044.21	937509.77	1167.767402	-2734	-878	-775298	-878	2734	72.2	0.0037	0.3	880	10.9	396
4/7/2019	915218.27	937430.38	1170.8	915591.19	936527.54	1170.434912	916044.21	937509.77	1167.683606	-2813	-874	-775298	-874	2813	72.7	0.0038	0.3	880	11.1	391
4/8/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1170.452388	916044.21	937509.77	1167.753697	-2847	-817	-775298	-817	2847	74.0	0.0038	0.3	880	11.2	391
4/9/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.453516	916044.21	937509.77	1167.742516	-2660	-913	-775298	-913	2660	71.1	0.0036	0.3	880	10.6	400
4/10/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.41306	916044.21	937509.77	1167.724384	-2778	-841	-775298	-841	2778	73.2	0.0037	0.3	880	11.0	394
4/11/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.381198	916044.21	937509.77	1167.680107	-2722	-876	-775298	-876	2722	72.2	0.0037	0.3	880	10.8	397
4/12/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.371918	916044.21	937509.77	1167.704161	-2800	-815	-775298	-815	2800	73.8	0.0038	0.3	880	11.0	393
4/13/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.357661	916044.21	937509.77	1167.688944	-2716	-854	-775298	-854	2716	72.6	0.0037	0.3	880	10.8	398
4/14/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.319829	916044.21	937509.77	1167.612557	-2788	-851	-775298	-851	2788	73.0	0.0038	0.3	880	11.0	393
4/15/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.382078	916044.21	937509.77	1167.734598	-2771	-812	-775298	-812	2771	73.7	0.0037	0.3	880	10.9	395
4/16/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.376581	916044.21	937509.77	1167.749081	-2759	-802	-775298	-802	2759	73.8	0.0037	0.3	880	10.9	396
4/17/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1170.382013	916044.21	937509.77	1167.790966	-2819	-745	-775298	-745	2819	75.2	0.0038	0.3	880	11.0	394
4/18/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.399549	916044.21	937509.77	1167.77313	-2735	-812	-775298	-812	2735	73.5	0.0037	0.3	880	10.8	398
4/19/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1170.418294	916044.21	937509.77	1167.81452	-2794	-766	-775298	-766	2794	74.7	0.0037	0.3	880	11.0	395
4/20/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.556501	916044.21	937509.77	1167.939934	-2768	-788	-775298	-788	2768	74.1	0.0037	0.3	880	10.9	397
4/21/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.545757	916044.21	937509.77	1167.946089	-2764	-777	-775298	-777	2764	74.3	0.0037	0.3	880	10.9	398
4/22/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.590172	916044.21	937509.77	1167.991319	-2818	-752	-775298	-752	2818	75.1	0.0038	0.3	880	11.0	395
4/23/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.661428	916044.21	937509.77	1168.009656	-2795	-804	-775298	-804	2795	74.0	0.0038	0.3	880	11.0	396
4/24/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.699593	916044.21	937509.77	1168.033886	-2771	-826	-775298	-826	2771	73.4	0.0037	0.3	880	10.9	397
4/25/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.733252	916044.21	937509.77	1168.018384	-2782	-860	-775298	-860	2782	72.8	0.0038	0.3	880	11.0	396
4/26/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.79272	916044.21	937509.77	1168.069211	-2829	-845	-775298	-845	2829	73.4	0.0038	0.3	880	11.2	393
4/27/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.866608	916044.21	937509.77	1168.14017	-2760	-879	-775298	-879	2760	72.3	0.0037	0.3	880	11.0	397
4/28/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.853785	916044.21	937509.77	1168.098162	-2798	-884	-775298	-884	2798	72.5	0.0038	0.3	880	11.1	395
4/29/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1172.256226	916044.21	937509.77	1168.133718	-2655	-2029	-775298	-2029	2655	52.6	0.0043	0.3	880	12.6	370
4/30/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.904319	916044.21	937509.77	1168.119815	-2775	-918	-775298	-918	2775	71.7	0.0038	0.3	880	11.1	396
5/1/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1170.919727	916044.21	937509.77	1168.124054	-2868	-884	-775298	-884	2868	72.9	0.0039	0.3	880	11.4	391
5/2/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.94483	916044.21	937509.77	1168.128857	-2764	-948	-775298	-948	2764	71.1	0.0038	0.3	880	11.1	396
5/3/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1170.962469	916044.21	937509.77	1168.145742	-2845	-911	-775298	-911	2845	72.2	0.0039	0.3	880	11.3	392
5/4/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.979865	916044.21	937509.77	1168.15025	-2741	-969	-775298	-969	2741	70.5	0.0038	0.3	880	11.0	397
5/5/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.952129	916044.21	937509.77	1168.082576	-2805	-971	-775298	-971	2805	70.9	0.0038	0.3	880	11.2	392
5/6/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1170.957434	916044.21	937509.77	1168.136615	-2854	-910	-775298	-910	2854	72.3	0.0039	0.3	880	11.3	391
5/7/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.947433	916044.21	937509.77	1168.117884	-2773	-954	-775298	-954	2773	71.0	0.0038	0.3	880	11.1	395
5/8/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.922655	916044.21	937509.77	1168.113979	-2288	-1162	-775298	-1162	2288	63.1	0.0033	0.3	880	9.7	419
5/9/2019	915218.27	937430.38	1171.17	915591.19	936527.54	1170.914391	916044.21	937509.77	1168.103414	-2789	-932	-775298	-932	2789	71.5	0.0038	0.3	880	11.1	394
5/10/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1170.946568	916044.21	937509.77	1168.184589	-2811	-883	-775298	-883	2811	72.6	0.0038	0.3	880	11.1	395
5/11/2019	915218.27	937430.38	1170.37	915591.19	936527.54	1170.977046	916044.21	937509.77	1168.210449	-1902	-1307	-775298	-1307	1902	55.5	0.0030	0.3	880	8.7	439
5/12/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1170.968775	916044.21	937509.77	1168.188419	-2806	-900	-775298	-900	2806	72.2	0.0038	0.3	880	11.1	395
5/13/2019	915218.27	937430.38	1171.57	915591.19	936527.54	1171.052743	916044.21	937509.77	1168.333041	-2964	-780	-775298	-780	2964	75.3	0.0040	0.3	880	11.6	389
5/14/2019	915218.27	937430.38	1171.67	915591.19	936527.54	1171.231498	916044.21	937509.77	1168.563815	-2839	-796	-775298	-796	2839	74.3	0.0038	0.3	880	11.2	397
5/15/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.340311	916044.21	937509.77	1168.705609	-2899	-743	-775298	-743	2899	75.6	0.0039	0.3	880	11.3	395
5/16/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.430913	916044.21	937509.77	1168.760414	-2842	-797	-775298	-797	2842	74.3	0.0038	0.3	880	11.2	398
5/17/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.52321	916044.21	937509.77	1168.832468	-2770	-846	-775298	-846	2770	73.0	0.0037	0.3	880	11.0	402
5/18/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.591676	916044.21	937509.77	1168.853678	-2745	-895	-775298	-895	2745	71.9	0.0037	0.3	880	10.9	402
5/19/2019	915218.27	937430.38	1171.97	915591.19	936527.54	1171.644494	916044.21	937509.77	1168.852035	-2841	-894	-775298	-894	2841	72.5	0.0038	0.3	880	11.3	397
5/20/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.739018	916044.21	937509.77	1168.926625	-2864	-899	-775298	-899	2864	72.6	0.0039	0.3	880	11.4	396
5/21/2019	915218.27	937430.38	1171.97	915591.19	936527.54	1171.783781	916044.21	937509.77	1168.805006	-2872	-1026	-775298	-1026	2872	70.3	0.0039	0.3	880	11.5	392
5/22/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.797226	916044.21	937509.77	1168.799762	-2974	-994	-775298	-994	2974	71.5	0.0040	0.3	880	11.9	387
5/23/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.841395	916044.21	937509.77	1168.823764	-2949	-1022	-775298	-1022	2949	70.9	0.0040	0.3	880	11.8	388

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
5/24/2019	915218.27	937430.38	1172.17	915591.19	936527.54	1171.845441	916044.21	937509.77	1168.837489	-3034	-975	-775298	-975	3034	72.2	0.0041	0.3	880	12.1	385
5/25/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1171.85129	916044.21	937509.77	1168.79997	-2184	-1401	-775298	-1401	2184	57.3	0.0033	0.3	880	9.8	420
5/26/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.862762	916044.21	937509.77	1168.798097	-2970	-1049	-775298	-1049	2970	70.5	0.0041	0.3	880	11.9	386
5/27/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.867844	916044.21	937509.77	1168.82307	-2948	-1044	-775298	-1044	2948	70.5	0.0040	0.3	880	11.8	388
5/28/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.886947	916044.21	937509.77	1168.827635	-2942	-1058	-775298	-1058	2942	70.2	0.0040	0.3	880	11.8	388
5/29/2019	915218.27	937430.38	1172.17	915591.19	936527.54	1171.87612	916044.21	937509.77	1168.835755	-3034	-1001	-775298	-1001	3034	71.7	0.0041	0.3	880	12.1	384
5/30/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.867564	916044.21	937509.77	1168.817863	-2952	-1046	-775298	-1046	2952	70.5	0.0040	0.3	880	11.8	388
5/31/2019	915218.27	937430.38	1172.07	915591.19	936527.54	1171.841304	916044.21	937509.77	1168.813377	-2958	-1026	-775298	-1026	2958	70.9	0.0040	0.3	880	11.8	388
6/1/2019	915218.27	937430.38	1171.97	915591.19	936527.54	1171.812047	916044.21	937509.77	1168.742976	-2926	-1073	-775298	-1073	2926	69.9	0.0040	0.3	880	11.8	388
6/2/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.736416	916044.21	937509.77	1168.609083	-2955	-1106	-775298	-1106	2955	69.5	0.0041	0.3	880	11.9	385
6/3/2019	915218.27	937430.38	1171.87	915591.19	936527.54	1171.685705	916044.21	937509.77	1168.591671	-2974	-1070	-775298	-1070	2974	70.2	0.0041	0.3	880	12.0	385
6/4/2019	915218.27	937430.38	1171.77	915591.19	936527.54	1171.63397	916044.21	937509.77	1168.526694	-2939	-1097	-775298	-1097	2939	69.5	0.0040	0.3	880	11.9	385
6/5/2019	915218.27	937430.38	1171.77	915591.19	936527.54	1171.594327	916044.21	937509.77	1168.528816	-2940	-1064	-775298	-1064	2940	70.1	0.0040	0.3	880	11.8	386
6/6/2019	915218.27	937430.38	1171.77	915591.19	936527.54	1171.569571	916044.21	937509.77	1168.510279	-2959	-1050	-775298	-1050	2959	70.5	0.0040	0.3	880	11.9	385
6/7/2019	915218.27	937430.38	1171.77	915591.19	936527.54	1171.520355	916044.21	937509.77	1168.504046	-2968	-1012	-775298	-1012	2968	71.2	0.0040	0.3	880	11.9	385
6/8/2019	915218.27	937430.38	1171.67	915591.19	936527.54	1171.465264	916044.21	937509.77	1168.455434	-2918	-1030	-775298	-1030	2918	70.6	0.0040	0.3	880	11.7	387
6/9/2019	915218.27	937430.38	1171.67	915591.19	936527.54	1171.375584	916044.21	937509.77	1168.364951	-3007	-989	-775298	-989	3007	71.8	0.0041	0.3	880	12.0	383
6/10/2019	915218.27	937430.38	1171.57	915591.19	936527.54	1171.329803	916044.21	937509.77	1168.379745	-2899	-991	-775298	-991	2899	71.1	0.0040	0.3	880	11.6	389
6/11/2019	915218.27	937430.38	1171.47	915591.19	936527.54	1171.271669	916044.21	937509.77	1168.322206	-2858	-1010	-775298	-1010	2858	70.5	0.0039	0.3	880	11.5	390
6/12/2019	915218.27	937430.38	1171.37	915591.19	936527.54	1171.181003	916044.21	937509.77	1168.212	-2866	-1022	-775298	-1022	2866	70.4	0.0039	0.3	880	11.5	389
6/13/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1171.102561	916044.21	937509.77	1168.067241	-2905	-1056	-775298	-1056	2905	70.0	0.0040	0.3	880	11.7	385
6/14/2019	915218.27	937430.38	1171.27	915591.19	936527.54	1171.006856	916044.21	937509.77	1167.974821	-2996	-1011	-775298	-1011	2996	71.3	0.0041	0.3	880	12.0	381
6/15/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.915872	916044.21	937509.77	1167.870029	-2901	-1066	-775298	-1066	2901	69.8	0.0040	0.3	880	11.7	384
6/16/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.833052	916044.21	937509.77	1167.771772	-2997	-1034	-775298	-1034	2997	71.0	0.0041	0.3	880	12.0	379
6/17/2019	915218.27	937430.38	1171.07	915591.19	936527.54	1170.810705	916044.21	937509.77	1167.796537	-2976	-1007	-775298	-1007	2976	71.3	0.0041	0.3	880	11.9	381
6/18/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.747286	916044.21	937509.77	1167.735349	-2938	-1022	-775298	-1022	2938	70.8	0.0040	0.3	880	11.8	382
6/19/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.688746	916044.21	937509.77	1167.723709	-2953	-978	-775298	-978	2953	71.7	0.0040	0.3	880	11.8	382
6/20/2019	915218.27	937430.38	1170.97	915591.19	936527.54	1170.665381	916044.21	937509.77	1167.675612	-2998	-977	-775298	-977	2998	72.0	0.0041	0.3	880	11.9	380
6/21/2019	915218.27	937430.38	1170.87	915591.19	936527.54	1170.680809	916044.21	937509.77	1167.708888	-2869	-1023	-775298	-1023	2869	70.4	0.0039	0.3	880	11.5	386
6/22/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.626226	916044.21	937509.77	1167.638362	-2839	-1049	-775298	-1049	2839	69.7	0.0039	0.3	880	11.5	386
6/23/2019	915218.27	937430.38	1170.77	915591.19	936527.54	1170.544784	916044.21	937509.77	1167.522603	-2950	-1025	-775298	-1025	2950	70.8	0.0040	0.3	880	11.8	380
6/24/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.503081	916044.21	937509.77	1167.514419	-2862	-1039	-775298	-1039	2862	70.1	0.0039	0.3	880	11.5	384
6/25/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.457617	916044.21	937509.77	1167.435637	-2937	-1031	-775298	-1031	2937	70.7	0.0040	0.3	880	11.8	380
6/26/2019	915218.27	937430.38	1170.67	915591.19	936527.54	1170.408445	916044.21	937509.77	1167.430538	-2945	-992	-775298	-992	2945	71.4	0.0040	0.3	880	11.8	380
6/27/2019	915218.27	937430.38	1170.57	915591.19	936527.54	1170.35862	916044.21	937509.77	1167.370027	-2906	-1019	-775298	-1019	2906	70.7	0.0040	0.3	880	11.7	382
6/28/2019	915218.27	937430.38	1170.6	915591.19	936527.54	1170.312418	916044.21	937509.77	1167.368356	-2911	-981	-775298	-981	2911	71.4	0.0040	0.3	880	11.6	382
6/29/2019	915218.27	937430.38	1170.47	915591.19	936527.54	1170.276438	916044.21	937509.77	1167.322216	-2857	-1014	-775298	-1014	2857	70.5	0.0039	0.3	880	11.5	384
6/30/2019	915218.27	937430.38	1170.37	915591.19	936527.54	1170.200671	916044.21	937509.77	1167.237007	-2842	-1028	-775298	-1028	2842	70.1	0.0039	0.3	880	11.4	384
7/1/2019	915218.27	937430.38	1170.47	915591.19	936527.54	1170.139279	916044.21	937509.77	1167.235872	-2946	-933	-775298	-933	2946	72.4	0.0040	0.3	880	11.7	380
7/2/2019	915218.27	937430.38	1170.27	915591.19	936527.54	1170.086327	916044.21	937509.77	1167.174567	-2809	-1003	-775298	-1003	2809	70.4	0.0038	0.3	880	11.3	386
7/3/2019	915218.27	937430.38	1170.27	915591.19	936527.54	1170.009476	916044.21	937509.77	1167.130743	-2855	-956	-775298	-956	2855	71.5	0.0039	0.3	880	11.4	384
7/4/2019	915218.27	937430.38	1170.2	915591.19	936527.54	1169.935815	916044.21	937509.77	1167.061966	-2825	-966	-775298	-966	2825	71.1	0.0039	0.3	880	11.3	385
7/5/2019	915218.27	937430.38	1170.27	915591.19	936527.54	1169.861389	916044.21	937509.77	1167.036499	-2952	-868	-775298	-868	2952	73.6	0.0040	0.3	880	11.6	380
7/6/2019	915218.27	937430.38	1170.07	915591.19	936527.54	1169.802566	916044.21	937509.77	1166.977674	-2813	-932	-775298	-932	2813	71.7	0.0038	0.3	880	11.2	386
7/7/2019	915218.27	937430.38	1169.97	915591.19	936527.54	1169.70117	916044.21	937509.77	1166.869831	-2820	-934	-775298	-934	2820	71.7	0.0038	0.3	880	11.2	385
7/8/2019	915218.27	937430.38	1168.4	915591.19	936527.54	1169.626095	916044.21	937509.77	1166.861611	-1262	-1600	-775298	-1600	1262	38.3	0.0026	0.3	880	7.7	453
7/9/2019	915218.27	937430.38	1169.87	915591.19	936527.54	1169.547593	916044.21	937509.77	1166.77966	-2816	-886	-775298	-886	2816	72.5	0.0038	0.3	880	11.2	385
7/10/2019	915218.27	937430.38	1169.8	915591.19	936527.54	1169.460126	916044.21	937509.77	1166.71815	-2780	-882	-775298	-882	2780	72.4	0.0038	0.3	880	11.0	387
7/11/2019	915218.27	937430.38	1169.67	915591.19	936527.54	1169.376691	916044.21	937509.77	1166.626839	-2771	-893	-775298	-893	2771	72.1	0.0038	0.3	880	11.0	387
7/12/2019	915218.27	937430.38	1169.67	915591.19	936527.54	1169.293331	916044.21	937509.77	1166.60085	-2801	-833	-775298	-833	2801	73.4	0.0038	0.3	880	11.1	386
7/13/2019	915218.27	937430.38	1169.57	915591.19	936527.54	1169.20278	916044.21	937509.77	1166.498763	-2802	-842	-775298	-842	2802	73.3	0.0038	0.3	880	11.1	385
7/14/2019	915218.27	937430.38	1169.5	915591.19	936527.54	1169.077198	916044.21	937509.77	1166.360586	-2838	-835	-775298	-835	2838	73.6	0.0038	0.3	880	11.2	382
7/15/2019	915218.27	937430.38	1169.5	915591.19	936527.54	1168.987045	916044.21	937509.77	1166.352873	-2853	-764	-775298	-764	2853	75.0	0.0038	0.3	880	11.2	383
7/16/2019	915218.27	937430.38	1169.37	915591.19	936527.54	1172.256226	916044.21	937509.77	1166.268403	-2571	-3540	-775298	-3540	2571	36.0	0.0056	0.3	880	16.6	314

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
7/17/2019	915218.27	937430.38	1169.4	915591.19	936527.54	1168.888189	916044.21	937509.77	1166.292174	-2817	-750	-775298	-750	2817	75.1	0.0038	0.3	880	11.0	385
7/18/2019	915218.27	937430.38	1169.3	915591.19	936527.54	1168.823201	916044.21	937509.77	1166.250191	-2762	-757	-775298	-757	2762	74.7	0.0037	0.3	880	10.8	387
7/19/2019	915218.27	937430.38	1169.27	915591.19	936527.54	1168.763247	916044.21	937509.77	1166.232831	-2782	-714	-775298	-714	2782	75.6	0.0037	0.3	880	10.9	387
7/20/2019	915218.27	937430.38	1169.1	915591.19	936527.54	1168.707623	916044.21	937509.77	1166.159706	-2656	-786	-775298	-786	2656	73.5	0.0036	0.3	880	10.5	393
7/21/2019	915218.27	937430.38	1169.07	915591.19	936527.54	1168.60479	916044.21	937509.77	1166.031435	-2780	-749	-775298	-749	2780	74.9	0.0037	0.3	880	10.9	385
7/22/2019	915218.27	937430.38	1167.5	915591.19	936527.54	1168.549826	916044.21	937509.77	1166.046592	-1199	-1423	-775298	-1423	1199	40.1	0.0024	0.3	880	7.0	466
7/23/2019	915218.27	937430.38	1168.97	915591.19	936527.54	1168.521993	916044.21	937509.77	1165.930375	-2780	-764	-775298	-764	2780	74.6	0.0037	0.3	880	10.9	384
7/24/2019	915218.27	937430.38	1169.07	915591.19	936527.54	1168.461019	916044.21	937509.77	1165.592849	-3188	-794	-775298	-794	3188	76.0	0.0042	0.3	880	12.4	361
7/25/2019	915218.27	937430.38	1168.87	915591.19	936527.54	1168.404021	916044.21	937509.77	1165.52183	-3060	-864	-775298	-864	3060	74.2	0.0041	0.3	880	12.0	365
7/26/2019	915218.27	937430.38	1168.9	915591.19	936527.54	1168.32762	916044.21	937509.77	1165.883913	-2739	-666	-775298	-666	2739	76.3	0.0036	0.3	880	10.7	388
7/27/2019	915218.27	937430.38	1168.67	915591.19	936527.54	1168.251245	916044.21	937509.77	1165.770728	-2651	-735	-775298	-735	2651	74.5	0.0035	0.3	880	10.4	391
7/28/2019	915218.27	937430.38	1168.57	915591.19	936527.54	1168.132222	916044.21	937509.77	1165.952267	-2398	-615	-775298	-615	2398	75.6	0.0032	0.3	880	9.4	412
7/29/2019	915218.27	937430.38	1168.57	915591.19	936527.54	1168.042556	916044.21	937509.77	1165.556724	-2762	-688	-775298	-688	2762	76.0	0.0037	0.3	880	10.8	384
7/30/2019	915218.27	937430.38	1168.37	915591.19	936527.54	1167.983953	916044.21	937509.77	1165.446604	-2670	-771	-775298	-771	2670	73.9	0.0036	0.3	880	10.5	387
7/31/2019	915218.27	937430.38	1168.07	915591.19	936527.54	1167.852631	916044.21	937509.77	1165.327133	-2494	-843	-775298	-843	2494	71.3	0.0034	0.3	880	10.0	396
8/1/2019	915218.27	937430.38	1168.27	915591.19	936527.54	1167.737104	916044.21	937509.77	1165.248737	-2770	-687	-775298	-687	2770	76.1	0.0037	0.3	880	10.8	382
8/2/2019	915218.27	937430.38	1168.3	915591.19	936527.54	1167.679399	916044.21	937509.77	1165.279043	-2747	-628	-775298	-628	2747	77.1	0.0036	0.3	880	10.7	384
8/3/2019	915218.27	937430.38	1168.17	915591.19	936527.54	1167.616816	916044.21	937509.77	1165.243645	-2686	-634	-775298	-634	2686	76.7	0.0036	0.3	880	10.4	388
8/4/2019	915218.27	937430.38	1168.07	915591.19	936527.54	1167.525642	916044.21	937509.77	1165.129453	-2698	-647	-775298	-647	2698	76.5	0.0036	0.3	880	10.5	386
8/5/2019	915218.27	937430.38	1168.0	915591.19	936527.54	1167.42985	916044.21	937509.77	1165.066644	-2664	-637	-775298	-637	2664	76.6	0.0035	0.3	880	10.4	388
8/6/2019	915218.27	937430.38	1167.77	915591.19	936527.54	1167.332634	916044.21	937509.77	1164.943285	-2587	-693	-775298	-693	2587	75.0	0.0035	0.3	880	10.1	391
8/7/2019	915218.27	937430.38	1167.87	915591.19	936527.54	1167.233148	916044.21	937509.77	1164.875975	-2754	-591	-775298	-591	2754	77.9	0.0036	0.3	880	10.7	382
8/8/2019	915218.27	937430.38	1167.67	915591.19	936527.54	1167.145868	916044.21	937509.77	1164.786566	-2645	-642	-775298	-642	2645	76.3	0.0035	0.3	880	10.3	387
8/9/2019	915218.27	937430.38	1167.67	915591.19	936527.54	1167.059958	916044.21	937509.77	1164.752256	-2683	-584	-775298	-584	2683	77.7	0.0035	0.3	880	10.4	385
8/10/2019	915218.27	937430.38	1167.47	915591.19	936527.54	1166.969519	916044.21	937509.77	1164.655022	-2581	-636	-775298	-636	2581	76.2	0.0034	0.3	880	10.1	390
8/11/2019	915218.27	937430.38	1167.37	915591.19	936527.54	1166.833545	916044.21	937509.77	1164.490861	-2642	-631	-775298	-631	2642	76.6	0.0035	0.3	880	10.3	385
8/12/2019	915218.27	937430.38	1167.37	915591.19	936527.54	1166.739182	916044.21	937509.77	1164.470933	-2667	-560	-775298	-560	2667	78.1	0.0035	0.3	880	10.3	385
8/13/2019	915218.27	937430.38	1167.17	915591.19	936527.54	1166.64728	916044.21	937509.77	1164.3678	-2571	-613	-775298	-613	2571	76.6	0.0034	0.3	880	10.0	389
8/14/2019	915218.27	937430.38	1167.17	915591.19	936527.54	1166.523942	916044.21	937509.77	1164.259317	-2679	-552	-775298	-552	2679	78.4	0.0035	0.3	880	10.3	383
8/15/2019	915218.27	937430.38	1166.97	915591.19	936527.54	1166.420663	916044.21	937509.77	1164.152441	-2587	-597	-775298	-597	2587	77.0	0.0034	0.3	880	10.0	387
8/16/2019	915218.27	937430.38	1166.97	915591.19	936527.54	1166.331285	916044.21	937509.77	1164.11974	-2624	-535	-775298	-535	2624	78.5	0.0035	0.3	880	10.1	385
8/17/2019	915218.27	937430.38	1166.87	915591.19	936527.54	1166.236221	916044.21	937509.77	1164.018479	-2625	-540	-775298	-540	2625	78.4	0.0035	0.3	880	10.1	385
8/18/2019	915218.27	937430.38	1166.77	915591.19	936527.54	1166.130823	916044.21	937509.77	1163.869144	-2670	-554	-775298	-554	2670	78.3	0.0035	0.3	880	10.3	381
8/19/2019	915218.27	937430.38	1166.77	915591.19	936527.54	1166.05203	916044.21	937509.77	1163.87371	-2672	-487	-775298	-487	2672	79.7	0.0035	0.3	880	10.3	381
8/20/2019	915218.27	937430.38	1166.47	915591.19	936527.54	1165.970929	916044.21	937509.77	1163.778281	-2470	-592	-775298	-592	2470	76.5	0.0033	0.3	880	9.6	392
8/21/2019	915218.27	937430.38	1166.57	915591.19	936527.54	1172.256226	916044.21	937509.77	1163.672973	-2164	-5777	-775298	-5777	2164	20.5	0.0033	0.3	880	9.8	390
8/22/2019	915218.27	937430.38	1166.37	915591.19	936527.54	1165.759262	916044.21	937509.77	1163.576209	-2571	-537	-775298	-537	2571	78.2	0.0034	0.3	880	9.9	385
8/23/2019	915218.27	937430.38	1166.37	915591.19	936527.54	1165.651822	916044.21	937509.77	1163.496694	-2651	-478	-775298	-478	2651	79.8	0.0035	0.3	880	10.2	380
8/24/2019	915218.27	937430.38	1166.17	915591.19	936527.54	1165.548792	916044.21	937509.77	1163.385571	-2563	-525	-775298	-525	2563	78.4	0.0034	0.3	880	9.9	385
8/25/2019	915218.27	937430.38	1165.97	915591.19	936527.54	1165.398323	916044.21	937509.77	1163.202028	-2544	-560	-775298	-560	2544	77.6	0.0034	0.3	880	9.9	384
8/26/2019	915218.27	937430.38	1165.97	915591.19	936527.54	1165.304111	916044.21	937509.77	1163.176597	-2575	-492	-775298	-492	2575	79.2	0.0034	0.3	880	9.9	383
8/27/2019	915218.27	937430.38	1165.87	915591.19	936527.54	1165.200067	916044.21	937509.77	1163.058527	-2591	-495	-775298	-495	2591	79.2	0.0034	0.3	880	10.0	381
8/28/2019	915218.27	937430.38	1165.87	915591.19	936527.54	1165.111519	916044.21	937509.77	1163.002141	-2649	-443	-775298	-443	2649	80.5	0.0035	0.3	880	10.2	378
8/29/2019	915218.27	937430.38	1165.67	915591.19	936527.54	1165.043682	916044.21	937509.77	1162.943211	-2512	-500	-775298	-500	2512	78.8	0.0033	0.3	880	9.7	385
8/30/2019	915218.27	937430.38	1165.67	915591.19	936527.54	1164.95148	916044.21	937509.77	1162.884898	-2572	-445	-775298	-445	2572	80.2	0.0034	0.3	880	9.9	382
8/31/2019	915218.27	937430.38	1165.47	915591.19	936527.54	1164.848524	916044.21	937509.77	1162.75676	-2499	-499	-775298	-499	2499	78.7	0.0033	0.3	880	9.6	385
9/1/2019	915218.27	937430.38	1165.37	915591.19	936527.54	1164.702505	916044.21	937509.77	1162.57494	-2576	-491	-775298	-491	2576	79.2	0.0034	0.3	880	9.9	379
9/2/2019	915218.27	937430.38	1165.27	915591.19	936527.54	1164.57895	916044.21	937509.77	1162.574309	-2489	-435	-775298	-435	2489	80.1	0.0033	0.3	880	9.6	385
9/3/2019	915218.27	937430.38	1165.07	915591.19	936527.54	1164.548186	916044.21	937509.77	1162.472085	-2387	-538	-775298	-538	2387	77.3	0.0032	0.3	880	9.3	390
9/4/2019	915218.27	937430.38	1165.07	915591.19	936527.54	1164.42974	916044.21	937509.77	1162.349706	-2507	-486	-775298	-486	2507	79.0	0.0033	0.3	880	9.7	382
9/5/2019	915218.27	937430.38	1164.97	915591.19	936527.54	1164.327102	916044.21	937509.77	1162.207318	-2545	-499	-775298	-499	2545	78.9	0.0033	0.3	880	9.8	378
9/6/2019	915218.27	937430.38	1164.97	915591.19	936527.54	1164.229	916044.21	937509.77	1162.159259	-2596	-436	-775298	-436	2596	80.5	0.0034	0.3	880	10.0	376
9/7/2019	915218.27	937430.38	1164.47	915591.19	936527.54	1164.148974	916044.21	937509.77	1162.060999	-2200	-633	-775298	-633	2200	73.9	0.0030	0.3	880	8.7	399
9/8/2019	915218.27	937430.38	1164.67	915591.19	936527.54	1163.997099	916044.21	937509.77	1161.884666	-2568	-483	-775298	-483	2568	79.4	0.0034	0.3	880	9.9	375

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
9/9/2019	915218.27	937430.38	1164.67	915591.19	936527.54	1163.919176	916044.21	937509.77	1161.867336	-2590	-425	-775298	-425	2590	80.7	0.0034	0.3	880	9.9	374
9/10/2019	915218.27	937430.38	1164.47	915591.19	936527.54	1163.827205	916044.21	937509.77	1161.743974	-2512	-486	-775298	-486	2512	79.1	0.0033	0.3	880	9.7	378
9/11/2019	915218.27	937430.38	1164.37	915591.19	936527.54	1163.712053	916044.21	937509.77	1161.649791	-2508	-471	-775298	-471	2508	79.4	0.0033	0.3	880	9.7	377
9/12/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.615012	916044.21	937509.77	1161.534732	-2522	-479	-775298	-479	2522	79.2	0.0033	0.3	880	9.7	376
9/13/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.509383	916044.21	937509.77	1161.469987	-2588	-416	-775298	-416	2588	80.9	0.0034	0.3	880	9.9	372
9/14/2019	915218.27	937430.38	1164.07	915591.19	936527.54	1163.423229	916044.21	937509.77	1161.354928	-2503	-478	-775298	-478	2503	79.2	0.0033	0.3	880	9.6	376
9/15/2019	915218.27	937430.38	1163.87	915591.19	936527.54	1163.263273	916044.21	937509.77	1161.15551	-2499	-511	-775298	-511	2499	78.4	0.0033	0.3	880	9.7	374
9/16/2019	915218.27	937430.38	1163.97	915591.19	936527.54	1163.179483	916044.21	937509.77	1161.14097	-2617	-402	-775298	-402	2617	81.3	0.0034	0.3	880	10.0	368
9/17/2019	915218.27	937430.38	1163.67	915591.19	936527.54	1163.094715	916044.21	937509.77	1161.025555	-2433	-511	-775298	-511	2433	78.1	0.0032	0.3	880	9.4	378
9/18/2019	915218.27	937430.38	1163.57	915591.19	936527.54	1162.971992	916044.21	937509.77	1160.93371	-2428	-489	-775298	-489	2428	78.6	0.0032	0.3	880	9.4	378
9/19/2019	915218.27	937430.38	1163.47	915591.19	936527.54	1162.862191	916044.21	937509.77	1160.784396	-2473	-500	-775298	-500	2473	78.6	0.0033	0.3	880	9.5	373
9/20/2019	915218.27	937430.38	1163.37	915591.19	936527.54	1162.772455	916044.21	937509.77	1160.740143	-2422	-487	-775298	-487	2422	78.6	0.0032	0.3	880	9.3	377
9/21/2019	915218.27	937430.38	1163.27	915591.19	936527.54	1162.650763	916044.21	937509.77	1160.544421	-2510	-505	-775298	-505	2510	78.6	0.0033	0.3	880	9.7	369
9/22/2019	915218.27	937430.38	1163.17	915591.19	936527.54	1162.494195	916044.21	937509.77	1160.385993	-2567	-480	-775298	-480	2567	79.4	0.0034	0.3	880	9.9	365
9/23/2019	915218.27	937430.38	1162.67	915591.19	936527.54	1162.41843	916044.21	937509.77	1160.395434	-2074	-640	-775298	-640	2074	72.8	0.0028	0.3	880	8.2	397
9/24/2019	915218.27	937430.38	1162.97	915591.19	936527.54	1162.334799	916044.21	937509.77	1160.270498	-2488	-482	-775298	-482	2488	79.0	0.0033	0.3	880	9.6	369
9/25/2019	915218.27	937430.38	1162.97	915591.19	936527.54	1162.22508	916044.21	937509.77	1160.210827	-2550	-414	-775298	-414	2550	80.8	0.0033	0.3	880	9.8	366
9/26/2019	915218.27	937430.38	1162.77	915591.19	936527.54	1162.130791	916044.21	937509.77	1160.081638	-2478	-475	-775298	-475	2478	79.2	0.0033	0.3	880	9.5	369
9/27/2019	915218.27	937430.38	1162.77	915591.19	936527.54	1162.030645	916044.21	937509.77	1160.035685	-2527	-409	-775298	-409	2527	80.8	0.0033	0.3	880	9.7	366
9/28/2019	915218.27	937430.38	1162.57	915591.19	936527.54	1161.934627	916044.21	937509.77	1159.8883	-2472	-475	-775298	-475	2472	79.1	0.0032	0.3	880	9.5	368
9/29/2019	915218.27	937430.38	1162.47	915591.19	936527.54	1161.780091	916044.21	937509.77	1159.723805	-2534	-454	-775298	-454	2534	79.8	0.0033	0.3	880	9.7	363
9/30/2019	915218.27	937430.38	1162.47	915591.19	936527.54	1161.707904	916044.21	937509.77	1159.744256	-2521	-387	-775298	-387	2521	81.3	0.0033	0.3	880	9.7	365
10/1/2019	915218.27	937430.38	1162.27	915591.19	936527.54	1172.256226	916044.21	937509.77	1159.623059	-1597	-9235	-775298	-9235	1597	9.8	0.0033	0.3	880	9.6	364
10/2/2019	915218.27	937430.38	1162.27	915591.19	936527.54	1161.51579	916044.21	937509.77	1159.554455	-2512	-390	-775298	-390	2512	81.2	0.0033	0.3	880	9.6	364
10/3/2019	915218.27	937430.38	1162.17	915591.19	936527.54	1161.414631	916044.21	937509.77	1159.455683	-2511	-388	-775298	-388	2511	81.2	0.0033	0.3	880	9.6	363
10/4/2019	915218.27	937430.38	1162.27	915591.19	936527.54	1161.48249	916044.21	937509.77	1159.521271	-2544	-375	-775298	-375	2544	81.6	0.0033	0.3	880	9.7	362
10/5/2019	915218.27	937430.38	1162.07	915591.19	936527.54	1161.376574	916044.21	937509.77	1159.435447	-2434	-410	-775298	-410	2434	80.4	0.0032	0.3	880	9.3	368
10/6/2019	915218.27	937430.38	1162.07	915591.19	936527.54	1161.240104	916044.21	937509.77	1159.267646	-2596	-360	-775298	-360	2596	82.1	0.0034	0.3	880	9.9	357
10/7/2019	915218.27	937430.38	1162.07	915591.19	936527.54	1161.254514	916044.21	937509.77	1159.350586	-2520	-341	-775298	-341	2520	82.3	0.0033	0.3	880	9.6	362
10/8/2019	915218.27	937430.38	1161.87	915591.19	936527.54	1161.252108	916044.21	937509.77	1159.325738	-2346	-438	-775298	-438	2346	79.4	0.0031	0.3	880	9.0	373
10/9/2019	915218.27	937430.38	1161.97	915591.19	936527.54	1161.1437	916044.21	937509.77	1159.256535	-2515	-329	-775298	-329	2515	82.5	0.0033	0.3	880	9.6	362
10/10/2019	915218.27	937430.38	1161.77	915591.19	936527.54	1161.079894	916044.21	937509.77	1159.159967	-2411	-403	-775298	-403	2411	80.5	0.0032	0.3	880	9.2	368
10/11/2019	915218.27	937430.38	1161.77	915591.19	936527.54	1161.008715	916044.21	937509.77	1159.140993	-2434	-352	-775298	-352	2434	81.8	0.0032	0.3	880	9.3	367
10/12/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.942744	916044.21	937509.77	1159.024094	-2348	-431	-775298	-431	2348	79.6	0.0031	0.3	880	9.0	371
10/13/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.810934	916044.21	937509.77	1158.85587	-2511	-385	-775298	-385	2511	81.3	0.0033	0.3	880	9.6	359
10/14/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.753957	916044.21	937509.77	1158.873325	-2499	-332	-775298	-332	2499	82.4	0.0033	0.3	880	9.5	361
10/15/2019	915218.27	937430.38	1161.27	915591.19	936527.54	1160.692641	916044.21	937509.77	1158.75936	-2313	-459	-775298	-459	2313	78.8	0.0030	0.3	880	8.9	371
10/16/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.608843	916044.21	937509.77	1158.704183	-2467	-365	-775298	-365	2467	81.6	0.0032	0.3	880	9.4	361
10/17/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.798264	916044.21	937509.77	1158.717122	-2441	-517	-775298	-517	2441	78.0	0.0032	0.3	880	9.4	361
10/18/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.735383	916044.21	937509.77	1158.875088	-2499	-316	-775298	-316	2499	82.8	0.0032	0.3	880	9.5	361
10/19/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.744788	916044.21	937509.77	1158.904692	-2275	-403	-775298	-403	2275	80.0	0.0030	0.3	880	8.7	375
10/20/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.666409	916044.21	937509.77	1158.783971	-2391	-383	-775298	-383	2391	80.9	0.0031	0.3	880	9.2	367
10/21/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.690743	916044.21	937509.77	1158.8731	-2505	-280	-775298	-280	2505	83.6	0.0033	0.3	880	9.5	361
10/22/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.696887	916044.21	937509.77	1158.814673	-2360	-397	-775298	-397	2360	80.5	0.0031	0.3	880	9.1	369
10/23/2019	915218.27	937430.38	1161.47	915591.19	936527.54	1160.699358	916044.21	937509.77	1158.827793	-2447	-349	-775298	-349	2447	81.9	0.0032	0.3	880	9.4	364
10/24/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.684773	916044.21	937509.77	1158.806947	-2368	-390	-775298	-390	2368	80.7	0.0031	0.3	880	9.1	368
10/25/2019	915218.27	937430.38	1161.57	915591.19	936527.54	1160.685301	916044.21	937509.77	1158.856853	-2520	-281	-775298	-281	2520	83.6	0.0033	0.3	880	9.6	360
10/26/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.705593	916044.21	937509.77	1158.820713	-2354	-402	-775298	-402	2354	80.3	0.0031	0.3	880	9.0	369
10/27/2019	915218.27	937430.38	1161.27	915591.19	936527.54	1160.586991	916044.21	937509.77	1158.659805	-2411	-409	-775298	-409	2411	80.4	0.0032	0.3	880	9.3	364
10/28/2019	915218.27	937430.38	1161.47	915591.19	936527.54	1160.666566	916044.21	937509.77	1158.799692	-2475	-332	-775298	-332	2475	82.4	0.0032	0.3	880	9.4	362
10/29/2019	915218.27	937430.38	1161.27	915591.19	936527.54	1160.681729	916044.21	937509.77	1158.758215	-2314	-451	-775298	-451	2314	79.0	0.0030	0.3	880	8.9	371
10/30/2019	915218.27	937430.38	1161.37	915591.19	936527.54	1160.661161	916044.21	937509.77	1158.770705	-2403	-384	-775298	-384	2403	80.9	0.0031	0.3	880	9.2	366
10/31/2019	915218.27	937430.38	1161.67	915591.19	936527.54	1160.688882	916044.21	937509.77	1158.766377	-2699	-272	-775298	-272	2699	84.2	0.0035	0.3	880	10.3	348
11/1/2019	915218.27	937430.38	1162.27	915591.19	936527.54	1161.153755	916044.21	937509.77	1159.38325	-2695	-155	-775298	-155	2695	86.7	0.0035	0.3	880	10.2	353

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
11/2/2019	915218.27	937430.38	1162.37	915591.19	936527.54	1161.40082	916044.21	937509.77	1159.901491	-2306	-120	-775298	-120	2306	87.0	0.0030	0.3	880	8.7	383
11/3/2019	915218.27	937430.38	1162.67	915591.19	936527.54	1172.256226	916044.21	937509.77	1160.118394	-1543	-8869	-775298	-8869	1543	9.9	0.0030	0.3	880	8.8	383
11/4/2019	915218.27	937430.38	1162.97	915591.19	936527.54	1161.876076	916044.21	937509.77	1160.472821	-2341	-28	-775298	-28	2341	89.3	0.0030	0.3	880	8.9	384
11/5/2019	915218.27	937430.38	1163.07	915591.19	936527.54	1162.144806	916044.21	937509.77	1160.652831	-2256	-137	-775298	-137	2256	86.5	0.0029	0.3	880	8.6	392
11/6/2019	915218.27	937430.38	1163.37	915591.19	936527.54	1162.331873	916044.21	937509.77	1160.815619	-2389	-95	-775298	-95	2389	87.7	0.0031	0.3	880	9.0	383
11/7/2019	915218.27	937430.38	1163.47	915591.19	936527.54	1162.53564	916044.21	937509.77	1160.943654	-2355	-170	-775298	-170	2355	85.9	0.0030	0.3	880	8.9	386
11/8/2019	915218.27	937430.38	1163.67	915591.19	936527.54	1162.698486	916044.21	937509.77	1161.11473	-2384	-150	-775298	-150	2384	86.4	0.0031	0.3	880	9.0	385
11/9/2019	915218.27	937430.38	1163.37	915591.19	936527.54	1162.833307	916044.21	937509.77	1161.139753	-2056	-388	-775298	-388	2056	79.3	0.0027	0.3	880	7.9	409
11/10/2019	915218.27	937430.38	1163.57	915591.19	936527.54	1162.825195	916044.21	937509.77	1161.026305	-2356	-333	-775298	-333	2356	81.9	0.0031	0.3	880	9.0	385
11/11/2019	915218.27	937430.38	1163.97	915591.19	936527.54	1162.964804	916044.21	937509.77	1161.270563	-2517	-176	-775298	-176	2517	86.0	0.0033	0.3	880	9.5	377
11/12/2019	915218.27	937430.38	1163.67	915591.19	936527.54	1163.07166	916044.21	937509.77	1161.310824	-2177	-386	-775298	-386	2177	80.0	0.0029	0.3	880	8.4	400
11/13/2019	915218.27	937430.38	1163.67	915591.19	936527.54	1163.100425	916044.21	937509.77	1161.350509	-2139	-395	-775298	-395	2139	79.6	0.0028	0.3	880	8.2	404
11/14/2019	915218.27	937430.38	1163.87	915591.19	936527.54	1163.142769	916044.21	937509.77	1161.318663	-2361	-351	-775298	-351	2361	81.5	0.0031	0.3	880	9.0	387
11/15/2019	915218.27	937430.38	1163.87	915591.19	936527.54	1163.200655	916044.21	937509.77	1161.439748	-2247	-353	-775298	-353	2247	81.1	0.0029	0.3	880	8.6	396
11/16/2019	915218.27	937430.38	1163.87	915591.19	936527.54	1163.258917	916044.21	937509.77	1161.454615	-2229	-396	-775298	-396	2229	79.9	0.0029	0.3	880	8.6	397
11/17/2019	915218.27	937430.38	1163.97	915591.19	936527.54	1163.249496	916044.21	937509.77	1161.406951	-2371	-361	-775298	-361	2371	81.4	0.0031	0.3	880	9.1	386
11/18/2019	915218.27	937430.38	1164.17	915591.19	936527.54	1163.340079	916044.21	937509.77	1161.588014	-2397	-277	-775298	-277	2397	83.4	0.0031	0.3	880	9.1	387
11/19/2019	915218.27	937430.38	1164.07	915591.19	936527.54	1163.397097	916044.21	937509.77	1161.602748	-2281	-364	-775298	-364	2281	80.9	0.0030	0.3	880	8.7	395
11/20/2019	915218.27	937430.38	1164.17	915591.19	936527.54	1163.428535	916044.21	937509.77	1161.650276	-2334	-327	-775298	-327	2334	82.0	0.0030	0.3	880	8.9	391
11/21/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.474625	916044.21	937509.77	1161.644815	-2433	-322	-775298	-322	2433	82.5	0.0032	0.3	880	9.3	384
11/22/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.515075	916044.21	937509.77	1161.744543	-2340	-318	-775298	-318	2340	82.3	0.0030	0.3	880	8.9	392
11/23/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.540789	916044.21	937509.77	1161.725385	-2355	-347	-775298	-347	2355	81.6	0.0031	0.3	880	9.0	390
11/24/2019	915218.27	937430.38	1164.27	915591.19	936527.54	1163.505099	916044.21	937509.77	1161.650677	-2426	-345	-775298	-345	2426	81.9	0.0032	0.3	880	9.3	384
11/25/2019	915218.27	937430.38	1164.37	915591.19	936527.54	1163.555435	916044.21	937509.77	1161.795628	-2389	-287	-775298	-287	2389	83.1	0.0031	0.3	880	9.1	389
11/26/2019	915218.27	937430.38	1164.47	915591.19	936527.54	1163.593546	916044.21	937509.77	1161.786685	-2492	-277	-775298	-277	2492	83.7	0.0032	0.3	880	9.5	381
11/27/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1163.626562	916044.21	937509.77	1161.850356	-2530	-235	-775298	-235	2530	84.7	0.0033	0.3	880	9.6	380
11/28/2019	915218.27	937430.38	1164.47	915591.19	936527.54	1163.651063	916044.21	937509.77	1161.840614	-2439	-304	-775298	-304	2439	82.9	0.0032	0.3	880	9.3	385
11/29/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1172.256226	916044.21	937509.77	1161.945297	-1759	-7327	-775298	-7327	1759	13.5	0.0032	0.3	880	9.3	386
11/30/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1163.755489	916044.21	937509.77	1161.952158	-2428	-304	-775298	-304	2428	82.9	0.0032	0.3	880	9.3	387
12/1/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1163.751744	916044.21	937509.77	1161.896285	-2479	-321	-775298	-321	2479	82.6	0.0032	0.3	880	9.5	383
12/2/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1163.84494	916044.21	937509.77	1162.077224	-2308	-331	-775298	-331	2308	81.8	0.0030	0.3	880	8.8	396
12/3/2019	915218.27	937430.38	1164.57	915591.19	936527.54	1163.887484	916044.21	937509.77	1162.054275	-2325	-374	-775298	-374	2325	80.9	0.0030	0.3	880	8.9	394
12/4/2019	915218.27	937430.38	1164.67	915591.19	936527.54	1163.920473	916044.21	937509.77	1162.117591	-2364	-333	-775298	-333	2364	82.0	0.0031	0.3	880	9.0	392
12/5/2019	915218.27	937430.38	1164.67	915591.19	936527.54	1163.937708	916044.21	937509.77	1162.097266	-2381	-355	-775298	-355	2381	81.5	0.0031	0.3	880	9.1	391
12/6/2019	915218.27	937430.38	1162.87	915591.19	936527.54	1163.985305	916044.21	937509.77	1162.189519	-526	-1175	-775298	-1175	526	24.1	0.0017	0.3	880	4.9	517
12/7/2019	915218.27	937430.38	1164.47	915591.19	936527.54	1163.980623	916044.21	937509.77	1162.101532	-2177	-479	-775298	-479	2177	77.6	0.0029	0.3	880	8.4	404
12/8/2019	915218.27	937430.38	1164.67	915591.19	936527.54	1163.924003	916044.21	937509.77	1161.980319	-2488	-387	-775298	-387	2488	81.2	0.0032	0.3	880	9.5	382
12/9/2019	915218.27	937430.38	1162.77	915591.19	936527.54	1164.031871	916044.21	937509.77	1162.18117	-431	-1262	-775298	-1262	431	18.9	0.0017	0.3	880	5.0	507
12/10/2019	915218.27	937430.38	1164.97	915591.19	936527.54	1164.243485	916044.21	937509.77	1162.313475	-2456	-391	-775298	-391	2456	81.0	0.0032	0.3	880	9.4	386
12/11/2019	915218.27	937430.38	1165.27	915591.19	936527.54	1164.381235	916044.21	937509.77	1162.694009	-2396	-227	-775298	-227	2396	84.6	0.0031	0.3	880	9.1	395
12/12/2019	915218.27	937430.38	1165.57	915591.19	936527.54	1164.559213	916044.21	937509.77	1162.929532	-2464	-150	-775298	-150	2464	86.5	0.0032	0.3	880	9.3	392
12/13/2019	915218.27	937430.38	1165.87	915591.19	936527.54	1164.800638	916044.21	937509.77	1163.244772	-2455	-96	-775298	-96	2455	87.8	0.0032	0.3	880	9.3	395
12/14/2019	915218.27	937430.38	1165.07	915591.19	936527.54	1165.070508	916044.21	937509.77	1163.43559	-1476	-610	-775298	-610	1476	67.5	0.0021	0.3	880	6.0	483
12/15/2019	915218.27	937430.38	1166.27	915591.19	936527.54	1165.278478	916044.21	937509.77	1163.633684	-2459	-164	-775298	-164	2459	86.2	0.0032	0.3	880	9.3	397
12/16/2019	915218.27	937430.38	1166.67	915591.19	936527.54	1165.51739	916044.21	937509.77	1164.01817	-2486	-37	-775298	-37	2486	89.1	0.0032	0.3	880	9.4	398
12/17/2019	915218.27	937430.38	1166.77	915591.19	936527.54	1165.77527	916044.21	937509.77	1164.240844	-2362	-122	-775298	-122	2362	87.1	0.0031	0.3	880	8.9	409
12/18/2019	915218.27	937430.38	1167.07	915591.19	936527.54	1165.986347	916044.21	937509.77	1164.453415	-2448	-81	-775298	-81	2448	88.1	0.0032	0.3	880	9.3	404
12/19/2019	915218.27	937430.38	1167.17	915591.19	936527.54	1166.15761	916044.21	937509.77	1164.561918	-2435	-136	-775298	-136	2435	86.8	0.0031	0.3	880	9.2	405
12/20/2019	915218.27	937430.38	1167.37	915591.19	936527.54	1166.31338	916044.21	937509.77	1164.705979	-2489	-121	-775298	-121	2489	87.2	0.0032	0.3	880	9.4	402
12/21/2019	915218.27	937430.38	1166.47	915591.19	936527.54	1166.459404	916044.21	937509.77	1164.75349	-1551	-631	-775298	-631	1551	67.8	0.0022	0.3	880	6.3	483
12/22/2019	915218.27	937430.38	1167.37	915591.19	936527.54	1166.562331	916044.21	937509.77	1164.780871	-2402	-298	-775298	-298	2402	82.9	0.0031	0.3	880	9.2	408
12/23/2019	915218.27	937430.38	1167.67	915591.19	936527.54	1166.689394	916044.21	937509.77	1164.913286	-2567	-218	-775298	-218	2567	85.1	0.0033	0.3	880	9.7	398
12/24/2019	915218.27	937430.38	1167.67	915591.19	936527.54	1166.797673	916044.21	937509.77	1164.965209	-2511	-288	-775298	-288	2511	83.5	0.0033	0.3	880	9.6	402
12/25/2019	915218.27	937430.38	1167.77	915591.19	936527.54	1166.9033	916044.21	937509.77	1165.057809	-2517	-296	-775298	-296	2517	83.3	0.0033	0.3	880	9.6	402

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
12/26/2019	915218.27	937430.38	1167.77	915591.19	936527.54	1166.999778	916044.21	937509.77	1165.09999	-2472	-360	-775298	-360	2472	81.7	0.0032	0.3	880	9.5	405
12/27/2019	915218.27	937430.38	1167.97	915591.19	936527.54	1167.116029	916044.21	937509.77	1165.211105	-2559	-324	-775298	-324	2559	82.8	0.0033	0.3	880	9.8	400
12/28/2019	915218.27	937430.38	1166.97	915591.19	936527.54	1167.207092	916044.21	937509.77	1165.243061	-1540	-840	-775298	-840	1540	61.4	0.0023	0.3	880	6.6	476
12/29/2019	915218.27	937430.38	1168.07	915591.19	936527.54	1167.288296	916044.21	937509.77	1165.29297	-2569	-390	-775298	-390	2569	81.4	0.0034	0.3	880	9.8	399
12/30/2019	915218.27	937430.38	1166.57	915591.19	936527.54	1167.486437	916044.21	937509.77	1165.517154	-878	-1150	-775298	-1150	878	37.4	0.0019	0.3	880	5.5	521
12/31/2019	915218.27	937430.38	1168.57	915591.19	936527.54	1167.657692	916044.21	937509.77	1165.710525	-2654	-313	-775298	-313	2654	83.3	0.0034	0.3	880	10.1	396
1/1/2020	915218.27	937430.38	1167.57	915591.19	936527.54	1167.808396	916044.21	937509.77	1165.909679	-1480	-816	-775298	-816	1480	61.1	0.0022	0.3	880	6.4	490
1/2/2020	915218.27	937430.38	1168.67	915591.19	936527.54	1167.93213	916044.21	937509.77	1165.80646	-2644	-458	-775298	-458	2644	80.2	0.0035	0.3	880	10.2	396
1/3/2020	915218.27	937430.38	1168.87	915591.19	936527.54	1168.04392	916044.21	937509.77	1165.990959	-2665	-391	-775298	-391	2665	81.6	0.0035	0.3	880	10.2	397
1/4/2020	915218.27	937430.38	1168.07	915591.19	936527.54	1172.256226	916044.21	937509.77	1166.117567	-1430	-4186	-775298	-4186	1430	18.9	0.0057	0.3	880	16.7	306
1/5/2020	915218.27	937430.38	1168.97	915591.19	936527.54	1168.256826	916044.21	937509.77	1166.156485	-2597	-460	-775298	-460	2597	80.0	0.0034	0.3	880	10.0	402
1/6/2020	915218.27	937430.38	1169.17	915591.19	936527.54	1168.375846	916044.21	937509.77	1166.298263	-2656	-415	-775298	-415	2656	81.1	0.0035	0.3	880	10.2	399
1/7/2020	915218.27	937430.38	1169.17	915591.19	936527.54	1168.483611	916044.21	937509.77	1166.36471	-2587	-479	-775298	-479	2587	79.5	0.0034	0.3	880	10.0	404
1/8/2020	915218.27	937430.38	1169.17	915591.19	936527.54	1168.575011	916044.21	937509.77	1166.473707	-2482	-514	-775298	-514	2482	78.3	0.0033	0.3	880	9.6	411
1/9/2020	915218.27	937430.38	1169.27	915591.19	936527.54	1168.605977	916044.21	937509.77	1166.43885	-2609	-507	-775298	-507	2609	79.0	0.0034	0.3	880	10.1	402
1/10/2020	915218.27	937430.38	1169.37	915591.19	936527.54	1168.712258	916044.21	937509.77	1166.55718	-2592	-506	-775298	-506	2592	79.0	0.0034	0.3	880	10.0	404
1/11/2020	915218.27	937430.38	1168.47	915591.19	936527.54	1168.869486	916044.21	937509.77	1166.628988	-1630	-1017	-775298	-1017	1630	58.1	0.0025	0.3	880	7.3	467
1/12/2020	915218.27	937430.38	1169.57	915591.19	936527.54	1168.903873	916044.21	937509.77	1166.656877	-2683	-536	-775298	-536	2683	78.7	0.0035	0.3	880	10.4	398
1/13/2020	915218.27	937430.38	1167.67	915591.19	936527.54	1169.0058	916044.21	937509.77	1166.798918	-680	-1428	-775298	-1428	680	25.5	0.0020	0.3	880	6.0	508
1/14/2020	915218.27	937430.38	1169.67	915591.19	936527.54	1169.104029	916044.21	937509.77	1166.832183	-2607	-591	-775298	-591	2607	77.2	0.0034	0.3	880	10.1	404
1/15/2020	915218.27	937430.38	1169.87	915591.19	936527.54	1169.193171	916044.21	937509.77	1166.92218	-2715	-540	-775298	-540	2715	78.7	0.0036	0.3	880	10.5	398
1/16/2020	915218.27	937430.38	1169.87	915591.19	936527.54	1169.269469	916044.21	937509.77	1166.949259	-2685	-593	-775298	-593	2685	77.5	0.0035	0.3	880	10.4	399
1/17/2020	915218.27	937430.38	1169.97	915591.19	936527.54	1169.301795	916044.21	937509.77	1166.999742	-2735	-556	-775298	-556	2735	78.5	0.0036	0.3	880	10.6	397
1/18/2020	915218.27	937430.38	1169.97	915591.19	936527.54	1169.4075	916044.21	937509.77	1167.023531	-2705	-634	-775298	-634	2705	76.8	0.0036	0.3	880	10.5	398
1/19/2020	915218.27	937430.38	1169.97	915591.19	936527.54	1169.443343	916044.21	937509.77	1167.025784	-2700	-663	-775298	-663	2700	76.2	0.0036	0.3	880	10.5	398
1/20/2020	915218.27	937430.38	1170.07	915591.19	936527.54	1169.47678	916044.21	937509.77	1167.09111	-2737	-621	-775298	-621	2737	77.2	0.0036	0.3	880	10.6	397
1/21/2020	915218.27	937430.38	1170.07	915591.19	936527.54	1169.534183	916044.21	937509.77	1167.099297	-2725	-665	-775298	-665	2725	76.3	0.0036	0.3	880	10.6	397
1/22/2020	915218.27	937430.38	1170.17	915591.19	936527.54	1169.585781	916044.21	937509.77	1167.154847	-2769	-642	-775298	-642	2769	76.9	0.0037	0.3	880	10.8	395
1/23/2020	915218.27	937430.38	1170.07	915591.19	936527.54	1169.619443	916044.21	937509.77	1167.143912	-2678	-719	-775298	-719	2678	75.0	0.0036	0.3	880	10.5	399
1/24/2020	915218.27	937430.38	1170.17	915591.19	936527.54	1169.653999	916044.21	937509.77	1167.187248	-2734	-686	-775298	-686	2734	75.9	0.0036	0.3	880	10.7	396
1/25/2020	915218.27	937430.38	1170.27	915591.19	936527.54	1169.725667	916044.21	937509.77	1167.22248	-2795	-687	-775298	-687	2795	76.2	0.0037	0.3	880	10.9	393
1/26/2020	915218.27	937430.38	1170.27	915591.19	936527.54	1169.80714	916044.21	937509.77	1167.293162	-2724	-728	-775298	-728	2724	75.0	0.0036	0.3	880	10.7	397
1/27/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.884957	916044.21	937509.77	1167.413845	-2707	-702	-775298	-702	2707	75.5	0.0036	0.3	880	10.6	399
1/28/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.920406	916044.21	937509.77	1167.420226	-2699	-729	-775298	-729	2699	74.9	0.0036	0.3	880	10.6	399
1/29/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.922594	916044.21	937509.77	1167.433816	-2686	-725	-775298	-725	2686	74.9	0.0036	0.3	880	10.5	400
1/30/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.92322	916044.21	937509.77	1167.407979	-2710	-736	-775298	-736	2710	74.8	0.0036	0.3	880	10.6	398
1/31/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.929813	916044.21	937509.77	1167.412684	-2705	-739	-775298	-739	2705	74.7	0.0036	0.3	880	10.6	399
2/1/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1169.945403	916044.21	937509.77	1167.391467	-2821	-715	-775298	-715	2821	75.8	0.0038	0.3	880	11.0	392
2/2/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.964993	916044.21	937509.77	1167.400049	-2714	-773	-775298	-773	2714	74.1	0.0036	0.3	880	10.7	397
2/3/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1169.963552	916044.21	937509.77	1167.447229	-2769	-709	-775298	-709	2769	75.6	0.0037	0.3	880	10.8	395
2/4/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1169.97773	916044.21	937509.77	1167.438549	-2874	-679	-775298	-679	2874	76.7	0.0038	0.3	880	11.2	390
2/5/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1169.958029	916044.21	937509.77	1167.438273	-2876	-662	-775298	-662	2876	77.0	0.0038	0.3	880	11.2	390
2/6/2020	915218.27	937430.38	1169.47	915591.19	936527.54	1170.014146	916044.21	937509.77	1167.487267	-1747	-1189	-775298	-1189	1747	55.8	0.0027	0.3	880	8.0	453
2/7/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.09412	916044.21	937509.77	1167.58729	-2731	-719	-775298	-719	2731	75.2	0.0036	0.3	880	10.7	399
2/8/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.05795	916044.21	937509.77	1167.56456	-2852	-653	-775298	-653	2852	77.1	0.0038	0.3	880	11.1	392
2/9/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.01505	916044.21	937509.77	1167.48152	-2832	-693	-775298	-693	2832	76.2	0.0038	0.3	880	11.0	392
2/10/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.07665	916044.21	937509.77	1167.59516	-2823	-657	-775298	-657	2823	76.9	0.0037	0.3	880	11.0	394
2/11/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.12744	916044.21	937509.77	1167.6058	-2711	-740	-775298	-740	2711	74.7	0.0036	0.3	880	10.6	399
2/12/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.11547	916044.21	937509.77	1167.61634	-2801	-681	-775298	-681	2801	76.3	0.0037	0.3	880	10.9	395
2/13/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.16349	916044.21	937509.77	1167.62146	-2694	-764	-775298	-764	2694	74.2	0.0036	0.3	880	10.6	400
2/14/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.1165	916044.21	937509.77	1167.63792	-2781	-674	-775298	-674	2781	76.4	0.0037	0.3	880	10.8	397
2/15/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.14866	916044.21	937509.77	1167.61686	-2700	-753	-775298	-753	2700	74.4	0.0036	0.3	880	10.6	400
2/16/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.50002	-2638	-2538	-775298	-2538	2638	46.1	0.0047	0.3	880	13.8	350
2/17/2020	915218.27	937430.38	1170.57	915591.19	936527.54	1170.08257	916044.21	937509.77	1167.56321	-2753	-719	-775298	-719	2753	75.4	0.0037	0.3	880	10.8	397

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
2/18/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.13256	916044.21	937509.77	1167.55381	-2660	-809	-775298	-809	2660	73.1	0.0036	0.3	880	10.5	401
2/19/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.07561	916044.21	937509.77	1167.54363	-2673	-766	-775298	-766	2673	74.0	0.0036	0.3	880	10.5	401
2/20/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.08369	916044.21	937509.77	1167.51415	-2699	-783	-775298	-783	2699	73.8	0.0036	0.3	880	10.6	399
2/21/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.05485	916044.21	937509.77	1167.49561	-2718	-766	-775298	-766	2718	74.3	0.0036	0.3	880	10.7	398
2/22/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1170.0613	916044.21	937509.77	1167.50089	-2615	-815	-775298	-815	2615	72.7	0.0035	0.3	880	10.4	403
2/23/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1170.00572	916044.21	937509.77	1167.38476	-2724	-812	-775298	-812	2724	73.4	0.0037	0.3	880	10.8	396
2/24/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1169.98963	916044.21	937509.77	1167.40945	-2703	-790	-775298	-790	2703	73.7	0.0036	0.3	880	10.7	398
2/25/2020	915218.27	937430.38	1170.27	915591.19	936527.54	1170.00428	916044.21	937509.77	1167.41608	-2598	-845	-775298	-845	2598	72.0	0.0035	0.3	880	10.3	403
2/26/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.004	916044.21	937509.77	1167.42439	-2787	-751	-775298	-751	2787	74.9	0.0037	0.3	880	10.9	394
2/27/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.22191	916044.21	937509.77	1167.6262	-2784	-765	-775298	-765	2784	74.6	0.0037	0.3	880	10.9	395
2/28/2020	915218.27	937430.38	1170.77	915591.19	936527.54	1170.24469	916044.21	937509.77	1167.74588	-2772	-694	-775298	-694	2772	75.9	0.0037	0.3	880	10.8	397
2/29/2020	915218.27	937430.38	1170.77	915591.19	936527.54	1170.30662	916044.21	937509.77	1167.7894	-2728	-729	-775298	-729	2728	75.0	0.0036	0.3	880	10.7	400
3/1/2020	915218.27	937430.38	1170.77	915591.19	936527.54	1170.3256	916044.21	937509.77	1167.72915	-2781	-767	-775298	-767	2781	74.6	0.0037	0.3	880	10.9	396
3/2/2020	915218.27	937430.38	1170.87	915591.19	936527.54	1170.41743	916044.21	937509.77	1167.833209	-2778	-759	-775298	-759	2778	74.7	0.0037	0.3	880	10.9	397
3/3/2020	915218.27	937430.38	1170.97	915591.19	936527.54	1170.56846	916044.21	937509.77	1167.929329	-2777	-802	-775298	-802	2777	73.9	0.0037	0.3	880	10.9	396
3/4/2020	915218.27	937430.38	1171.27	915591.19	936527.54	1170.66107	916044.21	937509.77	1168.116617	-2895	-673	-775298	-673	2895	76.9	0.0038	0.3	880	11.2	393
3/5/2020	915218.27	937430.38	1171.37	915591.19	936527.54	1170.7918	916044.21	937509.77	1168.202761	-2905	-704	-775298	-704	2905	76.4	0.0039	0.3	880	11.3	392
3/6/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1170.95052	916044.21	937509.77	1168.320865	-2884	-745	-775298	-745	2884	75.5	0.0038	0.3	880	11.3	394
3/7/2020	915218.27	937430.38	1168.37	915591.19	936527.54	1171.07416	916044.21	937509.77	1168.3927	235	-2225	-775298	-2225	-235	354.0	0.0029	0.3	880	8.5	432
3/8/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1171.09433	916044.21	937509.77	1168.215623	-2968	-903	-775298	-903	2968	73.1	0.0040	0.3	880	11.7	386
3/9/2020	915218.27	937430.38	1171.57	915591.19	936527.54	1171.25891	916044.21	937509.77	1168.458856	-2834	-903	-775298	-903	2834	72.3	0.0038	0.3	880	11.3	395
3/10/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.41972	916044.21	937509.77	1168.581818	-2808	-945	-775298	-945	2808	71.4	0.0038	0.3	880	11.2	396
3/11/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.49805	916044.21	937509.77	1168.64739	-2841	-940	-775298	-940	2841	71.7	0.0039	0.3	880	11.3	395
3/12/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.60093	916044.21	937509.77	1168.685658	-2896	-965	-775298	-965	2896	71.6	0.0039	0.3	880	11.6	391
3/13/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.68168	916044.21	937509.77	1168.771408	-2812	-1000	-775298	-1000	2812	70.4	0.0039	0.3	880	11.3	396
3/14/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.71635	916044.21	937509.77	1168.77182	-2809	-1028	-775298	-1028	2809	69.9	0.0039	0.3	880	11.3	395
3/15/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.71906	916044.21	937509.77	1168.707629	-2867	-1055	-775298	-1055	2867	69.8	0.0039	0.3	880	11.6	391
3/16/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.7721	916044.21	937509.77	1168.77738	-2898	-1027	-775298	-1027	2898	70.5	0.0040	0.3	880	11.6	391
3/17/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.81814	916044.21	937509.77	1168.78928	-2786	-1106	-775298	-1106	2786	68.3	0.0039	0.3	880	11.3	395
3/18/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.7919	916044.21	937509.77	1168.767894	-2905	-1047	-775298	-1047	2905	70.2	0.0040	0.3	880	11.7	390
3/19/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.8283	916044.21	937509.77	1168.782355	-2889	-1072	-775298	-1072	2889	69.6	0.0040	0.3	880	11.7	390
3/20/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.87311	916044.21	937509.77	1168.821108	-2851	-1094	-775298	-1094	2851	69.0	0.0039	0.3	880	11.6	392
3/21/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.80686	916044.21	937509.77	1168.761299	-2812	-1107	-775298	-1107	2812	68.5	0.0039	0.3	880	11.4	393
3/22/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.7444	916044.21	937509.77	1168.646907	-2920	-1098	-775298	-1098	2920	69.4	0.0040	0.3	880	11.8	387
3/23/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.76857	916044.21	937509.77	1168.69527	-2874	-1100	-775298	-1100	2874	69.1	0.0040	0.3	880	11.6	390
3/24/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.75975	916044.21	937509.77	1168.685438	-2786	-1142	-775298	-1142	2786	67.7	0.0039	0.3	880	11.4	393
3/25/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.73775	916044.21	937509.77	1168.670746	-2899	-1084	-775298	-1084	2899	69.5	0.0040	0.3	880	11.7	389
3/26/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.73807	916044.21	937509.77	1168.640002	-2828	-1141	-775298	-1141	2828	68.0	0.0039	0.3	880	11.5	391
3/27/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.68133	916044.21	937509.77	1168.634396	-2838	-1096	-775298	-1096	2838	68.9	0.0039	0.3	880	11.5	391
3/28/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.60314	916044.21	937509.77	1168.592298	-2784	-1093	-775298	-1093	2784	68.6	0.0039	0.3	880	11.3	394
3/29/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1172.256226	916044.21	937509.77	1168.579994	-2841	-1591	-775298	-1591	2841	60.8	0.0042	0.3	880	12.3	378
3/30/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.66381	916044.21	937509.77	1168.662964	-2912	-1026	-775298	-1026	2912	70.6	0.0040	0.3	880	11.7	389
3/31/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.68674	916044.21	937509.77	1168.684205	-2891	-1037	-775298	-1037	2891	70.3	0.0040	0.3	880	11.6	390
4/1/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.69108	916044.21	937509.77	1168.697509	-2878	-1035	-775298	-1035	2878	70.2	0.0039	0.3	880	11.6	391
4/2/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.66913	916044.21	937509.77	1168.65501	-2820	-1078	-775298	-1078	2820	69.1	0.0039	0.3	880	11.4	393
4/3/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.63397	916044.21	937509.77	1168.64153	-2835	-1054	-775298	-1054	2835	69.6	0.0039	0.3	880	11.4	392
4/4/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.60593	916044.21	937509.77	1168.599123	-2778	-1092	-775298	-1092	2778	68.5	0.0038	0.3	880	11.3	395
4/5/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.53238	916044.21	937509.77	1168.465539	-2904	-1081	-775298	-1081	2904	69.6	0.0040	0.3	880	11.7	387
4/6/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.51289	916044.21	937509.77	1168.49267	-2881	-1055	-775298	-1055	2881	69.9	0.0040	0.3	880	11.6	389
4/7/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.50981	916044.21	937509.77	1168.464557	-2907	-1063	-775298	-1063	2907	69.9	0.0040	0.3	880	11.7	387
4/8/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.49511	916044.21	937509.77	1168.469318	-2904	-1049	-775298	-1049	2904	70.1	0.0040	0.3	880	11.7	388
4/9/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.48964	916044.21	937509.77	1168.437845	-2932	-1056	-775298	-1056	2932	70.2	0.0040	0.3	880	11.8	386
4/10/2020	915218.27	937430.38	1171.57	915591.19	936527.54	1171.45739	916044.21	937509.77	1168.446712	-2829	-1072	-775298	-1072	2829	69.2	0.0039	0.3	880	11.4	391
4/11/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1171.41417	916044.21	937509.77	1168.40223	-2774	-1098	-775298	-1098	2774	68.4	0.0038	0.3	880	11.3	393

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
4/12/2020	915218.27	937430.38	1171.57	915591.19	936527.54	1171.3353	916044.21	937509.77	1168.285867	-2984	-1031	-775298	-1031	2984	70.9	0.0041	0.3	880	11.9	383
4/13/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1170.94689	916044.21	937509.77	1168.347338	-2861	-732	-775298	-732	2861	75.6	0.0038	0.3	880	11.2	395
4/14/2020	915218.27	937430.38	1142.27	915591.19	936527.54	1171.295	916044.21	937509.77	1168.277557	25785	-14274	-775298	-14274	-25785	299.0	0.0038	0.3	880	11.3	211
4/15/2020	915218.27	937430.38	1171.37	915591.19	936527.54	1171.2516	916044.21	937509.77	1168.267302	-2811	-1059	-775298	-1059	2811	69.3	0.0039	0.3	880	11.4	391
4/16/2020	915218.27	937430.38	1171.37	915591.19	936527.54	1171.19803	916044.21	937509.77	1168.196126	-2879	-1042	-775298	-1042	2879	70.1	0.0039	0.3	880	11.6	388
4/17/2020	915218.27	937430.38	1171.37	915591.19	936527.54	1171.15856	916044.21	937509.77	1168.186279	-2891	-1013	-775298	-1013	2891	70.7	0.0040	0.3	880	11.6	388
4/18/2020	915218.27	937430.38	1171.27	915591.19	936527.54	1171.14689	916044.21	937509.77	1168.167187	-2811	-1055	-775298	-1055	2811	69.4	0.0039	0.3	880	11.4	391
4/19/2020	915218.27	937430.38	1171.27	915591.19	936527.54	1171.08105	916044.21	937509.77	1168.070198	-2904	-1037	-775298	-1037	2904	70.3	0.0040	0.3	880	11.7	386
4/20/2020	915218.27	937430.38	1171.27	915591.19	936527.54	1171.04853	916044.21	937509.77	1168.09771	-2882	-1000	-775298	-1000	2882	70.9	0.0039	0.3	880	11.5	388
4/21/2020	915218.27	937430.38	1171.17	915591.19	936527.54	1171.01266	916044.21	937509.77	1168.049416	-2830	-1034	-775298	-1034	2830	69.9	0.0039	0.3	880	11.4	390
4/22/2020	915218.27	937430.38	1171.17	915591.19	936527.54	1170.93513	916044.21	937509.77	1168.000394	-2880	-988	-775298	-988	2880	71.1	0.0039	0.3	880	11.5	387
4/23/2020	915218.27	937430.38	1171.07	915591.19	936527.54	1170.88219	916044.21	937509.77	1167.92527	-2854	-1018	-775298	-1018	2854	70.4	0.0039	0.3	880	11.5	388
4/24/2020	915218.27	937430.38	1171.07	915591.19	936527.54	1170.83666	916044.21	937509.77	1167.918048	-2864	-983	-775298	-983	2864	71.1	0.0039	0.3	880	11.5	388
4/25/2020	915218.27	937430.38	1170.97	915591.19	936527.54	1170.76965	916044.21	937509.77	1167.844651	-2838	-1000	-775298	-1000	2838	70.6	0.0039	0.3	880	11.4	389
4/26/2020	915218.27	937430.38	1170.97	915591.19	936527.54	1170.68826	916044.21	937509.77	1167.72688	-2950	-977	-775298	-977	2950	71.7	0.0040	0.3	880	11.8	382
4/27/2020	915218.27	937430.38	1171.07	915591.19	936527.54	1170.81801	916044.21	937509.77	1167.92912	-2856	-963	-775298	-963	2856	71.4	0.0039	0.3	880	11.4	389
4/28/2020	915218.27	937430.38	1171.07	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.936241	-2735	-2148	-775298	-2148	2735	51.9	0.0045	0.3	880	13.2	362
4/29/2020	915218.27	937430.38	1171.17	915591.19	936527.54	1170.79206	916044.21	937509.77	1167.967553	-2921	-882	-775298	-882	2921	73.2	0.0039	0.3	880	11.5	387
4/30/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1170.81698	916044.21	937509.77	1167.94512	-3234	-775	-775298	-775	3234	76.5	0.0043	0.3	880	12.6	373
5/1/2020	915218.27	937430.38	1171.47	915591.19	936527.54	1171.24617	916044.21	937509.77	1168.505133	-2695	-921	-775298	-921	2695	71.1	0.0037	0.3	880	10.8	403
5/2/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.41092	916044.21	937509.77	1168.632874	-2959	-828	-775298	-828	2959	74.4	0.0040	0.3	880	11.6	390
5/3/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.59322	916044.21	937509.77	1168.695746	-2986	-910	-775298	-910	2986	73.1	0.0040	0.3	880	11.8	388
5/4/2020	915218.27	937430.38	1172.07	915591.19	936527.54	1171.76105	916044.21	937509.77	1168.83949	-2941	-950	-775298	-950	2941	72.1	0.0040	0.3	880	11.7	390
5/5/2020	915218.27	937430.38	1172.17	915591.19	936527.54	1171.91511	916044.21	937509.77	1168.942883	-2934	-993	-775298	-993	2934	71.3	0.0040	0.3	880	11.7	390
5/6/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.03027	916044.21	937509.77	1169.008538	-2964	-1018	-775298	-1018	2964	71.0	0.0040	0.3	880	11.9	389
5/7/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.14014	916044.21	937509.77	1169.056436	-2912	-1091	-775298	-1091	2912	69.5	0.0040	0.3	880	11.8	390
5/8/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.22004	916044.21	937509.77	1169.110757	-2856	-1137	-775298	-1137	2856	68.3	0.0040	0.3	880	11.6	392
5/9/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.28052	916044.21	937509.77	1169.148828	-2817	-1173	-775298	-1173	2817	67.4	0.0039	0.3	880	11.5	394
5/10/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.28529	916044.21	937509.77	1169.068309	-2889	-1207	-775298	-1207	2889	67.3	0.0040	0.3	880	11.8	389
5/11/2020	915218.27	937430.38	1172.37	915591.19	936527.54	1172.32477	916044.21	937509.77	1169.103944	-2952	-1181	-775298	-1181	2952	68.2	0.0041	0.3	880	12.0	386
5/12/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.33241	916044.21	937509.77	1169.109689	-2848	-1230	-775298	-1230	2848	66.6	0.0040	0.3	880	11.7	391
5/13/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.3004	916044.21	937509.77	1169.068028	-2888	-1219	-775298	-1219	2888	67.1	0.0040	0.3	880	11.9	389
5/14/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.30616	916044.21	937509.77	1169.026147	-2926	-1240	-775298	-1240	2926	67.0	0.0041	0.3	880	12.0	386
5/15/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.30551	916044.21	937509.77	1169.048548	-2906	-1231	-775298	-1231	2906	67.0	0.0041	0.3	880	11.9	387
5/16/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.30591	916044.21	937509.77	1169.083639	-2874	-1218	-775298	-1218	2874	67.0	0.0040	0.3	880	11.8	389
5/17/2020	915218.27	937430.38	1172.27	915591.19	936527.54	1172.25171	916044.21	937509.77	1168.966744	-2984	-1217	-775298	-1217	2984	67.8	0.0042	0.3	880	12.2	383
5/18/2020	915218.27	937430.38	1172.17	915591.19	936527.54	1172.23916	916044.21	937509.77	1168.994423	-2862	-1241	-775298	-1241	2862	66.5	0.0040	0.3	880	11.8	389
5/19/2020	915218.27	937430.38	1172.17	915591.19	936527.54	1172.20565	916044.21	937509.77	1168.944163	-2910	-1232	-775298	-1232	2910	67.0	0.0041	0.3	880	12.0	386
5/20/2020	915218.27	937430.38	1172.07	915591.19	936527.54	1172.14616	916044.21	937509.77	1168.907766	-2849	-1242	-775298	-1242	2849	66.4	0.0040	0.3	880	11.8	389
5/21/2020	915218.27	937430.38	1172.07	915591.19	936527.54	1172.09369	916044.21	937509.77	1168.816226	-2936	-1233	-775298	-1233	2936	67.2	0.0041	0.3	880	12.0	384
5/22/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1172.05304	916044.21	937509.77	1168.816704	-2840	-1245	-775298	-1245	2840	66.3	0.0040	0.3	880	11.7	389
5/23/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1172.0164	916044.21	937509.77	1168.802842	-2856	-1219	-775298	-1219	2856	66.9	0.0040	0.3	880	11.7	389
5/24/2020	915218.27	937430.38	1171.97	915591.19	936527.54	1171.92288	916044.21	937509.77	1168.658794	-2993	-1196	-775298	-1196	2993	68.2	0.0042	0.3	880	12.2	381
5/25/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.87192	916044.21	937509.77	1168.66686	-2892	-1196	-775298	-1196	2892	67.5	0.0040	0.3	880	11.8	386
5/26/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.82434	916044.21	937509.77	1168.608636	-2850	-1224	-775298	-1224	2850	66.8	0.0040	0.3	880	11.7	388
5/27/2020	915218.27	937430.38	1171.87	915591.19	936527.54	1171.74255	916044.21	937509.77	1168.584859	-2976	-1120	-775298	-1120	2976	69.4	0.0041	0.3	880	12.0	383
5/28/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.67927	916044.21	937509.77	1168.488892	-2970	-1149	-775298	-1149	2970	68.9	0.0041	0.3	880	12.0	383
5/29/2020	915218.27	937430.38	1171.77	915591.19	936527.54	1171.61595	916044.21	937509.77	1168.471459	-2990	-1103	-775298	-1103	2990	69.8	0.0041	0.3	880	12.1	382
5/30/2020	915218.27	937430.38	1171.67	915591.19	936527.54	1171.64117	916044.21	937509.77	1168.490684	-2873	-1162	-775298	-1162	2873	68.0	0.0040	0.3	880	11.7	387
5/31/2020	915218.27	937430.38	1171.57	915591.19	936527.54	1171.4966	916044.21	937509.77	1168.292482	-2965	-1162	-775298	-1162	2965	68.6	0.0041	0.3	880	12.0	381
6/1/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1171.43078	916044.21	937509.77	1168.268594	-1911	-1614	-775298	-1614	1911	49.8	0.0032	0.3	880	9.5	423
6/2/2020	915218.27	937430.38	1171.37	915591.19	936527.54	1171.3638	916044.21	937509.77	1168.184579	-2876	-1183	-775298	-1183	2876	67.6	0.0040	0.3	880	11.8	385
6/3/2020	915218.27	937430.38	1171.27	915591.19	936527.54	1171.27138	916044.21	937509.77	1168.118884	-2845	-1176	-775298	-1176	2845	67.5	0.0040	0.3	880	11.6	386
6/4/2020	915218.27	937430.38	1171.17	915591.19	936527.54	1171.16573	916044.21	937509.77	1167.976058	-2884	-1188	-775298	-1188	2884	67.6	0.0040	0.3	880	11.8	383

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
6/5/2020	915218.27	937430.38	1170.97	915591.19	936527.54	1171.05865	916044.21	937509.77	1167.927211	-2740	-1208	-775298	-1208	2740	66.2	0.0039	0.3	880	11.3	389
6/6/2020	915218.27	937430.38	1170.97	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.826374	-2736	-2235	-775298	-2235	2736	50.8	0.0046	0.3	880	13.4	359
6/7/2020	915218.27	937430.38	1170.87	915591.19	936527.54	1170.79365	916044.21	937509.77	1167.64	-2922	-1141	-775298	-1141	2922	68.7	0.0040	0.3	880	11.9	380
6/8/2020	915218.27	937430.38	1170.77	915591.19	936527.54	1170.6853	916044.21	937509.77	1167.60904	-2861	-1109	-775298	-1109	2861	68.8	0.0040	0.3	880	11.6	384
6/9/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.57786	916044.21	937509.77	1167.50836	-2862	-1103	-775298	-1103	2862	68.9	0.0040	0.3	880	11.6	383
6/10/2020	915218.27	937430.38	1170.67	915591.19	936527.54	1170.44787	916044.21	937509.77	1167.42912	-2944	-1025	-775298	-1025	2944	70.8	0.0040	0.3	880	11.8	380
6/11/2020	915218.27	937430.38	1170.47	915591.19	936527.54	1170.30941	916044.21	937509.77	1167.27153	-2900	-1060	-775298	-1060	2900	69.9	0.0040	0.3	880	11.7	380
6/12/2020	915218.27	937430.38	1170.37	915591.19	936527.54	1170.18888	916044.21	937509.77	1167.24248	-2838	-1017	-775298	-1017	2838	70.3	0.0039	0.3	880	11.4	384
6/13/2020	915218.27	937430.38	1170.17	915591.19	936527.54	1170.05856	916044.21	937509.77	1167.11831	-2764	-1046	-775298	-1046	2764	69.3	0.0038	0.3	880	11.2	387
6/14/2020	915218.27	937430.38	1170.07	915591.19	936527.54	1169.87944	916044.21	937509.77	1166.91032	-2868	-1021	-775298	-1021	2868	70.4	0.0039	0.3	880	11.5	381
6/15/2020	915218.27	937430.38	1169.87	915591.19	936527.54	1169.75712	916044.21	937509.77	1166.88137	-2707	-1021	-775298	-1021	2707	69.3	0.0037	0.3	880	10.9	389
6/16/2020	915218.27	937430.38	1169.87	915591.19	936527.54	1169.63867	916044.21	937509.77	1166.77479	-2813	-963	-775298	-963	2813	71.1	0.0038	0.3	880	11.2	384
6/17/2020	915218.27	937430.38	1169.77	915591.19	936527.54	1169.50233	916044.21	937509.77	1166.68273	-2809	-930	-775298	-930	2809	71.7	0.0038	0.3	880	11.2	384
6/18/2020	915218.27	937430.38	1169.67	915591.19	936527.54	1169.37653	916044.21	937509.77	1166.5395	-2850	-925	-775298	-925	2850	72.0	0.0039	0.3	880	11.3	381
6/19/2020	915218.27	937430.38	1169.47	915591.19	936527.54	1169.26108	916044.21	937509.77	1166.50284	-2695	-934	-775298	-934	2695	70.9	0.0037	0.3	880	10.8	389
6/20/2020	915218.27	937430.38	1169.37	915591.19	936527.54	1169.1454	916044.21	937509.77	1166.42834	-2674	-911	-775298	-911	2674	71.2	0.0036	0.3	880	10.7	391
6/21/2020	915218.27	937430.38	1169.27	915591.19	936527.54	1168.98651	916044.21	937509.77	1166.23414	-2763	-898	-775298	-898	2763	72.0	0.0037	0.3	880	11.0	385
6/22/2020	915218.27	937430.38	1167.27	915591.19	936527.54	1168.86171	916044.21	937509.77	1166.20571	-835	-1712	-775298	-1712	835	26.0	0.0025	0.3	880	7.2	460
6/23/2020	915218.27	937430.38	1169.07	915591.19	936527.54	1168.74063	916044.21	937509.77	1166.08171	-2724	-842	-775298	-842	2724	72.8	0.0037	0.3	880	10.8	387
6/24/2020	915218.27	937430.38	1168.97	915591.19	936527.54	1168.62012	916044.21	937509.77	1166.02665	-2685	-809	-775298	-809	2685	73.2	0.0036	0.3	880	10.6	390
6/25/2020	915218.27	937430.38	1168.97	915591.19	936527.54	1168.49568	916044.21	937509.77	1165.90517	-2805	-751	-775298	-751	2805	75.0	0.0037	0.3	880	11.0	383
6/26/2020	915218.27	937430.38	1168.87	915591.19	936527.54	1168.38407	916044.21	937509.77	1165.9984	-2631	-670	-775298	-670	2631	75.7	0.0035	0.3	880	10.3	395
6/27/2020	915218.27	937430.38	1168.77	915591.19	936527.54	1168.29847	916044.21	937509.77	1166.048859	-2494	-625	-775298	-625	2494	75.9	0.0033	0.3	880	9.7	406
6/28/2020	915218.27	937430.38	1168.07	915591.19	936527.54	1168.16974	916044.21	937509.77	1165.63818	-2188	-989	-775298	-989	2188	65.7	0.0031	0.3	880	9.1	415
6/29/2020	915218.27	937430.38	1168.57	915591.19	936527.54	1168.01885	916044.21	937509.77	1165.86411	-2487	-554	-775298	-554	2487	77.4	0.0033	0.3	880	9.6	406
6/30/2020	915218.27	937430.38	1168.37	915591.19	936527.54	1167.93489	916044.21	937509.77	1165.45774	-2664	-727	-775298	-727	2664	74.7	0.0036	0.3	880	10.4	389
7/1/2020	915218.27	937430.38	1168.37	915591.19	936527.54	1167.81282	916044.21	937509.77	1165.38172	-2742	-654	-775298	-654	2742	76.6	0.0036	0.3	880	10.7	385
7/2/2020	915218.27	937430.38	1168.17	915591.19	936527.54	1167.69784	916044.21	937509.77	1165.24621	-2677	-700	-775298	-700	2677	75.3	0.0036	0.3	880	10.5	387
7/3/2020	915218.27	937430.38	1168.17	915591.19	936527.54	1167.56914	916044.21	937509.77	1165.18139	-2746	-618	-775298	-618	2746	77.3	0.0036	0.3	880	10.6	384
7/4/2020	915218.27	937430.38	1167.97	915591.19	936527.54	1167.46198	916044.21	937509.77	1165.07486	-2654	-660	-775298	-660	2654	76.0	0.0035	0.3	880	10.3	388
7/5/2020	915218.27	937430.38	1167.87	915591.19	936527.54	1167.30181	916044.21	937509.77	1164.8712	-2753	-649	-775298	-649	2753	76.7	0.0036	0.3	880	10.7	381
7/6/2020	915218.27	937430.38	1167.57	915591.19	936527.54	1167.18089	916044.21	937509.77	1164.837	-2498	-698	-775298	-698	2498	74.4	0.0033	0.3	880	9.8	396
7/7/2020	915218.27	937430.38	1167.57	915591.19	936527.54	1167.06625	916044.21	937509.77	1164.69139	-2639	-657	-775298	-657	2639	76.0	0.0035	0.3	880	10.3	386
7/8/2020	915218.27	937430.38	1167.57	915591.19	936527.54	1166.93201	916044.21	937509.77	1164.60566	-2727	-579	-775298	-579	2727	78.0	0.0036	0.3	880	10.5	382
7/9/2020	915218.27	937430.38	1167.37	915591.19	936527.54	1166.8233	916044.21	937509.77	1164.45074	-2679	-637	-775298	-637	2679	76.6	0.0036	0.3	880	10.4	383
7/10/2020	915218.27	937430.38	1167.37	915591.19	936527.54	1166.7027	916044.21	937509.77	1164.42112	-2715	-549	-775298	-549	2715	78.6	0.0036	0.3	880	10.5	382
7/11/2020	915218.27	937430.38	1167.27	915591.19	936527.54	1166.63595	916044.21	937509.77	1164.3763	-2663	-555	-775298	-555	2663	78.2	0.0035	0.3	880	10.3	384
7/12/2020	915218.27	937430.38	1167.17	915591.19	936527.54	1166.6423	916044.21	937509.77	1164.35477	-2584	-614	-775298	-614	2584	76.6	0.0034	0.3	880	10.0	388
7/13/2020	915218.27	937430.38	1167.27	915591.19	936527.54	1166.52586	916044.21	937509.77	1164.33342	-2710	-480	-775298	-480	2710	79.9	0.0036	0.3	880	10.4	382
7/14/2020	915218.27	937430.38	1166.97	915591.19	936527.54	1166.45225	916044.21	937509.77	1164.20558	-2537	-603	-775298	-603	2537	76.6	0.0034	0.3	880	9.9	391
7/15/2020	915218.27	937430.38	1166.97	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.15761	-2119	-5415	-775298	-5415	2119	21.4	0.0032	0.3	880	9.4	401
7/16/2020	915218.27	937430.38	1166.57	915591.19	936527.54	1166.24356	916044.21	937509.77	1164.02943	-2320	-678	-775298	-678	2320	73.7	0.0031	0.3	880	9.1	403
7/17/2020	915218.27	937430.38	1166.77	915591.19	936527.54	1166.13551	916044.21	937509.77	1163.98783	-2562	-513	-775298	-513	2562	78.7	0.0034	0.3	880	9.9	389
7/18/2020	915218.27	937430.38	1166.57	915591.19	936527.54	1166.04651	916044.21	937509.77	1163.87917	-2471	-571	-775298	-571	2471	77.0	0.0033	0.3	880	9.6	393
7/19/2020	915218.27	937430.38	1166.57	915591.19	936527.54	1165.89661	916044.21	937509.77	1163.66688	-2675	-526	-775298	-526	2675	78.9	0.0035	0.3	880	10.3	379
7/20/2020	915218.27	937430.38	1166.47	915591.19	936527.54	1165.80599	916044.21	937509.77	1163.6769	-2574	-493	-775298	-493	2574	79.2	0.0034	0.3	880	9.9	386
7/21/2020	915218.27	937430.38	1166.27	915591.19	936527.54	1165.70155	916044.21	937509.77	1163.55444	-2497	-543	-775298	-543	2497	77.7	0.0033	0.3	880	9.7	390
7/22/2020	915218.27	937430.38	1166.27	915591.19	936527.54	1165.57404	916044.21	937509.77	1163.45677	-2595	-474	-775298	-474	2595	79.6	0.0034	0.3	880	10.0	384
7/23/2020	915218.27	937430.38	1166.07	915591.19	936527.54	1165.47902	916044.21	937509.77	1163.33466	-2516	-532	-775298	-532	2516	78.1	0.0033	0.3	880	9.7	387
7/24/2020	915218.27	937430.38	1166.07	915591.19	936527.54	1165.35689	916044.21	937509.77	1163.27387	-2581	-454	-775298	-454	2581	80.0	0.0034	0.3	880	9.9	384
7/25/2020	915218.27	937430.38	1165.87	915591.19	936527.54	1165.25898	916044.21	937509.77	1163.1477	-2506	-511	-775298	-511	2506	78.5	0.0033	0.3	880	9.7	387
7/26/2020	915218.27	937430.38	1165.77	915591.19	936527.54	1165.09722	916044.21	937509.77	1162.92148	-2625	-507	-775298	-507	2625	79.1	0.0034	0.3	880	10.1	378
7/27/2020	915218.27	937430.38	1165.67	915591.19	936527.54	1164.98964	916044.21	937509.77	1162.91157	-2544	-467	-775298	-467	2544	79.6	0.0033	0.3	880	9.8	384
7/28/2020	915218.27	937430.38	1165.47	915591.19	936527.54	1164.88557	916044.21	937509.77	1162.77881	-2476	-521	-775298	-521	2476	78.1	0.0033	0.3	880	9.6	386

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
7/29/2020	915218.27	937430.38	1165.47	915591.19	936527.54	1164.73598	916044.21	937509.77	1162.64936	-2605	-446	-775298	-446	2605	80.3	0.0034	0.3	880	10.0	378
7/30/2020	915218.27	937430.38	1165.27	915591.19	936527.54	1164.6403	916044.21	937509.77	1162.54738	-2508	-495	-775298	-495	2508	78.8	0.0033	0.3	880	9.7	383
7/31/2020	915218.27	937430.38	1164.67	915591.19	936527.54	1164.49688	916044.21	937509.77	1162.45145	-2017	-684	-775298	-684	2017	71.3	0.0027	0.3	880	8.1	415
8/1/2020	915218.27	937430.38	1165.47	915591.19	936527.54	1164.39584	916044.21	937509.77	1162.32444	-2925	-286	-775298	-286	2925	84.4	0.0038	0.3	880	11.1	359
8/2/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1164.22379	916044.21	937509.77	1162.12197	-2139	-672	-775298	-672	2139	72.6	0.0029	0.3	880	8.5	403
8/3/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1164.09655	916044.21	937509.77	1162.07192	-2195	-586	-775298	-586	2195	75.1	0.0029	0.3	880	8.6	401
8/4/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1164.05361	916044.21	937509.77	1162.04935	-2219	-559	-775298	-559	2219	75.9	0.0030	0.3	880	8.7	399
8/5/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.94443	916044.21	937509.77	1161.97586	-2294	-496	-775298	-496	2294	77.8	0.0030	0.3	880	8.9	394
8/6/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.87528	916044.21	937509.77	1161.85636	-2407	-483	-775298	-483	2407	78.6	0.0032	0.3	880	9.3	385
8/7/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.76232	916044.21	937509.77	1161.79852	-2468	-412	-775298	-412	2468	80.5	0.0032	0.3	880	9.5	382
8/8/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.6704	916044.21	937509.77	1161.67268	-2589	-383	-775298	-383	2589	81.6	0.0034	0.3	880	9.9	373
8/9/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.49322	916044.21	937509.77	1161.42084	-2830	-330	-775298	-330	2830	83.3	0.0037	0.3	880	10.8	358
8/10/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.3922	916044.21	937509.77	1161.41759	-2841	-248	-775298	-248	2841	85.0	0.0037	0.3	880	10.8	358
8/11/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.33812	916044.21	937509.77	1161.32934	-2925	-236	-775298	-236	2925	85.4	0.0038	0.3	880	11.1	353
8/12/2020	915218.27	937430.38	1164.47	915591.19	936527.54	1163.23378	916044.21	937509.77	1161.26968	-2988	-172	-775298	-172	2988	86.7	0.0039	0.3	880	11.3	349
8/13/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1163.14918	916044.21	937509.77	1161.15137	-2119	-600	-775298	-600	2119	74.2	0.0028	0.3	880	8.3	400
8/14/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1163.03009	916044.21	937509.77	1161.07434	-2198	-530	-775298	-530	2198	76.4	0.0029	0.3	880	8.6	394
8/15/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.95523	916044.21	937509.77	1160.97952	-2289	-504	-775298	-504	2289	77.6	0.0030	0.3	880	8.9	387
8/16/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.77684	916044.21	937509.77	1160.71989	-2538	-453	-775298	-453	2538	79.9	0.0033	0.3	880	9.8	369
8/17/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.67455	916044.21	937509.77	1160.69848	-2565	-377	-775298	-377	2565	81.6	0.0033	0.3	880	9.8	368
8/18/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.60495	916044.21	937509.77	1160.61114	-2650	-352	-775298	-352	2650	82.4	0.0034	0.3	880	10.1	363
8/19/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.45001	916044.21	937509.77	1160.48465	-2776	-271	-775298	-271	2776	84.4	0.0036	0.3	880	10.6	355
8/20/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.36036	916044.21	937509.77	1160.32908	-2924	-255	-775298	-255	2924	85.0	0.0038	0.3	880	11.1	346
8/21/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1162.22936	916044.21	937509.77	1160.27181	-2986	-168	-775298	-168	2986	86.8	0.0039	0.3	880	11.3	343
8/22/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1162.13556	916044.21	937509.77	1160.1189	-2149	-601	-775298	-601	2149	74.4	0.0029	0.3	880	8.4	390
8/23/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1159.85716	-1582	-9057	-775298	-9057	1582	9.9	0.0029	0.3	880	8.5	388
8/24/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.85356	916044.21	937509.77	1159.89172	-2377	-452	-775298	-452	2377	79.2	0.0031	0.3	880	9.2	374
8/25/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.77353	916044.21	937509.77	1159.77237	-2491	-431	-775298	-431	2491	80.2	0.0033	0.3	880	9.6	366
8/26/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.63284	916044.21	937509.77	1159.67818	-2587	-350	-775298	-350	2587	82.3	0.0034	0.3	880	9.9	360
8/27/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.56188	916044.21	937509.77	1159.55385	-2705	-337	-775298	-337	2705	82.9	0.0035	0.3	880	10.3	353
8/28/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.45221	916044.21	937509.77	1159.51235	-2751	-262	-775298	-262	2751	84.6	0.0036	0.3	880	10.5	350
8/29/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1161.366	916044.21	937509.77	1159.42166	-2840	-225	-775298	-225	2840	85.5	0.0037	0.3	880	10.8	345
8/30/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1161.22697	916044.21	937509.77	1159.22436	-2047	-637	-775298	-637	2047	72.7	0.0028	0.3	880	8.1	390
8/31/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1161.11015	916044.21	937509.77	1159.18198	-2094	-556	-775298	-556	2094	75.1	0.0028	0.3	880	8.2	388
9/1/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1161.03106	916044.21	937509.77	1159.04313	-2226	-542	-775298	-542	2226	76.3	0.0030	0.3	880	8.7	378
9/2/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.89254	916044.21	937509.77	1158.95538	-2316	-461	-775298	-461	2316	78.7	0.0030	0.3	880	8.9	372
9/3/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.81356	916044.21	937509.77	1158.82751	-2438	-443	-775298	-443	2438	79.7	0.0032	0.3	880	9.4	363
9/4/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.69621	916044.21	937509.77	1158.77387	-2496	-366	-775298	-366	2496	81.6	0.0033	0.3	880	9.5	360
9/5/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.61358	916044.21	937509.77	1158.66207	-2603	-340	-775298	-340	2603	82.6	0.0034	0.3	880	9.9	353
9/6/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.46821	916044.21	937509.77	1158.45204	-2804	-298	-775298	-298	2804	83.9	0.0036	0.3	880	10.7	340
9/7/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1160.36882	916044.21	937509.77	1158.45863	-2806	-213	-775298	-213	2806	85.6	0.0036	0.3	880	10.6	341
9/8/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1160.30271	916044.21	937509.77	1158.31999	-1954	-664	-775298	-664	1954	71.2	0.0027	0.3	880	7.8	390
9/9/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1160.15971	916044.21	937509.77	1158.25237	-2027	-571	-775298	-571	2027	74.3	0.0027	0.3	880	8.0	386
9/10/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1160.07001	916044.21	937509.77	1158.12035	-2153	-546	-775298	-546	2153	75.8	0.0029	0.3	880	8.4	376
9/11/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.9504	916044.21	937509.77	1158.04894	-2227	-474	-775298	-474	2227	78.0	0.0029	0.3	880	8.6	372
9/12/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.87642	916044.21	937509.77	1157.96189	-2312	-445	-775298	-445	2312	79.1	0.0030	0.3	880	8.9	365
9/13/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.74128	916044.21	937509.77	1157.76213	-2503	-408	-775298	-408	2503	80.7	0.0033	0.3	880	9.6	352
9/14/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.63291	916044.21	937509.77	1157.7462	-2526	-324	-775298	-324	2526	82.7	0.0033	0.3	880	9.6	351
9/15/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.55928	916044.21	937509.77	1157.63955	-2628	-303	-775298	-303	2628	83.4	0.0034	0.3	880	10.0	345
9/16/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.44184	916044.21	937509.77	1157.56257	-2707	-235	-775298	-235	2707	85.0	0.0035	0.3	880	10.3	340
9/17/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.36635	916044.21	937509.77	1157.44145	-2822	-218	-775298	-218	2822	85.6	0.0037	0.3	880	10.7	333
9/18/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1159.24438	916044.21	937509.77	1157.37381	-1910	-595	-775298	-595	1910	72.7	0.0026	0.3	880	7.6	389
9/19/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1159.16754	916044.21	937509.77	1157.29426	-1988	-562	-775298	-562	1988	74.2	0.0027	0.3	880	7.8	383
9/20/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1159.03054	916044.21	937509.77	1157.06664	-2205	-533	-775298	-533	2205	76.4	0.0029	0.3	880	8.6	365

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
9/21/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.91499	916044.21	937509.77	1157.0594	-2220	-441	-775298	-441	2220	78.8	0.0029	0.3	880	8.6	366
9/22/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.84818	916044.21	937509.77	1156.9248	-2347	-436	-775298	-436	2347	79.5	0.0031	0.3	880	9.0	356
9/23/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.73276	916044.21	937509.77	1156.87561	-2401	-359	-775298	-359	2401	81.5	0.0031	0.3	880	9.2	353
9/24/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.65457	916044.21	937509.77	1156.73952	-2530	-345	-775298	-345	2530	82.2	0.0033	0.3	880	9.7	344
9/25/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1156.68081	-1503	-11601	-775298	-11601	1503	7.4	0.0032	0.3	880	9.4	349
9/26/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.45339	916044.21	937509.77	1156.53399	-2731	-255	-775298	-255	2731	84.7	0.0035	0.3	880	10.4	332
9/27/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1158.31306	916044.21	937509.77	1156.33151	-1943	-668	-775298	-668	1943	71.0	0.0027	0.3	880	7.8	376
9/28/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1158.20112	916044.21	937509.77	1156.34574	-1939	-570	-775298	-570	1939	73.6	0.0026	0.3	880	7.6	379
9/29/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1158.129	916044.21	937509.77	1156.27182	-2012	-538	-775298	-538	2012	75.0	0.0027	0.3	880	7.9	374
9/30/2020	915218.27	937430.38	1159.47	915591.19	936527.54	1158.06095	916044.21	937509.77	1156.24563	-3023	-39	-775298	-39	3023	89.3	0.0039	0.3	880	11.4	316
10/1/2020	915218.27	937430.38	1159.37625	915591.19	936527.54	1158.02392	916044.21	937509.77	1156.10106	-3064	-104	-775298	-104	3064	88.0	0.0040	0.3	880	11.6	314
10/2/2020	915218.27	937430.38	1159.2825	915591.19	936527.54	1157.93526	916044.21	937509.77	1156.14174	-2943	-59	-775298	-59	2943	88.9	0.0038	0.3	880	11.1	319
10/3/2020	915218.27	937430.38	1159.18875	915591.19	936527.54	1157.89269	916044.21	937509.77	1156.07915	-2910	-89	-775298	-89	2910	88.2	0.0038	0.3	880	11.0	321
10/4/2020	915218.27	937430.38	1159.095	915591.19	936527.54	1157.75947	916044.21	937509.77	1155.85143	-3034	-107	-775298	-107	3034	88.0	0.0039	0.3	880	11.5	313
10/5/2020	915218.27	937430.38	1159.00125	915591.19	936527.54	1157.66744	916044.21	937509.77	1155.86899	-2934	-66	-775298	-66	2934	88.7	0.0038	0.3	880	11.1	318
10/6/2020	915218.27	937430.38	1158.9075	915591.19	936527.54	1157.60913	916044.21	937509.77	1155.75561	-2949	-103	-775298	-103	2949	88.0	0.0038	0.3	880	11.2	317
10/7/2020	915218.27	937430.38	1158.81375	915591.19	936527.54	1157.5129	916044.21	937509.77	1155.7102	-2905	-83	-775298	-83	2905	88.4	0.0037	0.3	880	11.0	318
10/8/2020	915218.27	937430.38	1158.72	915591.19	936527.54	1157.44889	916044.21	937509.77	1155.62917	-2891	-103	-775298	-103	2891	88.0	0.0037	0.3	880	10.9	319
10/9/2020	915218.27	937430.38	1158.62625	915591.19	936527.54	1157.34418	916044.21	937509.77	1155.55175	-2878	-88	-775298	-88	2878	88.3	0.0037	0.3	880	10.9	319
10/10/2020	915218.27	937430.38	1158.5325	915591.19	936527.54	1157.28092	916044.21	937509.77	1155.45815	-2875	-113	-775298	-113	2875	87.8	0.0037	0.3	880	10.9	318
10/11/2020	915218.27	937430.38	1158.43875	915591.19	936527.54	1157.15538	916044.21	937509.77	1155.24887	-2982	-130	-775298	-130	2982	87.5	0.0038	0.3	880	11.3	312
10/12/2020	915218.27	937430.38	1158.345	915591.19	936527.54	1157.05876	916044.21	937509.77	1155.26345	-2884	-87	-775298	-87	2884	88.3	0.0037	0.3	880	10.9	317
10/13/2020	915218.27	937430.38	1158.25125	915591.19	936527.54	1157.00753	916044.21	937509.77	1155.18903	-2863	-115	-775298	-115	2863	87.7	0.0037	0.3	880	10.8	317
10/14/2020	915218.27	937430.38	1158.1575	915591.19	936527.54	1156.90508	916044.21	937509.77	1155.12455	-2838	-97	-775298	-97	2838	88.0	0.0037	0.3	880	10.7	318
10/15/2020	915218.27	937430.38	1158.06375	915591.19	936527.54	1156.88126	916044.21	937509.77	1154.99672	-2863	-167	-775298	-167	2863	86.7	0.0037	0.3	880	10.9	316
10/16/2020	915218.27	937430.38	1157.97	915591.19	936527.54	1156.77106	916044.21	937509.77	1154.99711	-2779	-118	-775298	-118	2779	87.6	0.0036	0.3	880	10.5	320
10/17/2020	915218.27	937430.38	1157.87625	915591.19	936527.54	1156.73125	916044.21	937509.77	1154.92215	-2758	-156	-775298	-156	2758	86.8	0.0036	0.3	880	10.5	321
10/18/2020	915218.27	937430.38	1157.7825	915591.19	936527.54	1156.60735	916044.21	937509.77	1154.70655	-2870	-176	-775298	-176	2870	86.5	0.0037	0.3	880	10.9	314
10/19/2020	915218.27	937430.38	1157.68875	915591.19	936527.54	1156.52186	916044.21	937509.77	1154.76214	-2735	-128	-775298	-128	2735	87.3	0.0035	0.3	880	10.4	321
10/20/2020	915218.27	937430.38	1157.595	915591.19	936527.54	1156.54254	916044.21	937509.77	1154.72867	-2671	-200	-775298	-200	2671	85.7	0.0035	0.3	880	10.1	324
10/21/2020	915218.27	937430.38	1157.50125	915591.19	936527.54	1156.45622	916044.21	937509.77	1154.71136	-2602	-177	-775298	-177	2602	86.1	0.0034	0.3	880	9.9	327
10/22/2020	915218.27	937430.38	1157.4075	915591.19	936527.54	1156.40842	916044.21	937509.77	1154.52428	-2682	-250	-775298	-250	2682	84.7	0.0035	0.3	880	10.2	322
10/23/2020	915218.27	937430.38	1157.31375	915591.19	936527.54	1156.36723	916044.21	937509.77	1154.64001	-2489	-215	-775298	-215	2489	85.1	0.0032	0.3	880	9.5	333
10/24/2020	915218.27	937430.38	1157.22	915591.19	936527.54	1156.31805	916044.21	937509.77	1154.4287	-2592	-296	-775298	-296	2592	83.5	0.0034	0.3	880	9.9	326
10/25/2020	915218.27	937430.38	1157.12625	915591.19	936527.54	1156.19471	916044.21	937509.77	1154.38046	-2553	-255	-775298	-255	2553	84.3	0.0033	0.3	880	9.7	328
10/26/2020	915218.27	937430.38	1157.0325	915591.19	936527.54	1156.15191	916044.21	937509.77	1154.42391	-2425	-245	-775298	-245	2425	84.2	0.0031	0.3	880	9.2	335
10/27/2020	915218.27	937430.38	1156.93875	915591.19	936527.54	1156.11867	916044.21	937509.77	1154.23395	-2507	-331	-775298	-331	2507	82.5	0.0033	0.3	880	9.6	329
10/28/2020	915218.27	937430.38	1156.845	915591.19	936527.54	1156.08938	916044.21	937509.77	1154.38396	-2282	-294	-775298	-294	2282	82.7	0.0030	0.3	880	8.7	344
10/29/2020	915218.27	937430.38	1156.75125	915591.19	936527.54	1156.04212	916044.21	937509.77	1154.15305	-2402	-383	-775298	-383	2402	80.9	0.0031	0.3	880	9.2	334
10/30/2020	915218.27	937430.38	1156.6575	915591.19	936527.54	1156.1131	916044.21	937509.77	1154.41659	-2066	-386	-775298	-386	2066	79.4	0.0027	0.3	880	8.0	358
10/31/2020	915218.27	937430.38	1156.56375	915591.19	936527.54	1156.07	916044.21	937509.77	1154.23457	-2142	-461	-775298	-461	2142	77.9	0.0028	0.3	880	8.3	350
11/1/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.94714	916044.21	937509.77	1154.17653	-2112	-423	-775298	-423	2112	78.7	0.0028	0.3	880	8.2	353
11/2/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1155.9386	916044.21	937509.77	1154.25351	-3026	65	-775298	65	3026	91.2	0.0028	0.3	880	8.1	362
11/3/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1154.04824	-933	-13942	-775298	-13942	933	3.8	0.0027	0.3	880	8.0	356
11/4/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.89504	916044.21	937509.77	1154.23213	-2066	-360	-775298	-360	2066	80.1	0.0027	0.3	880	7.9	357
11/5/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.83946	916044.21	937509.77	1154.00098	-2279	-400	-775298	-400	2279	80.0	0.0030	0.3	880	8.8	340
11/6/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.80205	916044.21	937509.77	1154.12347	-2172	-323	-775298	-323	2172	81.5	0.0028	0.3	880	8.3	349
11/7/2020	915218.27	937430.38	1154.47	915591.19	936527.54	1155.75607	916044.21	937509.77	1153.91731	-397	-1268	-775298	-1268	397	17.4	0.0017	0.3	880	5.0	430
11/8/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.62865	916044.21	937509.77	1153.76206	-2512	-315	-775298	-315	2512	82.9	0.0033	0.3	880	9.6	325
11/9/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.62089	916044.21	937509.77	1153.91091	-2378	-253	-775298	-253	2378	83.9	0.0031	0.3	880	9.0	335
11/10/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.58375	916044.21	937509.77	1153.69109	-2579	-304	-775298	-304	2579	83.3	0.0033	0.3	880	9.8	321
11/11/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.57342	916044.21	937509.77	1153.85292	-2434	-235	-775298	-235	2434	84.5	0.0032	0.3	880	9.3	331
11/12/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.65048	916044.21	937509.77	1153.7846	-2490	-325	-775298	-325	2490	82.6	0.0032	0.3	880	9.5	327
11/13/2020	915218.27	937430.38	1155.47	915591.19	936527.54	1155.6576	916044.21	937509.77	1154.00103	-1311	-703	-775298	-703	1311	61.8	0.0019	0.3	880	5.6	416

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
11/14/2020	915218.27	937430.38	1154.47	915591.19	936527.54	1155.67386	916044.21	937509.77	1153.86548	-450	-1220	-775298	-1220	450	20.3	0.0017	0.3	880	4.9	435
11/15/2020	915218.27	937430.38	1155.47	915591.19	936527.54	1155.59484	916044.21	937509.77	1153.82007	-1480	-718	-775298	-718	1480	64.1	0.0021	0.3	880	6.2	395
11/16/2020	915218.27	937430.38	1154.47	915591.19	936527.54	1155.63975	916044.21	937509.77	1153.74909	-558	-1235	-775298	-1235	558	24.3	0.0017	0.3	880	5.1	426
11/17/2020	915218.27	937430.38	1154.47	915591.19	936527.54	1155.55555	916044.21	937509.77	1153.5992	-700	-1221	-775298	-1221	700	29.8	0.0018	0.3	880	5.3	418
11/18/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.54577	916044.21	937509.77	1153.77256	-2509	-243	-775298	-243	2509	84.5	0.0033	0.3	880	9.5	326
11/19/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.61682	916044.21	937509.77	1153.80314	-2475	-290	-775298	-290	2475	83.3	0.0032	0.3	880	9.4	328
11/20/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.58145	916044.21	937509.77	1153.8373	-2447	-248	-775298	-248	2447	84.2	0.0032	0.3	880	9.3	330
11/21/2020	915218.27	937430.38	1155.47	915591.19	936527.54	1155.61126	916044.21	937509.77	1153.83962	-1461	-725	-775298	-725	1461	63.6	0.0021	0.3	880	6.2	397
11/22/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.49966	916044.21	937509.77	1153.55624	-2708	-285	-775298	-285	2708	84.0	0.0035	0.3	880	10.3	314
11/23/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.58787	916044.21	937509.77	1153.6326	-2632	-330	-775298	-330	2632	82.9	0.0034	0.3	880	10.0	318
11/24/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.62731	916044.21	937509.77	1153.66155	-2602	-351	-775298	-351	2602	82.3	0.0034	0.3	880	9.9	319
11/25/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.57169	916044.21	937509.77	1153.79759	-2484	-255	-775298	-255	2484	84.1	0.0032	0.3	880	9.4	328
11/26/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.67683	916044.21	937509.77	1153.8675	-2413	-315	-775298	-315	2413	82.6	0.0031	0.3	880	9.2	332
11/27/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.70937	916044.21	937509.77	1153.97183	-2316	-303	-775298	-303	2316	82.5	0.0030	0.3	880	8.8	339
11/28/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.84065	916044.21	937509.77	1154.05867	-2227	-379	-775298	-379	2227	80.3	0.0029	0.3	880	8.5	344
11/29/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.87395	916044.21	937509.77	1153.99075	-2286	-432	-775298	-432	2286	79.3	0.0030	0.3	880	8.8	339
11/30/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1155.98635	916044.21	937509.77	1154.28486	-2011	-415	-775298	-415	2011	78.3	0.0026	0.3	880	7.8	361
12/1/2020	915218.27	937430.38	1156.47	915591.19	936527.54	1156.17653	916044.21	937509.77	1154.34096	-1945	-552	-775298	-552	1945	74.2	0.0026	0.3	880	7.7	364
12/2/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1156.28728	916044.21	937509.77	1154.53421	-2744	-118	-775298	-118	2744	87.5	0.0035	0.3	880	10.4	319
12/3/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1154.65366	-1369	-13263	-775298	-13263	1369	5.9	0.0033	0.3	880	9.7	330
12/4/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1156.60289	916044.21	937509.77	1154.84623	-2438	-262	-775298	-262	2438	83.9	0.0032	0.3	880	9.3	337
12/5/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1156.81086	916044.21	937509.77	1154.97813	-2302	-385	-775298	-385	2302	80.5	0.0030	0.3	880	8.8	346
12/6/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1156.87728	916044.21	937509.77	1154.91126	-2357	-465	-775298	-465	2357	78.8	0.0031	0.3	880	9.1	341
12/7/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1156.99686	916044.21	937509.77	1155.18568	-2100	-461	-775298	-461	2100	77.6	0.0028	0.3	880	8.1	360
12/8/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1157.15068	916044.21	937509.77	1155.2147	-2062	-577	-775298	-577	2062	74.4	0.0028	0.3	880	8.1	361
12/9/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1157.18724	916044.21	937509.77	1155.33551	-1950	-562	-775298	-562	1950	73.9	0.0026	0.3	880	7.7	371
12/10/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1157.28731	916044.21	937509.77	1155.33842	-1939	-644	-775298	-644	1939	71.6	0.0026	0.3	880	7.7	370
12/11/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.31538	916044.21	937509.77	1155.44136	-2826	-176	-775298	-176	2826	86.4	0.0037	0.3	880	10.7	320
12/12/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.4103	916044.21	937509.77	1155.48341	-2781	-239	-775298	-239	2781	85.1	0.0036	0.3	880	10.6	323
12/13/2020	915218.27	937430.38	1157.47	915591.19	936527.54	1157.36783	916044.21	937509.77	1155.31096	-1957	-721	-775298	-721	1957	69.8	0.0027	0.3	880	7.9	366
12/14/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.4252	916044.21	937509.77	1155.53544	-2732	-231	-775298	-231	2732	85.2	0.0035	0.3	880	10.4	326
12/15/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.50322	916044.21	937509.77	1155.5306	-2731	-298	-775298	-298	2731	83.8	0.0035	0.3	880	10.4	325
12/16/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.51423	916044.21	937509.77	1155.60669	-2661	-278	-775298	-278	2661	84.0	0.0035	0.3	880	10.1	330
12/17/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.59508	916044.21	937509.77	1155.6313	-2632	-336	-775298	-336	2632	82.7	0.0034	0.3	880	10.0	331
12/18/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.57177	916044.21	937509.77	1155.6709	-2598	-302	-775298	-302	2598	83.4	0.0034	0.3	880	9.9	333
12/19/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.63129	916044.21	937509.77	1155.65315	-2610	-358	-775298	-358	2610	82.2	0.0034	0.3	880	10.0	332
12/20/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.58508	916044.21	937509.77	1155.52234	-2732	-368	-775298	-368	2732	82.3	0.0036	0.3	880	10.4	325
12/21/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.6323	916044.21	937509.77	1155.7549	-2518	-321	-775298	-321	2518	82.7	0.0033	0.3	880	9.6	338
12/22/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.68629	916044.21	937509.77	1155.72011	-2545	-378	-775298	-378	2545	81.5	0.0033	0.3	880	9.7	336
12/23/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.66163	916044.21	937509.77	1155.80248	-2473	-327	-775298	-327	2473	82.5	0.0032	0.3	880	9.4	341
12/24/2020	915218.27	937430.38	1158.47	915591.19	936527.54	1157.7274	916044.21	937509.77	1155.84052	-2433	-367	-775298	-367	2433	81.4	0.0032	0.3	880	9.3	344
12/25/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1158.45881	916044.21	937509.77	1157.05815	-3240	389	-775298	389	3240	96.8	0.0042	0.3	880	12.3	310
12/26/2020	915218.27	937430.38	1160.47	915591.19	936527.54	1159.04707	916044.21	937509.77	1158.30838	-2065	369	-775298	369	2065	100.1	0.0027	0.3	880	7.9	387
12/27/2020	915218.27	937430.38	1161.47	915591.19	936527.54	1159.60533	916044.21	937509.77	1159.06948	-2315	645	-775298	645	2315	105.6	0.0031	0.3	880	9.1	369
12/28/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1160.27482	916044.21	937509.77	1159.87725	-2515	846	-775298	846	2515	108.6	0.0034	0.3	880	10.0	357
12/29/2020	915218.27	937430.38	1162.47	915591.19	936527.54	1160.84463	916044.21	937509.77	1160.3005	-2088	533	-775298	533	2088	104.3	0.0028	0.3	880	8.2	397
12/30/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1161.3423	916044.21	937509.77	1160.755	-2620	745	-775298	745	2620	105.9	0.0035	0.3	880	10.3	359
12/31/2020	915218.27	937430.38	1163.47	915591.19	936527.54	1161.79581	916044.21	937509.77	1161.04532	-2322	479	-775298	479	2322	101.6	0.0031	0.3	880	9.0	385
1/1/2021	915218.27	937430.38	1163.47	915591.19	936527.54	1162.1411	916044.21	937509.77	1161.34712	-2022	306	-775298	306	2022	98.6	0.0026	0.3	880	7.7	415
1/2/2021	915218.27	937430.38	1164.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1161.71628	-1868	-7458	-775298	-7458	1868	14.1	0.0029	0.3	880	8.5	403
1/3/2021	915218.27	937430.38	1164.47	915591.19	936527.54	1162.93834	916044.21	937509.77	1161.94039	-2405	322	-775298	322	2405	97.6	0.0031	0.3	880	9.2	388
1/4/2021	915218.27	937430.38	1164.47	915591.19	936527.54	1163.28638	916044.21	937509.77	1162.34737	-2010	186	-775298	186	2010	95.3	0.0026	0.3	880	7.6	425
1/5/2021	915218.27	937430.38	1165.47	915591.19	936527.54	1163.66418	916044.21	937509.77	1162.5914	-2742	418	-775298	418	2742	98.7	0.0036	0.3	880	10.5	369
1/6/2021	915218.27	937430.38	1165.47	915591.19	936527.54	1163.95322	916044.21	937509.77	1162.89135	-2449	291	-775298	291	2449	96.8	0.0032	0.3	880	9.3	391

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
1/7/2021	915218.27	937430.38	1165.47	915591.19	936527.54	1164.24565	916044.21	937509.77	1163.0349	-2296	103	-775298	103	2296	92.6	0.0030	0.3	880	8.7	405
1/8/2021	915218.27	937430.38	1165.47	915591.19	936527.54	1164.52653	916044.21	937509.77	1163.33594	-2002	-17	-775298	-17	2002	89.5	0.0026	0.3	880	7.6	434
1/9/2021	915218.27	937430.38	1165.47	915591.19	936527.54	1164.76872	916044.21	937509.77	1163.4363	-1892	-179	-775298	-179	1892	84.6	0.0025	0.3	880	7.2	446
1/10/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1164.85697	916044.21	937509.77	1163.3771	-2920	179	-775298	179	2920	93.5	0.0038	0.3	880	11.1	366
1/11/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.07631	916044.21	937509.77	1163.69255	-2618	115	-775298	115	2618	92.5	0.0034	0.3	880	9.9	386
1/12/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.22388	916044.21	937509.77	1163.74016	-2564	11	-775298	11	2564	90.3	0.0033	0.3	880	9.7	391
1/13/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.3487	916044.21	937509.77	1163.88475	-2423	-38	-775298	-38	2423	89.1	0.0031	0.3	880	9.2	402
1/14/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.45902	916044.21	937509.77	1163.87869	-2420	-131	-775298	-131	2420	86.9	0.0031	0.3	880	9.2	402
1/15/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.58225	916044.21	937509.77	1164.05	-2255	-169	-775298	-169	2255	85.7	0.0029	0.3	880	8.6	416
1/16/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.73458	916044.21	937509.77	1164.12031	-2180	-269	-775298	-269	2180	83.0	0.0028	0.3	880	8.3	422
1/17/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.75267	916044.21	937509.77	1164.00955	-2278	-325	-775298	-325	2278	81.9	0.0030	0.3	880	8.7	412
1/18/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.89716	916044.21	937509.77	1164.28643	-2017	-341	-775298	-341	2017	80.4	0.0026	0.3	880	7.7	437
1/19/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.00704	916044.21	937509.77	1164.30941	-1987	-423	-775298	-423	1987	78.0	0.0026	0.3	880	7.7	439
1/20/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.09355	916044.21	937509.77	1164.40667	-2875	-6	-775298	-6	2875	89.9	0.0037	0.3	880	10.9	375
1/21/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.23075	916044.21	937509.77	1164.45158	-2824	-102	-775298	-102	2824	87.9	0.0036	0.3	880	10.7	379
1/22/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.30355	916044.21	937509.77	1164.5667	-2714	-119	-775298	-119	2714	87.5	0.0035	0.3	880	10.3	386
1/23/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.35418	916044.21	937509.77	1164.5346	-2739	-173	-775298	-173	2739	86.4	0.0035	0.3	880	10.4	384
1/24/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.36091	916044.21	937509.77	1164.43382	-2829	-216	-775298	-216	2829	85.6	0.0037	0.3	880	10.7	378
1/25/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.46234	916044.21	937509.77	1164.66143	-2616	-215	-775298	-215	2616	85.3	0.0034	0.3	880	9.9	393
1/26/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.53735	916044.21	937509.77	1164.68536	-2588	-268	-775298	-268	2588	84.1	0.0034	0.3	880	9.8	394
1/27/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.51245	916044.21	937509.77	1164.67943	-2595	-250	-775298	-250	2595	84.5	0.0034	0.3	880	9.9	394
1/28/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.53521	916044.21	937509.77	1164.62165	-2646	-290	-775298	-290	2646	83.7	0.0034	0.3	880	10.1	390
1/29/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.56939	916044.21	937509.77	1164.71442	-2559	-284	-775298	-284	2559	83.7	0.0033	0.3	880	9.7	396
1/30/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.57784	916044.21	937509.77	1164.67532	-2594	-305	-775298	-305	2594	83.3	0.0034	0.3	880	9.9	394
1/31/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.54234	916044.21	937509.77	1164.55348	-2707	-321	-775298	-321	2707	83.2	0.0035	0.3	880	10.3	385
2/1/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.59472	916044.21	937509.77	1164.71637	-2556	-304	-775298	-304	2556	83.2	0.0033	0.3	880	9.7	397
2/2/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.6451	916044.21	937509.77	1164.71858	-2550	-345	-775298	-345	2550	82.3	0.0033	0.3	880	9.7	397
2/3/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.63197	916044.21	937509.77	1164.74878	-2523	-323	-775298	-323	2523	82.7	0.0033	0.3	880	9.6	399
2/4/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.63252	-2182	-5011	-775298	-5011	2182	23.5	0.0033	0.3	880	9.7	398
2/5/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.62099	916044.21	937509.77	1164.72332	-2547	-323	-775298	-323	2547	82.8	0.0033	0.3	880	9.7	397
2/6/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.56037	916044.21	937509.77	1164.60682	-1675	-769	-775298	-769	1675	65.3	0.0024	0.3	880	7.0	461
2/7/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.48794	916044.21	937509.77	1164.46362	-2792	-310	-775298	-310	2792	83.7	0.0036	0.3	880	10.6	380
2/8/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.46826	916044.21	937509.77	1164.56289	-2704	-257	-775298	-257	2704	84.6	0.0035	0.3	880	10.3	386
2/9/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.46298	916044.21	937509.77	1164.5264	-2738	-266	-775298	-266	2738	84.5	0.0035	0.3	880	10.4	384
2/10/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.40767	916044.21	937509.77	1164.47678	-2787	-239	-775298	-239	2787	85.1	0.0036	0.3	880	10.6	380
2/11/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.37216	916044.21	937509.77	1164.39804	-2861	-239	-775298	-239	2861	85.2	0.0037	0.3	880	10.9	376
2/12/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.346	916044.21	937509.77	1164.43621	-2828	-203	-775298	-203	2828	85.9	0.0037	0.3	880	10.7	378
2/13/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.33601	916044.21	937509.77	1164.38306	-2877	-215	-775298	-215	2877	85.7	0.0037	0.3	880	10.9	375
2/14/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.22817	916044.21	937509.77	1164.19059	-3059	-197	-775298	-197	3059	86.3	0.0040	0.3	880	11.6	363
2/15/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.24439	916044.21	937509.77	1164.32465	-2937	-161	-775298	-161	2937	86.9	0.0038	0.3	880	11.1	371
2/16/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.2581	916044.21	937509.77	1164.30685	-1970	-632	-775298	-632	1970	72.2	0.0027	0.3	880	7.8	435
2/17/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.14081	916044.21	937509.77	1164.2286	-2050	-564	-775298	-564	2050	74.6	0.0027	0.3	880	8.0	429
2/18/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.09447	916044.21	937509.77	1164.11609	-2155	-568	-775298	-568	2155	75.2	0.0029	0.3	880	8.4	419
2/19/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.09398	916044.21	937509.77	1164.1726	-2104	-546	-775298	-546	2104	75.4	0.0028	0.3	880	8.2	424
2/20/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.04923	916044.21	937509.77	1164.08896	-2183	-540	-775298	-540	2183	76.1	0.0029	0.3	880	8.5	417
2/21/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.92012	916044.21	937509.77	1163.87301	-2388	-514	-775298	-514	2388	77.8	0.0032	0.3	880	9.2	400
2/22/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.99569	916044.21	937509.77	1164.06135	-2212	-506	-775298	-506	2212	77.1	0.0029	0.3	880	8.6	415
2/23/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.9711	916044.21	937509.77	1163.97436	-2293	-519	-775298	-519	2293	77.3	0.0030	0.3	880	8.9	408
2/24/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.91934	916044.21	937509.77	1163.95126	-2318	-484	-775298	-484	2318	78.2	0.0031	0.3	880	9.0	406
2/25/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.81751	916044.21	937509.77	1163.80506	-2458	-455	-775298	-455	2458	79.5	0.0032	0.3	880	9.5	396
2/26/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.79183	916044.21	937509.77	1163.81888	-2447	-429	-775298	-429	2447	80.1	0.0032	0.3	880	9.4	397
2/27/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.83714	916044.21	937509.77	1163.83878	-2426	-459	-775298	-459	2426	79.3	0.0032	0.3	880	9.3	398
2/28/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.80326	916044.21	937509.77	1163.7009	-2553	-482	-775298	-482	2553	79.3	0.0034	0.3	880	9.8	388
3/1/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1165.92361	916044.21	937509.77	1163.90987	-2355	-503	-775298	-503	2355	77.9	0.0031	0.3	880	9.1	403

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
3/2/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.00277	916044.21	937509.77	1163.95648	-2306	-551	-775298	-551	2306	76.6	0.0031	0.3	880	9.0	406
3/3/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.115	916044.21	937509.77	1164.12944	-2141	-580	-775298	-580	2141	74.9	0.0029	0.3	880	8.4	420
3/4/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1166.22943	916044.21	937509.77	1164.18215	-2085	-654	-775298	-654	2085	72.6	0.0028	0.3	880	8.3	423
3/5/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.36009	916044.21	937509.77	1164.33121	-2922	-254	-775298	-254	2922	85.0	0.0038	0.3	880	11.1	372
3/6/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.45468	916044.21	937509.77	1164.38066	-2870	-313	-775298	-313	2870	83.8	0.0037	0.3	880	10.9	374
3/7/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.471	916044.21	937509.77	1164.29012	-2950	-361	-775298	-361	2950	83.0	0.0038	0.3	880	11.2	369
3/8/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.56071	916044.21	937509.77	1164.47082	-2780	-367	-775298	-367	2780	82.5	0.0036	0.3	880	10.6	380
3/9/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1164.49031	-2310	-5064	-775298	-5064	2310	24.5	0.0036	0.3	880	10.5	382
3/10/2021	915218.27	937430.38	1167.47	915591.19	936527.54	1166.67024	916044.21	937509.77	1164.54881	-2701	-429	-775298	-429	2701	81.0	0.0035	0.3	880	10.3	385
3/11/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1166.85358	916044.21	937509.77	1164.64075	-3586	-93	-775298	-93	3586	88.5	0.0046	0.3	880	13.6	342
3/12/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.02462	916044.21	937509.77	1165.08195	-3174	-70	-775298	-70	3174	88.7	0.0041	0.3	880	12.0	363
3/13/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.29943	916044.21	937509.77	1165.43146	-2836	-166	-775298	-166	2836	86.6	0.0037	0.3	880	10.7	384
3/14/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.56482	916044.21	937509.77	1165.58543	-2676	-328	-775298	-328	2676	83.0	0.0035	0.3	880	10.2	394
3/15/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.85141	916044.21	937509.77	1165.9247	-2347	-438	-775298	-438	2347	79.4	0.0031	0.3	880	9.0	419
3/16/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.13017	916044.21	937509.77	1166.08999	-3158	-154	-775298	-154	3158	87.2	0.0041	0.3	880	12.0	370
3/17/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.35226	916044.21	937509.77	1166.29804	-2953	-260	-775298	-260	2953	85.0	0.0038	0.3	880	11.2	382
3/18/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.58433	916044.21	937509.77	1166.39707	-2845	-414	-775298	-414	2845	81.7	0.0037	0.3	880	10.9	388
3/19/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.77325	916044.21	937509.77	1166.62728	-2622	-485	-775298	-485	2622	79.5	0.0034	0.3	880	10.1	403
3/20/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.96493	916044.21	937509.77	1166.72953	-2514	-605	-775298	-605	2514	76.5	0.0033	0.3	880	9.8	409
3/21/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1169.11161	916044.21	937509.77	1166.75815	-2477	-715	-775298	-715	2477	73.9	0.0033	0.3	880	9.8	410
3/22/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.33257	916044.21	937509.77	1167.02375	-3202	-346	-775298	-346	3202	83.8	0.0042	0.3	880	12.2	373
3/23/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.49519	916044.21	937509.77	1167.0689	-3148	-463	-775298	-463	3148	81.6	0.0041	0.3	880	12.0	375
3/24/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.6748	916044.21	937509.77	1167.2412	-2978	-547	-775298	-547	2978	79.6	0.0039	0.3	880	11.5	384
3/25/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.81841	916044.21	937509.77	1167.25272	-2956	-662	-775298	-662	2956	77.4	0.0039	0.3	880	11.5	384
3/26/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.01465	916044.21	937509.77	1167.45579	-2757	-748	-775298	-748	2757	74.8	0.0037	0.3	880	10.8	396
3/27/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.11326	916044.21	937509.77	1167.45694	-2749	-829	-775298	-829	2749	73.2	0.0037	0.3	880	10.9	395
3/28/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.26962	916044.21	937509.77	1167.5094	-2689	-939	-775298	-939	2689	70.8	0.0037	0.3	880	10.8	396
3/29/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.3428	916044.21	937509.77	1167.65121	-2555	-946	-775298	-946	2555	69.7	0.0035	0.3	880	10.3	405
3/30/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.45677	916044.21	937509.77	1167.67126	-2528	-1033	-775298	-1033	2528	67.8	0.0035	0.3	880	10.3	405
3/31/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.56103	916044.21	937509.77	1167.7809	-2421	-1078	-775298	-1078	2421	66.0	0.0034	0.3	880	10.0	411
4/1/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.61991	916044.21	937509.77	1167.76147	-2433	-1134	-775298	-1134	2433	65.0	0.0035	0.3	880	10.2	408
4/2/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.67657	916044.21	937509.77	1167.854225	-3327	-693	-775298	-693	3327	78.2	0.0044	0.3	880	12.9	369
4/3/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.73372	916044.21	937509.77	1167.84462	-2349	-1197	-775298	-1197	2349	63.0	0.0034	0.3	880	10.0	412
4/4/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.73313	916044.21	937509.77	1167.77605	-2411	-1222	-775298	-1222	2411	63.1	0.0035	0.3	880	10.2	407
4/5/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.79197	916044.21	937509.77	1167.913847	-2282	-1219	-775298	-1219	2282	61.9	0.0033	0.3	880	9.8	416
4/6/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.79755	916044.21	937509.77	1167.874189	-3300	-786	-775298	-786	3300	76.6	0.0044	0.3	880	12.8	369
4/7/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.7752	916044.21	937509.77	1167.889867	-2305	-1214	-775298	-1214	2305	62.2	0.0034	0.3	880	9.9	414
4/8/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.79482	-2273	-2473	-775298	-2473	2273	42.6	0.0043	0.3	880	12.7	365
4/9/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.70623	916044.21	937509.77	1167.832597	-2362	-1179	-775298	-1179	2362	63.5	0.0034	0.3	880	10.0	411
4/10/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.66346	916044.21	937509.77	1167.75572	-2435	-1172	-775298	-1172	2435	64.3	0.0035	0.3	880	10.2	407
4/11/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.59176	916044.21	937509.77	1167.64718	-2539	-1153	-775298	-1153	2539	65.6	0.0036	0.3	880	10.6	400
4/12/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.54923	916044.21	937509.77	1167.7091	-2486	-1095	-775298	-1095	2486	66.2	0.0035	0.3	880	10.3	406
4/13/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.49585	916044.21	937509.77	1167.62684	-2565	-1082	-775298	-1082	2565	67.1	0.0036	0.3	880	10.5	401
4/14/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.50066	916044.21	937509.77	1167.65442	-2540	-1075	-775298	-1075	2540	67.1	0.0036	0.3	880	10.4	403
4/15/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.47127	916044.21	937509.77	1167.58327	-2606	-1078	-775298	-1078	2606	67.5	0.0036	0.3	880	10.7	398
4/16/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.46244	916044.21	937509.77	1167.62953	-2565	-1053	-775298	-1053	2565	67.7	0.0036	0.3	880	10.5	402
4/17/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1170.43651	916044.21	937509.77	1167.57256	-1636	-1506	-775298	-1506	1636	47.4	0.0029	0.3	880	8.4	441
4/18/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.37362	916044.21	937509.77	1167.45048	-2734	-1046	-775298	-1046	2734	69.1	0.0038	0.3	880	11.1	391
4/19/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.40857	916044.21	937509.77	1167.56675	-2626	-1032	-775298	-1032	2626	68.5	0.0036	0.3	880	10.7	398
4/20/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.35171	916044.21	937509.77	1167.49727	-2693	-1011	-775298	-1011	2693	69.4	0.0037	0.3	880	10.9	394
4/21/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.35573	916044.21	937509.77	1167.53235	-2661	-1001	-775298	-1001	2661	69.4	0.0037	0.3	880	10.8	397
4/22/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.32273	916044.21	937509.77	1167.46603	-2724	-999	-775298	-999	2724	69.9	0.0037	0.3	880	11.0	393
4/23/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.34158	916044.21	937509.77	1167.53086	-2664	-990	-775298	-990	2664	69.6	0.0037	0.3	880	10.8	397
4/24/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.34055	916044.21	937509.77	1167.48592	-2704	-1006	-775298	-1006	2704	69.6	0.0037	0.3	880	10.9	394

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
4/25/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.2933	916044.21	937509.77	1167.40085	-2785	-999	-775298	-999	2785	70.3	0.0038	0.3	880	11.2	389
4/26/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.28565	916044.21	937509.77	1167.48133	-2713	-962	-775298	-962	2713	70.5	0.0037	0.3	880	10.9	394
4/27/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.28567	916044.21	937509.77	1167.44213	-2748	-977	-775298	-977	2748	70.4	0.0038	0.3	880	11.0	391
4/28/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.25399	916044.21	937509.77	1167.43644	-2756	-953	-775298	-953	2756	70.9	0.0038	0.3	880	11.0	392
4/29/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.22707	916044.21	937509.77	1167.35699	-2830	-960	-775298	-960	2830	71.3	0.0039	0.3	880	11.3	387
4/30/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.32045	916044.21	937509.77	1167.54333	-2654	-968	-775298	-968	2654	70.0	0.0036	0.3	880	10.7	398
5/1/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.31513	916044.21	937509.77	1167.5338	-2663	-967	-775298	-967	2663	70.0	0.0037	0.3	880	10.7	397
5/2/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.28914	916044.21	937509.77	1167.45783	-2734	-974	-775298	-974	2734	70.4	0.0037	0.3	880	11.0	392
5/3/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.38339	916044.21	937509.77	1167.60624	-2592	-996	-775298	-996	2592	69.0	0.0036	0.3	880	10.5	401
5/4/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.43529	916044.21	937509.77	1167.61976	-2576	-1034	-775298	-1034	2576	68.1	0.0036	0.3	880	10.5	401
5/5/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.4707	916044.21	937509.77	1167.67602	-2522	-1043	-775298	-1043	2522	67.5	0.0035	0.3	880	10.3	405
5/6/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.49197	916044.21	937509.77	1167.65428	-2540	-1068	-775298	-1068	2540	67.2	0.0036	0.3	880	10.4	403
5/7/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.55651	916044.21	937509.77	1167.74784	-2451	-1087	-775298	-1087	2451	66.1	0.0035	0.3	880	10.1	408
5/8/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.824433	-2247	-2462	-775298	-2462	2247	42.4	0.0043	0.3	880	12.6	366
5/9/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.68405	916044.21	937509.77	1167.80616	-3370	-717	-775298	-717	3370	78.0	0.0044	0.3	880	13.0	366
5/10/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.8327	916044.21	937509.77	1168.031088	-3155	-756	-775298	-756	3155	76.5	0.0042	0.3	880	12.3	377
5/11/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.90251	916044.21	937509.77	1168.080864	-3105	-795	-775298	-795	3105	75.6	0.0041	0.3	880	12.1	379
5/12/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.96766	916044.21	937509.77	1168.161861	-3027	-819	-775298	-819	3027	74.9	0.0040	0.3	880	11.9	384
5/13/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.02754	916044.21	937509.77	1168.148814	-3034	-873	-775298	-873	3034	73.9	0.0041	0.3	880	11.9	382
5/14/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.1107	916044.21	937509.77	1168.257945	-2928	-901	-775298	-901	2928	72.9	0.0040	0.3	880	11.6	388
5/15/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.15941	916044.21	937509.77	1168.252446	-2930	-943	-775298	-943	2930	72.2	0.0040	0.3	880	11.6	387
5/16/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.14442	916044.21	937509.77	1168.177035	-2999	-959	-775298	-959	2999	72.3	0.0041	0.3	880	11.9	383
5/17/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.19785	916044.21	937509.77	1168.286347	-2896	-962	-775298	-962	2896	71.6	0.0039	0.3	880	11.5	389
5/18/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.18964	916044.21	937509.77	1168.22965	-2948	-977	-775298	-977	2948	71.7	0.0040	0.3	880	11.7	386
5/19/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.15679	916044.21	937509.77	1168.218679	-2960	-954	-775298	-954	2960	72.1	0.0040	0.3	880	11.8	385
5/20/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.10347	916044.21	937509.77	1168.121786	-3052	-946	-775298	-946	3052	72.8	0.0041	0.3	880	12.1	380
5/21/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1171.04023	916044.21	937509.77	1168.075822	-3099	-911	-775298	-911	3099	73.6	0.0042	0.3	880	12.2	378
5/22/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.98502	916044.21	937509.77	1167.994859	-3176	-895	-775298	-895	3176	74.3	0.0043	0.3	880	12.5	374
5/23/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.87332	916044.21	937509.77	1167.854017	-3312	-856	-775298	-856	3312	75.5	0.0044	0.3	880	12.9	367
5/24/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1170.82424	916044.21	937509.77	1167.918132	-1294	-1697	-775298	-1697	1294	37.3	0.0028	0.3	880	8.1	450
5/25/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.75698	916044.21	937509.77	1167.841977	-3332	-764	-775298	-764	3332	77.1	0.0044	0.3	880	12.9	367
5/26/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.66846	916044.21	937509.77	1167.80088	-2394	-1159	-775298	-1159	2394	64.2	0.0034	0.3	880	10.1	410
5/27/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.59265	916044.21	937509.77	1167.70491	-2487	-1132	-775298	-1132	2487	65.5	0.0035	0.3	880	10.3	404
5/28/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.52723	916044.21	937509.77	1167.70255	-3476	-626	-775298	-626	3476	79.8	0.0046	0.3	880	13.4	361
5/29/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1170.50008	916044.21	937509.77	1167.66533	-1548	-1524	-775298	-1524	1548	45.4	0.0028	0.3	880	8.2	446
5/30/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.39417	916044.21	937509.77	1167.52146	-2668	-1037	-775298	-1037	2668	68.8	0.0037	0.3	880	10.8	395
5/31/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.39998	916044.21	937509.77	1167.62319	-2576	-1004	-775298	-1004	2576	68.7	0.0036	0.3	880	10.5	402
6/1/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.34957	916044.21	937509.77	1167.54199	-2653	-992	-775298	-992	2653	69.5	0.0037	0.3	880	10.7	397
6/2/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.28825	916044.21	937509.77	1167.50919	-2688	-954	-775298	-954	2688	70.5	0.0037	0.3	880	10.8	396
6/3/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.21384	916044.21	937509.77	1167.42932	-2766	-922	-775298	-922	2766	71.6	0.0038	0.3	880	11.0	392
6/4/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.32828	916044.21	937509.77	1167.56916	-2630	-965	-775298	-965	2630	69.9	0.0036	0.3	880	10.6	399
6/5/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.24917	916044.21	937509.77	1167.51047	-2690	-921	-775298	-921	2690	71.1	0.0037	0.3	880	10.8	397
6/6/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.13468	916044.21	937509.77	1167.36271	-2832	-882	-775298	-882	2832	72.7	0.0038	0.3	880	11.2	388
6/7/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.44182	-2592	-2605	-775298	-2605	2592	44.9	0.0047	0.3	880	13.9	349
6/8/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.04475	916044.21	937509.77	1167.36396	-2838	-807	-775298	-807	2838	74.1	0.0038	0.3	880	11.2	389
6/9/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.95953	916044.21	937509.77	1167.339	-2867	-746	-775298	-746	2867	75.4	0.0038	0.3	880	11.2	388
6/10/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.86097	916044.21	937509.77	1167.20725	-2994	-714	-775298	-714	2994	76.6	0.0040	0.3	880	11.6	381
6/11/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.79088	916044.21	937509.77	1167.22248	-2986	-650	-775298	-650	2986	77.7	0.0039	0.3	880	11.6	382
6/12/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.71329	916044.21	937509.77	1167.13295	-3073	-619	-775298	-619	3073	78.6	0.0040	0.3	880	11.9	378
6/13/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.56562	916044.21	937509.77	1166.96737	-3234	-559	-775298	-559	3234	80.2	0.0042	0.3	880	12.4	369
6/14/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.58743	916044.21	937509.77	1167.03183	-3174	-553	-775298	-553	3174	80.1	0.0042	0.3	880	12.2	372
6/15/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.41356	916044.21	937509.77	1166.92686	-3283	-449	-775298	-449	3283	82.2	0.0043	0.3	880	12.5	367
6/16/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1169.30551	916044.21	937509.77	1166.87789	-2353	-831	-775298	-831	2353	70.6	0.0032	0.3	880	9.4	416
6/17/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1169.1797	916044.21	937509.77	1166.73236	-2495	-781	-775298	-781	2495	72.6	0.0034	0.3	880	9.9	407

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
6/18/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1169.09892	916044.21	937509.77	1166.72167	-2511	-718	-775298	-718	2511	74.0	0.0034	0.3	880	9.9	407
6/19/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1169.00116	916044.21	937509.77	1166.61536	-2615	-677	-775298	-677	2615	75.5	0.0035	0.3	880	10.2	400
6/20/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.86377	916044.21	937509.77	1166.45675	-2769	-623	-775298	-623	2769	77.3	0.0037	0.3	880	10.7	390
6/21/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.83395	916044.21	937509.77	1166.54339	-2693	-566	-775298	-566	2693	78.1	0.0035	0.3	880	10.4	397
6/22/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.73916	916044.21	937509.77	1166.44025	-2793	-526	-775298	-526	2793	79.3	0.0037	0.3	880	10.8	390
6/23/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.61201	916044.21	937509.77	1166.3675	-2869	-448	-775298	-448	2869	81.1	0.0037	0.3	880	11.0	386
6/24/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.49696	916044.21	937509.77	1166.2138	-3017	-411	-775298	-411	3017	82.2	0.0039	0.3	880	11.5	377
6/25/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.41601	916044.21	937509.77	1166.21811	-3020	-342	-775298	-342	3020	83.5	0.0039	0.3	880	11.5	377
6/26/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.32348	916044.21	937509.77	1166.08785	-3145	-314	-775298	-314	3145	84.3	0.0041	0.3	880	12.0	370
6/27/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.16801	916044.21	937509.77	1165.89595	-3330	-257	-775298	-257	3330	85.6	0.0043	0.3	880	12.6	360
6/28/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1168.09938	916044.21	937509.77	1165.93665	-2317	-639	-775298	-639	2317	74.6	0.0031	0.3	880	9.1	417
6/29/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.99483	916044.21	937509.77	1165.7903	-2457	-607	-775298	-607	2457	76.1	0.0033	0.3	880	9.6	407
6/30/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.89868	916044.21	937509.77	1165.73956	-2511	-546	-775298	-546	2511	77.7	0.0033	0.3	880	9.7	404
7/1/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.84283	916044.21	937509.77	1165.62832	-2615	-542	-775298	-542	2615	78.3	0.0034	0.3	880	10.1	396
7/2/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.91441	916044.21	937509.77	1165.72802	-2520	-564	-775298	-564	2520	77.4	0.0033	0.3	880	9.8	403
7/3/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.81626	916044.21	937509.77	1165.64847	-2599	-512	-775298	-512	2599	78.9	0.0034	0.3	880	10.0	398
7/4/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.70464	916044.21	937509.77	1165.47346	-2766	-485	-775298	-485	2766	80.0	0.0036	0.3	880	10.6	386
7/5/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.67812	916044.21	937509.77	1165.56318	-2687	-430	-775298	-430	2687	80.9	0.0035	0.3	880	10.3	392
7/6/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.61595	916044.21	937509.77	1165.46207	-2783	-416	-775298	-416	2783	81.5	0.0036	0.3	880	10.6	386
7/7/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.56481	916044.21	937509.77	1165.47371	-2777	-370	-775298	-370	2777	82.4	0.0036	0.3	880	10.6	387
7/8/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.59349	916044.21	937509.77	1165.4405	-2805	-406	-775298	-406	2805	81.8	0.0037	0.3	880	10.7	384
7/9/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.77826	916044.21	937509.77	1165.67528	-2578	-471	-775298	-471	2578	79.6	0.0034	0.3	880	9.9	400
7/10/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1165.60982	-2282	-4194	-775298	-4194	2282	28.5	0.0036	0.3	880	10.5	388
7/11/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.62036	916044.21	937509.77	1165.45001	-2794	-424	-775298	-424	2794	81.4	0.0036	0.3	880	10.7	385
7/12/2021	915218.27	937430.38	1166.47	915591.19	936527.54	1167.74529	916044.21	937509.77	1165.67529	-616	-1350	-775298	-1350	616	24.5	0.0019	0.3	880	5.6	513
7/13/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.73007	916044.21	937509.77	1165.58071	-2667	-466	-775298	-466	2667	80.1	0.0035	0.3	880	10.2	393
7/14/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.97736	916044.21	937509.77	1165.839	-2414	-574	-775298	-574	2414	76.6	0.0032	0.3	880	9.4	411
7/15/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.11158	916044.21	937509.77	1165.96081	-3276	-187	-775298	-187	3276	86.7	0.0042	0.3	880	12.4	363
7/16/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.20737	916044.21	937509.77	1166.12794	-3118	-203	-775298	-203	3118	86.3	0.0040	0.3	880	11.8	372
7/17/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1168.32376	916044.21	937509.77	1166.15968	-2097	-741	-775298	-741	2097	70.5	0.0029	0.3	880	8.4	434
7/18/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.39522	916044.21	937509.77	1166.18113	-3055	-339	-775298	-339	3055	83.7	0.0040	0.3	880	11.6	375
7/19/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.53149	916044.21	937509.77	1166.36613	-2877	-382	-775298	-382	2877	82.4	0.0037	0.3	880	11.0	386
7/20/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.61101	916044.21	937509.77	1166.36224	-2874	-449	-775298	-449	2874	81.1	0.0038	0.3	880	11.0	386
7/21/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.69213	916044.21	937509.77	1166.46676	-2773	-477	-775298	-477	2773	80.2	0.0036	0.3	880	10.6	392
7/22/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.72955	916044.21	937509.77	1166.42654	-2807	-523	-775298	-523	2807	79.4	0.0037	0.3	880	10.8	389
7/23/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.79531	916044.21	937509.77	1166.54571	-2694	-533	-775298	-533	2694	78.8	0.0035	0.3	880	10.4	397
7/24/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1168.83374	916044.21	937509.77	1166.49259	-1756	-1038	-775298	-1038	1756	59.4	0.0026	0.3	880	7.7	453
7/25/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.7831	916044.21	937509.77	1166.37508	-2849	-587	-775298	-587	2849	78.4	0.0038	0.3	880	11.0	386
7/26/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.78647	916044.21	937509.77	1166.45955	-2772	-558	-775298	-558	2772	78.6	0.0036	0.3	880	10.7	391
7/27/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.82168	916044.21	937509.77	1166.39162	-2831	-613	-775298	-613	2831	77.8	0.0037	0.3	880	11.0	387
7/28/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.71217	916044.21	937509.77	1166.39671	-2835	-520	-775298	-520	2835	79.6	0.0037	0.3	880	10.9	387
7/29/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.68227	916044.21	937509.77	1166.31835	-2908	-525	-775298	-525	2908	79.8	0.0038	0.3	880	11.2	383
7/30/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.65024	916044.21	937509.77	1166.38977	-2846	-472	-775298	-472	2846	80.6	0.0037	0.3	880	10.9	387
7/31/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.59385	916044.21	937509.77	1166.25557	-2972	-475	-775298	-475	2972	80.9	0.0039	0.3	880	11.4	379
8/1/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.59374	916044.21	937509.77	1166.11589	-3098	-527	-775298	-527	3098	80.3	0.0041	0.3	880	11.9	371
8/2/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.67504	916044.21	937509.77	1166.33294	-2895	-513	-775298	-513	2895	79.9	0.0038	0.3	880	11.1	384
8/3/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.60903	916044.21	937509.77	1166.26468	-2962	-484	-775298	-484	2962	80.7	0.0039	0.3	880	11.4	380
8/4/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.59845	916044.21	937509.77	1166.31305	-2919	-457	-775298	-457	2919	81.1	0.0038	0.3	880	11.2	383
8/5/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.56953	916044.21	937509.77	1166.24077	-2987	-461	-775298	-461	2987	81.2	0.0039	0.3	880	11.4	378
8/6/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.54353	916044.21	937509.77	1166.28721	-2947	-422	-775298	-422	2947	81.9	0.0038	0.3	880	11.3	381
8/7/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.50472	916044.21	937509.77	1166.21449	-3016	-417	-775298	-417	3016	82.1	0.0039	0.3	880	11.5	377
8/8/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.42426	916044.21	937509.77	1166.08215	-3142	-400	-775298	-400	3142	82.7	0.0041	0.3	880	12.0	370
8/9/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.41582	916044.21	937509.77	1166.21726	-3020	-342	-775298	-342	3020	83.5	0.0039	0.3	880	11.5	377
8/10/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.36696	916044.21	937509.77	1166.14568	-3089	-329	-775298	-329	3089	83.9	0.0040	0.3	880	11.8	373

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
8/11/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.317	916044.21	937509.77	1166.14869	-3090	-286	-775298	-286	3090	84.7	0.0040	0.3	880	11.7	373
8/12/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.25205	916044.21	937509.77	1166.03751	-3196	-274	-775298	-274	3196	85.1	0.0041	0.3	880	12.1	367
8/13/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.20299	916044.21	937509.77	1166.05151	-3187	-228	-775298	-228	3187	85.9	0.0041	0.3	880	12.1	368
8/14/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1168.11766	916044.21	937509.77	1165.91287	-2337	-663	-775298	-663	2337	74.2	0.0031	0.3	880	9.2	415
8/15/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.97793	916044.21	937509.77	1165.71534	-2526	-621	-775298	-621	2526	76.2	0.0034	0.3	880	9.8	401
8/16/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.93859	916044.21	937509.77	1165.81224	-2442	-552	-775298	-552	2442	77.3	0.0032	0.3	880	9.5	409
8/17/2021	915218.27	937430.38	1168.47	915591.19	936527.54	1167.9967	916044.21	937509.77	1165.83114	-2420	-593	-775298	-593	2420	76.2	0.0032	0.3	880	9.4	410
8/18/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1168.24078	916044.21	937509.77	1166.18564	-3063	-210	-775298	-210	3063	86.1	0.0040	0.3	880	11.6	375
8/19/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1168.50396	916044.21	937509.77	1166.80329	-3467	256	-775298	256	3467	94.2	0.0045	0.3	880	13.2	359
8/20/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.01102	916044.21	937509.77	1167.07333	-3182	-62	-775298	-62	3182	88.9	0.0041	0.3	880	12.0	375
8/21/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.22444	916044.21	937509.77	1167.12392	-3120	-219	-775298	-219	3120	86.0	0.0040	0.3	880	11.8	378
8/22/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.40141	916044.21	937509.77	1167.10551	-3122	-372	-775298	-372	3122	83.2	0.0041	0.3	880	11.9	377
8/23/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.62865	916044.21	937509.77	1167.34721	-2886	-470	-775298	-470	2886	80.8	0.0038	0.3	880	11.1	391
8/24/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.37782	-2650	-2628	-775298	-2628	2650	45.2	0.0048	0.3	880	14.1	346
8/25/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.94897	916044.21	937509.77	1167.4835	-2738	-683	-775298	-683	2738	76.0	0.0036	0.3	880	10.7	398
8/26/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.05402	916044.21	937509.77	1167.48938	-2724	-768	-775298	-768	2724	74.3	0.0037	0.3	880	10.7	397
8/27/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.15822	916044.21	937509.77	1167.62427	-2594	-804	-775298	-804	2594	72.8	0.0035	0.3	880	10.3	406
8/28/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.36627	916044.21	937509.77	1167.76796	-2448	-922	-775298	-922	2448	69.4	0.0034	0.3	880	9.9	413
8/29/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.41042	916044.21	937509.77	1167.73424	-3457	-518	-775298	-518	3457	81.5	0.0045	0.3	880	13.2	363
8/30/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.54408	916044.21	937509.77	1167.939181	-3261	-552	-775298	-552	3261	80.4	0.0043	0.3	880	12.5	374
8/31/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.6025	916044.21	937509.77	1167.924927	-3270	-606	-775298	-606	3270	79.5	0.0043	0.3	880	12.6	373
9/1/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.65989	916044.21	937509.77	1167.971685	-3223	-635	-775298	-635	3223	78.8	0.0042	0.3	880	12.4	375
9/2/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.6413	916044.21	937509.77	1167.899089	-3290	-647	-775298	-647	3290	78.9	0.0043	0.3	880	12.7	371
9/3/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.6661	916044.21	937509.77	1167.93233	-3258	-655	-775298	-655	3258	78.6	0.0043	0.3	880	12.6	373
9/4/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.66157	916044.21	937509.77	1167.870654	-2332	-1128	-775298	-1128	2332	64.2	0.0033	0.3	880	9.8	415
9/5/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.60383	916044.21	937509.77	1167.76936	-3410	-665	-775298	-665	3410	79.0	0.0045	0.3	880	13.1	365
9/6/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.6102	916044.21	937509.77	1167.88426	-3306	-627	-775298	-627	3306	79.3	0.0043	0.3	880	12.7	370
9/7/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.56998	916044.21	937509.77	1167.78936	-3394	-629	-775298	-629	3394	79.5	0.0045	0.3	880	13.1	366
9/8/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.54132	916044.21	937509.77	1167.81056	-3378	-598	-775298	-598	3378	80.0	0.0044	0.3	880	13.0	367
9/9/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.55643	916044.21	937509.77	1167.78354	-3401	-620	-775298	-620	3401	79.7	0.0045	0.3	880	13.1	365
9/10/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.55689	916044.21	937509.77	1167.879311	-3314	-585	-775298	-585	3314	80.0	0.0043	0.3	880	12.7	370
9/11/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.54753	916044.21	937509.77	1167.832683	-3357	-595	-775298	-595	3357	80.0	0.0044	0.3	880	12.9	368
9/12/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.48431	916044.21	937509.77	1167.70768	-3475	-589	-775298	-589	3475	80.4	0.0045	0.3	880	13.3	362
9/13/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.53164	916044.21	937509.77	1167.869107	-2343	-1021	-775298	-1021	2343	66.5	0.0033	0.3	880	9.7	418
9/14/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.52435	916044.21	937509.77	1167.840293	-3352	-573	-775298	-573	3352	80.3	0.0044	0.3	880	12.9	368
9/15/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.54036	916044.21	937509.77	1167.842233	-3349	-585	-775298	-585	3349	80.1	0.0044	0.3	880	12.9	368
9/16/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.5234	916044.21	937509.77	1167.76184	-3423	-601	-775298	-601	3423	80.0	0.0045	0.3	880	13.1	364
9/17/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.53825	916044.21	937509.77	1167.81717	-3372	-593	-775298	-593	3372	80.0	0.0044	0.3	880	13.0	367
9/18/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.54318	916044.21	937509.77	1167.72942	-2468	-1082	-775298	-1082	2468	66.3	0.0035	0.3	880	10.2	407
9/19/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.45295	916044.21	937509.77	1167.53555	-2651	-1080	-775298	-1080	2651	67.8	0.0037	0.3	880	10.8	395
9/20/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.4449	916044.21	937509.77	1167.60415	-2589	-1048	-775298	-1048	2589	68.0	0.0036	0.3	880	10.6	400
9/21/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.405	916044.21	937509.77	1167.5116	-2676	-1050	-775298	-1050	2676	68.6	0.0037	0.3	880	10.9	394
9/22/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.36725	916044.21	937509.77	1167.51477	-2676	-1017	-775298	-1017	2676	69.2	0.0037	0.3	880	10.8	395
9/23/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.44199	916044.21	937509.77	1167.48047	-2701	-1092	-775298	-1092	2701	68.0	0.0038	0.3	880	11.0	392
9/24/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.40181	916044.21	937509.77	1167.57756	-2617	-1022	-775298	-1022	2617	68.7	0.0036	0.3	880	10.6	399
9/25/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.36582	916044.21	937509.77	1167.50623	-2684	-1019	-775298	-1019	2684	69.2	0.0037	0.3	880	10.9	395
9/26/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.3022	916044.21	937509.77	1167.35208	-2828	-1024	-775298	-1024	2828	70.1	0.0039	0.3	880	11.4	386
9/27/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.33147	916044.21	937509.77	1167.47749	-2713	-1002	-775298	-1002	2713	69.7	0.0037	0.3	880	10.9	393
9/28/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.28296	916044.21	937509.77	1167.38433	-2801	-996	-775298	-996	2801	70.4	0.0038	0.3	880	11.2	388
9/29/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.23374	916044.21	937509.77	1167.38781	-2801	-954	-775298	-954	2801	71.2	0.0038	0.3	880	11.2	389
9/30/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.16	916044.21	937509.77	1167.25835	-2924	-942	-775298	-942	2924	72.2	0.0040	0.3	880	11.6	381
10/1/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.10417	916044.21	937509.77	1167.26396	-2924	-893	-775298	-893	2924	73.0	0.0039	0.3	880	11.6	382
10/2/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.04228	916044.21	937509.77	1167.1565	-3026	-882	-775298	-882	3026	73.7	0.0041	0.3	880	11.9	377
10/3/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1169.91282	916044.21	937509.77	1166.9839	-3192	-840	-775298	-840	3192	75.3	0.0043	0.3	880	12.5	368

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
10/4/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.05584	916044.21	937509.77	1167.20468	-2981	-876	-775298	-876	2981	73.6	0.0040	0.3	880	11.8	379
10/5/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1167.31335	-2708	-2652	-775298	-2652	2708	45.6	0.0049	0.3	880	14.3	343
10/6/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.12878	916044.21	937509.77	1167.38762	-2810	-868	-775298	-868	2810	72.8	0.0038	0.3	880	11.1	390
10/7/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.17468	916044.21	937509.77	1167.34484	-2845	-922	-775298	-922	2845	72.1	0.0039	0.3	880	11.3	387
10/8/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.25607	916044.21	937509.77	1167.45882	-2736	-946	-775298	-946	2736	70.9	0.0037	0.3	880	11.0	393
10/9/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1170.32211	916044.21	937509.77	1167.49368	-1717	-1441	-775298	-1441	1717	50.0	0.0029	0.3	880	8.5	439
10/10/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.32704	916044.21	937509.77	1167.40519	-2778	-1025	-775298	-1025	2778	69.8	0.0038	0.3	880	11.2	389
10/11/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.41312	916044.21	937509.77	1167.5442	-2646	-1044	-775298	-1044	2646	68.5	0.0037	0.3	880	10.8	396
10/12/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.44236	916044.21	937509.77	1167.5806	-2611	-1055	-775298	-1055	2611	68.0	0.0036	0.3	880	10.7	398
10/13/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.44307	916044.21	937509.77	1167.56441	-2625	-1061	-775298	-1061	2625	68.0	0.0037	0.3	880	10.7	397
10/14/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.43026	916044.21	937509.77	1167.54558	-2643	-1058	-775298	-1058	2643	68.2	0.0037	0.3	880	10.8	396
10/15/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.45242	916044.21	937509.77	1167.59786	-2594	-1057	-775298	-1057	2594	67.8	0.0036	0.3	880	10.6	399
10/16/2021	915218.27	937430.38	1169.47	915591.19	936527.54	1170.55393	916044.21	937509.77	1167.63395	-1572	-1580	-775298	-1580	1572	44.8	0.0029	0.3	880	8.4	441
10/17/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.43799	916044.21	937509.77	1167.54287	-2645	-1065	-775298	-1065	2645	68.1	0.0037	0.3	880	10.8	396
10/18/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.47339	916044.21	937509.77	1167.67106	-2527	-1047	-775298	-1047	2527	67.5	0.0035	0.3	880	10.3	404
10/19/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.51202	916044.21	937509.77	1167.67925	-2516	-1075	-775298	-1075	2516	66.9	0.0035	0.3	880	10.4	404
10/20/2021	915218.27	937430.38	1170.47	915591.19	936527.54	1170.52477	916044.21	937509.77	1167.70181	-2495	-1078	-775298	-1078	2495	66.6	0.0035	0.3	880	10.3	406
10/21/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.5316	916044.21	937509.77	1167.68823	-3489	-635	-775298	-635	3489	79.7	0.0046	0.3	880	13.4	361
10/22/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.60929	916044.21	937509.77	1167.79816	-3383	-658	-775298	-658	3383	79.0	0.0044	0.3	880	13.0	366
10/23/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.63124	916044.21	937509.77	1167.839553	-3344	-661	-775298	-661	3344	78.8	0.0044	0.3	880	12.9	368
10/24/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.59735	916044.21	937509.77	1167.72384	-3451	-676	-775298	-676	3451	78.9	0.0045	0.3	880	13.3	362
10/25/2021	915218.27	937430.38	1171.47	915591.19	936527.54	1170.72812	916044.21	937509.77	1167.92742	-3257	-708	-775298	-708	3257	77.7	0.0043	0.3	880	12.6	372
10/26/2021	915218.27	937430.38	1172.47	915591.19	936527.54	1170.67936	916044.21	937509.77	1167.983496	-4193	-194	-775298	-194	4193	87.3	0.0054	0.3	880	15.9	337
10/27/2021	915218.27	937430.38	1172.47	915591.19	936527.54	1171.66427	916044.21	937509.77	1168.983689	-3212	-635	-775298	-635	3212	78.8	0.0042	0.3	880	12.4	381
10/28/2021	915218.27	937430.38	1172.47	915591.19	936527.54	1172.00149	916044.21	937509.77	1169.184007	-3004	-838	-775298	-838	3004	74.4	0.0040	0.3	880	11.8	391
10/29/2021	915218.27	937430.38	1172.47	915591.19	936527.54	1172.33324	916044.21	937509.77	1169.428326	-2757	-1021	-775298	-1021	2757	69.7	0.0038	0.3	880	11.1	403
10/30/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1172.3881	916044.21	937509.77	1169.708165	-3482	-509	-775298	-509	3482	81.7	0.0045	0.3	880	13.3	374
10/31/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1172.91919	916044.21	937509.77	1169.816	-3343	-908	-775298	-908	3343	74.8	0.0045	0.3	880	13.1	377
11/1/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1173.15558	916044.21	937509.77	1170.038429	-3123	-1020	-775298	-1020	3123	71.9	0.0042	0.3	880	12.4	387
11/2/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1173.38162	916044.21	937509.77	1170.191842	-2967	-1149	-775298	-1149	2967	68.8	0.0041	0.3	880	12.0	393
11/3/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1173.57449	916044.21	937509.77	1170.304616	-2850	-1267	-775298	-1267	2850	66.0	0.0040	0.3	880	11.8	397
11/4/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1173.750712	916044.21	937509.77	1170.425576	-2726	-1367	-775298	-1367	2726	63.4	0.0039	0.3	880	11.5	401
11/5/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1173.902332	916044.21	937509.77	1170.546057	-2606	-1447	-775298	-1447	2606	60.9	0.0038	0.3	880	11.3	406
11/6/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1174.024935	916044.21	937509.77	1170.655122	-2497	-1508	-775298	-1508	2497	58.9	0.0038	0.3	880	11.0	410
11/7/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.071345	916044.21	937509.77	1170.656426	-3475	-1093	-775298	-1093	3475	72.5	0.0047	0.3	880	13.8	373
11/8/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.161125	916044.21	937509.77	1170.782823	-3353	-1120	-775298	-1120	3353	71.5	0.0046	0.3	880	13.4	379
11/9/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.218517	916044.21	937509.77	1170.843986	-3294	-1145	-775298	-1145	3294	70.8	0.0045	0.3	880	13.2	381
11/10/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.212599	916044.21	937509.77	1170.829671	-3307	-1145	-775298	-1145	3307	70.9	0.0045	0.3	880	13.2	380
11/11/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.213335	916044.21	937509.77	1170.791559	-3341	-1160	-775298	-1160	3341	70.9	0.0046	0.3	880	13.4	378
11/12/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.331587	916044.21	937509.77	1171.048204	-3100	-1162	-775298	-1162	3100	69.5	0.0043	0.3	880	12.5	391
11/13/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1174.565849	916044.21	937509.77	1171.163309	-1996	-1765	-775298	-1765	1996	48.5	0.0034	0.3	880	10.1	429
11/14/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.585627	916044.21	937509.77	1171.111091	-3023	-1348	-775298	-1348	3023	66.0	0.0043	0.3	880	12.5	391
11/15/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.639537	916044.21	937509.77	1171.200273	-2939	-1359	-775298	-1359	2939	65.2	0.0042	0.3	880	12.2	396
11/16/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.675786	916044.21	937509.77	1171.224869	-2913	-1380	-775298	-1380	2913	64.7	0.0042	0.3	880	12.2	396
11/17/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.712203	916044.21	937509.77	1171.203796	-2930	-1418	-775298	-1418	2930	64.2	0.0042	0.3	880	12.3	395
11/18/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.719567	916044.21	937509.77	1171.24067	-2896	-1410	-775298	-1410	2896	64.0	0.0042	0.3	880	12.2	397
11/19/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1172.256226	916044.21	937509.77	1171.257133	-3076	630	-775298	630	3076	101.6	0.0041	0.3	880	11.9	402
11/20/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.771543	916044.21	937509.77	1171.264355	-2870	-1445	-775298	-1445	2870	63.3	0.0041	0.3	880	12.2	397
11/21/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.765465	916044.21	937509.77	1171.181965	-2945	-1470	-775298	-1470	2945	63.5	0.0042	0.3	880	12.5	392
11/22/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.804644	916044.21	937509.77	1171.26107	-2871	-1473	-775298	-1473	2871	62.8	0.0042	0.3	880	12.2	396
11/23/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.771137	916044.21	937509.77	1171.252645	-2881	-1449	-775298	-1449	2881	63.3	0.0042	0.3	880	12.2	396
11/24/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.74079	916044.21	937509.77	1171.166057	-2961	-1456	-775298	-1456	2961	63.8	0.0043	0.3	880	12.5	392
11/25/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.742833	916044.21	937509.77	1171.186503	-2943	-1450	-775298	-1450	2943	63.8	0.0042	0.3	880	12.4	393
11/26/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.770116	916044.21	937509.77	1171.209855	-2920	-1464	-775298	-1464	2920	63.4	0.0042	0.3	880	12.4	394

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
11/27/2021	915218.27	937430.38	1173.47	915591.19	936527.54	1174.716595	916044.21	937509.77	1171.171254	-1976	-1887	-775298	-1887	1976	46.3	0.0035	0.3	880	10.3	424
11/28/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.673153	916044.21	937509.77	1171.05455	-3067	-1441	-775298	-1441	3067	64.8	0.0044	0.3	880	12.8	387
11/29/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.609374	916044.21	937509.77	1171.049821	-3077	-1391	-775298	-1391	3077	65.7	0.0044	0.3	880	12.8	387
11/30/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.574816	916044.21	937509.77	1171.021183	-3105	-1373	-775298	-1373	3105	66.2	0.0044	0.3	880	12.8	386
12/1/2021	915218.27	937430.38	1174.47	915591.19	936527.54	1174.476675	916044.21	937509.77	1170.940559	-3186	-1322	-775298	-1322	3186	67.5	0.0044	0.3	880	13.1	383
5/11/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.815198	916044.21	937509.77	1170.320908	-3336	-1219	-775298	-1219	3336	69.9	0.0046	0.3	880	13.4	375
5/12/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.705558	916044.21	937509.77	1170.220385	-3436	-1166	-775298	-1166	3436	71.2	0.0047	0.3	880	13.7	371
5/13/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.578959	916044.21	937509.77	1170.148233	-3511	-1089	-775298	-1089	3511	72.8	0.0047	0.3	880	13.9	369
5/14/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.449028	916044.21	937509.77	1170.02101	-3636	-1029	-775298	-1029	3636	74.2	0.0049	0.3	880	14.3	364
5/15/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.277158	916044.21	937509.77	1169.831601	-3821	-957	-775298	-957	3821	75.9	0.0051	0.3	880	14.9	356
5/16/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.149195	916044.21	937509.77	1169.741093	-3913	-886	-775298	-886	3913	77.2	0.0052	0.3	880	15.2	353
5/17/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1173.050753	916044.21	937509.77	1169.656915	-3996	-836	-775298	-836	3996	78.2	0.0053	0.3	880	15.4	350
5/18/2022	915218.27	937430.38	1174.0	915591.19	936527.54	1172.900527	916044.21	937509.77	1169.522175	-4130	-762	-775298	-762	4130	79.5	0.0054	0.3	880	15.9	345
5/19/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.800898	916044.21	937509.77	1169.429183	-3240	-1167	-775298	-1167	3240	70.2	0.0044	0.3	880	13.0	375
5/20/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.675827	916044.21	937509.77	1169.342096	-3328	-1096	-775298	-1096	3328	71.8	0.0045	0.3	880	13.3	372
5/21/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.550014	916044.21	937509.77	1169.242693	-3428	-1030	-775298	-1030	3428	73.3	0.0046	0.3	880	13.5	368
5/22/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.400472	916044.21	937509.77	1169.115589	-3555	-953	-775298	-953	3555	75.0	0.0047	0.3	880	13.9	363
5/23/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.271202	916044.21	937509.77	1169.044016	-3629	-873	-775298	-873	3629	76.5	0.0048	0.3	880	14.1	360
5/24/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.153317	916044.21	937509.77	1168.948454	-3725	-812	-775298	-812	3725	77.7	0.0049	0.3	880	14.4	356
5/25/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1172.02102	916044.21	937509.77	1168.859949	-3816	-735	-775298	-735	3816	79.1	0.0050	0.3	880	14.7	353
5/26/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1171.90168	916044.21	937509.77	1168.769108	-3907	-671	-775298	-671	3907	80.3	0.0051	0.3	880	15.0	350
5/27/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1171.792195	916044.21	937509.77	1168.711051	-3968	-602	-775298	-602	3968	81.4	0.0052	0.3	880	15.2	347
5/28/2022	915218.27	937430.38	1173.0	915591.19	936527.54	1171.690997	916044.21	937509.77	1168.642029	-4038	-544	-775298	-544	4038	82.3	0.0053	0.3	880	15.4	345
5/29/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1171.538084	916044.21	937509.77	1168.49998	-3197	-924	-775298	-924	3197	73.9	0.0043	0.3	880	12.6	376
5/30/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1171.420115	916044.21	937509.77	1168.436085	-3264	-850	-775298	-850	3264	75.4	0.0044	0.3	880	12.8	373
5/31/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1171.302641	916044.21	937509.77	1168.338131	-3361	-790	-775298	-790	3361	76.8	0.0045	0.3	880	13.1	369
6/1/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1171.167474	916044.21	937509.77	1168.242044	-3459	-714	-775298	-714	3459	78.3	0.0046	0.3	880	13.4	365
6/2/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1171.062492	916044.21	937509.77	1168.178426	-3525	-651	-775298	-651	3525	79.5	0.0046	0.3	880	13.6	362
6/3/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1170.932992	916044.21	937509.77	1168.082659	-3621	-580	-775298	-580	3621	80.9	0.0047	0.3	880	13.9	358
6/4/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1170.787225	916044.21	937509.77	1167.91894	-3781	-520	-775298	-520	3781	82.2	0.0049	0.3	880	14.4	351
6/5/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1170.613817	916044.21	937509.77	1167.744208	-3952	-442	-775298	-442	3952	83.6	0.0051	0.3	880	15.0	344
6/6/2022	915218.27	937430.38	1172.0	915591.19	936527.54	1170.477189	916044.21	937509.77	1167.67409	-4027	-355	-775298	-355	4027	85.0	0.0052	0.3	880	15.3	341
6/7/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1170.347428	916044.21	937509.77	1167.569594	-3149	-740	-775298	-740	3149	76.8	0.0042	0.3	880	12.2	375
6/8/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1170.222033	916044.21	937509.77	1167.507679	-3215	-660	-775298	-660	3215	78.4	0.0042	0.3	880	12.4	372
6/9/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1170.141147	916044.21	937509.77	1167.456559	-3267	-612	-775298	-612	3267	79.4	0.0043	0.3	880	12.6	370
6/10/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1170.048477	916044.21	937509.77	1167.43126	-3298	-545	-775298	-545	3298	80.6	0.0043	0.3	880	12.6	369
6/11/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.946464	916044.21	937509.77	1167.350081	-3379	-491	-775298	-491	3379	81.7	0.0044	0.3	880	12.9	365
6/12/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.829376	916044.21	937509.77	1167.254512	-3475	-430	-775298	-430	3475	82.9	0.0045	0.3	880	13.2	360
6/13/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.728275	916044.21	937509.77	1167.216697	-3517	-361	-775298	-361	3517	84.1	0.0046	0.3	880	13.4	359
6/14/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.623656	916044.21	937509.77	1167.130506	-3603	-306	-775298	-306	3603	85.1	0.0047	0.3	880	13.7	355
6/15/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.501345	916044.21	937509.77	1167.052704	-3683	-234	-775298	-234	3683	86.4	0.0048	0.3	880	14.0	351
6/16/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.442507	916044.21	937509.77	1167.010689	-3725	-201	-775298	-201	3725	86.9	0.0048	0.3	880	14.1	349
6/17/2022	915218.27	937430.38	1171.0	915591.19	936527.54	1169.360904	916044.21	937509.77	1166.987439	-3753	-143	-775298	-143	3753	87.8	0.0048	0.3	880	14.2	348
6/18/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1169.261844	916044.21	937509.77	1166.892215	-2864	-549	-775298	-549	2864	79.1	0.0038	0.3	880	11.0	389
6/19/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1169.133086	916044.21	937509.77	1166.757523	-2996	-493	-775298	-493	2996	80.7	0.0039	0.3	880	11.5	381
6/20/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1169.030865	916044.21	937509.77	1166.713235	-3044	-425	-775298	-425	3044	82.0	0.0040	0.3	880	11.6	378
6/21/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.928696	916044.21	937509.77	1166.605779	-3149	-381	-775298	-381	3149	83.1	0.0041	0.3	880	12.0	373
6/22/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.818519	916044.21	937509.77	1166.528974	-3228	-319	-775298	-319	3228	84.4	0.0042	0.3	880	12.3	368
6/23/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.710931	916044.21	937509.77	1166.430619	-3325	-266	-775298	-266	3325	85.4	0.0043	0.3	880	12.6	363
6/24/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.598132	916044.21	937509.77	1166.358521	-3399	-200	-775298	-200	3399	86.6	0.0044	0.3	880	12.9	360
6/25/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.476407	916044.21	937509.77	1166.226847	-3528	-149	-775298	-149	3528	87.6	0.0046	0.3	880	13.4	353
6/26/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.346447	916044.21	937509.77	1166.111968	-3642	-84	-775298	-84	3642	88.7	0.0047	0.3	880	13.8	348
6/27/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.268965	916044.21	937509.77	1166.108583	-3651	-21	-775298	-21	3651	89.7	0.0047	0.3	880	13.8	347

Table 2.1.F
Groundwater Flow Calculations Using LH#7 Data
Cortlandville Sand and Gravel - DEIS

	LH#7			MW-3S			MW-4S			*Calculated Values*							Hydraulics			
Date	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	U_1 i	$-U_2$ j	U_3 k	easting	northing	*Flow Direction*	*Hydraulic Gradient*	Porosity	Hydraulic Conductivity, ft/day	V_{avg}, ft/day	LH#7 Radius of Influence, ft
6/28/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.162448	916044.21	937509.77	1165.989266	-3767	22	-775298	22	3767	90.3	0.0049	0.3	880	14.3	342
6/29/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1168.044768	916044.21	937509.77	1165.897763	-3859	85	-775298	85	3859	91.3	0.0050	0.3	880	14.6	338
6/30/2022	915218.27	937430.38	1170.0	915591.19	936527.54	1167.930733	916044.21	937509.77	1165.778631	-3975	135	-775298	135	3975	91.9	0.0051	0.3	880	15.0	333
7/1/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.8211	916044.21	937509.77	1165.7071	-3067	-254	-775298	-254	3067	85.3	0.0040	0.3	880	11.6	372
7/2/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.712421	916044.21	937509.77	1165.58615	-3184	-210	-775298	-210	3184	86.2	0.0041	0.3	880	12.1	365
7/3/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.573172	916044.21	937509.77	1165.438893	-3328	-150	-775298	-150	3328	87.4	0.0043	0.3	880	12.6	358
7/4/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.459563	916044.21	937509.77	1165.376026	-3394	-79	-775298	-79	3394	88.7	0.0044	0.3	880	12.8	354
7/5/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.360892	916044.21	937509.77	1165.278725	-3490	-34	-775298	-34	3490	89.4	0.0045	0.3	880	13.2	349
7/6/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.250086	916044.21	937509.77	1165.184217	-3584	22	-775298	22	3584	90.4	0.0046	0.3	880	13.6	345
7/7/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.140745	916044.21	937509.77	1165.077275	-3689	73	-775298	73	3689	91.1	0.0048	0.3	880	14.0	340
7/8/2022	915218.27	937430.38	1169.0	915591.19	936527.54	1167.022986	916044.21	937509.77	1164.982831	-3784	135	-775298	135	3784	92.0	0.0049	0.3	880	14.3	335
7/9/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.909912	916044.21	937509.77	1164.86166	-2920	-270	-775298	-270	2920	84.7	0.0038	0.3	880	11.1	375
7/10/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.767732	916044.21	937509.77	1164.693498	-3083	-215	-775298	-215	3083	86.0	0.0040	0.3	880	11.7	365
7/11/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.653645	916044.21	937509.77	1164.625764	-3153	-146	-775298	-146	3153	87.3	0.0041	0.3	880	11.9	361
7/12/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.539418	916044.21	937509.77	1164.496317	-3279	-100	-775298	-100	3279	88.2	0.0042	0.3	880	12.4	354
7/13/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.407905	916044.21	937509.77	1164.375228	-3399	-37	-775298	-37	3399	89.4	0.0044	0.3	880	12.9	348
7/14/2022	915218.27	937430.38	1168.0	915591.19	936527.54	1166.282517	916044.21	937509.77	1164.241354	-3530	17	-775298	17	3530	90.3	0.0046	0.3	880	13.4	342
7/15/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1166.153118	916044.21	937509.77	1164.143745	-2646	-366	-775298	-366	2646	82.1	0.0034	0.3	880	10.1	386
7/16/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1166.022542	916044.21	937509.77	1163.9777	-2806	-320	-775298	-320	2806	83.5	0.0036	0.3	880	10.7	376
7/17/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.882026	916044.21	937509.77	1163.836032	-2945	-257	-775298	-257	2945	85.0	0.0038	0.3	880	11.2	367
7/18/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.782292	916044.21	937509.77	1163.799746	-2986	-188	-775298	-188	2986	86.4	0.0039	0.3	880	11.3	365
7/19/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.689426	916044.21	937509.77	1163.70614	-3078	-146	-775298	-146	3078	87.3	0.0040	0.3	880	11.7	360
7/20/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.566438	916044.21	937509.77	1163.595866	-3187	-85	-775298	-85	3187	88.5	0.0041	0.3	880	12.1	353
7/21/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.451737	916044.21	937509.77	1163.47341	-3307	-36	-775298	-36	3307	89.4	0.0043	0.3	880	12.5	347
7/22/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.331215	916044.21	937509.77	1163.378155	-3402	28	-775298	28	3402	90.5	0.0044	0.3	880	12.9	342
7/23/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.21561	916044.21	937509.77	1163.243995	-3533	73	-775298	73	3533	91.2	0.0046	0.3	880	13.4	336
7/24/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.062808	916044.21	937509.77	1163.059054	-3712	130	-775298	130	3712	92.0	0.0048	0.3	880	14.1	328
7/25/2022	915218.27	937430.38	1167.0	915591.19	936527.54	1165.024015	916044.21	937509.77	1163.094479	-3683	176	-775298	176	3683	92.7	0.0048	0.3	880	14.0	329
7/26/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.953479	916044.21	937509.77	1163.032563	-2762	-242	-775298	-242	2762	85.0	0.0036	0.3	880	10.5	373
7/27/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.838139	916044.21	937509.77	1162.922646	-2871	-188	-775298	-188	2871	86.3	0.0037	0.3	880	10.9	366
7/28/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.732736	916044.21	937509.77	1162.723128	-3059	-175	-775298	-175	3059	86.7	0.0040	0.3	880	11.6	354
7/29/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.61985	916044.21	937509.77	1162.548253	-3226	-147	-775298	-147	3226	87.4	0.0042	0.3	880	12.2	345
7/30/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.503096	916044.21	937509.77	1162.410112	-3360	-102	-775298	-102	3360	88.3	0.0043	0.3	880	12.7	338
7/31/2022	915218.27	937430.38	1166.0	915591.19	936527.54	1164.344325	916044.21	937509.77	1162.227329	-3538	-39	-775298	-39	3538	89.4	0.0046	0.3	880	13.4	330

$$\boldsymbol{U_1 i} = \big((y_1 - y_2) * (z_3 - z_2) - (y_3 - y_2) * (z_1 - z_2)\big)\boldsymbol{i}$$

$$\boldsymbol{-U_2 j} = -\big((x_1 - x_2) * (z_3 - z_2) - (x_3 - x_2) * (z_1 - z_2)\big)\boldsymbol{j}$$

$$\boldsymbol{U_3 k} = \big((x_1 - x_2) * (y_3 - y_2) - (x_3 - x_2) * (y_1 - y_2)\big)\boldsymbol{k}$$

$$S = \{(U_2 * 1 - 0 * U_3), -(U_1 * 1 - 0 * U_3), (U_1 * 0 - 0 * U_2)\} = \{U_2, -U_1, 0\} = \{E, N, 0\}$$

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
2/5/2019	357	9.2	344	13	0.8	8.4	6368925.024	8.7%	1172.9	58.02	6975489	0.9	31363	272	0.6	6.5	169884	0.3	227462	1889066	1687819	112	59289	1.34	0.0074
2/6/2019	288	6	343.5	No Comingling Possible																					
2/7/2019	352	8.9	343	9	0.6	8.3	6336490.248	6.7%	1173.3	58.42	6794550	0.7	18295	271	0.6	6.5	169884	0.3	229030	2000330	1812151	111	55491	0.94	0.0052
2/8/2019	365	9.6	342	23	1.1	8.5	6478068.96	11.5%	1173.2	58.32	7316407	1.7	81457	271	0.6	6.5	169884	0.3	228638	1972193	1720852	111	56283	1.75	0.0094
2/9/2019	357	9.2	341.5	15.5	0.9	8.3	6358183.128	9.8%	1173.5	58.62	7047625	1.1	43124	270	0.6	6.6	172498	0.4	306418	2056604	1840982	113	54945	1.40	0.0077
2/10/2019	404	11.8	341	63	2.1	9.7	7316564.112	17.8%	1172.6	57.72	8900563	4.6	420790	273	0.6	6.4	167270	0.3	226285	1808503	1220443	111	61377	3.65	0.0167
2/11/2019	378	10.3	340.5	37.5	1.5	8.8	6706706.688	14.6%	1173.2	58.32	7849895	2.7	176418	271	0.6	6.5	169884	0.3	228638	1972193	1625891	111	56283	2.39	0.0123
2/12/2019	358	9.2	340.5	17.5	0.9	8.3	6379876.008	9.8%	1173.7	58.82	7071670	1.3	50965	269	0.6	6.6	172498	0.4	307464	2112877	1889414	112	53008	1.35	0.0074
2/13/2019	370	9.9	340	30	1.3	8.6	6587996.976	13.1%	1173.5	58.62	7583857	2.2	124582	270	0.6	6.6	172498	0.4	306418	2056604	1759524	113	54945	2.02	0.0106
2/14/2019	391	11	340.5	50.5	1.8	9.2	6987511.872	16.4%	1173	58.12	8354634	3.7	290110	271	0.6	6.5	169884	0.3	227854	1915920	1455926	112	58458	2.98	0.0145
2/15/2019	372	10	340.5	31.5	1.3	8.7	6653232.432	13.0%	1173.4	58.52	7647394	2.3	130244	270	0.6	6.6	172498	0.3	229422	2028467	1725725	113	55707	2.05	0.0107
2/16/2019	282	5.7	340.5	No Comingling Possible																					
2/17/2019	409	12.1	341	68	2.2	9.9	7454483.784	18.2%	1172.5	57.62	9111036	4.9	469577	273	0.6	6.3	164657	0.3	225893	1781649	1147415	109	61179	3.81	0.017
2/18/2019	379	10.4	341	38	1.5	8.9	6771288.744	14.4%	1173.1	58.22	7912517	2.8	182952	271	0.6	6.5	169884	0.3	228246	1944057	1591221	112	57611	2.45	0.0124
2/19/2019	366	9.7	341.5	24.5	1.1	8.6	6565520.016	11.3%	1173.3	58.42	7405296	1.8	86249	271	0.6	6.5	169884	0.3	229030	2000330	1744197	111	55491	1.73	0.0092
2/20/2019	277	5.5	342	No Comingling Possible																					
2/21/2019	363	9.5	342	21	1	8.5	6478068.96	10.5%	1173.2	58.32	7240195	1.5	65340	271	0.6	6.5	169884	0.3	228638	1972193	1736969	111	56283	1.59	0.0086
2/22/2019	401	11.6	343	58	2	9.6	7190954.496	17.2%	1172.2	57.32	8689070	4.2	365904	274	0.6	6.3	164657	0.3	224717	1701086	1170525	110	64665	3.66	0.0171
2/23/2019	360	9.3	343.5	16.5	0.9	8.4	6379902.144	9.7%	1173	58.12	7063463	1.2	47045	271	0.6	6.5	169884	0.3	227854	1915920	1698991	112	58458	1.49	0.0082
2/24/2019	396	11.3	343.5	52.5	1.9	9.4	7028859.024	16.8%	1172.1	57.22	8449586	3.8	314503	274	0.6	6.2	162043	0.3	224325	1674232	1197686	108	64507	3.47	0.0167
2/25/2019	367	9.7	344	23	1.1	8.6	6498089.136	11.3%	1172.7	57.82	7329240	1.7	81457	272	0.6	6.4	167270	0.3	226678	1835357	1586630	111	60479	1.88	0.0101
2/26/2019	355	9.1	344.5	10.5	0.7	8.4	6368925.024	7.7%	1172.9	58.02	6899669	0.8	24394	272	0.6	6.5	169884	0.3	227462	1889066	1694788	112	59289	1.18	0.0065
2/27/2019	364	9.6	344.5	19.5	1	8.6	6486850.656	10.4%	1172.6	57.72	7241136	1.4	60984	273	0.6	6.4	167270	0.3	226285	1808503	1580249	111	61377	1.74	0.0094
2/28/2019	388	10.9	345	43	1.6	9.3	6941930.688	14.7%	1172	57.12	8136241	3.1	216058	275	0.6	6.2	162043	0.3	223933	1647378	1269277	109	66166	3.00	0.0148
3/1/2019	427	13.1	345.5	81.5	2.6	10.5	7700449.68	19.8%	1171	56.12	9607228	5.9	668210	278	0.6	5.9	154202	0.3	220013	1391715	569303	105	75446	5.55	0.0234
3/2/2019	355	9.1	345.5	9.5	0.7	8.4	6335993.664	7.7%	1172.6	57.72	6863993	0.7	21344	273	0.6	6.4	167270	0.3	226285	1808503	1619889	111	61377	1.22	0.0068
3/3/2019	395	11.3	346	49	1.8	9.5	7041561.12	15.9%	1171.6	56.72	8375752	3.6	282269	276	0.6	6.1	159430	0.3	222365	1545113	1103414	108	69898	3.56	0.0172
3/4/2019	444	14.2	346.5	97.5	3.1	11.1	7937398.656	21.8%	1169.6	54.72	10154150	7.1	958756	282	0.5	5.4	117612	0.2	143016	1060268	-16100	99	93373	8.20	0.0326
3/5/2019	273	5.4	347	No Comingling Possible																					
3/6/2019	271	5.3	347	No Comingling Possible																					
3/7/2019	439	13.9	348	91	2.9	11	7937764.56	20.9%	1170.1	55.22	10030448	6.6	833738	281	0.5	5.7	124146	0.3	216484	1175226	217342	103	87643	7.20	0.029
3/8/2019	391	11	348.5	42.5	1.7	9.3	6844704.768	15.5%	1171.2	56.32	8095887	3.1	229561	277	0.6	6	156816	0.3	220797	1442848	1056471	107	74159	3.57	0.0178
3/9/2019	281	5.7	348.5	No Comingling Possible																					
3/10/2019	353	9	349	4	0.4	8.6	6408181.296	4.4%	1171.9	57.02	6706236	0.3	5227	275	0.6	6.2	162043	0.3	223541	1621812	1454542	109	67209	0.76	0.0042
3/11/2019	386	10.7	349	37	1.5	9.2	6759083.232	14.0%	1171.1	56.22	7861108	2.7	176418	277	0.6	6	156816	0.3	220405	1417281	1084047	107	75497	3.21	0.0163
3/12/2019	273	5.4	349.6	No Comingling Possible																					
3/13/2019	353	9	350.2	2.8	0.4	8.6	6385704.336	4.4%	1171.7	56.82	6682714	0.2	3485	276	0.6	6.1	159430	0.3	222757	1570679	1407764	107	68123	0.77	0.0043
3/14/2019	398	11.4	349.6	48.4	1.8	9.6	7015320.576	15.8%	1170.8	55.92	8330693	3.5	274428	278	0.6	5.9	154202	0.3	219229	1343606	914976	106	78892	4.02	0.0195
3/15/2019	354	9	349.6	4.4	0.5	8.5	6300344.16	5.6%	1171.6	56.72	6670953	0.3	6534	276	0.6	6.1	159430	0.3	222365	1545113	1379149	108	69898	0.99	0.0055
3/16/2019	357	9.2	349.6	7.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0064
3/17/2019	358	9.2	349.6	8.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.6	15682	276	0.6	6.1	159430	0.3	222757	1570679	1395567	107	68123	1.16	0.0064
3/18/2019	412	12.2	349.6	62.4	2.2	10	7281489.6	18.0%	1170.6	55.72	8883417	4.5	431244	279	0.6	5.8	151589	0.3	218445	1295498	712665	104	80278	5.00	0.0229
3/19/2019	358	9.2	349.6	8.4	0.6	8.6	6374465.856	6.5%	1171.6	56.72	6819196	0.6	15682	276	0.6	6.1	159430	0.3	222365	1545113	1370001	108	69898	1.19	0.0066
3/20/2019	366	9.7	350.2	15.8	0.9	8.8	6499709.568	9.3%	1171.4	56.52	7164453	1.1	43124	276	0.6	6.1	159430	0.3	221581	1493980	1291426	108	72290	1.84	0.0099
3/21/2019	384	10.6	350.2	33.8	1.4	9.2	6747060.672	13.2%	1171	56.12	7773787	2.5	152460	278	0.6	5.9	154202	0.3	220013	1391715	1085053	105	75446	2.99	0.0153
3/22/2019	379	10.4	349.6	29.4	1.3	9.1	6697506.816	12.5%	1171.2	56.32	7654294	2.1	118919	277	0.6	6	156816	0.3	220797	1442848	1167113	107	74159	2.73	0.0141
3/23/2019	360	9.3	349.6	10.4	0.7	8.6	6374465.856	7.5%	1171.6	56.72	6893318	0.8	24394	276	0.6	6.1	159430	0.3	222365	1545113	1361289	108	69898	1.39	0.0077
3/24/2019	408	12	349.6	58.4	2.1	9.9	7221612.024	17.5%	1170.7	55.82	8753469	4.2	384199	279	0.6	5.8	151589	0.3	218837	1319552	783764	104	78815	4.69	0.0218
3/25/2019	413	12.3	349.6	63.4	2.2	10.1	7354304.496	17.9%	1170.6	55.72	8956232	4.6	440827	279	0.6	5.8	151589	0.3	218445	1295498	703082	104	80278	5.00	0.0227
3/26/2019	362	9.5	350.2	11.8	0.8	8.7	6437218.392	8.4%	1171.5	56.62	7029147	0.9	31363	276	0.6	6.1	159430	0.3	221973	1519547	1328754	108	71074	1.61	0.0088
3/27/2019	277	5.5	350.2	No Comingling Possible																					
3/28/2019	355	9.1	350.2	4.8	0.5	8.6	6374465.856	5.5%	1171.6	56.72	6745074	0.3	6534	276	0.6	6.1	159430	0.3	222365	1545113	1379149	108	69898	0.99	0.0055
3/29/2019	412	12.2	350.2	61.8	2.2	10	7268421.6	18.0%	1170.5	55.62	8867474	4.5	431244	279	0.6	5.8	151589	0.3	218053	1271444	688611	104	81797	5.10	0.0234
3/30/2019	358	9.2	350.2	7.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.6	15682	276	0.6	6.1	159430	0.3	221973	1519547	1344435	108	71074	1.21	0.0067
3/31/2019	403	11.7	350.2	52.8	1.9	9.8	7135859.808	16.2%	1170.6	55.72	8519343	3.8	314503	279	0.6	5.8	151589	0.3	218445	1295498	829406	104	80278	4.32	0.0205
4/1/2019	358	9.2	350.2	7.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.6	15682	276	0.6	6.1	159430	0.3	221973	1519547	1344435	108	71074	1.21	0.0067
4/2/2019	357	9.2	350.2	6.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.5	13068	276	0.6	6.1	159430	0.3	221973	1519547	1347049	108	71074	1.21	0.0067
4/3/2019	358	9.2	350.2	7.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.6	15682	276	0.6	6.1	159430	0.3	221973	1519547	1344435	108	71074	1.21	0.0067

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
4/4/2019	356	9.1	350.8	5.2	0.5	8.6	6363227.376	5.5%	1171.5	56.62	6733182	0.4	8712	276	0.6	6.1	159430	0.3	221973	1519547	1351405	108	71074	1.01	0.0056
4/5/2019	352	8.9	350.2	1.8	0.3	8.6	6374465.856	3.4%	1171.6	56.72	6596831	0.1	1307	276	0.6	6.1	159430	0.3	222365	1545113	1384376	108	69898	0.59	0.0033
4/6/2019	362	9.5	350.2	11.8	0.8	8.7	6425849.232	8.4%	1171.4	56.52	7016732	0.9	31363	276	0.6	6.1	159430	0.3	221581	1493980	1303187	108	72290	1.64	0.009
4/7/2019	353	9	350.8	2.2	0.3	8.7	6437218.392	3.3%	1171.5	56.62	6659191	0.2	2614	276	0.6	6.1	159430	0.3	221973	1519547	1357503	108	71074	0.60	0.0033
4/8/2019	357	9.2	350.2	6.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.5	13068	276	0.6	6.1	159430	0.3	221973	1519547	1347049	108	71074	1.21	0.0067
4/9/2019	361	9.4	350.8	10.2	0.7	8.7	6425849.232	7.4%	1171.4	56.52	6942872	0.7	21344	276	0.6	6.1	159430	0.3	221581	1493980	1313206	108	72290	1.43	0.0078
4/10/2019	360	9.3	350.8	9.2	0.7	8.6	6351988.896	7.5%	1171.4	56.52	6869011	0.7	21344	276	0.6	6.1	159430	0.3	221581	1493980	1313206	108	72290	1.43	0.0079
4/11/2019	357	9.2	350.8	6.2	0.5	8.7	6425849.232	5.4%	1171.4	56.52	6795151	0.5	10890	276	0.6	6.1	159430	0.3	221581	1493980	1323660	108	72290	1.02	0.0056
4/12/2019	354	9	350.8	3.2	0.4	8.6	6363227.376	4.4%	1171.5	56.62	6659191	0.2	3485	276	0.6	6.1	159430	0.3	221973	1519547	1356632	108	71074	0.81	0.0045
4/13/2019	358	9.2	350.8	7.2	0.6	8.6	6351988.896	6.5%	1171.4	56.52	6795151	0.5	13068	276	0.6	6.1	159430	0.3	221581	1493980	1321482	108	72290	1.23	0.0068
4/14/2019	354	9	351.4	2.6	0.3	8.7	6425849.232	3.3%	1171.4	56.52	6647430	0.2	2614	276	0.6	6.1	159430	0.3	221581	1493980	1331936	108	72290	0.61	0.0034
4/15/2019	355	9.1	350.8	4.2	0.4	8.7	6437218.392	4.4%	1171.5	56.62	6733182	0.3	5227	276	0.6	6.1	159430	0.3	221973	1519547	1354890	108	71074	0.81	0.0044
4/16/2019	361	9.4	350.8	10.2	0.7	8.7	6425849.232	7.4%	1171.4	56.52	6942872	0.7	21344	276	0.6	6.1	159430	0.3	221581	1493980	1313206	108	72290	1.43	0.0078
4/17/2019	358	9.2	350.2	7.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.6	15682	276	0.6	6.1	159430	0.3	221973	1519547	1344435	108	71074	1.21	0.0067
4/18/2019	357	9.2	350.2	6.8	0.6	8.6	6363227.376	6.5%	1171.5	56.62	6807173	0.5	13068	276	0.6	6.1	159430	0.3	221973	1519547	1347049	108	71074	1.21	0.0067
4/19/2019	355	9.1	350.2	4.8	0.5	8.6	6374465.856	5.5%	1171.6	56.72	6745074	0.3	6534	276	0.6	6.1	159430	0.3	222365	1545113	1379149	108	69898	0.99	0.0055
4/20/2019	361	9.4	349.6	11.4	0.8	8.6	6374465.856	8.5%	1171.6	56.72	6967439	0.8	27878	276	0.6	6.1	159430	0.3	222365	1545113	1357805	108	69898	1.58	0.0087
4/21/2019	357	9.2	349.6	7.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0064
4/22/2019	354	9	349	5	0.5	8.5	6322559.76	5.6%	1171.8	56.92	6694475	0.4	8712	275	0.6	6.2	162043	0.3	223149	1596245	1425490	109	68285	0.97	0.0054
4/23/2019	359	9.3	349	10	0.7	8.6	6385704.336	7.5%	1171.7	56.82	6905471	0.7	21344	276	0.6	6.1	159430	0.3	222757	1570679	1389905	107	68123	1.35	0.0074
4/24/2019	357	9.2	349	8	0.6	8.6	6396942.816	6.5%	1171.8	56.92	6843241	0.6	15682	275	0.6	6.2	162043	0.3	223149	1596245	1418520	109	68285	1.16	0.0064
4/25/2019	356	9.1	349	7	0.6	8.5	6322559.76	6.6%	1171.8	56.92	6768858	0.5	13068	275	0.6	6.2	162043	0.3	223149	1596245	1421134	109	68285	1.16	0.0065
4/26/2019	355	9.1	348.5	6.5	0.6	8.5	6333667.56	6.6%	1171.9	57.02	6780750	0.5	13068	275	0.6	6.2	162043	0.3	223541	1621812	1446701	109	67209	1.14	0.0063
4/27/2019	363	9.5	348.5	14.5	0.9	8.6	6396942.816	9.5%	1171.8	56.92	7066390	1.1	43124	275	0.6	6.2	162043	0.3	223149	1596245	1391078	109	68285	1.74	0.0095
4/28/2019	361	9.4	348.5	12.5	0.8	8.6	6396942.816	8.5%	1171.8	56.92	6992007	0.9	31363	275	0.6	6.2	162043	0.3	223149	1596245	1402839	109	68285	1.55	0.0085
4/29/2019	355	9.1	348.5	6.5	0.6	8.5	6333667.56	6.6%	1171.9	57.02	6780750	0.5	13068	275	0.6	6.2	162043	0.3	223541	1621812	1446701	109	67209	1.14	0.0063
4/30/2019	362	9.5	348.5	13.5	0.8	8.7	6471325.872	8.4%	1171.8	56.92	7066390	1	34848	275	0.6	6.2	162043	0.3	223149	1596245	1399354	109	68285	1.55	0.0084
5/1/2019	362	9.5	348.5	13.5	0.8	8.7	6471325.872	8.4%	1171.8	56.92	7066390	1	34848	275	0.6	6.2	162043	0.3	223149	1596245	1399354	109	68285	1.55	0.0084
5/2/2019	358	9.2	348.5	9.5	0.7	8.5	6333667.56	7.6%	1171.9	57.02	6855264	0.7	21344	275	0.6	6.2	162043	0.3	223541	1621812	1438425	109	67209	1.33	0.0074
5/3/2019	359	9.3	348.5	10.5	0.7	8.6	6408181.296	7.5%	1171.9	57.02	6929777	0.8	24394	275	0.6	6.2	162043	0.3	223541	1621812	1435375	109	67209	1.33	0.0073
5/4/2019	355	9.1	348	7	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.5	13068	275	0.6	6.2	162043	0.3	223933	1647378	1472267	109	66166	1.12	0.0062
5/5/2019	356	9.1	348.5	7.5	0.6	8.5	6333667.56	6.6%	1171.9	57.02	6780750	0.5	13068	275	0.6	6.2	162043	0.3	223541	1621812	1446701	109	67209	1.14	0.0063
5/6/2019	359	9.3	348.5	10.5	0.7	8.6	6408181.296	7.5%	1171.9	57.02	6929777	0.8	24394	275	0.6	6.2	162043	0.3	223541	1621812	1435375	109	67209	1.33	0.0073
5/7/2019	358	9.2	348.5	9.5	0.7	8.5	6333667.56	7.6%	1171.9	57.02	6855264	0.7	21344	275	0.6	6.2	162043	0.3	223541	1621812	1438425	109	67209	1.33	0.0074
5/8/2019	362	9.5	348.5	13.5	0.8	8.7	6471325.872	8.4%	1171.8	56.92	7066390	1	34848	275	0.6	6.2	162043	0.3	223149	1596245	1399354	109	68285	1.55	0.0084
5/9/2019	361	9.4	348.5	12.5	0.8	8.6	6396942.816	8.5%	1171.8	56.92	6992007	0.9	31363	275	0.6	6.2	162043	0.3	223149	1596245	1402839	109	68285	1.55	0.0085
5/10/2019	356	9.1	348	8	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.6	15682	275	0.6	6.2	162043	0.3	223933	1647378	1469653	109	66166	1.12	0.0062
5/11/2019	279	5.6	348	No Comingling Possible																					
5/12/2019	356	9.1	348	8	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.6	15682	275	0.6	6.2	162043	0.3	223933	1647378	1469653	109	66166	1.12	0.0062
5/13/2019	354	9	347.5	6.5	0.6	8.4	6292085.184	6.7%	1172.2	57.32	6741520	0.5	13068	274	0.6	6.3	164657	0.3	224717	1701086	1523361	110	64665	1.10	0.0062
5/14/2019	362	9.5	346	16	0.9	8.6	6453135.216	9.5%	1172.3	57.42	7128463	1.2	47045	274	0.6	6.3	164657	0.3	225109	1727941	1516239	110	63660	1.62	0.0088
5/15/2019	359	9.3	345.5	13.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1	34848	273	0.6	6.3	164657	0.3	225893	1781649	1582144	109	61179	1.39	0.0076
5/16/2019	363	9.5	345	18	1	8.5	6400314.36	10.5%	1172.5	57.62	7153293	1.3	56628	273	0.6	6.3	164657	0.3	225893	1781649	1560364	109	61179	1.73	0.0095
5/17/2019	362	9.5	345	17	0.9	8.6	6486850.656	9.5%	1172.6	57.72	7165707	1.2	47045	273	0.6	6.4	167270	0.3	226285	1808503	1594188	111	61377	1.56	0.0084
5/18/2019	363	9.5	344.5	18.5	1	8.5	6411422.16	10.5%	1172.6	57.72	7165707	1.3	56628	273	0.6	6.4	167270	0.3	226285	1808503	1584605	111	61377	1.74	0.0095
5/19/2019	363	9.5	344.5	18.5	1	8.5	6411422.16	10.5%	1172.6	57.72	7165707	1.3	56628	273	0.6	6.4	167270	0.3	226285	1808503	1584605	111	61377	1.74	0.0095
5/20/2019	363	9.5	344.5	18.5	1	8.5	6422529.96	10.5%	1172.7	57.82	7178122	1.3	56628	272	0.6	6.4	167270	0.3	226678	1835357	1611459	111	60479	1.71	0.0093
5/21/2019	361	9.4	345	16	0.9	8.5	6411422.16	9.6%	1172.6	57.72	7090279	1.2	47045	273	0.6	6.4	167270	0.3	226285	1808503	1594188	111	61377	1.56	0.0085
5/22/2019	357	9.2	345	12	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/23/2019	358	9.2	345	13	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/24/2019	354	9	345	9	0.7	8.3	6282258.048	7.8%	1172.8	57.92	6812087	0.7	21344	272	0.6	6.4	167270	0.3	227070	1862212	1673598	110	59070	1.17	0.0066
5/25/2019	283	5.8	345	No Comingling Possible																					
5/26/2019	357	9.2	345	12	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/27/2019	354	9	345	9	0.7	8.3	6282258.048	7.8%	1172.8	57.92	6812087	0.7	21344	272	0.6	6.4	167270	0.3	227070	1862212	1673598	110	59070	1.17	0.0066
5/28/2019	358	9.2	345	13	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/29/2019	354	9	345	9	0.7	8.3	6282258.048	7.8%	1172.8	57.92	6812087	0.7	21344	272	0.6	6.4	167270	0.3	227070	1862212	1673598	110	59070	1.17	0.0066
5/30/2019	358	9.2	345	13	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
5/31/2019	357	9.2	345	12	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
6/1/2019	358	9.2	345.5	12.5	0.8	8.4	6335993.664	8.7%	1172.6	57.72	6939422	0.9	31363	273	0.6	6.4	167270	0.3	226285	1808503	1609870	111	61377	1.39	0.0077
6/2/2019	356	9.1	346	10	0.7	8.4	6325016.544	7.7%	1172.5	57.62	6852101	0.7	21344	273	0.6	6.3	164657	0.3	225893	1781649	1595648	109	61179	1.21	0.0067
6/3/2019	351	8.9	346	5	0.5	8.4	6335993.664	5.6%	1172.6	57.72	6713136	0.4	8712	273	0.6	6.4	167270	0.3	226285	1808503	1632521	111	61377	0.87	0.0048
6/4/2019	352	8.9	346.5	5.5	0.5	8.4	6325016.544	5.6%	1172.5	57.62	6701506	0.4	8712	273	0.6	6.3	164657	0.3	225893	1781649	1608280	109	61179	0.87	0.0049
6/5/2019	352	8.9	346.5	5.5	0.5	8.4	6325016.544	5.6%	1172.5	57.62	6701506	0.4	8712	273	0.6	6.3	164657	0.3	225893	1781649	1608280	109	61179	0.87	0.0049
6/6/2019	356	9.1	346.5	9.5	0.7	8.4	6314039.424	7.7%	1172.4	57.52	6840209	0.7	21344	273	0.6	6.3	164657	0.3	225501	1754795	1568794	110	62685	1.24	0.0069
6/7/2019	355	9.1	346.5	8.5	0.6	8.5	6389206.56	6.6%	1172.4	57.52	6840209	0.6	15682	273	0.6	6.3	164657	0.3	225501	1754795	1574456	110	62685	1.07	0.0059
6/8/2019	357	9.2	346.5	10.5	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.8	24394	274	0.6	6.3	164657	0.3	225109	1727941	1538890	110	63660	1.26	0.0069
6/9/2019	353	9	347	6	0.5	8.5	6378098.76	5.6%	1172.3	57.42	6753281	0.4	8712	274	0.6	6.3	164657	0.3	225109	1727941	1554572	110	63660	0.90	0.005
6/10/2019	358	9.2	347	11	0.7	8.5	6366990.96	7.6%	1172.2	57.32	6891331	0.8	24394	274	0.6	6.3	164657	0.3	224717	1701086	1512035	110	64665	1.28	0.0071
6/11/2019	359	9.3	347.5	11.5	0.8	8.5	6355883.16	8.6%	1172.1	57.22	6954084	0.8	27878	274	0.6	6.2	162043	0.3	224325	1674232	1484311	108	64507	1.46	0.0081
6/12/2019	354	9	348	6	0.5	8.5	6355883.16	5.6%	1172.1	57.22	6729759	0.4	8712	274	0.6	6.2	162043	0.3	224325	1674232	1503477	108	64507	0.91	0.005
6/13/2019	351	8.9	348.5	2.5	0.3	8.6	6419419.776	3.4%	1172	57.12	6643353	0.2	2614	275	0.6	6.2	162043	0.3	223933	1647378	1482721	109	66166	0.56	0.0031
6/14/2019	351	8.9	349	2	0.3	8.6	6408181.296	3.4%	1171.9	57.02	6631723	0.1	1307	275	0.6	6.2	162043	0.3	223541	1621812	1458462	109	67209	0.57	0.0031
6/15/2019	350	8.8	349.6	0.4	0.1	8.7	6471325.872	1.1%	1171.8	56.92	6545709	0	0	275	0.6	6.2	162043	0.3	223149	1596245	1434202	109	68285	0.19	0.001
6/16/2019	350	8.8	350.2	No Comingling Possible																					
6/17/2019	347	8.7	350.2	No Comingling Possible																					
6/18/2019	352	8.9	350.8	1.2	0.2	8.7	6448587.552	2.2%	1171.6	56.72	6596831	0.1	871	276	0.6	6.1	159430	0.3	222365	1545113	1384812	108	69898	0.40	0.0022
6/19/2019	347	8.7	350.8	No Comingling Possible																					
6/20/2019	349	8.8	350.8	No Comingling Possible																					
6/21/2019	351	8.9	350.8	0.2	0.1	8.8	6522709.248	1.1%	1171.6	56.72	6596831	0	0	276	0.6	6.1	159430	0.3	222365	1545113	1385683	108	69898	0.20	0.0011
6/22/2019	356	9.1	351.4	4.6	0.5	8.6	6351988.896	5.5%	1171.4	56.52	6721291	0.3	6534	276	0.6	6.1	159430	0.3	221581	1493980	1328016	108	72290	1.02	0.0057
6/23/2019	351	8.9	352	No Comingling Possible																					
6/24/2019	350	8.8	352	No Comingling Possible																					
6/25/2019	351	8.9	352.6	No Comingling Possible																					
6/26/2019	350	8.8	352.6	No Comingling Possible																					
6/27/2019	352	8.9	352.6	No Comingling Possible																					
6/28/2019	347	8.7	352.6	No Comingling Possible																					
6/29/2019	349	8.8	353.2	No Comingling Possible																					
6/30/2019	349	8.8	353.8	No Comingling Possible																					
7/1/2019	349	8.8	353.8	No Comingling Possible																					
7/2/2019	351	8.9	353.8	No Comingling Possible																					
7/3/2019	348	8.7	354.4	No Comingling Possible																					
7/4/2019	349	8.8	354.4	No Comingling Possible																					
7/5/2019	348	8.7	355	No Comingling Possible																					
7/6/2019	349	8.8	355	No Comingling Possible																					
7/7/2019	348	8.7	355.6	No Comingling Possible																					
7/8/2019	382	10.5	355.6	26.4	1.3	9.2	6626835.072	12.4%	1170	55.12	7563236	1.9	107593	281	0.5	5.6	121968	0.3	216092	1151172	921611	102	88605	3.26	0.0171
7/9/2019	352	8.9	356.2	No Comingling Possible																					
7/10/2019	349	8.8	356.8	No Comingling Possible																					
7/11/2019	349	8.8	357.4	No Comingling Possible																					
7/12/2019	347	8.7	357.4	No Comingling Possible																					
7/13/2019	351	8.9	358	No Comingling Possible																					
7/14/2019	349	8.8	358.6	No Comingling Possible																					
7/15/2019	348	8.7	358.6	No Comingling Possible																					
7/16/2019	324	7.6	359.2	No Comingling Possible																					
7/17/2019	345	8.6	359.2	No Comingling Possible																					
7/18/2019	352	8.9	359.2	No Comingling Possible																					
7/19/2019	346	8.6	359.8	No Comingling Possible																					
7/20/2019	352	8.9	359.8	No Comingling Possible																					
7/21/2019	350	8.8	361	No Comingling Possible																					
7/22/2019	350	8.8	361	No Comingling Possible																					
7/23/2019	354	9	361.95	No Comingling Possible																					
7/24/2019	338	8.2	364.8	No Comingling Possible																					
7/25/2019	352	8.9	365.75	No Comingling Possible																					
7/26/2019	361	9.4	361.95	No Comingling Possible																					
7/27/2019	354	9	362.9	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
7/28/2019	374	10.1	361	13	0.8	9.3	6589486.728	7.9%	1169.1	54.22	7156324	0.9	31363	284	0.5	5.2	113256	0.2	141709	946638.9	802020	96	101411	2.30	0.0123
7/29/2019	374	10.1	364.8	9.2	0.7	9.4	6611205.744	6.9%	1168.7	53.82	7103530	0.7	21344	285	0.5	5.1	111078	0.2	140664	859291.2	726869	95	110556	2.19	0.0117
7/30/2019	352	8.9	366.7	No Comingling Possible																					
7/31/2019	345	8.6	367.65	No Comingling Possible																					
8/1/2019	341	8.4	368.6	No Comingling Possible																					
8/2/2019	342	8.4	367.65	No Comingling Possible																					
8/3/2019	344	8.5	368.6	No Comingling Possible																					
8/4/2019	343	8.5	369.55	No Comingling Possible																					
8/5/2019	344	8.5	369.55	No Comingling Possible																					
8/6/2019	480	16.6	373.85	106.15	3.6	13	8616516.48	21.7%	1165.6	50.72	11002629	7.7	1207483	329	0.3	3.3	43124	0.1	66281	246175.2	-1004432	65	264040	26.92	0.0968
8/7/2019	344	8.5	373.85	No Comingling Possible																					
8/8/2019	344	8.5	377.2	No Comingling Possible																					
8/9/2019	341	8.4	377.2	No Comingling Possible																					
8/10/2019	346	8.6	380.55	No Comingling Possible																					
8/11/2019	337	8.2	387.25	No Comingling Possible																					
8/12/2019	340	8.3	387.25	No Comingling Possible																					
8/13/2019	335	8.1	390.6	No Comingling Possible																					
8/14/2019	338	8.2	393.95	No Comingling Possible																					
8/15/2019	333	8	397.3	No Comingling Possible																					
8/16/2019	335	8.1	400.65	No Comingling Possible																					
8/17/2019	330	7.9	404	No Comingling Possible																					
8/18/2019	332	7.9	406.75	No Comingling Possible																					
8/19/2019	336	8.1	406.75	No Comingling Possible																					
8/20/2019	331	7.9	409.5	No Comingling Possible																					
8/21/2019	428	13.2	412.25	15.75	1.1	12.1	8272984.896	8.3%	1167.2	52.32	9025074	1.1	52708	302	0.4	4.4	76666	0.2	136744	545837.4	416463	84	153892	4.79	0.0203
8/22/2019	330	7.9	415	No Comingling Possible																					
8/23/2019	335	8.1	417.75	No Comingling Possible																					
8/24/2019	338	8.2	420.5	No Comingling Possible																					
8/25/2019	339	8.3	426	No Comingling Possible																					
8/26/2019	332	7.9	426	No Comingling Possible																					
8/27/2019	335	8.1	428.75	No Comingling Possible																					
8/28/2019	332	7.9	431.5	No Comingling Possible																					
8/29/2019	333	8	434.15	No Comingling Possible																					
8/30/2019	335	8.1	434.15	No Comingling Possible																					
8/31/2019	338	8.2	436.8	No Comingling Possible																					
9/1/2019	333	8	442.1	No Comingling Possible																					
9/2/2019	331	7.9	442.1	No Comingling Possible																					
9/3/2019	342	8.4	444.75	No Comingling Possible																					
9/4/2019	335	8.1	450.05	No Comingling Possible																					
9/5/2019	332	7.9	452.7	No Comingling Possible																					
9/6/2019	329	7.8	452.7	No Comingling Possible																					
9/7/2019	350	8.8	455.35	No Comingling Possible																					
9/8/2019	329	7.8	460.65	No Comingling Possible																					
9/9/2019	327	7.7	460.65	No Comingling Possible																					
9/10/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/11/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/12/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/13/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/14/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/15/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/16/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/17/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/18/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/19/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/20/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/21/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/22/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/23/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
9/24/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/25/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/26/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/27/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/28/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/29/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/30/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/1/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/2/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/3/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/4/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/5/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/6/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/7/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/8/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/9/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/10/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/11/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/12/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/13/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/14/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/15/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/16/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/17/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/18/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/19/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/20/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/21/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/22/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/23/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/24/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/25/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/26/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/27/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/28/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/29/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/30/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/31/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/1/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/2/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/3/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/4/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/5/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/6/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/7/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/8/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/9/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/10/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/11/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/12/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/13/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/14/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/15/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/16/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/17/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/18/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/19/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
11/20/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/21/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/22/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/23/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/24/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/25/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/26/2019	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/27/2019	334	8	460.65	No Comingling Possible																					
11/28/2019	333	8	463.3	No Comingling Possible																					
11/29/2019	439	13.9	460.65	No Comingling Possible																					
11/30/2019	335	8.1	458	No Comingling Possible																					
12/1/2019	332	7.9	460.65	No Comingling Possible																					
12/2/2019	342	8.4	455.35	No Comingling Possible																					
12/3/2019	341	8.4	455.35	No Comingling Possible																					
12/4/2019	334	8	455.35	No Comingling Possible																					
12/5/2019	333	8	455.35	No Comingling Possible																					
12/6/2019	333	8	452.7	No Comingling Possible																					
12/7/2019	350	8.8	455.35	No Comingling Possible																					
12/8/2019	333	8	458	No Comingling Possible																					
12/9/2019	397	11.4	452.7	No Comingling Possible																					
12/10/2019	353	9	450.05	No Comingling Possible																					
12/11/2019	340	8.3	439.45	No Comingling Possible																					
12/12/2019	337	8.2	434.15	No Comingling Possible																					
12/13/2019	338	8.2	426	No Comingling Possible																					
12/14/2019	256	4.7	420.5	No Comingling Possible																					
12/15/2019	336	8.1	415	No Comingling Possible																					
12/16/2019	341	8.4	404	No Comingling Possible																					
12/17/2019	350	8.8	397.3	No Comingling Possible																					
12/18/2019	346	8.6	387.25	No Comingling Possible																					
12/19/2019	348	8.7	383.9	No Comingling Possible																					
12/20/2019	352	8.9	380.55	No Comingling Possible																					
12/21/2019	266	5.1	377.2	No Comingling Possible																					
12/22/2019	353	9	377.2	No Comingling Possible																					
12/23/2019	350	8.8	373.85	No Comingling Possible																					
12/24/2019	354	9	370.5	No Comingling Possible																					
12/25/2019	349	8.8	369.55	No Comingling Possible																					
12/26/2019	352	8.9	369.55	No Comingling Possible																					
12/27/2019	353	9	368.6	No Comingling Possible																					
12/28/2019	266	5.1	368.6	No Comingling Possible																					
12/29/2019	384	10.6	367.65	16.35	1	9.6	6689143.296	9.4%	1168.2	53.32	7385929	1.2	52272	285	0.5	4.9	106722	0.2	139357	751588.2	592594	92	122407	3.47	0.0182
12/30/2019	340	8.3	365.75	No Comingling Possible																					
12/31/2019	259	4.8	363.85	No Comingling Possible																					
1/1/2020	256	4.7	361.95	No Comingling Possible																					
1/2/2020	354	9	362.9	No Comingling Possible																					
1/3/2020	353	9	361	No Comingling Possible																					
1/4/2020	236	4	360.4	No Comingling Possible																					
1/5/2020	358	9.2	359.8	No Comingling Possible																					
1/6/2020	356	9.1	359.2	No Comingling Possible																					
1/7/2020	355	9.1	358.6	No Comingling Possible																					
1/8/2020	367	9.7	358	9	0.7	9	6459251.04	7.2%	1169.8	54.92	6961637	0.7	21344	282	0.5	5.5	119790	0.3	215308	1105720	964586	100	90439	1.79	0.0098
1/9/2020	354	9	358.6	No Comingling Possible																					
1/10/2020	361	9.4	357.4	3.6	0.4	9	6482773.44	4.3%	1170	55.12	6770897	0.3	5227	281	0.5	5.6	121968	0.3	216092	1151172	1023977	102	88605	1.00	0.0054
1/11/2020	269	5.2	357.4	No Comingling Possible																					
1/12/2020	352	8.9	356.8	No Comingling Possible																					
1/13/2020	423	12.9	356.2	66.8	2.3	10.6	7538301.936	17.8%	1169.3	54.42	9173971	4.9	490921	283	0.5	5.3	115434	0.2	142232	992090.7	385736	97	97773	6.37	0.028
1/14/2020	357	9.2	356.2	0.8	0.2	9	6529818.24	2.2%	1170.4	55.52	6674925	0.1	871	280	0.6	5.8	151589	0.3	217661	1247389	1094929	104	83374	0.47	0.0025
1/15/2020	357	9.2	355.6	1.4	0.3	8.9	6468895.224	3.3%	1170.5	55.62	6686948	0.1	1307	279	0.6	5.8	151589	0.3	218053	1271444	1118548	104	81797	0.69	0.0038
1/16/2020	359	9.3	355.6	3.4	0.4	8.9	6468895.224	4.3%	1170.5	55.62	6759632	0.2	3485	279	0.6	5.8	151589	0.3	218053	1271444	1116370	104	81797	0.93	0.0051

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
1/17/2020	357	9.2	355	2	0.3	8.9	6480525.744	3.3%	1170.6	55.72	6698970	0.1	1307	279	0.6	5.8	151589	0.3	218445	1295498	1142602	104	80278	0.68	0.0037
1/18/2020	359	9.3	355	4	0.4	8.9	6480525.744	4.3%	1170.6	55.72	6771785	0.3	5227	279	0.6	5.8	151589	0.3	218445	1295498	1138682	104	80278	0.91	0.005
1/19/2020	359	9.3	355	4	0.4	8.9	6480525.744	4.3%	1170.6	55.72	6771785	0.3	5227	279	0.6	5.8	151589	0.3	218445	1295498	1138682	104	80278	0.91	0.005
1/20/2020	357	9.2	354.4	2.6	0.4	8.8	6419210.688	4.3%	1170.7	55.82	6710993	0.2	3485	279	0.6	5.8	151589	0.3	218837	1319552	1164478	104	78815	0.89	0.0049
1/21/2020	358	9.2	354.4	3.6	0.4	8.8	6419210.688	4.3%	1170.7	55.82	6710993	0.3	5227	279	0.6	5.8	151589	0.3	218837	1319552	1162736	104	78815	0.89	0.0049
1/22/2020	356	9.1	353.8	2.2	0.3	8.8	6430710.528	3.3%	1170.8	55.92	6649939	0.2	2614	278	0.6	5.9	154202	0.3	219229	1343606	1186790	106	78892	0.67	0.0037
1/23/2020	356	9.1	354.4	1.6	0.3	8.8	6430710.528	3.3%	1170.8	55.92	6649939	0.1	1307	278	0.6	5.9	154202	0.3	219229	1343606	1188097	106	78892	0.67	0.0037
1/24/2020	353	9	353.8	No Comingling Possible																					
1/25/2020	356	9.1	353.8	2.2	0.3	8.8	6442210.368	3.3%	1170.9	56.02	6661831	0.2	2614	278	0.6	5.9	154202	0.3	219621	1367661	1210845	105	76773	0.65	0.0036
1/26/2020	355	9.1	353.2	1.8	0.3	8.8	6453710.208	3.3%	1171	56.12	6673723	0.1	1307	278	0.6	5.9	154202	0.3	220013	1391715	1236206	105	75446	0.64	0.0035
1/27/2020	356	9.1	352.6	3.4	0.4	8.7	6391741.752	4.4%	1171.1	56.22	6685615	0.2	3485	277	0.6	6	156816	0.3	220405	1417281	1256980	107	75497	0.86	0.0047
1/28/2020	362	9.5	352.6	9.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.7	21344	278	0.6	5.9	154202	0.3	220013	1391715	1216169	105	75446	1.50	0.0082
1/29/2020	362	9.5	352.6	9.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.7	21344	278	0.6	5.9	154202	0.3	220013	1391715	1216169	105	75446	1.50	0.0082
1/30/2020	356	9.1	352.6	3.4	0.4	8.7	6391741.752	4.4%	1171.1	56.22	6685615	0.2	3485	277	0.6	6	156816	0.3	220405	1417281	1256980	107	75497	0.86	0.0047
1/31/2020	356	9.1	352.6	3.4	0.4	8.7	6391741.752	4.4%	1171.1	56.22	6685615	0.2	3485	277	0.6	6	156816	0.3	220405	1417281	1256980	107	75497	0.86	0.0047
2/1/2020	355	9.1	352.6	2.4	0.3	8.8	6465210.048	3.3%	1171.1	56.22	6685615	0.2	2614	277	0.6	6	156816	0.3	220405	1417281	1257851	107	75497	0.64	0.0035
2/2/2020	356	9.1	352.6	3.4	0.4	8.7	6391741.752	4.4%	1171.1	56.22	6685615	0.2	3485	277	0.6	6	156816	0.3	220405	1417281	1256980	107	75497	0.86	0.0047
2/3/2020	353	9	352.6	0.4	0.1	8.9	6550308.864	1.1%	1171.2	56.32	6623908	0	0	277	0.6	6	156816	0.3	220797	1442848	1286032	107	74159	0.21	0.0011
2/4/2020	358	9.2	352.6	5.4	0.5	8.7	6391741.752	5.4%	1171.1	56.22	6759083	0.4	8712	277	0.6	6	156816	0.3	220405	1417281	1251753	107	75497	1.07	0.0059
2/5/2020	353	9	352.6	0.4	0.1	8.9	6550308.864	1.1%	1171.2	56.32	6623908	0	0	277	0.6	6	156816	0.3	220797	1442848	1286032	107	74159	0.21	0.0011
2/6/2020	356	9.1	352	4	0.4	8.7	6403110.912	4.4%	1171.2	56.32	6697507	0.3	5227	277	0.6	6	156816	0.3	220797	1442848	1280805	107	74159	0.84	0.0046
2/7/2020	361	9.4	351.4	9.6	0.7	8.7	6403110.912	7.4%	1171.2	56.32	6918304	0.7	21344	277	0.6	6	156816	0.3	220797	1442848	1264688	107	74159	1.47	0.0081
2/8/2020	270	5.3	351.4	No Comingling Possible																					
2/9/2020	355	9.1	352	3	0.4	8.7	6403110.912	4.4%	1171.2	56.32	6697507	0.2	3485	277	0.6	6	156816	0.3	220797	1442848	1282547	107	74159	0.84	0.0046
2/10/2020	356	9.1	351.4	4.6	0.5	8.6	6340750.416	5.5%	1171.3	56.42	6709399	0.3	6534	277	0.6	6	156816	0.3	221189	1468414	1305064	106	72187	1.02	0.0057
2/11/2020	362	9.5	351.4	10.6	0.7	8.8	6476709.888	7.4%	1171.2	56.32	6991903	0.8	24394	277	0.6	6	156816	0.3	220797	1442848	1261638	107	74159	1.47	0.008
2/12/2020	353	9	351.4	1.6	0.3	8.7	6425849.232	3.3%	1171.4	56.52	6647430	0.1	1307	276	0.6	6.1	159430	0.3	221581	1493980	1333243	108	72290	0.61	0.0034
2/13/2020	358	9.2	351.4	6.6	0.6	8.6	6340750.416	6.5%	1171.3	56.42	6783128	0.5	13068	277	0.6	6	156816	0.3	221189	1468414	1298530	106	72187	1.23	0.0068
2/14/2020	359	9.3	351.4	7.6	0.6	8.7	6414480.072	6.5%	1171.3	56.42	6856858	0.6	15682	277	0.6	6	156816	0.3	221189	1468414	1295916	106	72187	1.23	0.0068
2/15/2020	363	9.5	351.4	11.6	0.8	8.7	6403110.912	8.4%	1171.2	56.32	6991903	0.8	27878	277	0.6	6	156816	0.3	220797	1442848	1258154	107	74159	1.68	0.0092
2/16/2020	347	8.7	352	No Comingling Possible																					
2/17/2020	360	9.3	351.4	8.6	0.7	8.6	6329511.936	7.5%	1171.2	56.32	6844705	0.6	18295	277	0.6	6	156816	0.3	220797	1442848	1267737	107	74159	1.47	0.0082
2/18/2020	360	9.3	351.4	8.6	0.7	8.6	6329511.936	7.5%	1171.2	56.32	6844705	0.6	18295	277	0.6	6	156816	0.3	220797	1442848	1267737	107	74159	1.47	0.0082
2/19/2020	364	9.6	352	12	0.8	8.8	6465210.048	8.3%	1171.1	56.22	7052956	0.9	31363	277	0.6	6	156816	0.3	220405	1417281	1229102	107	75497	1.71	0.0093
2/20/2020	362	9.5	352	10	0.7	8.8	6465210.048	7.4%	1171.1	56.22	6979488	0.7	21344	277	0.6	6	156816	0.3	220405	1417281	1239121	107	75497	1.50	0.0082
2/21/2020	361	9.4	352	9	0.7	8.7	6391741.752	7.4%	1171.1	56.22	6906020	0.7	21344	277	0.6	6	156816	0.3	220405	1417281	1239121	107	75497	1.50	0.0083
2/22/2020	367	9.7	352	15	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1.1	43124	278	0.6	5.9	154202	0.3	220013	1391715	1194389	105	75446	1.92	0.0104
2/23/2020	360	9.3	352.6	7.4	0.6	8.7	6380372.592	6.5%	1171	56.12	6820398	0.5	13068	278	0.6	5.9	154202	0.3	220013	1391715	1224445	105	75446	1.28	0.0071
2/24/2020	361	9.4	352.6	8.4	0.6	8.8	6453710.208	6.4%	1171	56.12	6893736	0.6	15682	278	0.6	5.9	154202	0.3	220013	1391715	1221831	105	75446	1.28	0.007
2/25/2020	362	9.5	352.6	9.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.7	21344	278	0.6	5.9	154202	0.3	220013	1391715	1216169	105	75446	1.50	0.0082
2/26/2020	357	9.2	352.6	4.4	0.5	8.7	6391741.752	5.4%	1171.1	56.22	6759083	0.3	6534	277	0.6	6	156816	0.3	220405	1417281	1253931	107	75497	1.07	0.0059
2/27/2020	359	9.3	351.4	7.6	0.6	8.7	6414480.072	6.5%	1171.3	56.42	6856858	0.6	15682	277	0.6	6	156816	0.3	221189	1468414	1295916	106	72187	1.23	0.0068
2/28/2020	360	9.3	350.8	9.2	0.7	8.6	6351988.896	7.5%	1171.4	56.52	6869011	0.7	21344	276	0.6	6.1	159430	0.3	221581	1493980	1313206	108	72290	1.43	0.0079
2/29/2020	362	9.5	350.2	11.8	0.8	8.7	6425849.232	8.4%	1171.4	56.52	7016732	0.9	31363	276	0.6	6.1	159430	0.3	221581	1493980	1303187	108	72290	1.64	0.009
3/1/2020	359	9.3	350.8	8.2	0.6	8.7	6425849.232	6.5%	1171.4	56.52	6869011	0.6	15682	276	0.6	6.1	159430	0.3	221581	1493980	1318868	108	72290	1.23	0.0067
3/2/2020	360	9.3	350.2	9.8	0.7	8.6	6363227.376	7.5%	1171.5	56.62	6881164	0.7	21344	276	0.6	6.1	159430	0.3	221973	1519547	1338773	108	71074	1.41	0.0078
3/3/2020	356	9.1	349.6	6.4	0.6	8.5	6311451.96	6.6%	1171.7	56.82	6756966	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0065
3/4/2020	356	9.1	348.5	7.5	0.6	8.5	6333667.56	6.6%	1171.9	57.02	6780750	0.5	13068	275	0.6	6.2	162043	0.3	223541	1621812	1446701	109	67209	1.14	0.0063
3/5/2020	356	9.1	348	8	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.6	15682	275	0.6	6.2	162043	0.3	223933	1647378	1469653	109	66166	1.12	0.0062
3/6/2020	358	9.2	347.5	10.5	0.7	8.5	6355883.16	7.6%	1172.1	57.22	6879309	0.8	24394	274	0.6	6.2	162043	0.3	224325	1674232	1487795	108	64507	1.28	0.0071
3/7/2020	271	5.3	347	No Comingling Possible																					
3/8/2020	354	9	348	6	0.5	8.5	6355883.16	5.6%	1172.1	57.22	6729759	0.4	8712	274	0.6	6.2	162043	0.3	224325	1674232	1503477	108	64507	0.91	0.005
3/9/2020	361	9.4	346.5	14.5	0.9	8.5	6366990.96	9.6%	1172.2	57.32	7041143	1.1	43124	274	0.6	6.3	164657	0.3	224717	1701086	1493305	110	64665	1.65	0.0091
3/10/2020	363	9.5	346	17	0.9	8.6	6453135.216	9.5%	1172.3	57.42	7128463	1.2	47045	274	0.6	6.3	164657	0.3	225109	1727941	1516239	110	63660	1.62	0.0088
3/11/2020	362	9.5	346	16	0.9	8.6	6464373.696	9.5%	1172.4	57.52	7140878	1.2	47045	273	0.6	6.3	164657	0.3	225501	1754795	1543093	110	62685	1.60	0.0087
3/12/2020	360	9.3	345.5	14.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1.1	38333	273	0.6	6.3	164657	0.3	225893	1781649	1578659	109	61179	1.39	0.0076
3/13/2020	364	9.6	345	19	1	8.6	6475612.176	10.4%	1172.5	57.62	7228590	1.4	60984	273	0.6	6.3	164657	0.3	225893	1781649	1556008	109	61179	1.73	0.0093

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
3/14/2020	364	9.6	345	19	1	8.6	6475612.176	10.4%	1172.5	57.62	7228590	1.4	60984	273	0.6	6.3	164657	0.3	225893	1781649	1556008	109	61179	1.73	0.0093
3/15/2020	361	9.4	345.5	15.5	0.9	8.5	6400314.36	9.6%	1172.5	57.62	7077995	1.1	43124	273	0.6	6.3	164657	0.3	225893	1781649	1573868	109	61179	1.56	0.0085
3/16/2020	360	9.3	345	15	0.9	8.4	6335993.664	9.7%	1172.6	57.72	7014850	1.1	43124	273	0.6	6.4	167270	0.3	226285	1808503	1598109	111	61377	1.56	0.0086
3/17/2020	365	9.6	345	20	1	8.6	6475612.176	10.4%	1172.5	57.62	7228590	1.5	65340	273	0.6	6.3	164657	0.3	225893	1781649	1551652	109	61179	1.73	0.0093
3/18/2020	360	9.3	345	15	0.9	8.4	6335993.664	9.7%	1172.6	57.72	7014850	1.1	43124	273	0.6	6.4	167270	0.3	226285	1808503	1598109	111	61377	1.56	0.0086
3/19/2020	360	9.3	345	15	0.9	8.4	6335993.664	9.7%	1172.6	57.72	7014850	1.1	43124	273	0.6	6.4	167270	0.3	226285	1808503	1598109	111	61377	1.56	0.0086
3/20/2020	362	9.5	345	17	0.9	8.6	6486850.656	9.5%	1172.6	57.72	7165707	1.2	47045	273	0.6	6.4	167270	0.3	226285	1808503	1594188	111	61377	1.56	0.0084
3/21/2020	364	9.6	345	19	1	8.6	6475612.176	10.4%	1172.5	57.62	7228590	1.4	60984	273	0.6	6.3	164657	0.3	225893	1781649	1556008	109	61179	1.73	0.0093
3/22/2020	358	9.2	346	12	0.8	8.4	6325016.544	8.7%	1172.5	57.62	6927399	0.9	31363	273	0.6	6.3	164657	0.3	225893	1781649	1585629	109	61179	1.39	0.0077
3/23/2020	361	9.4	345.5	15.5	0.9	8.5	6400314.36	9.6%	1172.5	57.62	7077995	1.1	43124	273	0.6	6.3	164657	0.3	225893	1781649	1573868	109	61179	1.56	0.0085
3/24/2020	364	9.6	345.5	18.5	1	8.6	6464373.696	10.4%	1172.4	57.52	7216045	1.3	56628	273	0.6	6.3	164657	0.3	225501	1754795	1533510	110	62685	1.78	0.0096
3/25/2020	359	9.3	345.5	13.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1	34848	273	0.6	6.3	164657	0.3	225893	1781649	1582144	109	61179	1.39	0.0076
3/26/2020	362	9.5	346	16	0.9	8.6	6464373.696	9.5%	1172.4	57.52	7140878	1.2	47045	273	0.6	6.3	164657	0.3	225501	1754795	1543093	110	62685	1.60	0.0087
3/27/2020	362	9.5	346	16	0.9	8.6	6464373.696	9.5%	1172.4	57.52	7140878	1.2	47045	273	0.6	6.3	164657	0.3	225501	1754795	1543093	110	62685	1.60	0.0087
3/28/2020	360	9.3	346	14	0.8	8.5	6389206.56	8.6%	1172.4	57.52	6990544	1	34848	273	0.6	6.3	164657	0.3	225501	1754795	1555290	110	62685	1.42	0.0078
3/29/2020	359	9.3	346	13	0.8	8.5	6389206.56	8.6%	1172.4	57.52	6990544	0.9	31363	273	0.6	6.3	164657	0.3	225501	1754795	1558775	110	62685	1.42	0.0078
3/30/2020	359	9.3	345.5	13.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1	34848	273	0.6	6.3	164657	0.3	225893	1781649	1582144	109	61179	1.39	0.0076
3/31/2020	360	9.3	345.5	14.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1.1	38333	273	0.6	6.3	164657	0.3	225893	1781649	1578659	109	61179	1.39	0.0076
4/1/2020	360	9.3	345.5	14.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1.1	38333	273	0.6	6.3	164657	0.3	225893	1781649	1578659	109	61179	1.39	0.0076
4/2/2020	358	9.2	345.5	12.5	0.8	8.4	6325016.544	8.7%	1172.5	57.62	6927399	0.9	31363	273	0.6	6.3	164657	0.3	225893	1781649	1585629	109	61179	1.39	0.0077
4/3/2020	362	9.5	346	16	0.9	8.6	6464373.696	9.5%	1172.4	57.52	7140878	1.2	47045	273	0.6	6.3	164657	0.3	225501	1754795	1543093	110	62685	1.60	0.0087
4/4/2020	365	9.6	346	19	1	8.6	6453135.216	10.4%	1172.3	57.42	7203500	1.4	60984	274	0.6	6.3	164657	0.3	225109	1727941	1502300	110	63660	1.80	0.0098
4/5/2020	358	9.2	346.5	11.5	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.8	24394	274	0.6	6.3	164657	0.3	225109	1727941	1538890	110	63660	1.26	0.0069
4/6/2020	359	9.3	346.5	12.5	0.8	8.5	6378098.76	8.6%	1172.3	57.42	6978390	0.9	31363	274	0.6	6.3	164657	0.3	225109	1727941	1531921	110	63660	1.44	0.0079
4/7/2020	358	9.2	346.5	11.5	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.8	24394	274	0.6	6.3	164657	0.3	225109	1727941	1538890	110	63660	1.26	0.0069
4/8/2020	358	9.2	346.5	11.5	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.8	24394	274	0.6	6.3	164657	0.3	225109	1727941	1538890	110	63660	1.26	0.0069
4/9/2020	357	9.2	347	10	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.7	21344	274	0.6	6.3	164657	0.3	225109	1727941	1541940	110	63660	1.26	0.007
4/10/2020	357	9.2	347	10	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.7	21344	274	0.6	6.3	164657	0.3	225109	1727941	1541940	110	63660	1.26	0.007
4/11/2020	364	9.6	347	17	0.9	8.7	6505433.352	9.4%	1172.1	57.22	7178409	1.2	47045	274	0.6	6.2	162043	0.3	224325	1674232	1465144	108	64507	1.64	0.0088
4/12/2020	353	9	347.5	5.5	0.5	8.5	6366990.96	5.6%	1172.2	57.32	6741520	0.4	8712	274	0.6	6.3	164657	0.3	224717	1701086	1527717	110	64665	0.92	0.0051
4/13/2020	354	9	347.5	6.5	0.6	8.4	6292085.184	6.7%	1172.2	57.32	6741520	0.5	13068	274	0.6	6.3	164657	0.3	224717	1701086	1523361	110	64665	1.10	0.0062
4/14/2020	393	11.1	347.5	45.5	1.7	9.4	7016575.104	15.3%	1172	57.12	8285530	3.3	244372	275	0.6	6.2	162043	0.3	223933	1647378	1240963	109	66166	3.19	0.0155
4/15/2020	361	9.4	347.5	13.5	0.8	8.6	6419419.776	8.5%	1172	57.12	7016575	1	34848	275	0.6	6.2	162043	0.3	223933	1647378	1450487	109	66166	1.50	0.0082
4/16/2020	358	9.2	348	10	0.7	8.5	6344775.36	7.6%	1172	57.12	6867286	0.7	21344	275	0.6	6.2	162043	0.3	223933	1647378	1463991	109	66166	1.31	0.0073
4/17/2020	353	9	348	5	0.5	8.5	6355883.16	5.6%	1172.1	57.22	6729759	0.4	8712	274	0.6	6.2	162043	0.3	224325	1674232	1503477	108	64507	0.91	0.005
4/18/2020	361	9.4	348	13	0.8	8.6	6408181.296	8.5%	1171.9	57.02	7004291	0.9	31363	275	0.6	6.2	162043	0.3	223541	1621812	1428406	109	67209	1.52	0.0083
4/19/2020	356	9.1	348.5	7.5	0.6	8.5	6333667.56	6.6%	1171.9	57.02	6780750	0.5	13068	275	0.6	6.2	162043	0.3	223541	1621812	1446701	109	67209	1.14	0.0063
4/20/2020	353	9	348.5	4.5	0.5	8.5	6344775.36	5.6%	1172	57.12	6717997	0.3	6534	275	0.6	6.2	162043	0.3	223933	1647378	1478801	109	66166	0.94	0.0052
4/21/2020	359	9.3	349	10	0.7	8.6	6396942.816	7.5%	1171.8	56.92	6917624	0.7	21344	275	0.6	6.2	162043	0.3	223149	1596245	1412858	109	68285	1.35	0.0074
4/22/2020	356	9.1	349	7	0.6	8.5	6322559.76	6.6%	1171.8	56.92	6768858	0.5	13068	275	0.6	6.2	162043	0.3	223149	1596245	1421134	109	68285	1.16	0.0065
4/23/2020	357	9.2	349.6	7.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0064
4/24/2020	357	9.2	349.6	7.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0064
4/25/2020	358	9.2	350.2	7.8	0.6	8.6	6374465.856	6.5%	1171.6	56.72	6819196	0.6	15682	276	0.6	6.1	159430	0.3	222365	1545113	1370001	108	69898	1.19	0.0066
4/26/2020	347	8.7	350.8	No Comingling Possible																					
4/27/2020	357	9.2	349.6	7.4	0.6	8.6	6385704.336	6.5%	1171.7	56.82	6831219	0.5	13068	276	0.6	6.1	159430	0.3	222757	1570679	1398181	107	68123	1.16	0.0064
4/28/2020	353	9	349.6	3.4	0.4	8.6	6385704.336	4.4%	1171.7	56.82	6682714	0.2	3485	276	0.6	6.1	159430	0.3	222757	1570679	1407764	107	68123	0.77	0.0043
4/29/2020	354	9	349	5	0.5	8.5	6322559.76	5.6%	1171.8	56.92	6694475	0.4	8712	275	0.6	6.2	162043	0.3	223149	1596245	1425490	109	68285	0.97	0.0054
4/30/2020	341	8.4	349.6	No Comingling Possible																					
5/1/2020	379	10.4	346.5	32.5	1.4	9	6706236.24	13.5%	1171.9	57.02	7749429	2.4	146362	275	0.6	6.2	162043	0.3	223541	1621812	1313407	109	67209	2.66	0.0137
5/2/2020	356	9.1	346	10	0.7	8.4	6325016.544	7.7%	1172.5	57.62	6852101	0.7	21344	273	0.6	6.3	164657	0.3	225893	1781649	1595648	109	61179	1.21	0.0067
5/3/2020	356	9.1	345.5	10.5	0.7	8.4	6335993.664	7.7%	1172.6	57.72	6863993	0.8	24394	273	0.6	6.4	167270	0.3	226285	1808503	1616839	111	61377	1.22	0.0068
5/4/2020	358	9.2	345	13	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/5/2020	364	9.6	344.5	19.5	1	8.6	6498089.136	10.4%	1172.7	57.82	7253681	1.4	60984	272	0.6	6.4	167270	0.3	226678	1835357	1607103	111	60479	1.71	0.0092
5/6/2020	363	9.5	344	19	1	8.5	6433637.76	10.5%	1172.8	57.92	7190536	1.4	60984	272	0.6	6.4	167270	0.3	227070	1862212	1633958	110	59070	1.67	0.0091
5/7/2020	361	9.4	343.5	17.5	0.9	8.5	6444745.56	9.6%	1172.9	58.02	7127130	1.3	50965	272	0.6	6.5	169884	0.3	227462	1889066	1668217	112	59289	1.51	0.0082
5/8/2020	364	9.6	343.5	20.5	1	8.6	6520566.096	10.4%	1172.9	58.02	7278771	1.5	65340	272	0.6	6.5	169884	0.3	227462	1889066	1653842	112	59289	1.68	0.009
5/9/2020	366	9.7	343.5	22.5	1.1	8.6	6520566.096	11.3%	1172.9	58.02	7354592	1.6	76666	272	0.6	6.5	169884	0.3	227462	1889066	1642516	112	59289	1.85	0.0099

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
5/10/2020	362	9.5	343.5	18.5	1	8.5	6444745.56	10.5%	1172.9	58.02	7202951	1.3	56628	272	0.6	6.5	169884	0.3	227462	1889066	1662554	112	59289	1.68	0.0091
5/11/2020	359	9.3	343.5	15.5	0.9	8.4	6379902.144	9.7%	1173	58.12	7063463	1.1	43124	271	0.6	6.5	169884	0.3	227854	1915920	1702912	112	58458	1.49	0.0082
5/12/2020	364	9.6	343.5	20.5	1	8.6	6520566.096	10.4%	1172.9	58.02	7278771	1.5	65340	272	0.6	6.5	169884	0.3	227462	1889066	1653842	112	59289	1.68	0.009
5/13/2020	362	9.5	343.5	18.5	1	8.5	6444745.56	10.5%	1172.9	58.02	7202951	1.3	56628	272	0.6	6.5	169884	0.3	227462	1889066	1662554	112	59289	1.68	0.0091
5/14/2020	360	9.3	344	16	0.9	8.4	6368925.024	9.7%	1172.9	58.02	7051310	1.2	47045	272	0.6	6.5	169884	0.3	227462	1889066	1672137	112	59289	1.51	0.0083
5/15/2020	361	9.4	344	17	0.9	8.5	6444745.56	9.6%	1172.9	58.02	7127130	1.2	47045	272	0.6	6.5	169884	0.3	227462	1889066	1672137	112	59289	1.51	0.0082
5/16/2020	362	9.5	343.5	18.5	1	8.5	6444745.56	10.5%	1172.9	58.02	7202951	1.3	56628	272	0.6	6.5	169884	0.3	227462	1889066	1662554	112	59289	1.68	0.0091
5/17/2020	361	9.4	344	17	0.9	8.5	6433637.76	9.6%	1172.8	57.92	7114846	1.2	47045	272	0.6	6.4	167270	0.3	227070	1862212	1647897	110	59070	1.51	0.0082
5/18/2020	362	9.5	344	18	1	8.5	6433637.76	10.5%	1172.8	57.92	7190536	1.3	56628	272	0.6	6.4	167270	0.3	227070	1862212	1638314	110	59070	1.67	0.0091
5/19/2020	364	9.6	344.5	19.5	1	8.6	6498089.136	10.4%	1172.7	57.82	7253681	1.4	60984	272	0.6	6.4	167270	0.3	226678	1835357	1607103	111	60479	1.71	0.0092
5/20/2020	362	9.5	344.5	17.5	0.9	8.6	6498089.136	9.5%	1172.7	57.82	7178122	1.3	50965	272	0.6	6.4	167270	0.3	226678	1835357	1617122	111	60479	1.54	0.0083
5/21/2020	358	9.2	345	13	0.8	8.4	6346970.784	8.7%	1172.7	57.82	6951444	0.9	31363	272	0.6	6.4	167270	0.3	226678	1835357	1636724	111	60479	1.37	0.0076
5/22/2020	362	9.5	345	17	0.9	8.6	6486850.656	9.5%	1172.6	57.72	7165707	1.2	47045	273	0.6	6.4	167270	0.3	226285	1808503	1594188	111	61377	1.56	0.0084
5/23/2020	362	9.5	345	17	0.9	8.6	6486850.656	9.5%	1172.6	57.72	7165707	1.2	47045	273	0.6	6.4	167270	0.3	226285	1808503	1594188	111	61377	1.56	0.0084
5/24/2020	355	9.1	345.5	9.5	0.7	8.4	6335993.664	7.7%	1172.6	57.72	6863993	0.7	21344	273	0.6	6.4	167270	0.3	226285	1808503	1619889	111	61377	1.22	0.0068
5/25/2020	359	9.3	345.5	13.5	0.8	8.5	6400314.36	8.6%	1172.5	57.62	7002697	1	34848	273	0.6	6.3	164657	0.3	225893	1781649	1582144	109	61179	1.39	0.0076
5/26/2020	361	9.4	346	15	0.9	8.5	6389206.56	9.6%	1172.4	57.52	7065711	1.1	43124	273	0.6	6.3	164657	0.3	225501	1754795	1547014	110	62685	1.60	0.0088
5/27/2020	355	9.1	346	9	0.7	8.4	6325016.544	7.7%	1172.5	57.62	6852101	0.7	21344	273	0.6	6.3	164657	0.3	225893	1781649	1595648	109	61179	1.21	0.0067
5/28/2020	355	9.1	346.5	8.5	0.6	8.5	6389206.56	6.6%	1172.4	57.52	6840209	0.6	15682	273	0.6	6.3	164657	0.3	225501	1754795	1574456	110	62685	1.07	0.0059
5/29/2020	358	9.2	346.5	11.5	0.7	8.5	6378098.76	7.6%	1172.3	57.42	6903354	0.8	24394	274	0.6	6.3	164657	0.3	225109	1727941	1538890	110	63660	1.26	0.0069
5/30/2020	359	9.3	346.5	12.5	0.8	8.5	6378098.76	8.6%	1172.3	57.42	6978390	0.9	31363	274	0.6	6.3	164657	0.3	225109	1727941	1531921	110	63660	1.44	0.0079
5/31/2020	354	9	347.5	6.5	0.6	8.4	6292085.184	6.7%	1172.2	57.32	6741520	0.5	13068	274	0.6	6.3	164657	0.3	224717	1701086	1523361	110	64665	1.10	0.0062
6/1/2020	357	9.2	347.5	9.5	0.7	8.5	6355883.16	7.6%	1172.1	57.22	6879309	0.7	21344	274	0.6	6.2	162043	0.3	224325	1674232	1490845	108	64507	1.28	0.0071
6/2/2020	357	9.2	348	9	0.7	8.5	6344775.36	7.6%	1172	57.12	6867286	0.7	21344	275	0.6	6.2	162043	0.3	223933	1647378	1463991	109	66166	1.31	0.0073
6/3/2020	358	9.2	348.5	9.5	0.7	8.5	6333667.56	7.6%	1171.9	57.02	6855264	0.7	21344	275	0.6	6.2	162043	0.3	223541	1621812	1438425	109	67209	1.33	0.0074
6/4/2020	352	8.9	349	3	0.4	8.5	6333667.56	4.5%	1171.9	57.02	6631723	0.2	3485	275	0.6	6.2	162043	0.3	223541	1621812	1456284	109	67209	0.76	0.0042
6/5/2020	362	9.5	349.6	12.4	0.8	8.7	6448587.552	8.4%	1171.6	56.72	7041561	0.9	31363	276	0.6	6.1	159430	0.3	222365	1545113	1354320	108	69898	1.58	0.0086
6/6/2020	351	8.9	350.2	0.8	0.2	8.7	6448587.552	2.2%	1171.6	56.72	6596831	0.1	871	276	0.6	6.1	159430	0.3	222365	1545113	1384812	108	69898	0.40	0.0022
6/7/2020	352	8.9	351.4	0.6	0.2	8.7	6437218.392	2.2%	1171.5	56.62	6585200	0	0	276	0.6	6.1	159430	0.3	221973	1519547	1360117	108	71074	0.40	0.0022
6/8/2020	355	9.1	351.4	3.6	0.4	8.7	6425849.232	4.4%	1171.4	56.52	6721291	0.3	5227	276	0.6	6.1	159430	0.3	221581	1493980	1329323	108	72290	0.82	0.0045
6/9/2020	354	9	352	2	0.3	8.7	6414480.072	3.3%	1171.3	56.42	6635669	0.1	1307	277	0.6	6	156816	0.3	221189	1468414	1310291	106	72187	0.61	0.0034
6/10/2020	350	8.8	352.6	No Comingling Possible																					
6/11/2020	347	8.7	353.2	No Comingling Possible																					
6/12/2020	354	9	353.8	0.2	0.1	8.9	6527047.824	1.1%	1171	56.12	6600385	0	0	278	0.6	5.9	154202	0.3	220013	1391715	1237513	105	75446	0.21	0.0011
6/13/2020	357	9.2	354.4	2.6	0.4	8.8	6430710.528	4.3%	1170.8	55.92	6723016	0.2	3485	278	0.6	5.9	154202	0.3	219229	1343606	1185919	106	78892	0.89	0.0049
6/14/2020	351	8.9	355.6	No Comingling Possible																					
6/15/2020	358	9.2	355.6	2.4	0.3	8.9	6468895.224	3.3%	1170.5	55.62	6686948	0.2	2614	279	0.6	5.8	151589	0.3	218053	1271444	1117241	104	81797	0.69	0.0038
6/16/2020	353	9	356.2	No Comingling Possible																					
6/17/2020	352	8.9	356.8	No Comingling Possible																					
6/18/2020	350	8.8	358	No Comingling Possible																					
6/19/2020	357	9.2	358	No Comingling Possible																					
6/20/2020	352	8.9	358.6	No Comingling Possible																					
6/21/2020	347	8.7	359.8	No Comingling Possible																					
6/22/2020	397	11.4	359.8	37.2	1.6	9.8	6930953.568	14.0%	1169	54.12	8062538	2.7	188179	284	0.5	5.2	113256	0.2	141448	923913	622478	96	103906	4.71	0.0234
6/23/2020	348	8.7	360.4	No Comingling Possible																					
6/24/2020	349	8.8	361	No Comingling Possible																					
6/25/2020	348	8.7	361.95	No Comingling Possible																					
6/26/2020	356	9.1	361	No Comingling Possible																					
6/27/2020	364	9.6	361	3	0.4	9.2	6554699.712	4.2%	1169.4	54.52	6839687	0.2	3485	283	0.5	5.3	115434	0.2	142493	1014817	895898	97	95584	1.08	0.0058
6/28/2020	373	10	364.8	8.2	0.7	9.3	6553027.008	7.0%	1168.8	53.92	7046266	0.6	18295	285	0.5	5.1	111078	0.2	140925	880831.8	751459	95	107853	2.14	0.0115
6/29/2020	363	9.5	361.95	1.05	0.2	9.3	6601639.968	2.1%	1169.2	54.32	6743611	0.1	871	283	0.5	5.3	115434	0.2	141971	969364.8	853060	98	101097	0.57	0.003
6/30/2020	352	8.9	365.75	No Comingling Possible																					
7/1/2020	347	8.7	366.7	No Comingling Possible																					
7/2/2020	345	8.6	368.6	No Comingling Possible																					
7/3/2020	346	8.6	368.6	No Comingling Possible																					
7/4/2020	219	3.5	369.55	No Comingling Possible																					
7/5/2020	344	8.5	373.85	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
7/6/2020	351	8.9	377.2	No Comingling Possible																					
7/7/2020	348	8.7	380.55	No Comingling Possible																					
7/8/2020	338	8.2	383.9	No Comingling Possible																					
7/9/2020	340	8.3	387.25	No Comingling Possible																					
7/10/2020	338	8.2	390.6	No Comingling Possible																					
7/11/2020	340	8.3	390.6	No Comingling Possible																					
7/12/2020	344	8.5	390.6	No Comingling Possible																					
7/13/2020	342	8.4	393.95	No Comingling Possible																					
7/14/2020	345	8.6	397.3	No Comingling Possible																					
7/15/2020	437	13.8	397.3	39.7	1.9	11.9	8198445.024	13.8%	1167.6	52.72	9507440	2.9	240016	295	0.4	4.7	81893	0.2	137789	627172.2	305263	89	141907	7.63	0.0319
7/16/2020	345	8.6	404	No Comingling Possible																					
7/17/2020	342	8.4	404	No Comingling Possible																					
7/18/2020	346	8.6	406.75	No Comingling Possible																					
7/19/2020	340	8.3	412.25	No Comingling Possible																					
7/20/2020	339	8.3	412.25	No Comingling Possible																					
7/21/2020	343	8.5	415	No Comingling Possible																					
7/22/2020	337	8.2	417.75	No Comingling Possible																					
7/23/2020	340	8.3	423.25	No Comingling Possible																					
7/24/2020	336	8.1	423.25	No Comingling Possible																					
7/25/2020	340	8.3	428.75	No Comingling Possible																					
7/26/2020	333	8	434.15	No Comingling Possible																					
7/27/2020	336	8.1	434.15	No Comingling Possible																					
7/28/2020	344	8.5	436.8	No Comingling Possible																					
7/29/2020	337	8.2	442.1	No Comingling Possible																					
7/30/2020	336	8.1	444.75	No Comingling Possible																					
7/31/2020	335	8.1	444.75	No Comingling Possible																					
8/1/2020	324	7.6	450.05	No Comingling Possible																					
8/2/2020	314	7.1	455.35	No Comingling Possible																					
8/3/2020	310	6.9	455.35	No Comingling Possible																					
8/4/2020	360	9.3	458	No Comingling Possible																					
8/5/2020	355	9.1	458	No Comingling Possible																					
8/6/2020	348	8.7	460.65	No Comingling Possible																					
8/7/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/8/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/9/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/10/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/11/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/12/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/13/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/14/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/15/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/16/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/17/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/18/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/19/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/20/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/21/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/22/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/23/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/24/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/25/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/26/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/27/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/28/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/29/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/30/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
8/31/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/1/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
9/2/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/3/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/4/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/5/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/6/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/7/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/8/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/9/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/10/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/11/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/12/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/13/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/14/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/15/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/16/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/17/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/18/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/19/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/20/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/21/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/22/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/23/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/24/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/25/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/26/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
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9/28/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/29/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
9/30/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/1/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/2/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/3/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/4/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/5/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/6/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/7/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/8/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/9/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/10/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/11/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/12/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/13/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/14/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/15/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/16/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/17/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/18/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/19/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/20/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/21/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/22/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/23/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
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10/28/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
10/29/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/30/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
10/31/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/1/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/2/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/3/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/4/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/5/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/6/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/7/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/8/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/9/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/10/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/11/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/12/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/13/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/14/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/15/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/16/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/17/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/18/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/19/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/20/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/21/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/22/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/23/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/24/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/25/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/26/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/27/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/28/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
11/29/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
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12/1/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
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12/8/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/9/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/10/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/11/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/12/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/13/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/14/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/15/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/16/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/17/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/18/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/19/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/20/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/21/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/22/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/23/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/24/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
12/25/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/26/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/27/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/28/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/29/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/30/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
12/31/2020	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
1/1/2021	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
1/2/2021	North Marl Pond Dry, No Impact to water quality in the North Marl Pond																								
1/3/2021	337	8.2	460.65	No Comingling Possible																					
1/4/2021	307	6.8	450.05	No Comingling Possible																					
1/5/2021	323	7.5	442.1	No Comingling Possible																					
1/6/2021	342	8.4	434.15	No Comingling Possible																					
1/7/2021	354	9	431.5	No Comingling Possible																					
1/8/2021	317	7.2	423.25	No Comingling Possible																					
1/9/2021	325	7.6	420.5	No Comingling Possible																					
1/10/2021	324	7.6	420.5	No Comingling Possible																					
1/11/2021	341	8.4	412.25	No Comingling Possible																					
1/12/2021	346	8.6	412.25	No Comingling Possible																					
1/13/2021	355	9.1	406.75	No Comingling Possible																					
1/14/2021	356	9.1	406.75	No Comingling Possible																					
1/15/2021	368	9.8	400.65	No Comingling Possible																					
1/16/2021	374	10.1	400.65	No Comingling Possible																					
1/17/2021	315	7.2	404	No Comingling Possible																					
1/18/2021	327	7.7	393.95	No Comingling Possible																					
1/19/2021	330	7.9	393.95	No Comingling Possible																					
1/20/2021	335	8.1	390.6	No Comingling Possible																					
1/21/2021	339	8.3	387.25	No Comingling Possible																					
1/22/2021	345	8.6	383.9	No Comingling Possible																					
1/23/2021	344	8.5	387.25	No Comingling Possible																					
1/24/2021	339	8.3	390.6	No Comingling Possible																					
1/25/2021	351	8.9	380.55	No Comingling Possible																					
1/26/2021	354	9	380.55	No Comingling Possible																					
1/27/2021	353	9	380.55	No Comingling Possible																					
1/28/2021	350	8.8	383.9	No Comingling Possible																					
1/29/2021	355	9.1	380.55	No Comingling Possible																					
1/30/2021	354	9	380.55	No Comingling Possible																					
1/31/2021	347	8.7	383.9	No Comingling Possible																					
2/1/2021	356	9.1	380.55	No Comingling Possible																					
2/2/2021	357	9.2	380.55	No Comingling Possible																					
2/3/2021	358	9.2	380.55	No Comingling Possible																					
2/4/2021	430	13.3	383.9	46.1	2	11.3	7844145.408	15.0%	1168	53.12	9232490	3.4	296208	288	0.5	4.9	106722	0.2	138834	708507	305577	92	129851	7.35	0.0319
2/5/2021	357	9.2	380.55	No Comingling Possible																					
2/6/2021	277	5.5	383.9	No Comingling Possible																					
2/7/2021	342	8.4	387.25	No Comingling Possible																					
2/8/2021	347	8.7	383.9	No Comingling Possible																					
2/9/2021	345	8.6	387.25	No Comingling Possible																					
2/10/2021	342	8.4	387.25	No Comingling Possible																					
2/11/2021	338	8.2	390.6	No Comingling Possible																					
2/12/2021	339	8.3	390.6	No Comingling Possible																					
2/13/2021	337	8.2	390.6	No Comingling Possible																					
2/14/2021	328	7.8	397.3	No Comingling Possible																					
2/15/2021	333	8	393.95	No Comingling Possible																					
2/16/2021	333	8	393.95	No Comingling Possible																					
2/17/2021	328	7.8	397.3	No Comingling Possible																					
2/18/2021	323	7.5	400.65	No Comingling Possible																					
2/19/2021	325	7.6	397.3	No Comingling Possible																					
2/20/2021	322	7.5	400.65	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
2/21/2021	362	9.5	406.75	No Comingling Possible																					
2/22/2021	373	10	400.65	No Comingling Possible																					
2/23/2021	368	9.8	404	No Comingling Possible																					
2/24/2021	366	9.7	404	No Comingling Possible																					
2/25/2021	357	9.2	409.5	No Comingling Possible																					
2/26/2021	357	9.2	409.5	No Comingling Possible																					
2/27/2021	359	9.3	409.5	No Comingling Possible																					
2/28/2021	351	8.9	412.25	No Comingling Possible																					
3/1/2021	364	9.6	406.75	No Comingling Possible																					
3/2/2021	367	9.7	404	No Comingling Possible																					
3/3/2021	379	10.4	400.65	No Comingling Possible																					
3/4/2021	327	7.7	397.3	No Comingling Possible																					
3/5/2021	335	8.1	393.95	No Comingling Possible																					
3/6/2021	338	8.2	390.6	No Comingling Possible																					
3/7/2021	334	8	393.95	No Comingling Possible																					
3/8/2021	343	8.5	387.25	No Comingling Possible																					
3/9/2021	413	12.3	387.25	25.75	1.4	10.9	7566476.544	11.4%	1168	53.12	8538318	1.9	115870	288	0.5	4.9	106722	0.2	138834	708507	485915	92	129851	5.15	0.0237
3/10/2021	348	8.7	387.25	No Comingling Possible																					
3/11/2021	355	9.1	383.9	No Comingling Possible																					
3/12/2021	327	7.7	369.55	No Comingling Possible																					
3/13/2021	344	8.5	366.7	No Comingling Possible																					
3/14/2021	355	9.1	364.8	No Comingling Possible																					
3/15/2021	377	10.3	361.95	15.05	0.9	9.4	6648057.504	8.7%	1169	54.12	7284574	1.1	43124	284	0.5	5.2	113256	0.2	141448	923913	767533	96	103906	2.65	0.014
3/16/2021	334	8	360.4	No Comingling Possible																					
3/17/2021	345	8.6	359.2	No Comingling Possible																					
3/18/2021	352	8.9	358.6	No Comingling Possible																					
3/19/2021	365	9.6	357.4	7.6	0.6	9	6482773.44	6.3%	1170	55.12	6914958	0.6	15682	281	0.5	5.6	121968	0.3	216092	1151172	1013522	102	88605	1.51	0.0082
3/20/2021	372	10	356.8	15.2	0.9	9.1	6554804.256	9.0%	1170	55.12	7203082	1.1	43124	281	0.5	5.6	121968	0.3	216092	1151172	986080	102	88605	2.26	0.0121
3/21/2021	375	10.1	356.2	18.8	1	9.1	6554804.256	9.9%	1170	55.12	7275112	1.4	60984	281	0.5	5.6	121968	0.3	216092	1151172	968220	102	88605	2.51	0.0134
3/22/2021	339	8.3	355	No Comingling Possible																					
3/23/2021	342	8.4	354.4	No Comingling Possible																					
3/24/2021	351	8.9	353.8	No Comingling Possible																					
3/25/2021	353	9	353.2	No Comingling Possible																					
3/26/2021	364	9.6	352	12	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
3/27/2021	286	5.9	352	No Comingling Possible																					
3/28/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
3/29/2021	376	10.2	350.8	25.2	1.2	9	6600385.44	11.8%	1171	56.12	7480437	1.8	94090	278	0.6	5.9	154202	0.3	220013	1391715	1143423	105	75446	2.56	0.0135
3/30/2021	377	10.3	350.8	26.2	1.2	9.1	6673723.056	11.7%	1171	56.12	7553774	1.9	99317	278	0.6	5.9	154202	0.3	220013	1391715	1138196	105	75446	2.56	0.0133
3/31/2021	383	10.6	350.2	32.8	1.4	9.2	6747060.672	13.2%	1171	56.12	7773787	2.4	146362	278	0.6	5.9	154202	0.3	220013	1391715	1091151	105	75446	2.99	0.0153
4/1/2021	336	8.1	350.2	No Comingling Possible																					
4/2/2021	340	8.3	349.6	No Comingling Possible																					
4/3/2021	340	8.3	350.2	No Comingling Possible																					
4/4/2021	337	8.2	350.2	No Comingling Possible																					
4/5/2021	343	8.5	349.6	No Comingling Possible																					
4/6/2021	342	8.4	349.6	No Comingling Possible																					
4/7/2021	342	8.4	349.6	No Comingling Possible																					
4/8/2021	338	8.2	350.2	No Comingling Possible																					
4/9/2021	339	8.3	350.2	No Comingling Possible																					
4/10/2021	382	10.5	350.2	31.8	1.4	9.1	6673723.056	13.3%	1171	56.12	7700450	2.3	140263	278	0.6	5.9	154202	0.3	220013	1391715	1097250	105	75446	2.99	0.0155
4/11/2021	375	10.1	351.4	23.6	1.2	8.9	6527047.824	11.9%	1171	56.12	7407099	1.7	88862	278	0.6	5.9	154202	0.3	220013	1391715	1148651	105	75446	2.56	0.0137
4/12/2021	379	10.4	350.8	28.2	1.3	9.1	6673723.056	12.5%	1171	56.12	7627112	2.1	118919	278	0.6	5.9	154202	0.3	220013	1391715	1118594	105	75446	2.78	0.0145
4/13/2021	374	10.1	351.4	22.6	1.1	9	6600385.44	10.9%	1171	56.12	7407099	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0124
4/14/2021	376	10.2	350.8	25.2	1.2	9	6600385.44	11.8%	1171	56.12	7480437	1.8	94090	278	0.6	5.9	154202	0.3	220013	1391715	1143423	105	75446	2.56	0.0135
4/15/2021	372	10	351.4	20.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.5	71874	278	0.6	5.9	154202	0.3	220013	1391715	1165639	105	75446	2.35	0.0126
4/16/2021	375	10.1	351.4	23.6	1.2	8.9	6527047.824	11.9%	1171	56.12	7407099	1.7	88862	278	0.6	5.9	154202	0.3	220013	1391715	1148651	105	75446	2.56	0.0137
4/17/2021	281	5.7	351.4	No Comingling Possible																					
4/18/2021	365	9.6	352	13	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
4/19/2021	371	9.9	351.4	19.6	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.4	60984	278	0.6	5.9	154202	0.3	220013	1391715	1176529	105	75446	2.14	0.0115

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
4/20/2021	367	9.7	352	15	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1.1	43124	278	0.6	5.9	154202	0.3	220013	1391715	1194389	105	75446	1.92	0.0104
4/21/2021	369	9.8	352	17	1	8.8	6453710.208	10.2%	1171	56.12	7187086	1.2	52272	278	0.6	5.9	154202	0.3	220013	1391715	1185241	105	75446	2.14	0.0116
4/22/2021	366	9.7	352	14	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1	39204	278	0.6	5.9	154202	0.3	220013	1391715	1198309	105	75446	1.92	0.0104
4/23/2021	369	9.8	352	17	1	8.8	6453710.208	10.2%	1171	56.12	7187086	1.2	52272	278	0.6	5.9	154202	0.3	220013	1391715	1185241	105	75446	2.14	0.0116
4/24/2021	367	9.7	352	15	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1.1	43124	278	0.6	5.9	154202	0.3	220013	1391715	1194389	105	75446	1.92	0.0104
4/25/2021	362	9.5	352.6	9.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.7	21344	278	0.6	5.9	154202	0.3	220013	1391715	1216169	105	75446	1.50	0.0082
4/26/2021	366	9.7	352	14	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1	39204	278	0.6	5.9	154202	0.3	220013	1391715	1198309	105	75446	1.92	0.0104
4/27/2021	364	9.6	352.6	11.4	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.8	27878	278	0.6	5.9	154202	0.3	220013	1391715	1209635	105	75446	1.71	0.0093
4/28/2021	364	9.6	352.6	11.4	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.8	27878	278	0.6	5.9	154202	0.3	220013	1391715	1209635	105	75446	1.71	0.0093
4/29/2021	360	9.3	352.6	7.4	0.6	8.7	6380372.592	6.5%	1171	56.12	6820398	0.5	13068	278	0.6	5.9	154202	0.3	220013	1391715	1224445	105	75446	1.28	0.0071
4/30/2021	370	9.9	352	18	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.3	56628	278	0.6	5.9	154202	0.3	220013	1391715	1180885	105	75446	2.14	0.0115
5/1/2021	369	9.8	352	17	1	8.8	6453710.208	10.2%	1171	56.12	7187086	1.2	52272	278	0.6	5.9	154202	0.3	220013	1391715	1185241	105	75446	2.14	0.0116
5/2/2021	365	9.6	352	13	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
5/3/2021	373	10	351.4	21.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0126
5/4/2021	374	10.1	351.4	22.6	1.1	9	6600385.44	10.9%	1171	56.12	7407099	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0124
5/5/2021	377	10.3	350.8	26.2	1.2	9.1	6673723.056	11.7%	1171	56.12	7553774	1.9	99317	278	0.6	5.9	154202	0.3	220013	1391715	1138196	105	75446	2.56	0.0133
5/6/2021	376	10.2	350.8	25.2	1.2	9	6600385.44	11.8%	1171	56.12	7480437	1.8	94090	278	0.6	5.9	154202	0.3	220013	1391715	1143423	105	75446	2.56	0.0135
5/7/2021	381	10.5	350.8	30.2	1.3	9.2	6747060.672	12.4%	1171	56.12	7700450	2.2	124582	278	0.6	5.9	154202	0.3	220013	1391715	1112931	105	75446	2.78	0.0143
5/8/2021	367	9.7	350.2	16.8	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0104
5/9/2021	338	8.2	350.2	No Comingling Possible																					
5/10/2021	349	8.8	349	0	0	8.8	6568708.608	0.0%	1172	57.12	6568709	0	0	275	0.6	6.2	162043	0.3	223933	1647378	1485335	109	66166	0.00	0
5/11/2021	351	8.9	348.5	2.5	0.3	8.6	6419419.776	3.4%	1172	57.12	6643353	0.2	2614	275	0.6	6.2	162043	0.3	223933	1647378	1482721	109	66166	0.56	0.0031
5/12/2021	355	9.1	348	7	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.5	13068	275	0.6	6.2	162043	0.3	223933	1647378	1472267	109	66166	1.12	0.0062
5/13/2021	355	9.1	348.5	6.5	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.5	13068	275	0.6	6.2	162043	0.3	223933	1647378	1472267	109	66166	1.12	0.0062
5/14/2021	360	9.3	347.5	12.5	0.8	8.5	6344775.36	8.6%	1172	57.12	6941931	0.9	31363	275	0.6	6.2	162043	0.3	223933	1647378	1453972	109	66166	1.50	0.0083
5/15/2021	360	9.3	347.5	12.5	0.8	8.5	6344775.36	8.6%	1172	57.12	6941931	0.9	31363	275	0.6	6.2	162043	0.3	223933	1647378	1453972	109	66166	1.50	0.0083
5/16/2021	357	9.2	348	9	0.7	8.5	6344775.36	7.6%	1172	57.12	6867286	0.7	21344	275	0.6	6.2	162043	0.3	223933	1647378	1463991	109	66166	1.31	0.0073
5/17/2021	362	9.5	347.5	14.5	0.9	8.6	6419419.776	9.5%	1172	57.12	7091220	1.1	43124	275	0.6	6.2	162043	0.3	223933	1647378	1442211	109	66166	1.69	0.0092
5/18/2021	359	9.3	348	11	0.7	8.6	6419419.776	7.5%	1172	57.12	6941931	0.8	24394	275	0.6	6.2	162043	0.3	223933	1647378	1460941	109	66166	1.31	0.0072
5/19/2021	359	9.3	348	11	0.7	8.6	6419419.776	7.5%	1172	57.12	6941931	0.8	24394	275	0.6	6.2	162043	0.3	223933	1647378	1460941	109	66166	1.31	0.0072
5/20/2021	354	9	348.5	5.5	0.5	8.5	6344775.36	5.6%	1172	57.12	6717997	0.4	8712	275	0.6	6.2	162043	0.3	223933	1647378	1476623	109	66166	0.94	0.0052
5/21/2021	352	8.9	348.5	3.5	0.4	8.5	6344775.36	4.5%	1172	57.12	6643353	0.3	5227	275	0.6	6.2	162043	0.3	223933	1647378	1480108	109	66166	0.75	0.0042
5/22/2021	348	8.7	349	No Comingling Possible																					
5/23/2021	341	8.4	349.6	No Comingling Possible																					
5/24/2021	391	11	349.6	41.4	1.6	9.4	6893735.904	14.5%	1171	56.12	8067138	3	209088	278	0.6	5.9	154202	0.3	220013	1391715	1028425	105	75446	3.42	0.017
5/25/2021	340	8.3	350.2	No Comingling Possible																					
5/26/2021	338	8.2	350.2	No Comingling Possible																					
5/27/2021	334	8	350.8	No Comingling Possible																					
5/28/2021	333	8	350.8	No Comingling Possible																					
5/29/2021	279	5.6	350.8	No Comingling Possible																					
5/30/2021	369	9.8	352	17	1	8.8	6453710.208	10.2%	1171	56.12	7187086	1.2	52272	278	0.6	5.9	154202	0.3	220013	1391715	1185241	105	75446	2.14	0.0116
5/31/2021	374	10.1	351.4	22.6	1.1	9	6600385.44	10.9%	1171	56.12	7407099	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0124
6/1/2021	370	9.9	352	18	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.3	56628	278	0.6	5.9	154202	0.3	220013	1391715	1180885	105	75446	2.14	0.0115
6/2/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
6/3/2021	363	9.5	352.6	10.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.8	24394	278	0.6	5.9	154202	0.3	220013	1391715	1213119	105	75446	1.50	0.0082
6/4/2021	371	9.9	351.4	19.6	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.4	60984	278	0.6	5.9	154202	0.3	220013	1391715	1176529	105	75446	2.14	0.0115
6/5/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
6/6/2021	360	9.3	352.6	7.4	0.6	8.7	6380372.592	6.5%	1171	56.12	6820398	0.5	13068	278	0.6	5.9	154202	0.3	220013	1391715	1224445	105	75446	1.28	0.0071
6/7/2021	350	8.8	352.6	No Comingling Possible																					
6/8/2021	359	9.3	352.6	6.4	0.6	8.7	6380372.592	6.5%	1171	56.12	6820398	0.5	13068	278	0.6	5.9	154202	0.3	220013	1391715	1224445	105	75446	1.28	0.0071
6/9/2021	358	9.2	353.2	4.8	0.5	8.7	6380372.592	5.4%	1171	56.12	6747061	0.3	6534	278	0.6	5.9	154202	0.3	220013	1391715	1230979	105	75446	1.07	0.0059
6/10/2021	351	8.9	353.8	No Comingling Possible																					
6/11/2021	351	8.9	353.8	No Comingling Possible																					
6/12/2021	347	8.7	354.4	No Comingling Possible																					
6/13/2021	339	8.3	355	No Comingling Possible																					
6/14/2021	341	8.4	355	No Comingling Possible																					
6/15/2021	336	8.1	355.6	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
6/16/2021	383	10.6	355.6	27.4	1.3	9.3	6698865.888	12.3%	1170	55.12	7635266	2	113256	281	0.5	5.6	121968	0.3	216092	1151172	915948	102	88605	3.26	0.0169
6/17/2021	374	10.1	356.8	17.2	1	9.1	6554804.256	9.9%	1170	55.12	7275112	1.3	56628	281	0.5	5.6	121968	0.3	216092	1151172	972576	102	88605	2.51	0.0134
6/18/2021	373	10	356.8	16.2	0.9	9.1	6554804.256	9.0%	1170	55.12	7203082	1.2	47045	281	0.5	5.6	121968	0.3	216092	1151172	982159	102	88605	2.26	0.0121
6/19/2021	366	9.7	357.4	8.6	0.7	9	6482773.44	7.2%	1170	55.12	6986989	0.6	18295	281	0.5	5.6	121968	0.3	216092	1151172	1010909	102	88605	1.76	0.0096
6/20/2021	357	9.2	358	No Comingling Possible																					
6/21/2021	361	9.4	358	3	0.4	9	6482773.44	4.3%	1170	55.12	6770897	0.2	3485	281	0.5	5.6	121968	0.3	216092	1151172	1025719	102	88605	1.00	0.0054
6/22/2021	355	9.1	358.6	No Comingling Possible																					
6/23/2021	351	8.9	358.6	No Comingling Possible																					
6/24/2021	343	8.5	359.8	No Comingling Possible																					
6/25/2021	342	8.4	359.8	No Comingling Possible																					
6/26/2021	336	8.1	360.4	No Comingling Possible																					
6/27/2021	327	7.7	361.95	No Comingling Possible																					
6/28/2021	379	10.4	361.95	17.05	1	9.4	6648057.504	9.6%	1169	54.12	7355298	1.2	52272	284	0.5	5.2	113256	0.2	141448	923913	758385	96	103906	2.94	0.0155
6/29/2021	370	9.9	362.9	7.1	0.6	9.3	6577333.488	6.1%	1169	54.12	7001678	0.5	13068	284	0.5	5.2	113256	0.2	141448	923913	797589	96	103906	1.77	0.0095
6/30/2021	366	9.7	363.85	2.15	0.3	9.4	6648057.504	3.1%	1169	54.12	6860230	0.2	2614	284	0.5	5.2	113256	0.2	141448	923913	808043	96	103906	0.88	0.0047
7/1/2021	360	9.3	364.8	No Comingling Possible																					
7/2/2021	366	9.7	363.85	2.15	0.3	9.4	6648057.504	3.1%	1169	54.12	6860230	0.2	2614	284	0.5	5.2	113256	0.2	141448	923913	808043	96	103906	0.88	0.0047
7/3/2021	361	9.4	364.8	No Comingling Possible																					
7/4/2021	351	8.9	365.75	No Comingling Possible																					
7/5/2021	355	9.1	364.8	No Comingling Possible																					
7/6/2021	349	8.8	365.75	No Comingling Possible																					
7/7/2021	350	8.8	365.75	No Comingling Possible																					
7/8/2021	348	8.7	366.7	No Comingling Possible																					
7/9/2021	362	9.5	363.85	No Comingling Possible																					
7/10/2021	413	12.3	364.8	48.2	1.9	10.4	7355297.664	15.4%	1169	54.12	8699054	3.5	289674	284	0.5	5.2	113256	0.2	141448	923913	520983	96	103906	5.59	0.0258
7/11/2021	349	8.8	365.75	No Comingling Possible																					
7/12/2021	430	13.3	363.85	66.15	2.4	10.9	7566476.544	18.0%	1168	53.12	9232490	4.8	501811	288	0.5	4.9	106722	0.2	138834	708507	99974	92	129851	8.82	0.0386
7/13/2021	356	9.1	364.8	No Comingling Possible																					
7/14/2021	373	10	362.9	10.1	0.7	9.3	6577333.488	7.0%	1169	54.12	7072402	0.7	21344	284	0.5	5.2	113256	0.2	141448	923913	789313	96	103906	2.06	0.011
7/15/2021	328	7.8	361	No Comingling Possible																					
7/16/2021	336	8.1	360.4	No Comingling Possible																					
7/17/2021	267	5.1	359.8	No Comingling Possible																					
7/18/2021	340	8.3	359.8	No Comingling Possible																					
7/19/2021	350	8.8	358.6	No Comingling Possible																					
7/20/2021	351	8.9	358.6	No Comingling Possible																					
7/21/2021	356	9.1	358	No Comingling Possible																					
7/22/2021	355	9.1	358.6	No Comingling Possible																					
7/23/2021	361	9.4	358	3	0.4	9	6482773.44	4.3%	1170	55.12	6770897	0.2	3485	281	0.5	5.6	121968	0.3	216092	1151172	1025719	102	88605	1.00	0.0054
7/24/2021	259	4.8	358	No Comingling Possible																					
7/25/2021	353	9	358.6	No Comingling Possible																					
7/26/2021	357	9.2	358	No Comingling Possible																					
7/27/2021	354	9	358.6	No Comingling Possible																					
7/28/2021	353	9	358.6	No Comingling Possible																					
7/29/2021	349	8.8	359.2	No Comingling Possible																					
7/30/2021	352	8.9	358.6	No Comingling Possible																					
7/31/2021	346	8.6	359.2	No Comingling Possible																					
8/1/2021	339	8.3	360.4	No Comingling Possible																					
8/2/2021	350	8.8	359.2	No Comingling Possible																					
8/3/2021	346	8.6	359.2	No Comingling Possible																					
8/4/2021	348	8.7	359.2	No Comingling Possible																					
8/5/2021	345	8.6	359.8	No Comingling Possible																					
8/6/2021	346	8.6	359.2	No Comingling Possible																					
8/7/2021	343	8.5	359.8	No Comingling Possible																					
8/8/2021	336	8.1	360.4	No Comingling Possible																					
8/9/2021	342	8.4	359.8	No Comingling Possible																					
8/10/2021	339	8.3	360.4	No Comingling Possible																					
8/11/2021	338	8.2	360.4	No Comingling Possible																					
8/12/2021	333	8	361	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
8/13/2021	333	8	360.4	No Comingling Possible																					
8/14/2021	272	5.3	361.95	No Comingling Possible																					
8/15/2021	366	9.7	363.85	2.15	0.3	9.4	6648057.504	3.1%	1169	54.12	6860230	0.2	2614	284	0.5	5.2	113256	0.2	141448	923913	808043	96	103906	0.88	0.0047
8/16/2021	371	9.9	362.9	8.1	0.7	9.2	6506609.472	7.1%	1169	54.12	7001678	0.6	18295	284	0.5	5.2	113256	0.2	141448	923913	792362	96	103906	2.06	0.0111
8/17/2021	372	10	362.9	9.1	0.7	9.3	6577333.488	7.0%	1169	54.12	7072402	0.7	21344	284	0.5	5.2	113256	0.2	141448	923913	789313	96	103906	2.06	0.011
8/18/2021	339	8.3	359.8	No Comingling Possible																					
8/19/2021	321	7.4	356.2	No Comingling Possible																					
8/20/2021	337	8.2	354.4	No Comingling Possible																					
8/21/2021	342	8.4	354.4	No Comingling Possible																					
8/22/2021	343	8.5	354.4	No Comingling Possible																					
8/23/2021	356	9.1	353.2	2.8	0.4	8.7	6380372.592	4.4%	1171	56.12	6673723	0.2	3485	278	0.6	5.9	154202	0.3	220013	1391715	1234028	105	75446	0.85	0.0047
8/24/2021	347	8.7	352.6	No Comingling Possible																					
8/25/2021	365	9.6	352	13	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
8/26/2021	366	9.7	352	14	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1	39204	278	0.6	5.9	154202	0.3	220013	1391715	1198309	105	75446	1.92	0.0104
8/27/2021	374	10.1	351.4	22.6	1.1	9	6600385.44	10.9%	1171	56.12	7407099	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0124
8/28/2021	383	10.6	350.2	32.8	1.4	9.2	6747060.672	13.2%	1171	56.12	7773787	2.4	146362	278	0.6	5.9	154202	0.3	220013	1391715	1091151	105	75446	2.99	0.0153
8/29/2021	334	8	350.8	No Comingling Possible																					
8/30/2021	343	8.5	349.6	No Comingling Possible																					
8/31/2021	343	8.5	349.6	No Comingling Possible																					
9/1/2021	345	8.6	349	No Comingling Possible																					
9/2/2021	342	8.4	349.6	No Comingling Possible																					
9/3/2021	343	8.5	349.6	No Comingling Possible																					
9/4/2021	275	5.5	349.6	No Comingling Possible																					
9/5/2021	336	8.1	350.2	No Comingling Possible																					
9/6/2021	341	8.4	349.6	No Comingling Possible																					
9/7/2021	337	8.2	350.2	No Comingling Possible																					
9/8/2021	337	8.2	350.2	No Comingling Possible																					
9/9/2021	337	8.2	350.2	No Comingling Possible																					
9/10/2021	340	8.3	349.6	No Comingling Possible																					
9/11/2021	338	8.2	350.2	No Comingling Possible																					
9/12/2021	333	8	350.8	No Comingling Possible																					
9/13/2021	389	10.9	349.6	39.4	1.6	9.3	6820398.288	14.7%	1171	56.12	7993800	2.9	202118	278	0.6	5.9	154202	0.3	220013	1391715	1035395	105	75446	3.42	0.0172
9/14/2021	339	8.3	350.2	No Comingling Possible																					
9/15/2021	339	8.3	350.2	No Comingling Possible																					
9/16/2021	335	8.1	350.2	No Comingling Possible																					
9/17/2021	338	8.2	350.2	No Comingling Possible																					
9/18/2021	278	5.6	350.8	No Comingling Possible																					
9/19/2021	369	9.8	352	17	1	8.8	6453710.208	10.2%	1171	56.12	7187086	1.2	52272	278	0.6	5.9	154202	0.3	220013	1391715	1185241	105	75446	2.14	0.0116
9/20/2021	373	10	351.4	21.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0126
9/21/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
9/22/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
9/23/2021	366	9.7	352	14	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1	39204	278	0.6	5.9	154202	0.3	220013	1391715	1198309	105	75446	1.92	0.0104
9/24/2021	372	10	351.4	20.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.5	71874	278	0.6	5.9	154202	0.3	220013	1391715	1165639	105	75446	2.35	0.0126
9/25/2021	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
9/26/2021	360	9.3	352.6	7.4	0.6	8.7	6380372.592	6.5%	1171	56.12	6820398	0.5	13068	278	0.6	5.9	154202	0.3	220013	1391715	1224445	105	75446	1.28	0.0071
9/27/2021	366	9.7	352	14	0.9	8.8	6453710.208	9.3%	1171	56.12	7113749	1	39204	278	0.6	5.9	154202	0.3	220013	1391715	1198309	105	75446	1.92	0.0104
9/28/2021	361	9.4	352.6	8.4	0.6	8.8	6453710.208	6.4%	1171	56.12	6893736	0.6	15682	278	0.6	5.9	154202	0.3	220013	1391715	1221831	105	75446	1.28	0.007
9/29/2021	361	9.4	352.6	8.4	0.6	8.8	6453710.208	6.4%	1171	56.12	6893736	0.6	15682	278	0.6	5.9	154202	0.3	220013	1391715	1221831	105	75446	1.28	0.007
9/30/2021	355	9.1	353.2	1.8	0.3	8.8	6453710.208	3.3%	1171	56.12	6673723	0.1	1307	278	0.6	5.9	154202	0.3	220013	1391715	1236206	105	75446	0.64	0.0035
10/1/2021	355	9.1	353.2	1.8	0.3	8.8	6453710.208	3.3%	1171	56.12	6673723	0.1	1307	278	0.6	5.9	154202	0.3	220013	1391715	1236206	105	75446	0.64	0.0035
10/2/2021	350	8.8	353.8	No Comingling Possible																					
10/3/2021	341	8.4	355	No Comingling Possible																					
10/4/2021	352	8.9	353.8	No Comingling Possible																					
10/5/2021	344	8.5	353.2	No Comingling Possible																					
10/6/2021	361	9.4	352.6	8.4	0.6	8.8	6453710.208	6.4%	1171	56.12	6893736	0.6	15682	278	0.6	5.9	154202	0.3	220013	1391715	1221831	105	75446	1.28	0.007
10/7/2021	359	9.3	353.2	5.8	0.5	8.8	6453710.208	5.4%	1171	56.12	6820398	0.4	8712	278	0.6	5.9	154202	0.3	220013	1391715	1228801	105	75446	1.07	0.0058
10/8/2021	365	9.6	352	13	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
10/9/2021	283	5.8	352	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
10/10/2021	362	9.5	352.6	9.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.7	21344	278	0.6	5.9	154202	0.3	220013	1391715	1216169	105	75446	1.50	0.0082
10/11/2021	370	9.9	352	18	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.3	56628	278	0.6	5.9	154202	0.3	220013	1391715	1180885	105	75446	2.14	0.0115
10/12/2021	372	10	351.4	20.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.5	71874	278	0.6	5.9	154202	0.3	220013	1391715	1165639	105	75446	2.35	0.0126
10/13/2021	371	9.9	351.4	19.6	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.4	60984	278	0.6	5.9	154202	0.3	220013	1391715	1176529	105	75446	2.14	0.0115
10/14/2021	370	9.9	352	18	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.3	56628	278	0.6	5.9	154202	0.3	220013	1391715	1180885	105	75446	2.14	0.0115
10/15/2021	373	10	351.4	21.6	1.1	8.9	6527047.824	11.0%	1171	56.12	7333762	1.6	76666	278	0.6	5.9	154202	0.3	220013	1391715	1160847	105	75446	2.35	0.0126
10/16/2021	279	5.6	351.4	No Comingling Possible																					
10/17/2021	370	9.9	352	18	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.3	56628	278	0.6	5.9	154202	0.3	220013	1391715	1180885	105	75446	2.14	0.0115
10/18/2021	377	10.3	350.8	26.2	1.2	9.1	6673723.056	11.7%	1171	56.12	7553774	1.9	99317	278	0.6	5.9	154202	0.3	220013	1391715	1138196	105	75446	2.56	0.0133
10/19/2021	377	10.3	350.8	26.2	1.2	9.1	6673723.056	11.7%	1171	56.12	7553774	1.9	99317	278	0.6	5.9	154202	0.3	220013	1391715	1138196	105	75446	2.56	0.0133
10/20/2021	379	10.4	350.8	28.2	1.3	9.1	6673723.056	12.5%	1171	56.12	7627112	2.1	118919	278	0.6	5.9	154202	0.3	220013	1391715	1118594	105	75446	2.78	0.0145
10/21/2021	333	8	350.8	No Comingling Possible																					
10/22/2021	337	8.2	350.2	No Comingling Possible																					
10/23/2021	339	8.3	350.2	No Comingling Possible																					
10/24/2021	334	8	350.8	No Comingling Possible																					
10/25/2021	343	8.5	349.6	No Comingling Possible																					
10/26/2021	308	6.8	349	No Comingling Possible																					
10/27/2021	351	8.9	344	7	0.6	8.3	6303950.928	6.7%	1173	58.12	6759658	0.5	13068	271	0.6	6.5	169884	0.3	227854	1915920	1732968	112	58458	0.99	0.0055
10/28/2021	362	9.5	343	19	1	8.5	6455853.36	10.5%	1173	58.12	7215366	1.4	60984	271	0.6	6.5	169884	0.3	227854	1915920	1685052	112	58458	1.66	0.009
10/29/2021	375	10.1	342	33	1.4	8.7	6607755.792	13.9%	1173	58.12	7671073	2.4	146362	271	0.6	6.5	169884	0.3	227854	1915920	1599674	112	58458	2.32	0.0121
10/30/2021	343	8.5	340.5	2.5	0.3	8.2	6335157.312	3.5%	1174	59.12	6566931	0.2	2614	268	0.7	6.7	204296	0.4	309032	2197287	1990377	113	51427	0.44	0.0025
10/31/2021	351	8.9	340	11	0.7	8.2	6335157.312	7.9%	1174	59.12	6875963	0.8	24394	268	0.7	6.7	204296	0.4	309032	2197287	1968597	113	51427	1.02	0.0057
11/1/2021	361	9.4	339	22	1	8.4	6489673.344	10.6%	1174	59.12	7262254	1.6	69696	268	0.7	6.7	204296	0.4	309032	2197287	1923295	113	51427	1.46	0.0079
11/2/2021	369	9.8	338.2	30.8	1.3	8.5	6566931.36	13.3%	1174	59.12	7571286	2.2	124582	268	0.7	6.7	204296	0.4	309032	2197287	1868409	113	51427	1.89	0.01
11/3/2021	375	10.1	337.8	37.2	1.5	8.6	6644189.376	14.9%	1174	59.12	7803060	2.7	176418	268	0.7	6.7	204296	0.4	309032	2197287	1816573	113	51427	2.18	0.0113
11/4/2021	381	10.5	337.4	43.6	1.6	8.9	6875963.424	15.2%	1174	59.12	8112092	3.2	223027	268	0.7	6.7	204296	0.4	309032	2197287	1769964	113	51427	2.33	0.0116
11/5/2021	386	10.7	337	49	1.7	9	6953221.44	15.9%	1174	59.12	8266608	3.6	266587	268	0.7	6.7	204296	0.4	309032	2197287	1726404	113	51427	2.48	0.0121
11/6/2021	286	5.9	336.2	No Comingling Possible																					
11/7/2021	392	11.1	336.2	55.8	1.9	9.2	7107737.472	17.1%	1174	59.12	8575640	4.1	339332	268	0.7	6.7	204296	0.4	309032	2197287	1653659	113	51427	2.77	0.0131
11/8/2021	398	11.4	335.8	62.2	2.1	9.3	7184995.488	18.4%	1174	59.12	8807414	4.5	411642	268	0.7	6.7	204296	0.4	309032	2197287	1581349	113	51427	3.06	0.0142
11/9/2021	401	11.6	335.8	65.2	2.1	9.5	7339511.52	18.1%	1174	59.12	8961930	4.7	429937	268	0.7	6.7	204296	0.4	309032	2197287	1563054	113	51427	3.06	0.0139
11/10/2021	401	11.6	335.8	65.2	2.1	9.5	7339511.52	18.1%	1174	59.12	8961930	4.7	429937	268	0.7	6.7	204296	0.4	309032	2197287	1563054	113	51427	3.06	0.0139
11/11/2021	398	11.4	335.8	62.2	2.1	9.3	7184995.488	18.4%	1174	59.12	8807414	4.5	411642	268	0.7	6.7	204296	0.4	309032	2197287	1581349	113	51427	3.06	0.0142
11/12/2021	413	12.3	335	78	2.4	9.9	7648543.584	19.5%	1174	59.12	9502736	5.7	595901	268	0.7	6.7	204296	0.4	309032	2197287	1397090	113	51427	3.50	0.015
11/13/2021	276	5.5	334.2	No Comingling Possible																					
11/14/2021	413	12.3	334.6	78.4	2.5	9.8	7571285.568	20.3%	1174	59.12	9502736	5.7	620730	268	0.7	6.7	204296	0.4	309032	2197287	1372261	113	51427	3.64	0.0157
11/15/2021	418	12.6	334.2	83.8	2.6	10	7725801.6	20.6%	1174	59.12	9734510	6.1	690862	268	0.7	6.7	204296	0.4	309032	2197287	1302129	113	51427	3.79	0.0159
11/16/2021	419	12.7	334.2	84.8	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.2	702187	268	0.7	6.7	204296	0.4	309032	2197287	1290804	113	51427	3.79	0.0157
11/17/2021	417	12.5	334.2	82.8	2.6	9.9	7648543.584	20.8%	1174	59.12	9657252	6	679536	268	0.7	6.7	204296	0.4	309032	2197287	1313455	113	51427	3.79	0.0161
11/18/2021	420	12.7	334.2	85.8	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.2	702187	268	0.7	6.7	204296	0.4	309032	2197287	1290804	113	51427	3.79	0.0157
11/19/2021	419	12.7	333.8	85.2	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.2	702187	268	0.7	6.7	204296	0.4	309032	2197287	1290804	113	51427	3.79	0.0157
11/20/2021	420	12.7	333.8	86.2	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.3	713513	268	0.7	6.7	204296	0.4	309032	2197287	1279478	113	51427	3.79	0.0157
11/21/2021	415	12.4	334.2	80.8	2.5	9.9	7648543.584	20.2%	1174	59.12	9579994	5.9	642510	268	0.7	6.7	204296	0.4	309032	2197287	1350481	113	51427	3.64	0.0155
11/22/2021	419	12.7	333.8	85.2	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.2	702187	268	0.7	6.7	204296	0.4	309032	2197287	1290804	113	51427	3.79	0.0157
11/23/2021	419	12.7	333.8	85.2	2.6	10.1	7803059.616	20.5%	1174	59.12	9811768	6.2	702187	268	0.7	6.7	204296	0.4	309032	2197287	1290804	113	51427	3.79	0.0157
11/24/2021	414	12.4	334.2	79.8	2.5	9.9	7648543.584	20.2%	1174	59.12	9579994	5.8	631620	268	0.7	6.7	204296	0.4	309032	2197287	1361371	113	51427	3.64	0.0155
11/25/2021	415	12.4	334.2	80.8	2.5	9.9	7648543.584	20.2%	1174	59.12	9579994	5.9	642510	268	0.7	6.7	204296	0.4	309032	2197287	1350481	113	51427	3.64	0.0155
11/26/2021	416	12.5	334.2	81.8	2.5	10	7725801.6	20.0%	1174	59.12	9657252	5.9	642510	268	0.7	6.7	204296	0.4	309032	2197287	1350481	113	51427	3.64	0.0154
11/27/2021	275	5.5	334.2	No Comingling Possible																					
11/28/2021	408	12	334.6	73.4	2.3	9.7	7494027.552	19.2%	1174	59.12	9270962	5.3	530996	268	0.7	6.7	204296	0.4	309032	2197287	1461995	113	51427	3.35	0.0147
11/29/2021	409	12.1	335	74	2.3	9.8	7571285.568	19.0%	1174	59.12	9348220	5.4	541015	268	0.7	6.7	204296	0.4	309032	2197287	1451976	113	51427	3.35	0.0146
11/30/2021	408	12	335	73	2.3	9.7	7494027.552	19.2%	1174	59.12	9270962	5.3	530996	268	0.7	6.7	204296	0.4	309032	2197287	1461995	113	51427	3.35	0.0147
12/1/2021	404	11.8	335.4	68.6	2.2	9.6	7416769.536	18.6%	1174	59.12	9116446	5	479160	268	0.7	6.7	204296	0.4	309032	2197287	1513831	113	51427	3.20	0.0143
5/11/2022	375	10.1	337.8	37.2	1.5	8.6	6644189.376	14.9%	1174	59.12	7803060	2.7	176418	268	0.7	6.7	204296	0.4	309032	2197287	1816573	113	51427	2.18	0.0113
5/12/2022	370	9.9	338.2	31.8	1.3	8.6	6644189.376	13.1%	1174	59.12	7648544	2.3	130244	268	0.7	6.7	204296	0.4	309032	2197287	1862747	113	51427	1.89	0.0099
5/13/2022	367	9.7	338.6	28.4	1.2	8.5	6566931.36	12.4%	1174	59.12	7494028	2.1	109771	268	0.7	6.7	204296	0.4	309032	2197287	1883220	113	51427	1.75	0.0093

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
5/14/2022	361	9.4	339	22	1	8.4	6489673.344	10.6%	1174	59.12	7262254	1.6	69696	268	0.7	6.7	204296	0.4	309032	2197287	1923295	113	51427	1.46	0.0079
5/15/2022	352	8.9	340	12	0.7	8.2	6335157.312	7.9%	1174	59.12	6875963	0.9	27443	268	0.7	6.7	204296	0.4	309032	2197287	1965548	113	51427	1.02	0.0057
5/16/2022	348	8.7	340.5	7.5	0.6	8.1	6257899.296	6.9%	1174	59.12	6721447	0.5	13068	268	0.7	6.7	204296	0.4	309032	2197287	1979923	113	51427	0.87	0.0049
5/17/2022	345	8.6	340.5	4.5	0.4	8.2	6335157.312	4.7%	1174	59.12	6644189	0.3	5227	268	0.7	6.7	204296	0.4	309032	2197287	1987764	113	51427	0.58	0.0032
5/18/2022	339	8.3	341.5	No Comingling Possible																					
5/19/2022	375	10.1	342	33	1.4	8.7	6607755.792	13.9%	1173	58.12	7671073	2.4	146362	271	0.6	6.5	169884	0.3	227854	1915920	1599674	112	58458	2.32	0.0121
5/20/2022	371	9.9	342.5	28.5	1.2	8.7	6607755.792	12.1%	1173	58.12	7519170	2.1	109771	271	0.6	6.5	169884	0.3	227854	1915920	1636265	112	58458	1.99	0.0105
5/21/2022	366	9.7	343	23	1.1	8.6	6531804.576	11.3%	1173	58.12	7367268	1.7	81457	271	0.6	6.5	169884	0.3	227854	1915920	1664579	112	58458	1.82	0.0097
5/22/2022	360	9.3	343.5	16.5	0.9	8.4	6379902.144	9.7%	1173	58.12	7063463	1.2	47045	271	0.6	6.5	169884	0.3	227854	1915920	1698991	112	58458	1.49	0.0082
5/23/2022	356	9.1	344	12	0.8	8.3	6303950.928	8.8%	1173	58.12	6911561	0.9	31363	271	0.6	6.5	169884	0.3	227854	1915920	1714673	112	58458	1.32	0.0074
5/24/2022	352	8.9	344.5	7.5	0.6	8.3	6303950.928	6.7%	1173	58.12	6759658	0.5	13068	271	0.6	6.5	169884	0.3	227854	1915920	1732968	112	58458	0.99	0.0055
5/25/2022	348	8.7	344.5	3.5	0.4	8.3	6303950.928	4.6%	1173	58.12	6607756	0.3	5227	271	0.6	6.5	169884	0.3	227854	1915920	1740809	112	58458	0.66	0.0037
5/26/2022	343	8.5	345	No Comingling Possible																					
5/27/2022	340	8.3	345.5	No Comingling Possible																					
5/28/2022	337	8.2	346	No Comingling Possible																					
5/29/2022	373	10	346.5	26.5	1.2	8.8	6568708.608	12.0%	1172	57.12	7464442	1.9	99317	275	0.6	6.2	162043	0.3	223933	1647378	1386018	109	66166	2.25	0.0119
5/30/2022	370	9.9	347	23	1.1	8.8	6568708.608	11.1%	1172	57.12	7389797	1.7	81457	275	0.6	6.2	162043	0.3	223933	1647378	1403878	109	66166	2.06	0.0109
5/31/2022	365	9.6	347.5	17.5	1	8.6	6419419.776	10.4%	1172	57.12	7165864	1.3	56628	275	0.6	6.2	162043	0.3	223933	1647378	1428707	109	66166	1.87	0.0102
6/1/2022	360	9.3	348	12	0.8	8.5	6344775.36	8.6%	1172	57.12	6941931	0.9	31363	275	0.6	6.2	162043	0.3	223933	1647378	1453972	109	66166	1.50	0.0083
6/2/2022	356	9.1	348	8	0.6	8.5	6344775.36	6.6%	1172	57.12	6792642	0.6	15682	275	0.6	6.2	162043	0.3	223933	1647378	1469653	109	66166	1.12	0.0062
6/3/2022	351	8.9	348.5	2.5	0.3	8.6	6419419.776	3.4%	1172	57.12	6643353	0.2	2614	275	0.6	6.2	162043	0.3	223933	1647378	1482721	109	66166	0.56	0.0031
6/4/2022	343	8.5	349.6	No Comingling Possible																					
6/5/2022	335	8.1	350.8	No Comingling Possible																					
6/6/2022	332	7.9	350.8	No Comingling Possible																					
6/7/2022	371	9.9	351.4	19.6	1	8.9	6527047.824	10.1%	1171	56.12	7260424	1.4	60984	278	0.6	5.9	154202	0.3	220013	1391715	1176529	105	75446	2.14	0.0115
6/8/2022	368	9.8	352	16	0.9	8.9	6527047.824	9.2%	1171	56.12	7187086	1.2	47045	278	0.6	5.9	154202	0.3	220013	1391715	1190468	105	75446	1.92	0.0103
6/9/2022	365	9.6	352	13	0.8	8.8	6453710.208	8.3%	1171	56.12	7040411	0.9	31363	278	0.6	5.9	154202	0.3	220013	1391715	1206150	105	75446	1.71	0.0093
6/10/2022	363	9.5	352.6	10.4	0.7	8.8	6453710.208	7.4%	1171	56.12	6967074	0.8	24394	278	0.6	5.9	154202	0.3	220013	1391715	1213119	105	75446	1.50	0.0082
6/11/2022	358	9.2	352.6	5.4	0.5	8.7	6380372.592	5.4%	1171	56.12	6747061	0.4	8712	278	0.6	5.9	154202	0.3	220013	1391715	1228801	105	75446	1.07	0.0059
6/12/2022	353	9	353.2	No Comingling Possible																					
6/13/2022	351	8.9	353.8	No Comingling Possible																					
6/14/2022	346	8.6	354.4	No Comingling Possible																					
6/15/2022	342	8.4	354.4	No Comingling Possible																					
6/16/2022	339	8.3	355	No Comingling Possible																					
6/17/2022	338	8.2	355	No Comingling Possible																					
6/18/2022	384	10.6	355.6	28.4	1.3	9.3	6698865.888	12.3%	1170	55.12	7635266	2.1	118919	281	0.5	5.6	121968	0.3	216092	1151172	910285	102	88605	3.26	0.0169
6/19/2022	375	10.1	356.2	18.8	1	9.1	6554804.256	9.9%	1170	55.12	7275112	1.4	60984	281	0.5	5.6	121968	0.3	216092	1151172	968220	102	88605	2.51	0.0134
6/20/2022	372	10	356.8	15.2	0.9	9.1	6554804.256	9.0%	1170	55.12	7203082	1.1	43124	281	0.5	5.6	121968	0.3	216092	1151172	986080	102	88605	2.26	0.0121
6/21/2022	365	9.6	357.4	7.6	0.6	9	6482773.44	6.3%	1170	55.12	6914958	0.6	15682	281	0.5	5.6	121968	0.3	216092	1151172	1013522	102	88605	1.51	0.0082
6/22/2022	361	9.4	358	3	0.4	9	6482773.44	4.3%	1170	55.12	6770897	0.2	3485	281	0.5	5.6	121968	0.3	216092	1151172	1025719	102	88605	1.00	0.0054
6/23/2022	355	9.1	358.6	No Comingling Possible																					
6/24/2022	350	8.8	358.6	No Comingling Possible																					
6/25/2022	343	8.5	359.8	No Comingling Possible																					
6/26/2022	337	8.2	360.4	No Comingling Possible																					
6/27/2022	336	8.1	360.4	No Comingling Possible																					
6/28/2022	330	7.9	361	No Comingling Possible																					
6/29/2022	325	7.6	361.95	No Comingling Possible																					
6/30/2022	320	7.4	362.9	No Comingling Possible																					
7/1/2022	364	9.6	363.85	0.15	0.1	9.5	6718781.52	1.0%	1169	54.12	6789506	0	0	284	0.5	5.2	113256	0.2	141448	923913	810657	96	103906	0.29	0.0015
7/2/2022	357	9.2	364.8	No Comingling Possible																					
7/3/2022	348	8.7	366.7	No Comingling Possible																					
7/4/2022	344	8.5	366.7	No Comingling Possible																					
7/5/2022	338	8.2	367.65	No Comingling Possible																					
7/6/2022	333	8	368.6	No Comingling Possible																					
7/7/2022	328	7.8	369.55	No Comingling Possible																					
7/8/2022	323	7.5	370.5	No Comingling Possible																					
7/9/2022	367	9.7	373.85	No Comingling Possible																					
7/10/2022	357	9.2	380.55	No Comingling Possible																					

Table 2.1.G
Dilution Calculations and Probabilistic Analysis
Cortlandville Sand and Gravel - DEIS

	LH#7 Radius of Influence, ft	Area, acres	Distance Between North Marl Pond and LH#7, ft	Distance Radius of Influence Extends into North Marl Pond, ft	Area of North Marl Pond within LH#7 Radius of Influence, acres	Area within Radius of Influence Outside North Marl Pond, acres	Volume of Groundwater within Radius of Influence Outside North Marl Pond, ft3	Portion of North Marl Pond within LH#7 Radius of Influence, %	GW Elevation	Aquifer Thickness, ft	Aquifer Volume, ft3	Average Depth within North Marl Pond Area within LH#7 Capture Radius, ft	Water Volume within North Marl Pond that is within LH#7 Capture Radius, ft3	Distance Between North Marl Pond and Projected Mine Pond Surface, ft	Area of North Marl Pond Potentially Affected by Proposed Mine Pond, acres	Average Depth of North Marl Pond in the Area Affected by the Proposed Mine Pond, ft	Volume of Water in North Marl Pond in the Area Affected by the Proposed Mine Pond, ft3	Area between Proposed Mine Pond and North Marl Pond, acres	Volume of Water between Proposed Mine Pond and North Marl Pond, ft3	Volume of North Marl Pond, ft3	Volume of North Marl Pond Outside Mine Pond and Lime Hollow Well's Influence Areas, ft3	Volume of Contaminant In North Marl Pond, gal	Concentration of Contaminant within North Marl Pond, ppb	Volume of Contaminant in Capture Portion of North Marl Pond, ml	Concentration of Contaminant that Reaches LH#7, ppb
7/11/2022	352	8.9	383.9	No Comingling Possible																					
7/12/2022	344	8.5	387.25	No Comingling Possible																					
7/13/2022	337	8.2	390.6	No Comingling Possible																					
7/14/2022	330	7.9	397.3	No Comingling Possible																					
7/15/2022	380	10.4	400.65	No Comingling Possible																					
7/16/2022	369	9.8	404	No Comingling Possible																					
7/17/2022	359	9.3	409.5	No Comingling Possible																					
7/18/2022	356	9.1	409.5	No Comingling Possible																					
7/19/2022	350	8.8	412.25	No Comingling Possible																					
7/20/2022	343	8.5	415	No Comingling Possible																					
7/21/2022	336	8.1	417.75	No Comingling Possible																					
7/22/2022	331	7.9	420.5	No Comingling Possible																					
7/23/2022	324	7.6	426	No Comingling Possible																					
7/24/2022	315	7.2	428.75	No Comingling Possible																					
7/25/2022	316	7.2	428.75	No Comingling Possible																					
7/26/2022	365	9.6	431.5	No Comingling Possible																					
7/27/2022	357	9.2	434.15	No Comingling Possible																					
7/28/2022	345	8.6	439.45	No Comingling Possible																					
7/29/2022	336	8.1	444.75	No Comingling Possible																					
7/30/2022	328	7.8	447.4	No Comingling Possible																					
7/31/2022	319	7.3	452.7	No Comingling Possible																					

Table Statistical Summary		
Total Number of Days Analyzed	**1113**	
Number of Days where the Radius of Influence is less than the Distance between the North Marl Pond and the Town's Wells	**429**	**39%**
Number of Days where the North Marl Pond is dry and, therefore not able to be affected by the proposed mine pond	**227**	**20%**
Number of Days when contamination was possible	**457**	**41%**
% of days where hypothetical contaminant concentration is less than 0.01 ppb	**145**	**87%**
Maximum Theoretical Contaminant Concentration based on 500 gallons spilled in northwest corner of Proposed Mine Pond, ppb	**0.097**	

Land Use Category	Number of Parcels	Total Acres	Percent of Town Coverage	Average Acres/Parcel
Agricultural	112	10,427	36.85%	93.09
Forested & Conservation	18	1,245	4.16%	69.18
Vacant	687	6,179	20.65%	8.99
Single-Family Residential	2231	8,423	28.15%	3.78
Two-Family Residential	41	58	0.19%	1.42
Three-Family Residential	8	25.63	0.09%	3.2
Multi-Family Residential	32	121.86	0.41%	3.81
Commercial	243	585.1	1.96%	2.41
Industrial	26	513.69	1.72%	19.76
Community Services	73	1,322.48	4.42%	18.12
Recreation/Entertainment	25	712.81	1.90%	28.51
No Land Use Code	21	303.78	0.01%	14.47
Totals	3,517	29,918	100.00%	8.51

Table 2.2.A: Cortlandville Existing Land Use

Table 2.2.B: Spill Incident Database Search Details, Cortlandville, NY, 2018-2023 (NYSDEC)									
Spill Number	**Date Spill Reported**	**Material Spilled**	**Amount Spilled**	**Resource Affected**	**Spill Source**	**Date Spill Closed**	**Spill Name**	**City/Town**	**Address**
2208200	Thursday, January 5, 2023	Motor oil	Unknown	Unknown	Traffic Accident	Not Closed	TRACTOR TRAILER MVA	CORTLANDVILLE	MP 48.81 SB
2110379	Saturday, March 12, 2022	Diesel	Unknown	Unknown	Traffic Accident	Not Closed	ROADWAY	CORTLANDVILLE	MILE 47.9 I81 SB
2202229	Friday, June 10, 2022	Kerosene	Unknown	Unknown	Equipment Failure	Friday, June 10, 2022	RESIDENCE	CORTLANDVILLE	15 MORGAN DR
2203503	Friday, July 22, 2022	Antifreeze	Unknown	Surface water (Dry Creek)	Traffic Accident	Monday, October 3, 2022	MV IN CREEK	CORTLANDVILLE	4160 KINNEY GOLF RD
2207735	Friday, December 16, 2022	Motor oil	Unknown	Groundwater (Dry Creek)	Traffic Accident	Not Closed	INTERSECTION	CORTLANDVILLE	SWEENEY RD/ KINNEY GOLF RD
2104764	Thursday, August 19, 2021	Gasoline	Unknown	Unknown	Traffic Accident	Thursday, February 3, 2022	CORTLAND COUNTRY MUSIC PARK	CORTLANDVILLE	1824 ROUTE 13
1910854	Monday, February 24, 2020	Antifreeze	20 Gal.	Soil	Traffic Accident	Monday, March 9, 2020	WAMART	CORTLANDVILLE	818 BENNIE RD
2002581	Tuesday, July 7, 2020	Paint	5 Gal.	Soil	Human Error	Wednesday, October 14, 2020	TO ROADWAY	CORTLANDVILLE	RTE 13 AT BENNIE RD
2006811	Tuesday, October 27, 2020	Motor oil	20 Gal.	Soil	Traffic Accident	Friday, February 26, 2021	WOOD LATHE VS TT AT I81 NB MM 53	CORTLANDVILLE	I 81 NB MM 53
2007878	Monday, December 7, 2020	Diesel	Unknown	Soil	Unknown Commercial Vehicle Failure	Friday, May 27, 2022	TRACTOR TRAILER	CORTLANDVILLE	47 MM I81 NORTHBOUBND
1900449	Sunday, April 14, 2019	Antifreeze	2 Gal	Soil	Traffic Accident	Sunday, April 14, 2019	MVA	CORTLANDVILLE	RTE 13, STH OF LIGHTHOUSE RD
1909014	Saturday, December 14, 2019	#2 Fuel Oil	Unknown	Unknown	Traffic Accident	Tuesday, November 16, 2021	RESIDENCE-1157 GALLAGHER RD	CORTLANDVILLE	1157 GALLAGHER RD
1710061	Tuesday, February 6, 2018	Diesel	40 Gal.	Unknown	Traffic Accident	Friday, June 22, 2018	INTERSECTION OF MCLAIN RD	CORTLANDVILLE	ROUTE 281
1803453	Saturday, June 30, 2018	Motor oil	15 Gal.	Soil	Commercial/industrial equipment failur	Wednesday, July 31, 2019	MILE MARKER 81 NB	CORTLANDVILLE	MILE MARKER 81 NB
1803943	Thursday, July 12, 2018	Gasoline	Unknown	Soil, Groundwater	PBS Facility	Friday, November 16, 2018	PITS STOP EXIT 10 TRUCK STOP	CORTLANDVILLE	3742 RTE 11
1807554	Monday, October 15, 2018	Gasoline	Unknown	Unknown	Traffic Accident	Monday, October 15, 2018	SHOULDER OF ROAD	CORTLANDVILLE	I81 SB 52 MILE
1807783	Monday, October 22, 2018	Unknown Petroleum	Unknown	Soil	Traffic Accident	Monday, October 22, 2018	ROADWAY	CORTLANDVILLE	4491 COSMOS HILL RD
1808518	Friday, November 9, 2018	Hydraulic Oil	10 Gal.	Impervious Surface	Commercial Vehicle Equipment Failure	Tuesday, November 13, 2018	ROADWAY	CORTLANDVILLE	RTE 281 & LANKLER DR

Table 2.2.C: Marl Pond Water Quality Analysis Summary

		North Pond		Mid Pond	
Analyte	**Units**	**4/25/2022**	**5/4/2022**	**4/25/2022**	**5/4/2022**
FIELD PARAMETERS					
Temperature, °C	°C	14.79	16.01	15.11	14.57
pH	s.u.	8.24	8.29	8	7.92
Dissolved Oxygen (DO)	mg/L	8.35	10.13	7.2	7.5
Oxidation-Reduction Potential (ORP)	mV	92	214	224	109
Turbidity (field / lab)	NTU	4	60.3	14.7	0
Clarity	Feet		9		9
Water Depth	Feet		9		12.5
Specific Conductance	uS/cm	646	603	565	646
LAB PARAMETERS					
Inorganics and Misc.					
Niitrogen, Total Kjeldahl	mg/l		21.6		204
Phosphorous,Total	mg/l		0.979		0.034
Total Organic Carbon	mg/l		1.91		1.73
Chlorophyll A	mg/m3		19.4		6.39
Metals					
Aluminum	mg/L		0.47		0.123
Barium	mg/L		0.044		0.04
Calcium	mg/L		77.4		71.4
Antimony	mg/L		ND		ND
Arsenic	mg/L		ND		ND
Beryllium	mg/L		ND		ND
Cadmium	mg/L		ND		ND
Chromium	mg/L		0.0002		ND
Cobalt	mg/L		ND		ND
Copper	mg/L		0.004		ND
Iron	mg/L		0.597		0.193
Lead	mg/L		ND		ND
Magnesium	mg/L		17.8		17.5
Manganese	mg/L		0.049		0.042
Mercury	mg/L		ND		ND
Nickel	mg/L		ND		ND
Potassium	mg/L		0.971		0.958
Selenium	mg/L		ND		ND
Silver	mg/L		ND		ND
Sodium	mg/L		28.4		25.7
Thallium	mg/L		ND		ND
Vanadium	mg/L		ND		ND
Zinc	mg/L		0.01		0.005

Table 2.2.D Terrace Road Well Water Quality Analysis Summary

		Terrace Rd Well													
Analyte	**Units**	**3/6/2019**	**3/13/2019**	**6/5/2019**	**1/6/2020**	**3/4/2020**	**6/3/2020**	**12/2/2020**	**1/8/2021**	**3/3/2021**	**11/1/2021**	**1/10/2022**	**3/9/2022**	**4/4/2022**	**7/1/2022**
Sodium	**mg/L**		61.4	58.7	73.8	62.9	64.1	75.2	74.1	71.6	73.6	68		65.9	63
Nitrate	**mg/L**			1.91						1.64			1.83		
Chloride	**mg/L**			103		138				163			86.7		
Total Coliform	**in 100mL**		Absent				Absent	Absent			Absent	Absent			
E.Coli	**in 100mL**		Present				Absent	Absent			Absent	Absent			
HAA5	**ug/L**														
Trihalomethanes	**ug/L**														
Radium-228	**pCi/L**	0.518													
Sulfate (SO4)	**mg/L**					10.1									
Zinc	**mg/L**					0.0103									
Chlorine	**mg/L**										0.4	0.6			

Table 2.2.E Lime Hollow Well Water Quality Analysis Summary

		Lime Hollow					
Analyte	**Units**	**3/6/2019**	**4/10/2019**	**3/3/2020**	**5/19/2020**	**3/2/2021**	**3/8/2022**
Sodium	**mg/L**	12.8			17.1	17.8	18.6
Nitrate	**mg/L**	2.53		2.23		2.29	2.19
Chloride	**mg/L**	41.2		49.1	50	53.4	45.7
Total Coliform	**in 100mL**						
E.Coli	**in 100mL**						
HAA5	**ug/L**						
Trihalomethanes	**ug/L**						
Radium-228	**pCi/L**		0.155				
Sulfate (SO4)	**mg/L**			18.2	17.4		
Zinc	**mg/L**				0.0065		
Chlorine	**mg/L**						

Table 2.3.A: Marl Pond Soil Characterization

Marl Pond Hydric Soil Characterization										
			Matrix		Redox Features					
Pond	**Sampling ID**	**Depth (inches)**	**Color (Moist)**	**%**	**Color (Moist)**	**%**	**Type**	**Location**	**Texture**	**Hydric Soil Indicator**
North	Upland 1 (U1)	1-5"	Very dark gray (10YR3/1)	100					Clay-like loam	Upland soil
North		5-12"	Dark gray (10YR4/1)	100					Clay-like loam	
North	Hydric 1 (H1)	1-8"	Dark gray (5Y4/1)	80	Black (5Y2.5/1)	20	Depletion	Matrix	Clay-like loam	Depleted Matrix
North	Hydric 2 (H2)	1-8"	Very dark gray (5Y3/1)	100					Organic material	Histic epipedon
North		8-12"	White (White 10YR8/2)	100					Clay-like loam	
North	Hydric 3 (H3)	1-9"							Organic material	Histic epipedon
North		9-12"	Very dark gray (10YR3/1)	100					Clay-like loam	
North		12-15"	Very dark gray (10YR3/1)	75	Light gray (2.5Y7/1)	25	Depletion	Matrix	Clay-like loam	
North	Hydric 4 (H4)	1-11"	Dark gray (5Y4/1)	75	Olive brown (2.5Y4/4)	25	Concentration	Pore Lining	Clay-like loam	
North	Hydric 5 (H5)	1-9"							Organic material	Histic epipedon
North		9-16"	Very dark gray (2.5Y3/1)	100					Clay-like loam	
North	Hydric 6 (H6)	1-11"							Organic material	Histic epipedon
North		11-21"	Light olive gray (5Y6/2)	75	Light yellowish brown (2.5Y6/3)	25	Depletion	Matrix	Clay-like loam	
Mid	Hydric 7 (H7)	1-9"	Dark gray (Gley 1 4/N)	75	Dark yellowish brown (10YR4/6)	25	Depletion	Matrix	Clay-like loam	Loamy Gleyed Matrix
Mid	Hydric 8 (H8)	1-24"							Organic material	Histisol
Mid	Hydric 9 (H9)	1-8"							Organic material	Histic epipedon
Mid		9-16"	Gray (5Y6/1)	80	Black (5Y2.5/1)	20	Concentration	Pore Lining	Clay-like loam	

Table 2.3.B Cortland Marl Pond Emergence Survey				
Date	**Species**	**Sex**	**Mortality**	**Location**
3/19/2022	*Lithobates pipiens*	F	Alive	Lime Hollow Rd
3/19/2022	*Anaxyrus americanus*	F	Alive	Lime Hollow Rd
3/19/2022	*Ambystoma jeffersonianum/laterale*	F	Alive	Lime Hollow Rd
3/19/2022	*Ambystoma maculatum*	F	Alive	Trail
3/19/2022	*Ambystoma maculatum*	M	Alive	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Alive	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Pseudacris crucifer*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Ambystoma maculatum*	N/A	Dead	Lime Hollow Rd
3/19/2022	*Unidentified*	N/A	Dead	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	N/A	Dead	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	M	Alive	Lime Hollow Rd
3/24/2022	*Pseudacris crucifer*	N/A	Alive	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	M	Alive	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	F	Alive	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	N/A	Dead	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	N/A	Dead	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	N/A	Dead	Lime Hollow Rd
3/24/2022	*Ambystoma maculatum*	M	Dead	Lime Hollow Rd

Table 2.3.C: Cortland Marl Pond Egg Mass Count					
Date	**Pond**	**Transect No.**	**Species**	**Approximate No. Eggs**	**Type of Attachment**
4/25/2022	North	1	*Ambystoma jeffersonianum/laterale*	50	Bark
5/4/2022	North	3	*Ambystoma maculatum*	65	Benthic vegetation
5/4/2022	Middle	1	*Ambystoma maculatum*	100	Benthic vegetation
5/4/2022	Middle	1	*Ambystoma maculatum*	50	Benthic vegetation
5/4/2022	Middle	3	*Ambystoma maculatum*	50	Benthic vegetation
5/4/2022	Middle	4	*Ambystoma maculatum*	40	Benthic vegetation

Table 2.3.D: Cortland Marl Pond Vegetation Survey					
Pond	**Transect**	**Plot**	**Up/Wet**	**Species**	**Dominance per Plot**
North	5	A	Up	*Ilex verticillata*	30%
				Rhamnus cathartica	15%
				Asclepias sp.	5%
North	5	B	Wet	*Chara*	100%
North	5	C	Wet	*Chara*	80%
				Potamogeton	100%
				Thalictrum dioicum	10%
North	4	A	Up	*Ilex verticillata*	60%
				Rubus moluccanus	10%
				Thalictrum dioicum	10%
North	4	B	Wet	*Chara*	100%
North	4	C	Wet	*Chara*	100%
North	3	A	Up	*Cornus sericea*	100%
North	3	B	Wet	*Chara*	100%
North	3	C	Wet	*Potamogeton*	25%
				Thalictrum dioicum	25%
				Vitis riparia	10%
North	2	A	Wet	*Potamogeton*	100%
North	2	B	Wet	*Chara*	100%
North	2	C	Wet	*Chara*	100%
North	1	A	Wet	*Chara*	100%
North	1	B	Wet	*Salix*	75%
				Chara	25%
North	1	C	Up	*Asclepias sp.*	15%
				Vitis riparia	15%
				Populus tremuloides	10%
Mid	1	A	Up	*Asclepias sp.*	15%
				Eleocharis	10%
Mid	1	B	Wet	*Chara*	90%
				Potamogeton	10%
Mid	2	A	Up	*Lobelia cardinalis*	10%
				Asclepias sp.	10%
				Eleocharis	10%
Mid	2	B	Wet	*Chara*	100%
Mid	3	A	Up	*Asclepias sp.*	20%
				Rhamnus cathartica	20%
Mid	3	B	Wet	*Chara*	100%

Table 3.6.A
Monthly Radius of Influence Calculations
Cortlandville Sand and Gravel - DEIS

	2019	2020	2021	2022	Maximum All	Minimum All	Average All	Variation	Variation %
January	ND	474	532	ND	691	301	507	390	77%
February	422	460	495	ND	508	356	458	152	33%
March	436	435	474	ND	511	373	445	139	31%
April	447	432	435	ND	461	369	437	93	21%
May	442	422	436	429	460	370	434	90	21%
June	429	432	466	482	505	353	451	152	34%
July	443	466	481	506	510	309	470	201	43%
August	465	463	475	ND	542	350	465	192	41%
September	459	443	442	ND	477	340	444	137	31%
October	455	310	436	ND	464	274	401	190	47%
November	492	263	422	ND	536	255	394	281	72%
December	507	340	418	ND	991	281	467	710	152%

Notes:
All values except "Variation %" are in feet
ND = No Data

Source	Pollutant	No. of Runs	Data Rating	Emission Factor (b)			
				kg/Mg	lb/ton	kg/ha/day	lb/ac/day
Active Storage Piles (c)	Total Suspended Particulate	19	C	0.21	0.42	14.8	13.2
Inactive Storage Piles (d)	Total Suspended Particulate	19	C	0.055	0.11	3.9	3.5
Active/Inactive Storage Piles (e)	Total Suspended Particulate	19	C	0.17	0.33	11.7	10.4

(b) Factors in units of kg/Mg (lb/ton) of material stored and kg per hectare per day (lb per acre per day)

(c) Based on 8 to 12 hours of activity per 24-hour period; includes emissions from wind erosion, vehicle traffic, and material handling

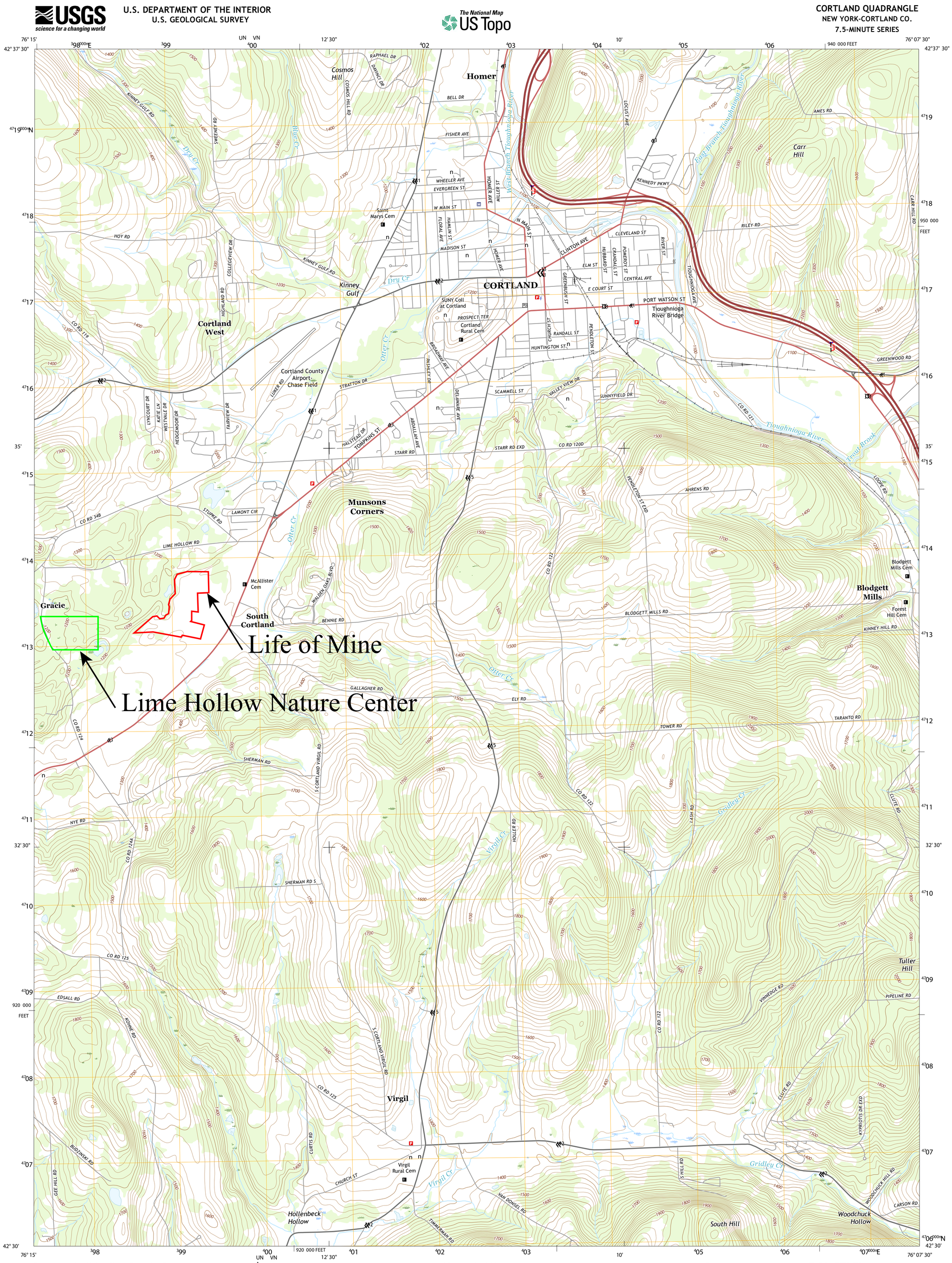
(d) Emissions due to wind eriosion during inactive periods

(e) Five active days per week

Table 6.1.A: Summary of Test Data for Construction Sand and Gravel Processing

Figures

Figure 1.A: Site Location



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 18T
10 000-foot ticks: New York Coordinate System of 1983 (central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, June 2013
Roads..... U.S. Census Bureau, 2015 - 2016
Names.....GNIS, 2016
Hydrography.....National Hydrography Dataset, 2013
Contours.....National Elevation Dataset, 1999
Boundaries.....Multiple sources; see metadata file 1972 - 2016

Wetlands.....FWS National Wetlands Inventory 1977 - 2014

UTM GRID AND 2016 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
MN 12° 14' 217 MILS
GN 0° 48' 14 MILS

U.S. National Grid
100,000-m Square ID
UN VN
Grid Zone Designation 18T

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.19

QUADRANGLE LOCATION
NEW YORK

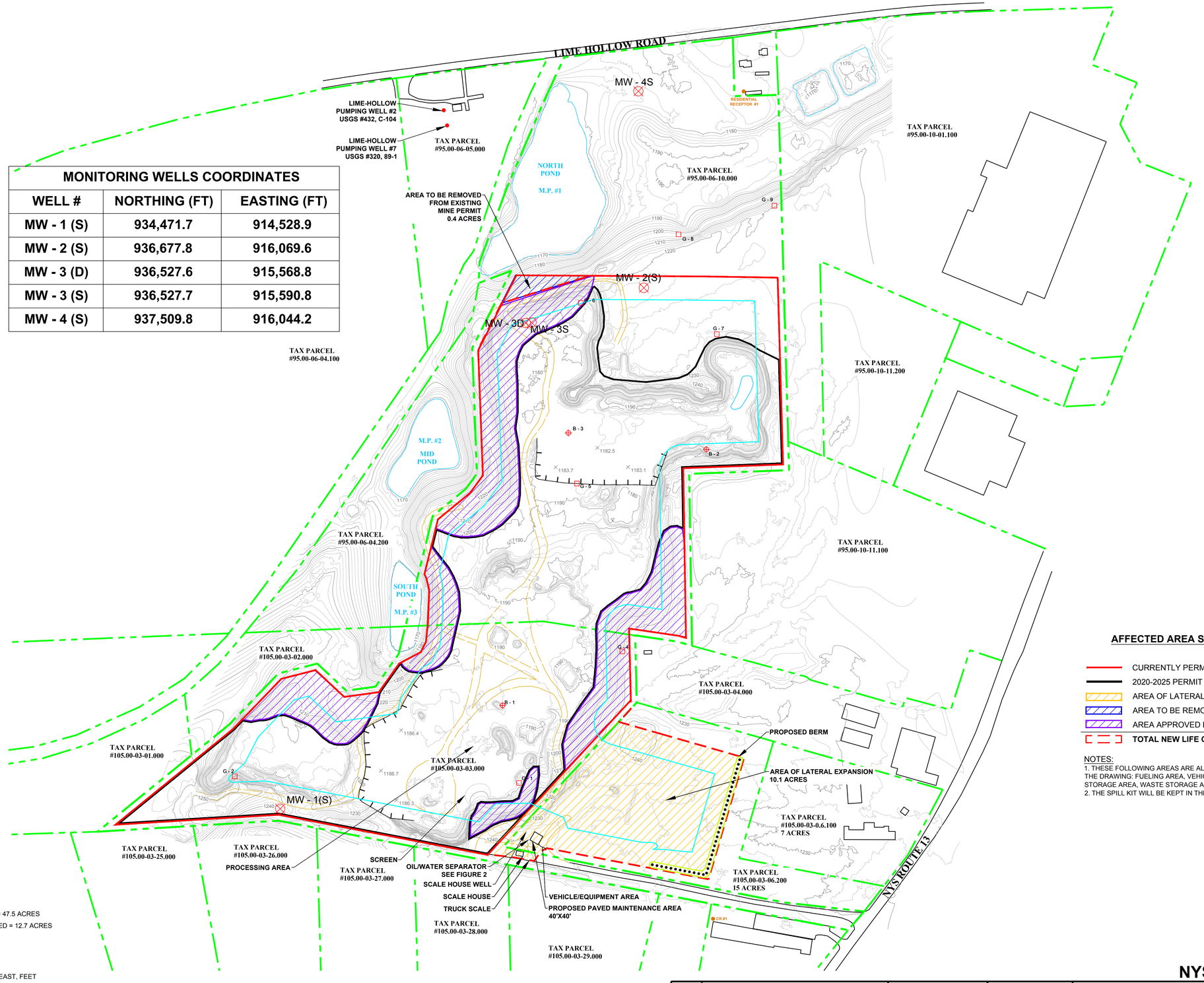
ADJOINING QUADRANGLES
1 Sempronius
2 Homer
3 Truxton
4 Groton
5 McGraw
6 Dryden
7 Harford
8 Marathon

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route / US Route H State Route

CORTLAND, NY
2016

NSN. 7643016386602
NGA REF NO. USGSX24K10216

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1 (S)	934,471.7	914,528.9
MW - 2 (S)	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2



LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY 66.8 Acres
- ACTIVE FACES UPDATED 6/17/2020
- BELOW WATER OPERATIONS BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- TEST PIT
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- SPOT SHOT ELEVATIONS

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.
8. ACTIVE FACE LOCATIONS UPDATED ON 6/17/2020.

AFFECTED AREA SUMMARY:

- CURRENTLY PERMITTED LIFE OF MINE = 66.8 ACRES
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA OF LATERAL EXPANSION = 10.1 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- **TOTAL NEW LIFE OF MINE = 76.5 ACRES**

NOTES:

1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
10/22/20	4	REVISED ACERAGES ON 10/22/2020
04/14/21	5	REVISED LOM BOUNDARY 04/14/2021
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

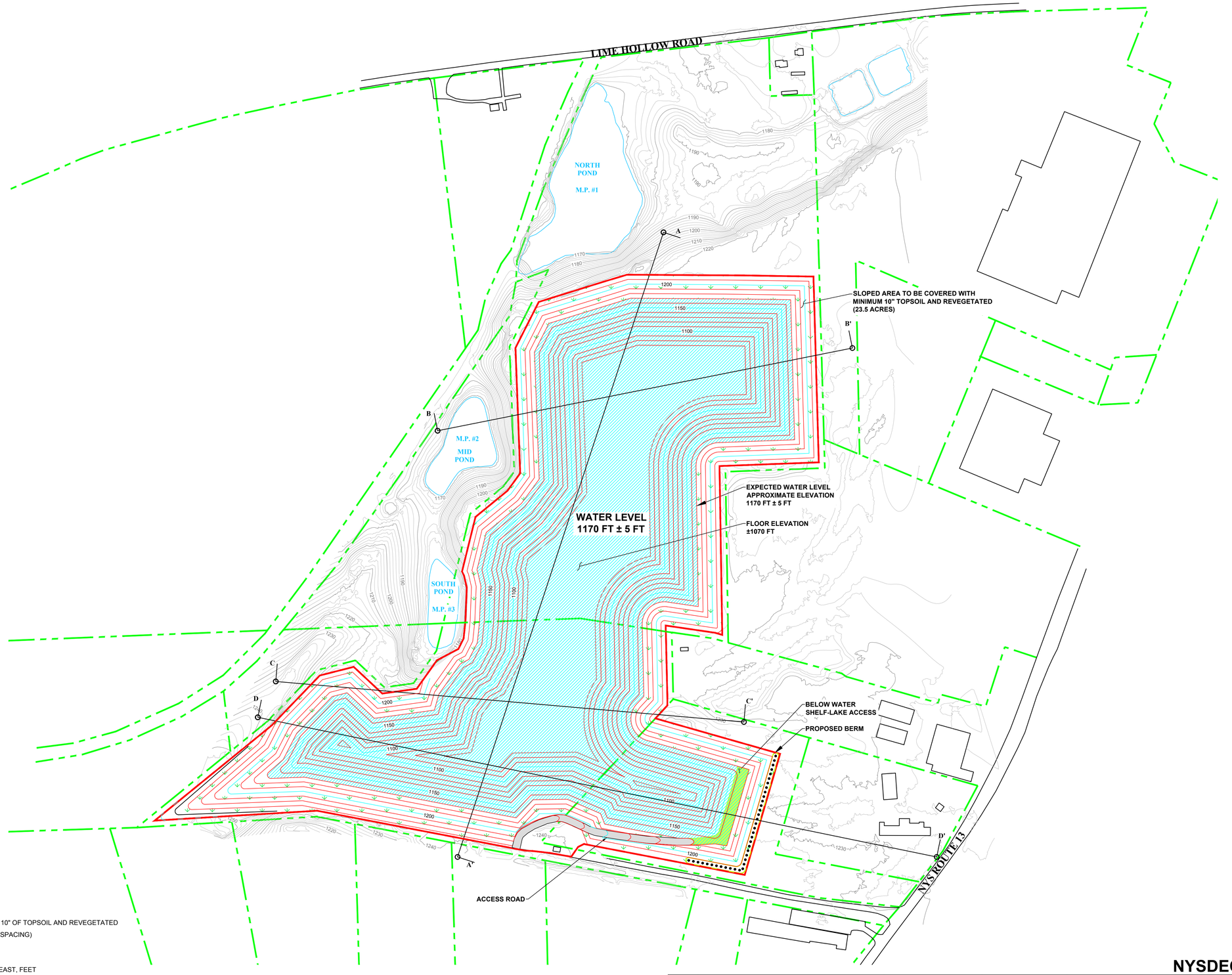
MINE PLAN MAP

TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 1.B

SHEET 1 OF 1



LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- ROAD
- BUILDING/LARGE MISC. OBJECT
- AREAS TO BE COVERED WITH MINIMUM OF 10" OF TOPSOIL AND REVEGETATED
- TREES (TO BE PLANTED WHITE PINE AT 20' SPACING)

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
12/22/17	1	ADDED SECTION D-D' WITH TERRACE INCLUDED
3/06/18	2	COMMENTS FROM NYSDEC NOIA 11/10/2017
10/22/20	3	REVISED RECLAMATION GRADES TO NORTH ON 10/22/20
04/14/21	4	REVISED LOM BOUNDARY 04/14/2021
	5	
	6	

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SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

PROPOSED RECLAMATION PLAN

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
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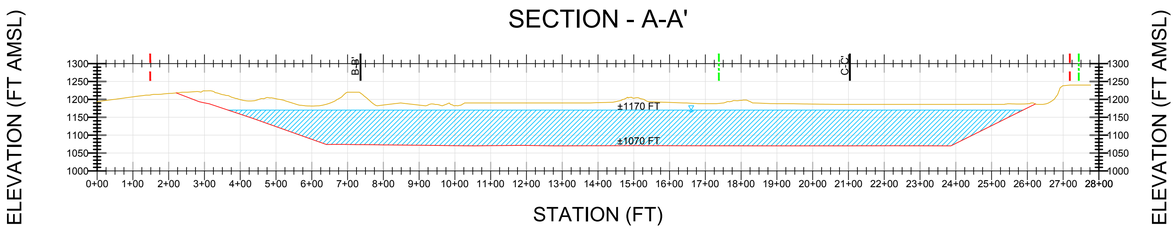
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

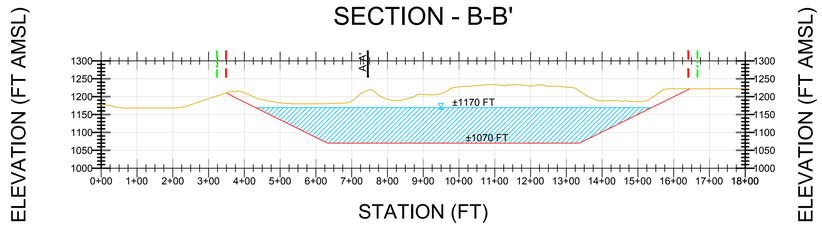
FIGURE 1.C

SHEET 1 OF 2

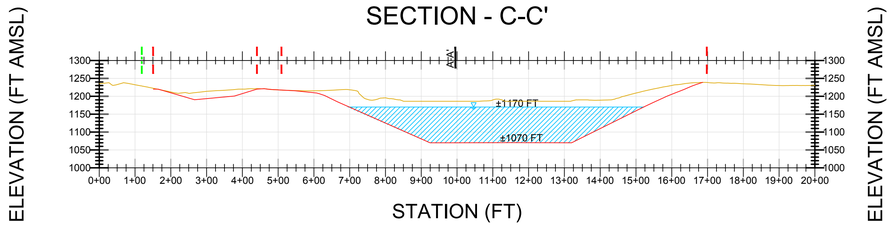
SECTION - A-A'



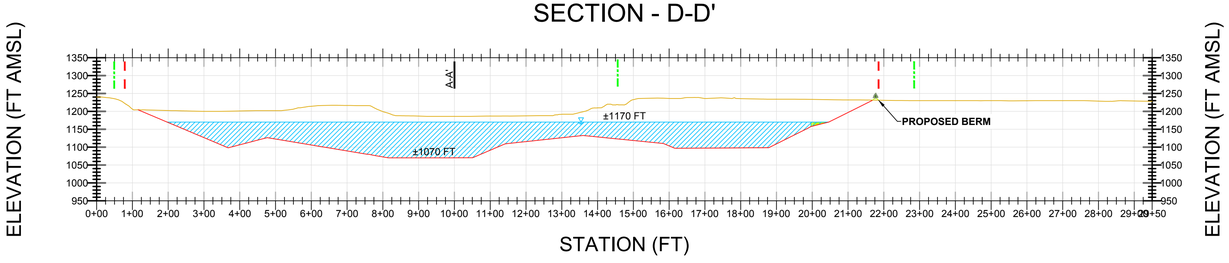
SECTION - B-B'



SECTION - C-C'



SECTION - D-D'



LEGEND

- EXISTING GRADE
- RECLAMATION GRADE
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- WATER LEVEL ±1170'
- BELOW WATER SHELF-LAKE ACCESS

HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 200'
SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
12/22/17	1	ADDED SECTION D-D' WITH TERRACE INCLUDED
10/22/20	2	REVISED SECTION A-A' ON 10/22/20
	3	
	4	
	5	
	6	

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PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

RECLAMATION SECTIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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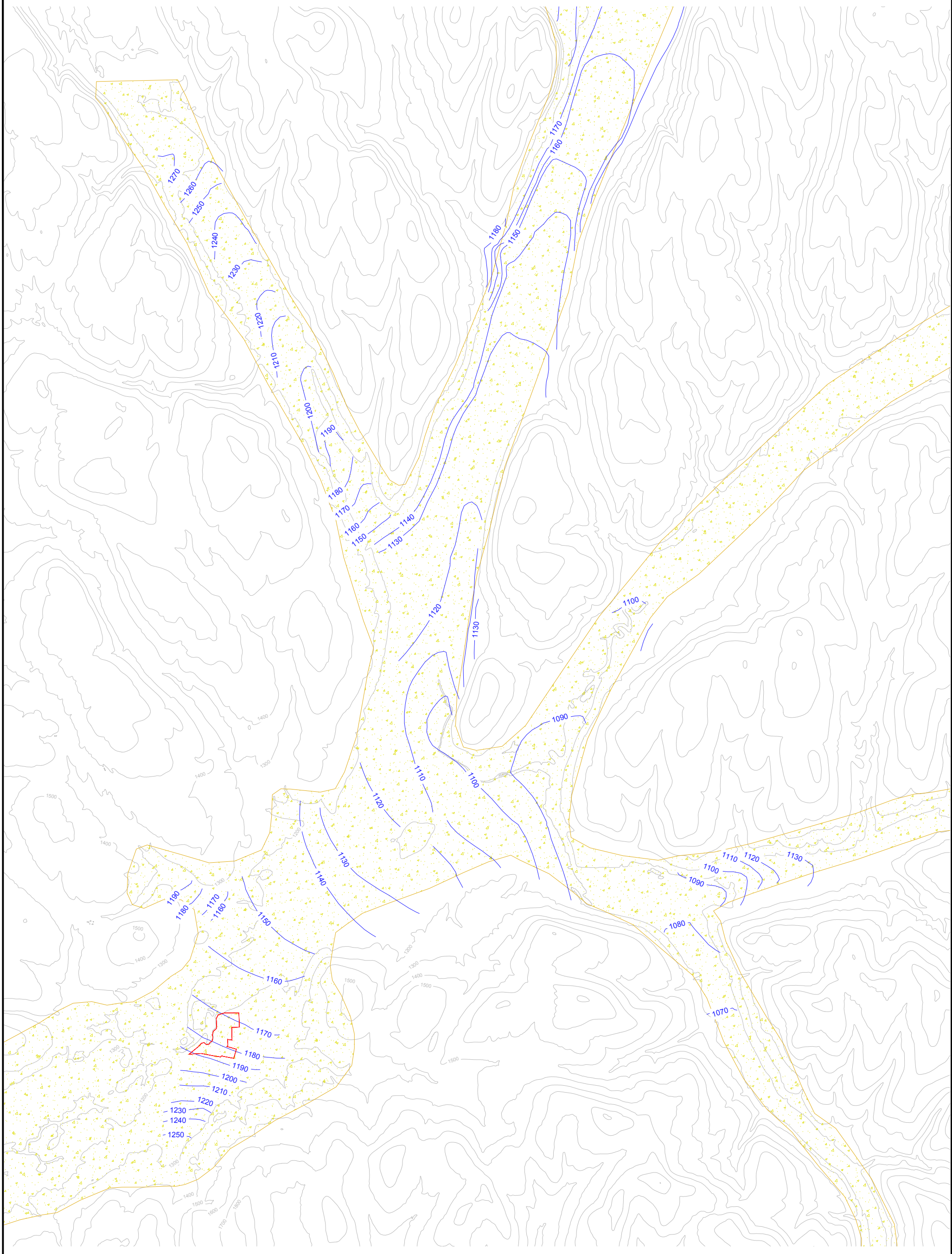
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 1.C

SHEET 2 OF 2



DATE	REVISIONS RECORD/DESCRIPTION
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SCALE :	
DATE :	10-12-2023

AQUIFER BOUNDARY WITH REGIONAL GROUNDWATER CONTOURS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
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FIGURE 2.1.A

SHEET 1 OF 1

LIME HOLLOW ROAD

LIME-HOLLOW
PUMPING WELL #2
USGS #432, C-104

LIME-HOLLOW
PUMPING WELL #7
USGS #320, 89-1

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROJECTED MINE POND BOUNDARY
- WPA - GFLOW WORST CASE SCENARIO
- TOWN WELL
- GROUNDWATER FLOW DIRECTION DIVIDE

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
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	6

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SCALE :	1"=300'
DATE :	10-12-2023

TOWN WELL WELLHEAD PROTECTION AREA

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
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FIGURE 2.1.B

SHEET 1 OF 1

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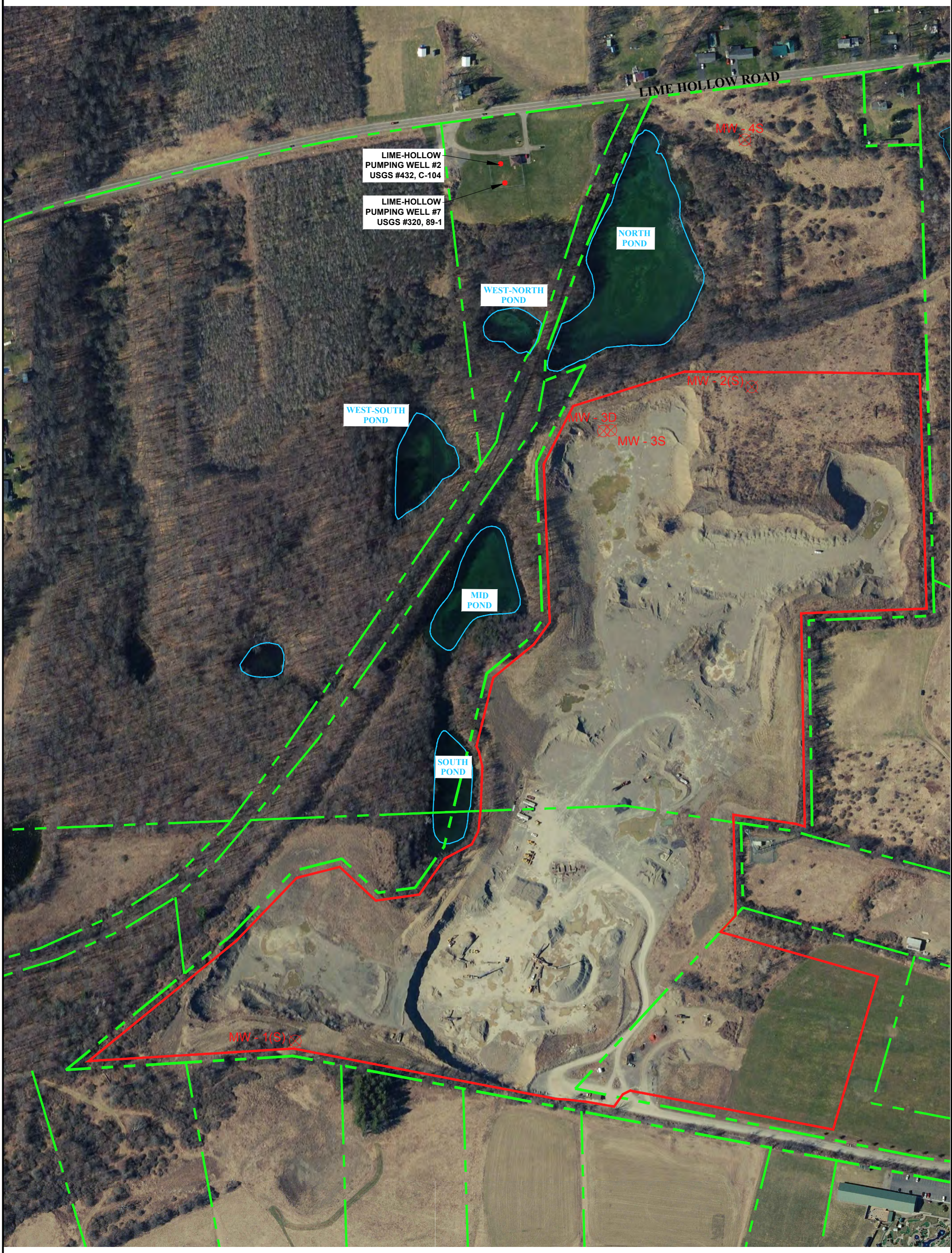

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MARL PONDS
- MONITORING WELL
- TOWN WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
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	6

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SCALE :	1"=300'
DATE :	10-12-2023

DATA COLLECTION & MONITORING LOCATIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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FIGURE 2.1.C

SHEET 1 OF 1

LIME-HOLLOW
PUMPING WELL #2
USGS #432, C-104

LIME-HOLLOW
PUMPING WELL #7
USGS #320, 89-1

MW - 4S
MW - 2(S)
MW - 3D
MW - 3S
MW - 1(S)

LEGEND

- BEDROCK SURFACE CONTOUR
- TOPOGRAPHIC CONTOUR
- LIFE OF MINE BOUNDARY
- MARL POND BOUNDARY
- GROUNDWATER FLOW DIRECTION DIVIDE
- MONITORING WELL
- TOWN WELL

N

SCALE IN FEET

0 1250 2500 5000

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
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DATE :	10-12-2023

CORTLANDVILLE, NY BEDROCK GEOMETRY

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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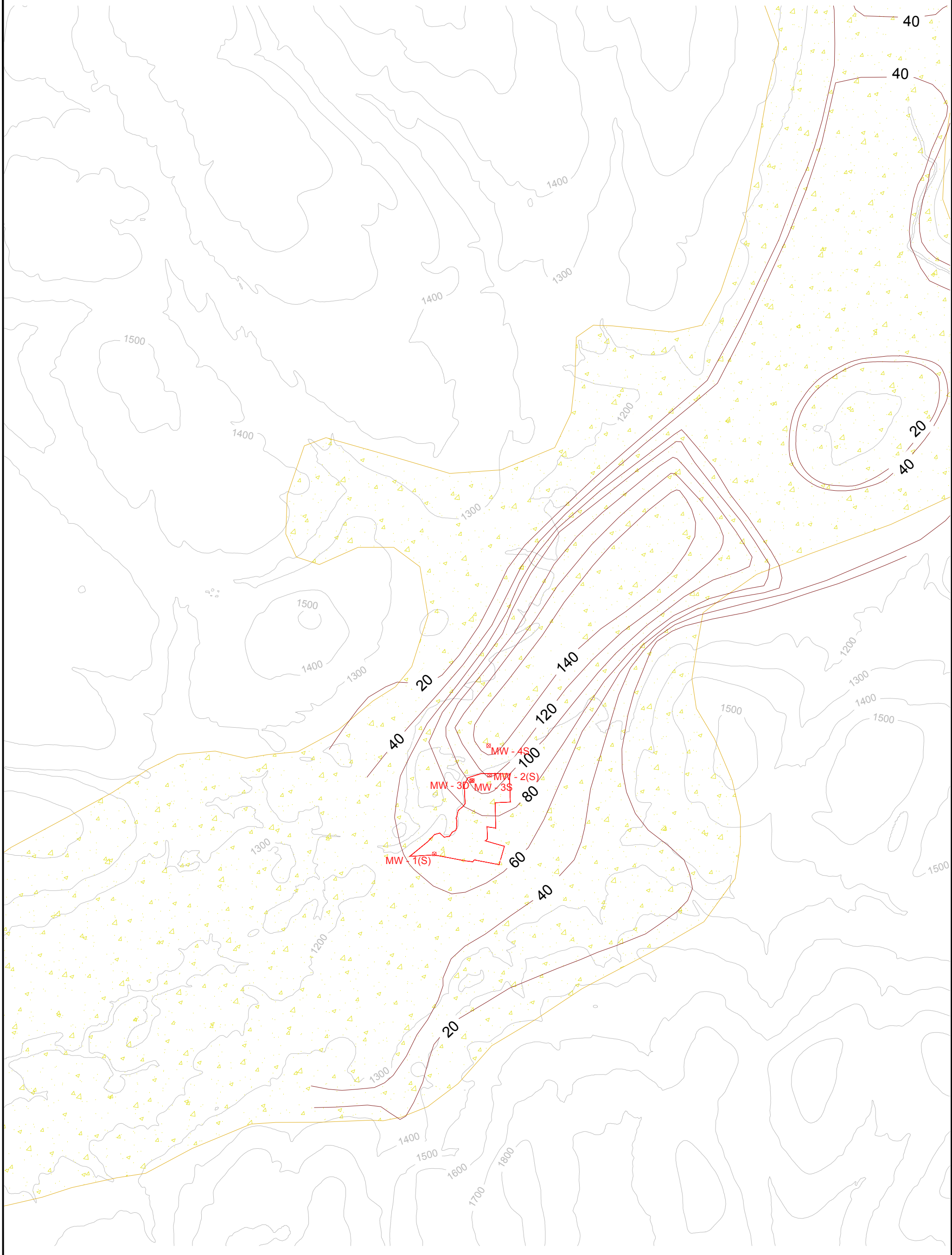
FIGURE 2.1.E

SHEET 1 OF 1

M:\Cortland S&G\Projects\2023 Environmental Impact Study_DEIS\Figures\CAD\2023-10-12 Cortlandville DEIS Environmental Study_Fig 2.1A.dwg, 10/23/2023 2:56:50 PM, DWG To PDF.pc3



LEGEND

- SOLE SOURCE AQUIFER
- AQUIFER THICKNESS CONTOUR
- TOPOGRAPHIC CONTOUR
- LIFE OF MINE BOUNDARY
- MONITORING WELLS

N

SCALE IN FEET

0 1250 2500 5000

DATE	REVISIONS RECORD/DESCRIPTION
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CORTLANDVILLE, NY AQUIFER THICKNESS GEOMETRY

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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FIGURE 2.1.F

SHEET 1 OF 1

M:\Cortland 58\GIS\Projects\2023 Environmental Impact Study_DEIS\Figures\CAD\2023-10-12 Cortlandville DEIS Environmental Study_Fig 2.1A.dwg, 10/23/2023 11:52:57 AM, DWG To PDF.pc3

LIME HOLLOW ROAD

6.8 ACRES

LIME-HOLLOW
PUMPING WELL #2
USGS #432, C-104

LIME-HOLLOW
PUMPING WELL #7
USGS #320, 89-1

MW - 4S

MW - 2(S)

MW - 3D

MW - 3S

MW - 1(S)

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MONITORING WELL
- TOWN WELL
- MEAN GROUNDWATER FLOW DIRECTION
- PARTICLE TRACKING USING ONSITE WELLS
- PARTICLE TRACKING USING TOWN & ONSITE WELLS
- MARL PONDS

N

SCALE IN FEET

0 150 300 600

DATE	REVISIONS RECORD/DESCRIPTION
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SCALE :	1"=300'
DATE :	10-12-2023

PARTICLE TRACKING ANALYSIS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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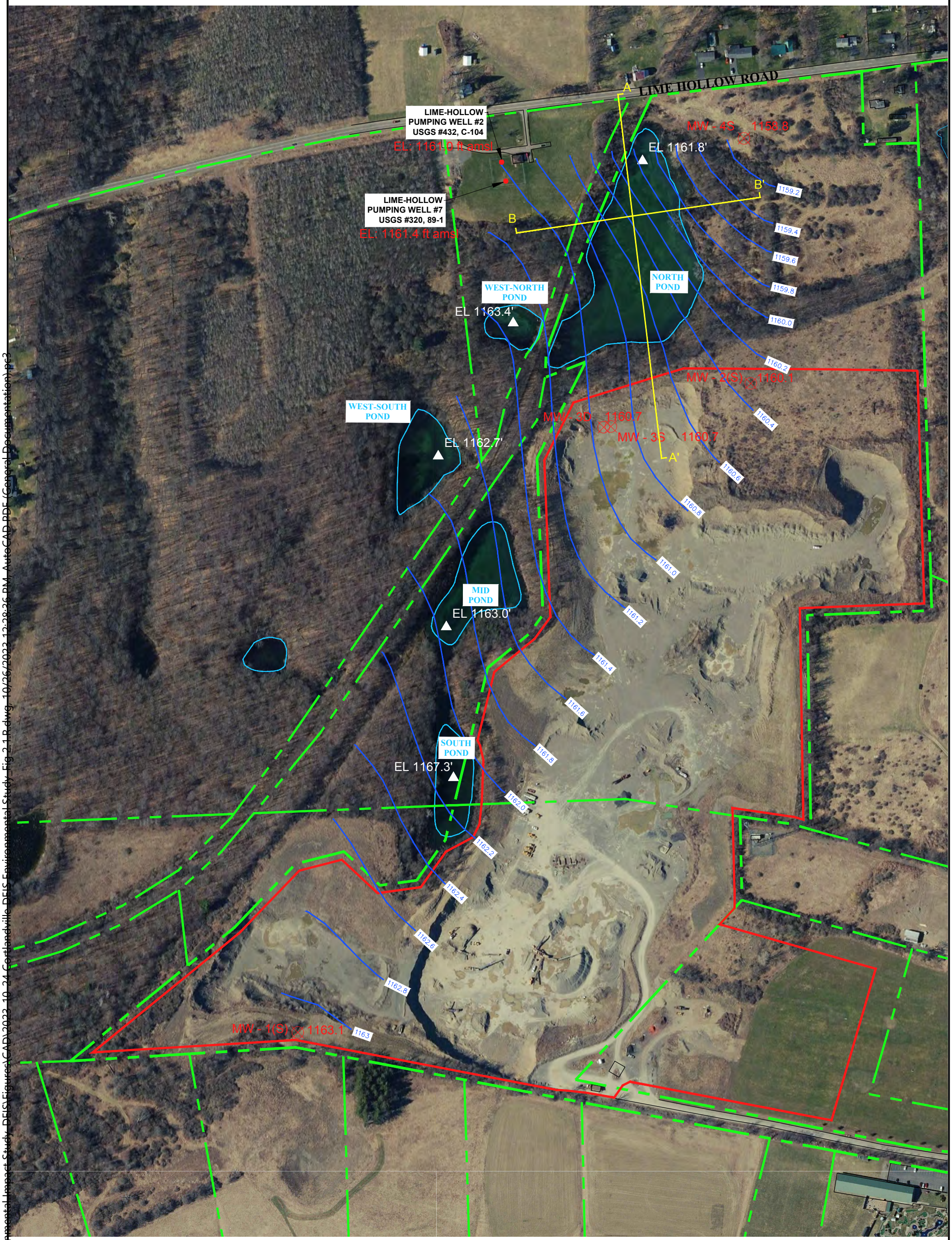
FIGURE 2.1.G

SHEET 1 OF 1



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DATE :	10-12-2023

CURRENT CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL LOW

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 2.1.R.a

SHEET 01 OF 02

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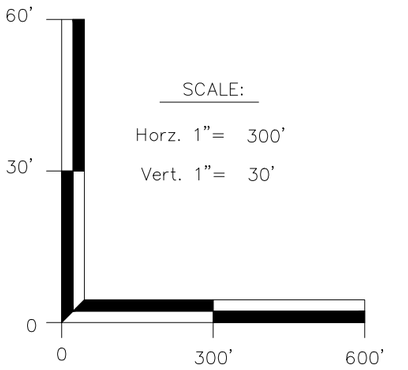
M:\Cortland S&G\Projects\2023 Environmental Impact Study_DEIS\Figures\CAD\2023-10-24 Cortlandville DEIS Environmental Study_Fig 2.1.R SECTIONS.dwg, 10/26/2023 12:30:24 PM, AutoCAD



SCALE:

Horz. 1"= 300'

Vert. 1"= 30'

LEGEND

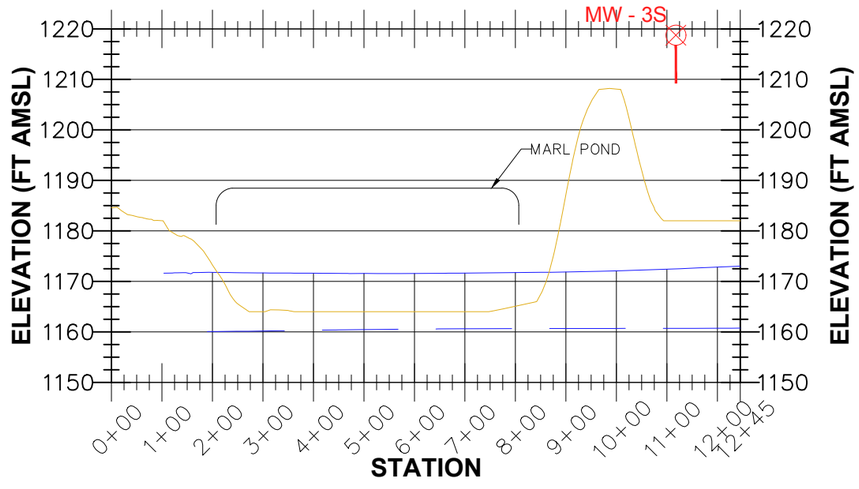
EXISTING GRADE

HIGH GROUNDWATER CONTOURS

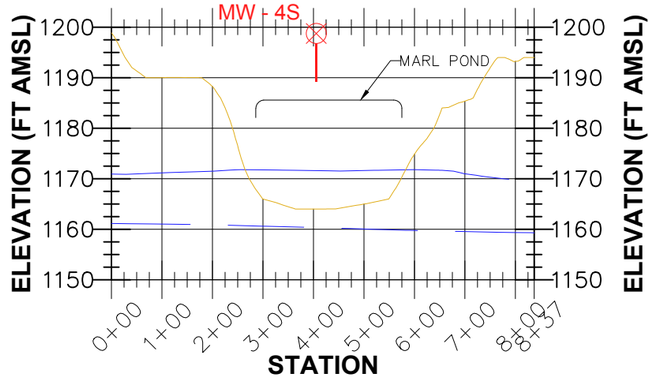
LOW GROUNDWATER CONTOURS

NAME GROUNDWATER MONITORING WELL

SECTION A-A' CURRENT



SECTIONS B-B' CURRENT



DATE	REVISIONS RECORD/DESCRIPTION
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DESIGN BY :	SAS
CHECK BY :	RAH
PROJ. NO :	360.00
SCALE :	1"=300'
DATE :	10-12-2023

CURRENT CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST.
TROY, NY 12180
(518) 270-1620
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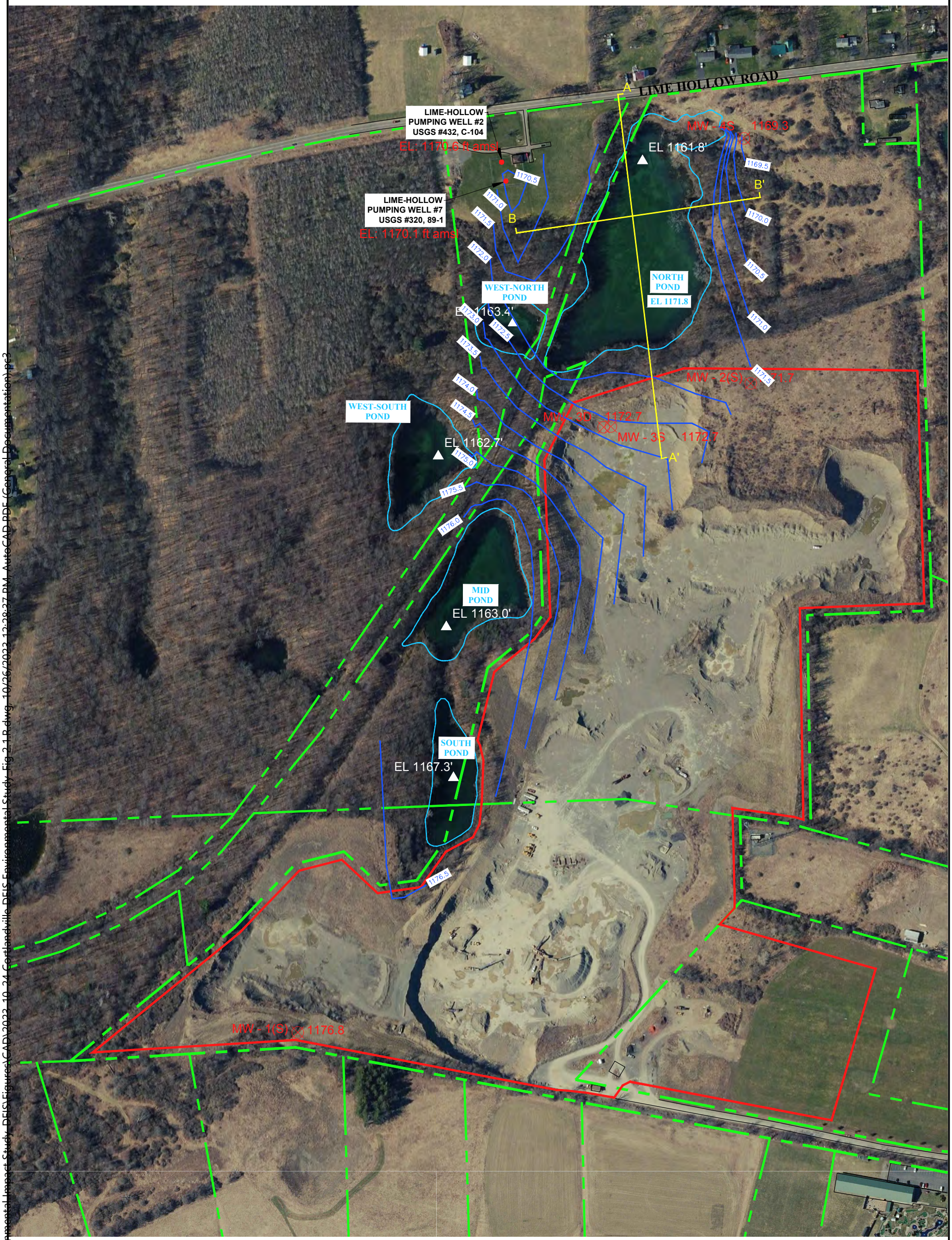
FIGURE 2.1.R.a

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
	5
	6

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DESIGN BY :	SAS
CHECK BY :	RAH
PROJ. NO :	360.00
SCALE :	1"=300'
DATE :	10-12-2023

CURRENT CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
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FIGURE 2.1.R.b

SHEET 01 OF 02

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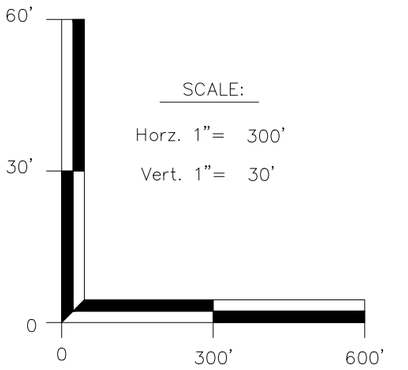


SCALE:

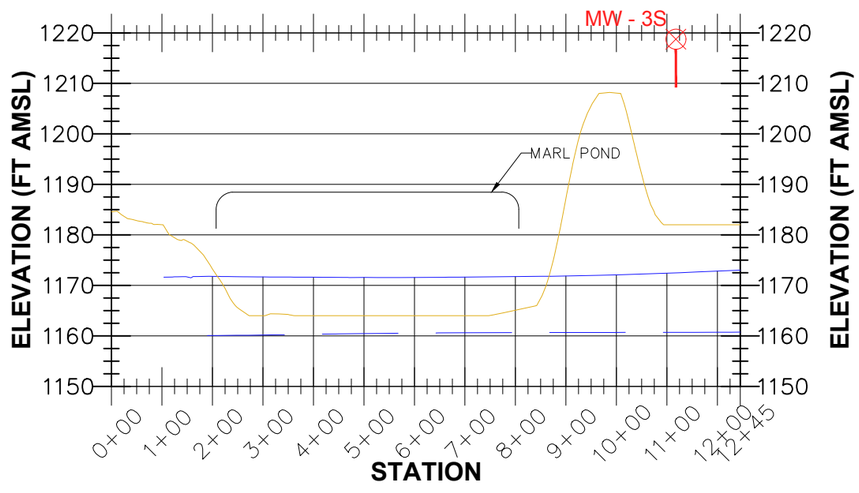
Horz. 1"= 300'

Vert. 1"= 30'

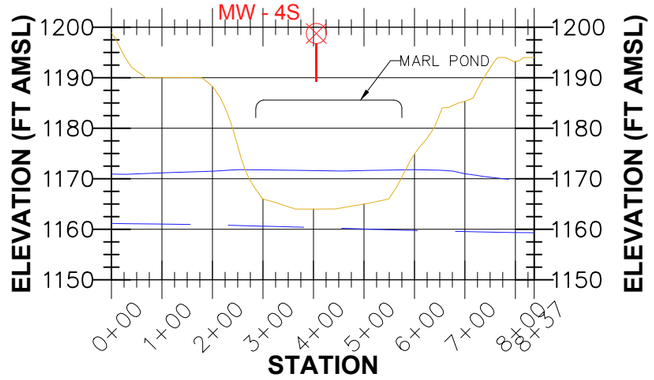
LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

SECTION A-A' CURRENT



SECTIONS B-B' CURRENT



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DATE :	10-12-2023

CURRENT CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
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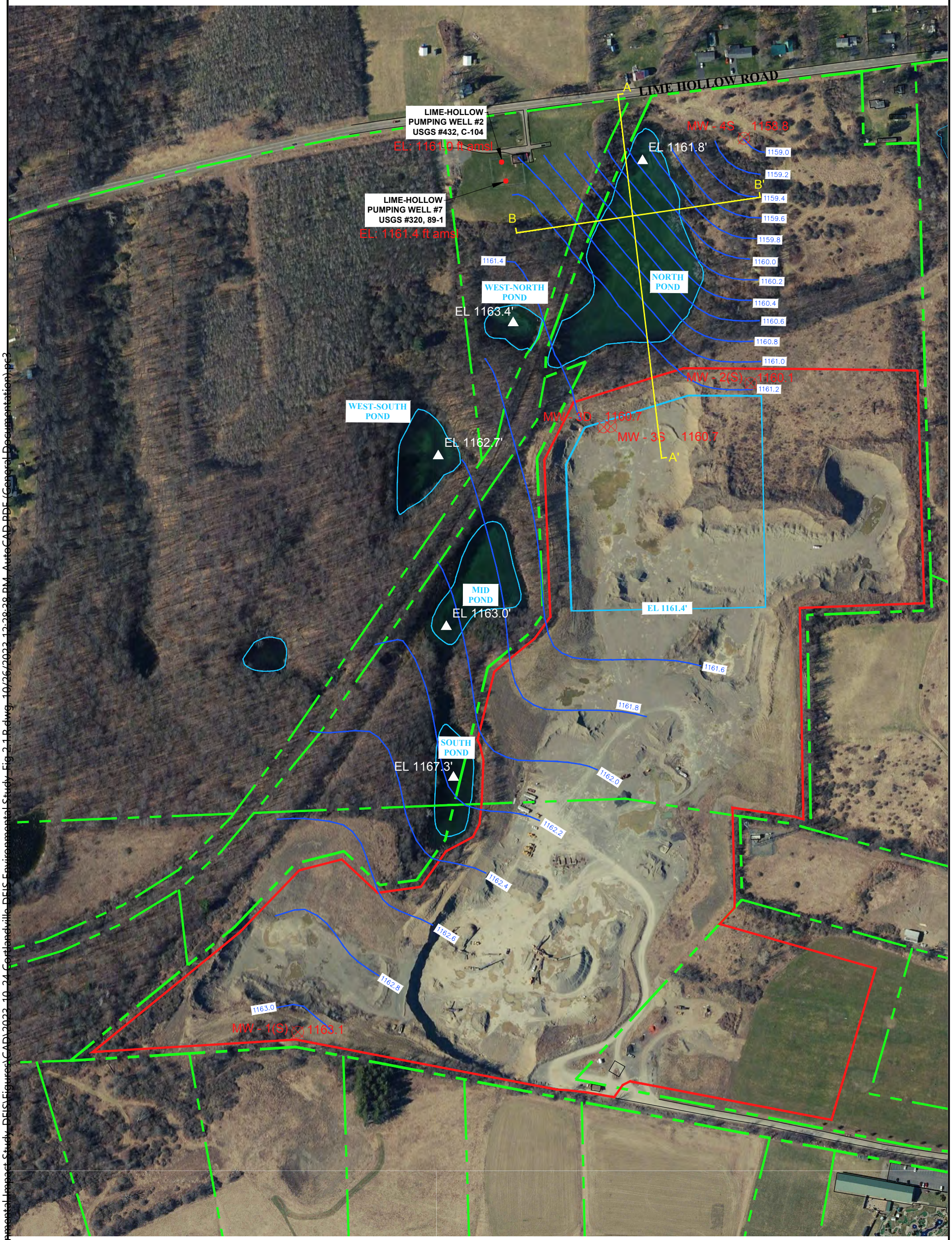
FIGURE 2.1.R.b

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

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PHASE 1 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL LOW

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FIGURE 2.1.R.c

SHEET 01 OF 02

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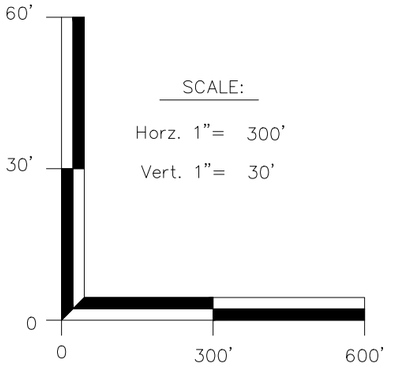

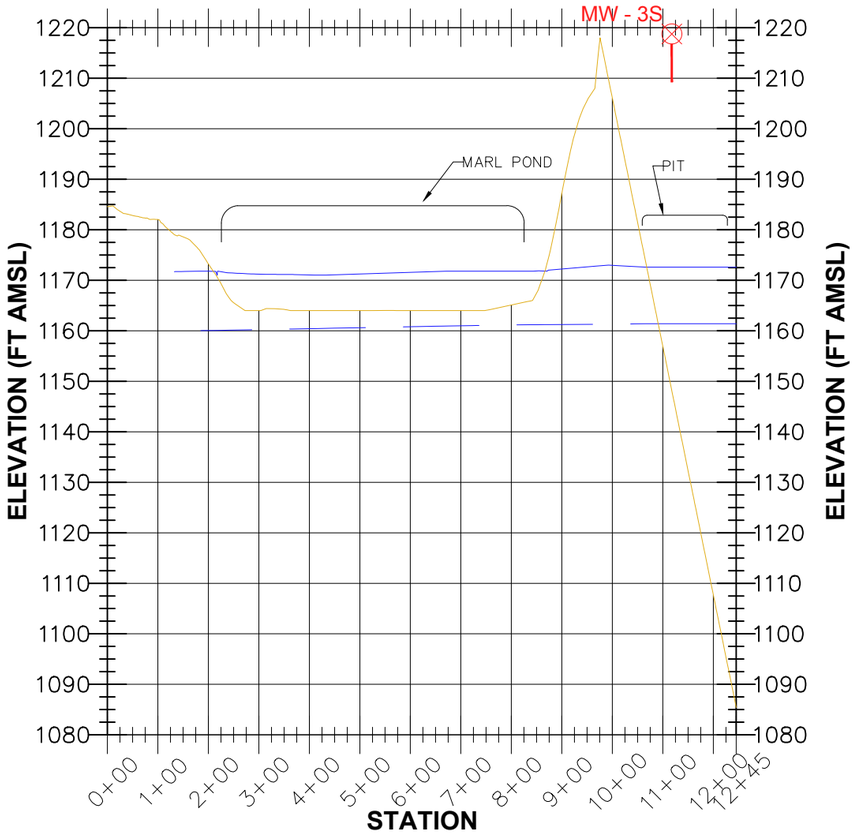

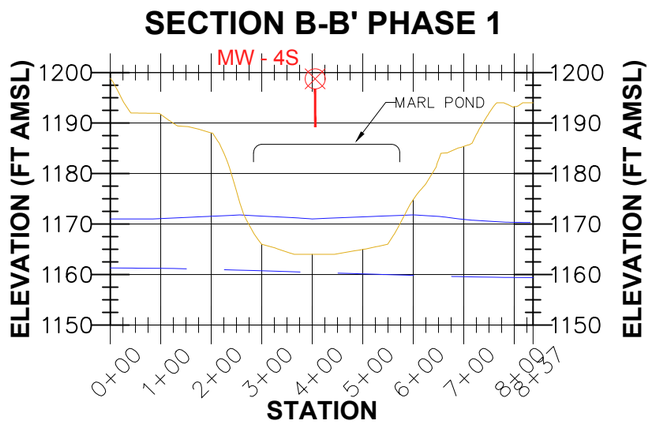

LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

DATE	REVISIONS RECORD/DESCRIPTION
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PHASE 1 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

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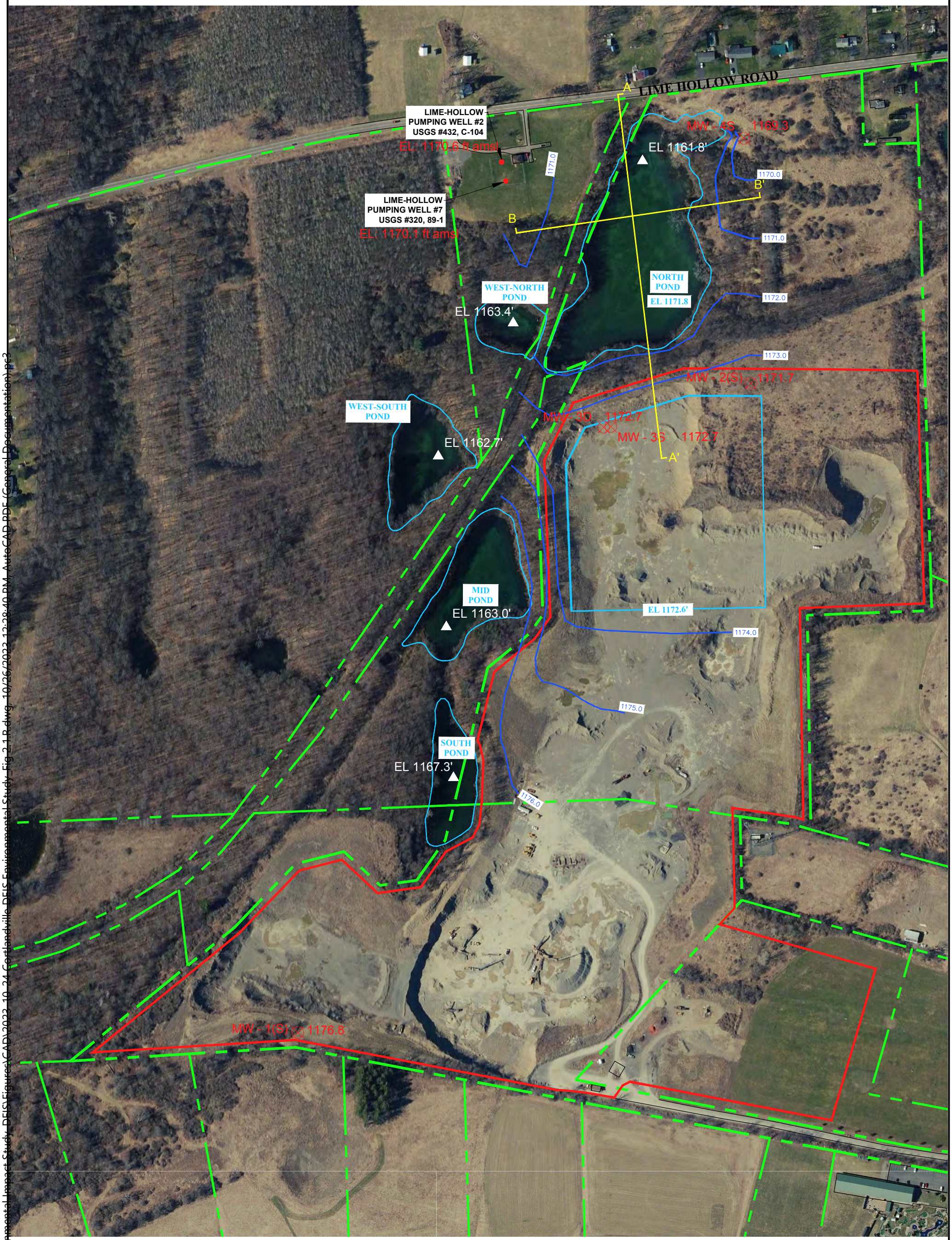
FIGURE 2.1.R.c

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

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PHASE 1 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH

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FIGURE 2.1.R.d

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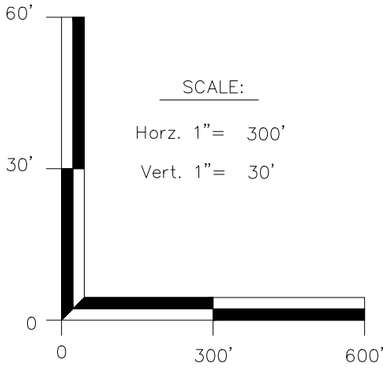
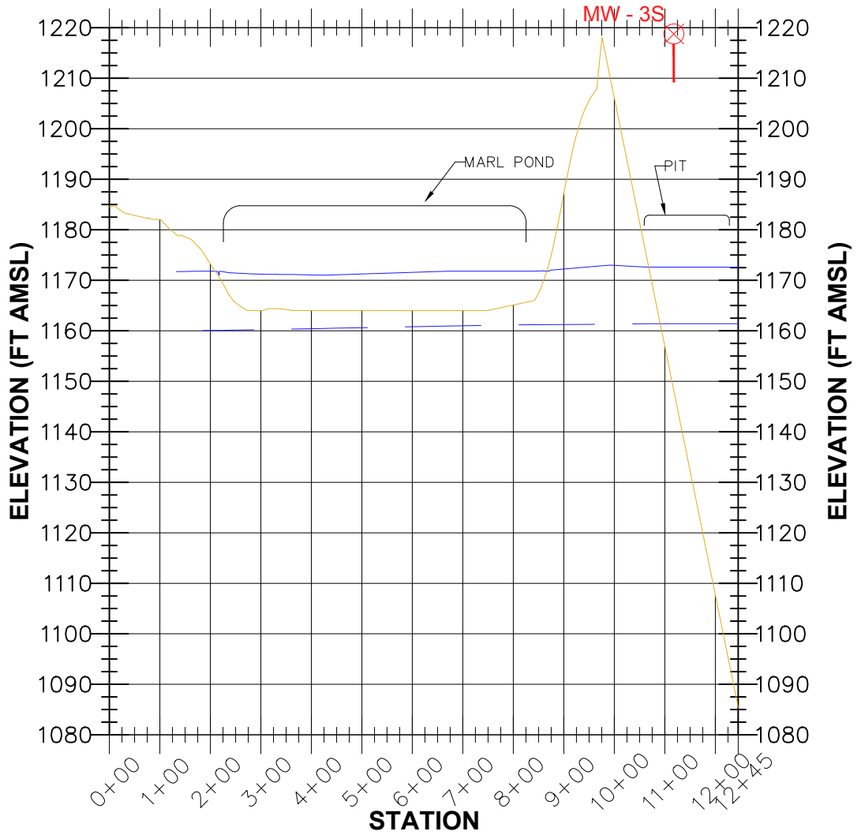


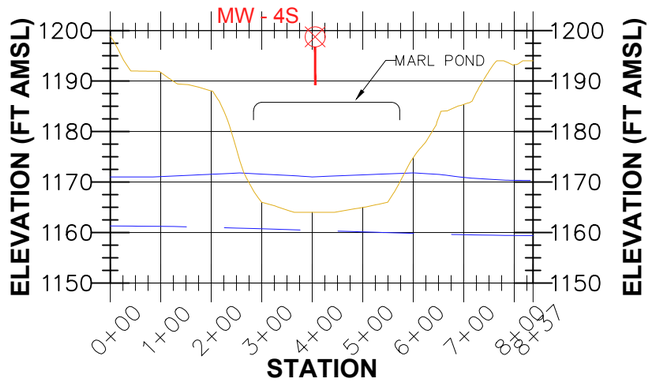
LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

SECTION A-A' PHASE 1



SECTION B-B' PHASE 1



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PHASE 1 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

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FIGURE 2.1.R.d

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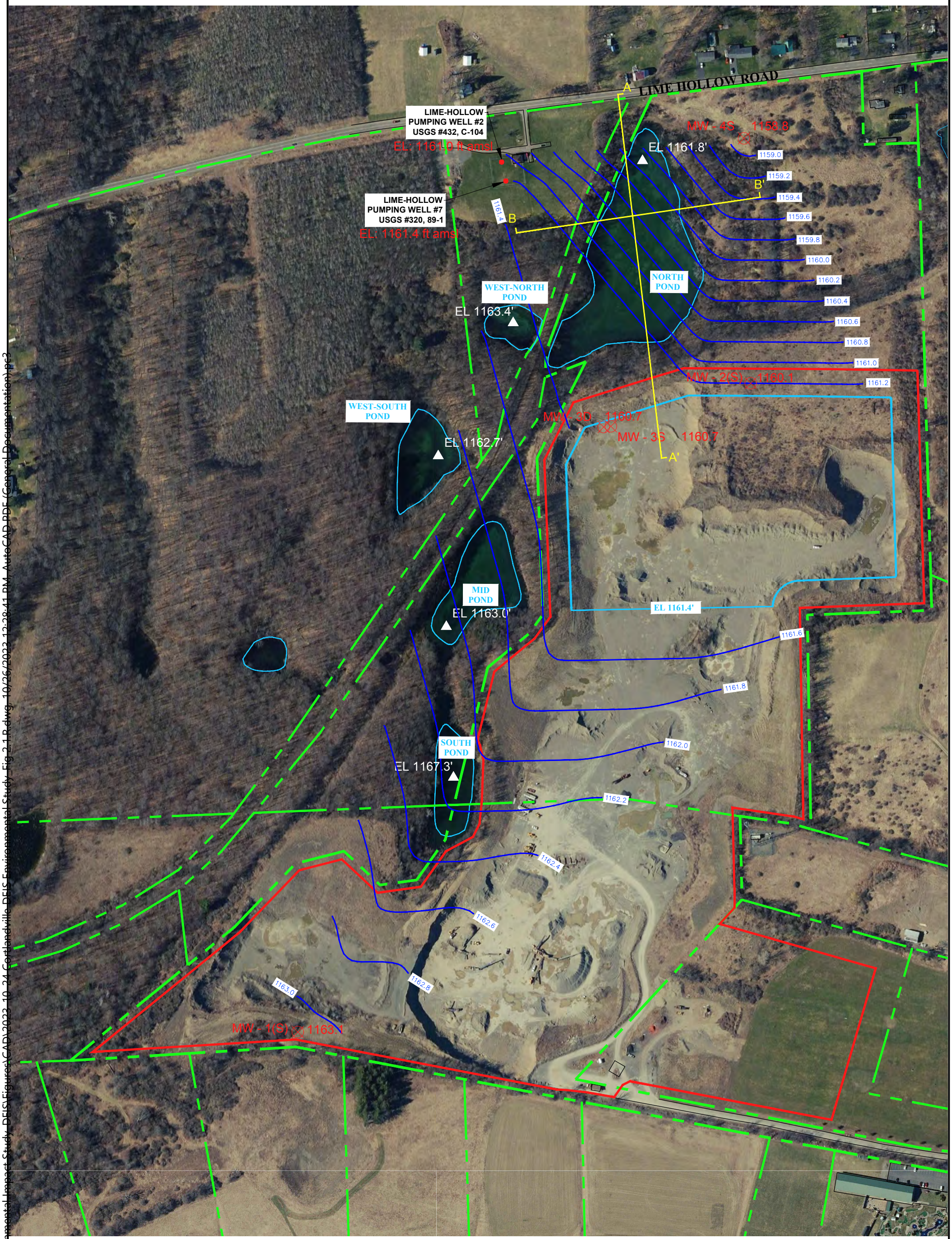

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
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PHASE 2 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL LOW

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FIGURE 2.1.R.e

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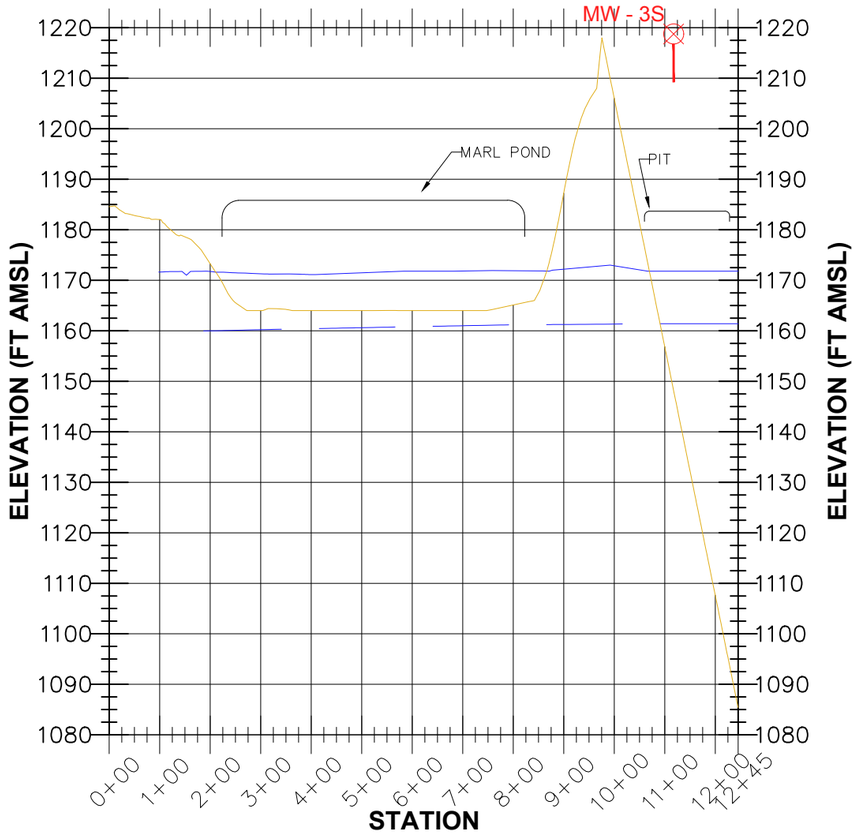
SECTION A-A' PHASE 2



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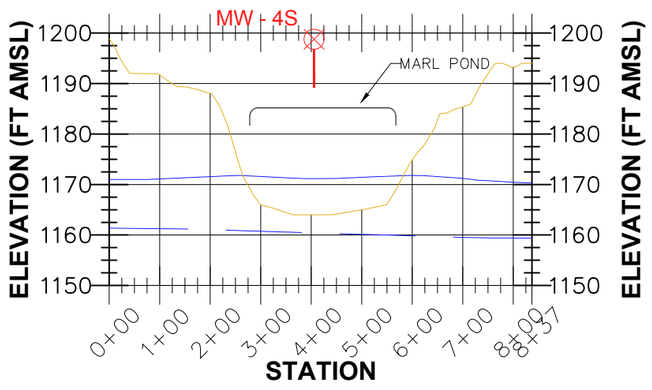

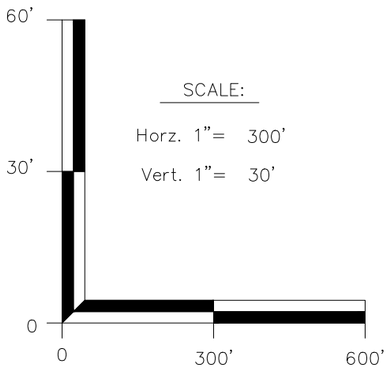

SCALE:

Horz. 1"= 300'

Vert. 1"= 30'

LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

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PHASE 2 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

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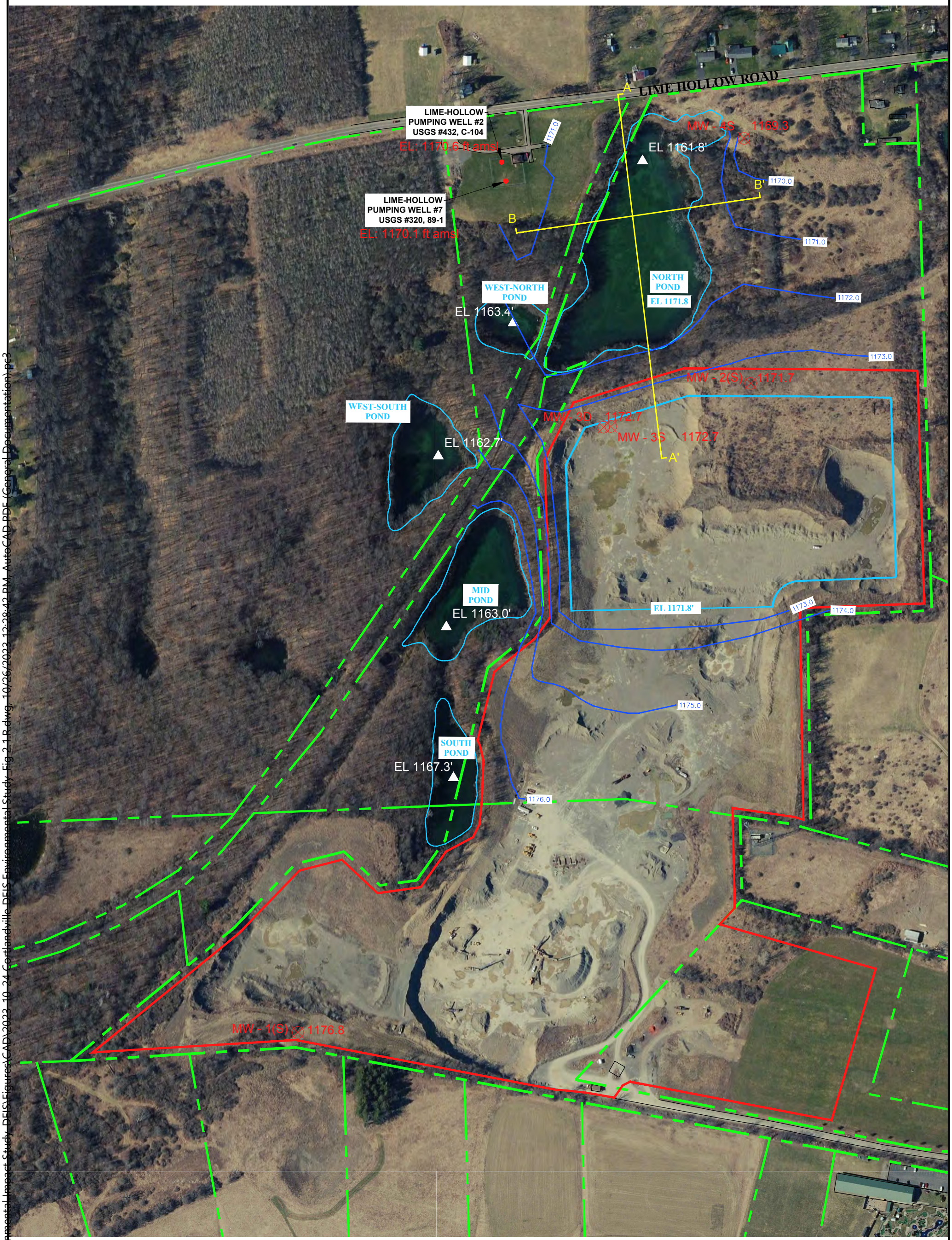
FIGURE 2.1.R.e

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

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PHASE 2 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH

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FIGURE 2.1.R.f

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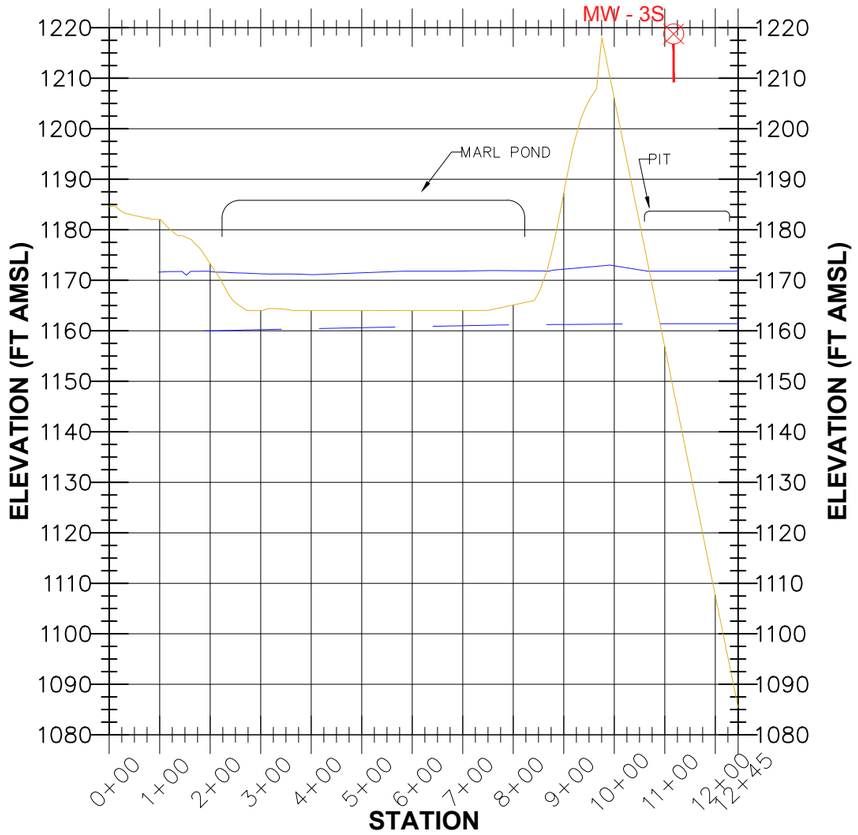
SECTION A-A' PHASE 2



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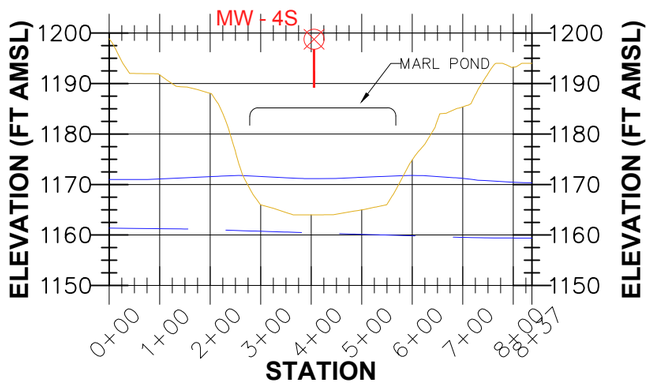

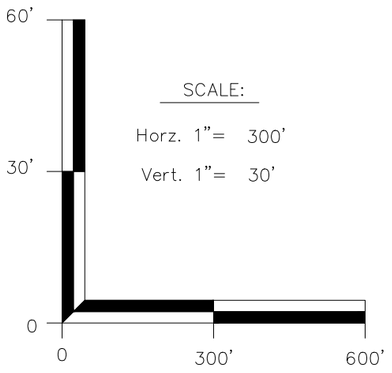

SCALE:

Horz. 1"= 300'

Vert. 1"= 30'

LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

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PHASE 2 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

CORTLANDVILLE SAND & GRAVEL

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FIGURE 2.1.R.f

SHEET 02 OF 02

LIME HOLLOW ROAD

LIME-HOLLOW PUMPING WELL #2
USGS #432, C-104
EL: 1161.0 ft amsl

LIME-HOLLOW PUMPING WELL #7
USGS #320, 89-1
EL: 1161.4 ft amsl

MW - 4S 1158.8

EL 1161.8'

A

A'

B

B'

NORTH POND

WEST-NORTH POND
EL 1163.4'

WEST-SOUTH POND
EL 1162.7'

MID POND
EL 1163.0'

SOUTH POND
EL 1167.3'

MW - 2(S) 1160.1

MW - 3D 1160.7

MW - 3S 1160.7

MW - 1(S) 1163.1

EL 1161.4'

1159.0
1159.2
1159.4
1159.6
1159.8
1160.0
1160.2
1160.4
1160.6
1160.8
1161.0
1161.2
1161.6
1161.8
1162.0
1162.2
1162.4
1162.6
1162.8
1163.0

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
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PHASE 3 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL LOW

CORTLANDVILLE SAND & GRAVEL

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FIGURE 2.1.R.g

SHEET 01 OF 02

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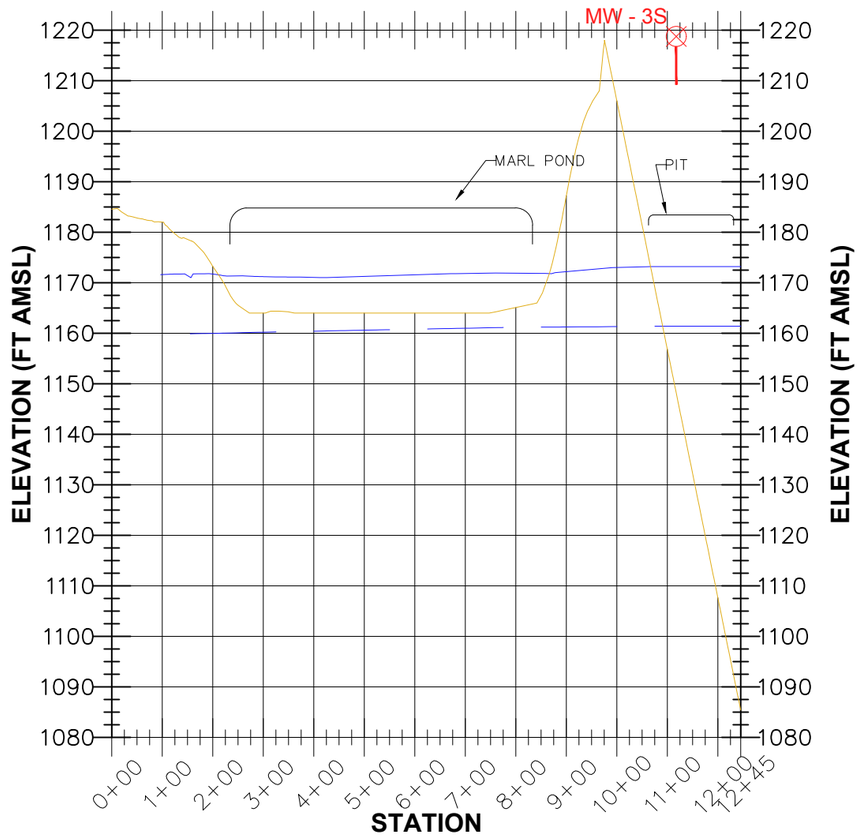
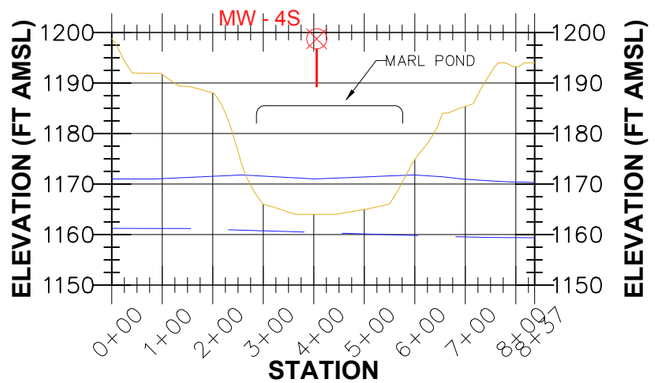
SECTION A-A' PHASE 3



SECTION B-B' PHASE 3



LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME — GROUNDWATER MONITORING WELL

DATE	REVISIONS RECORD/DESCRIPTION
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PHASE 3 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

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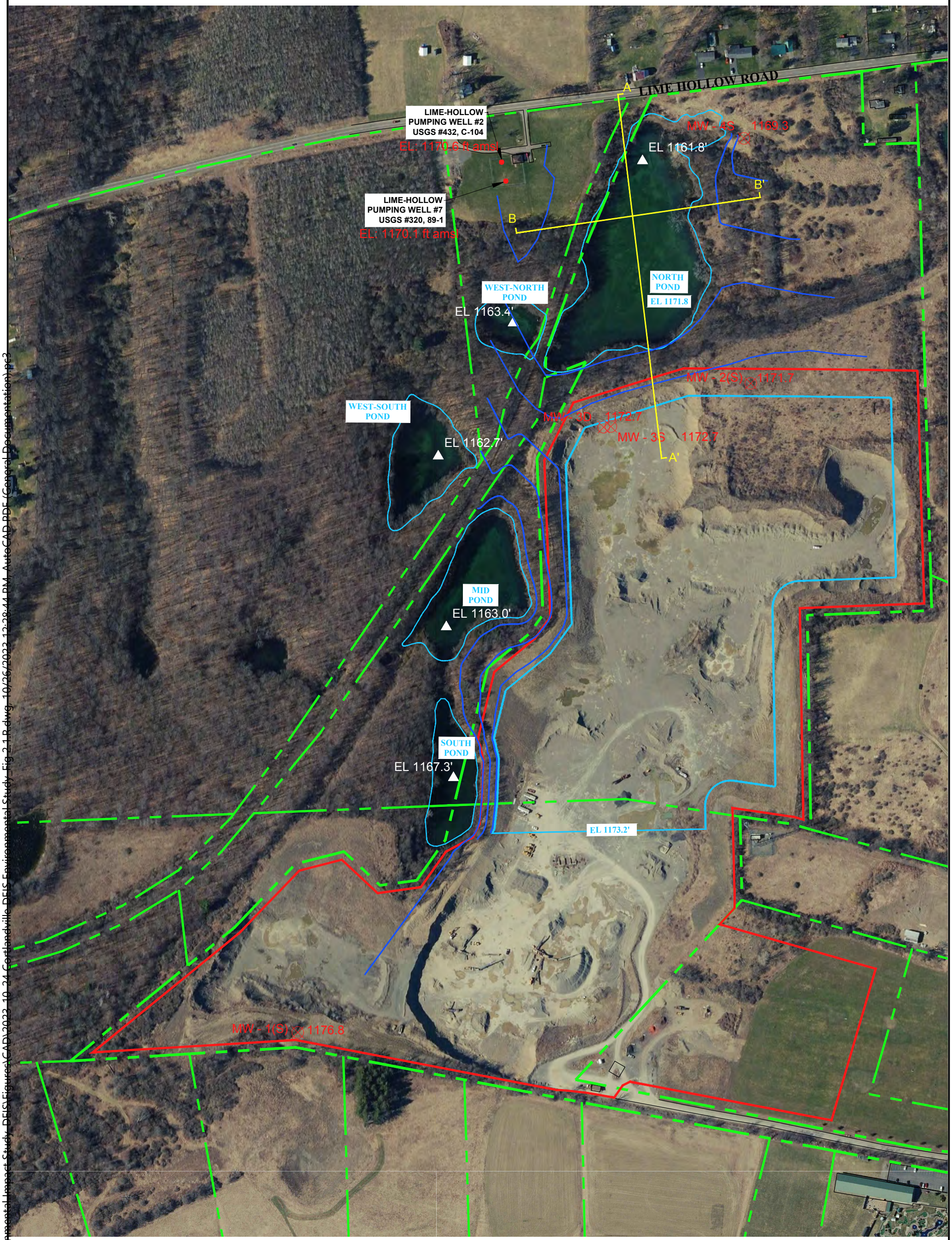
FIGURE 2.1.R.g

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

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PHASE 3 CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH

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FIGURE 2.1.R.h

SHEET 01 OF 02

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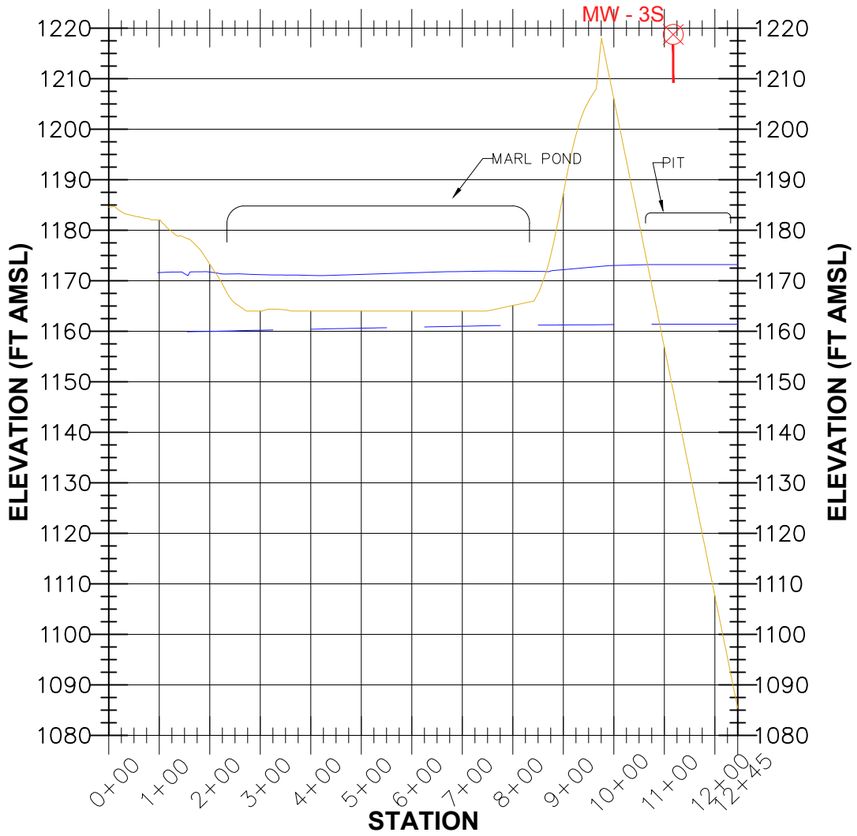
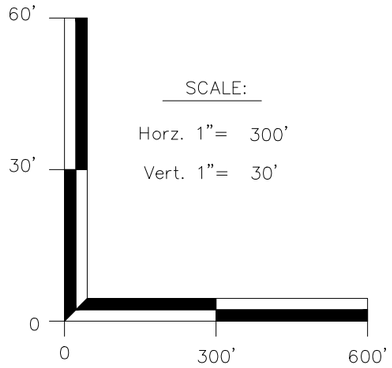
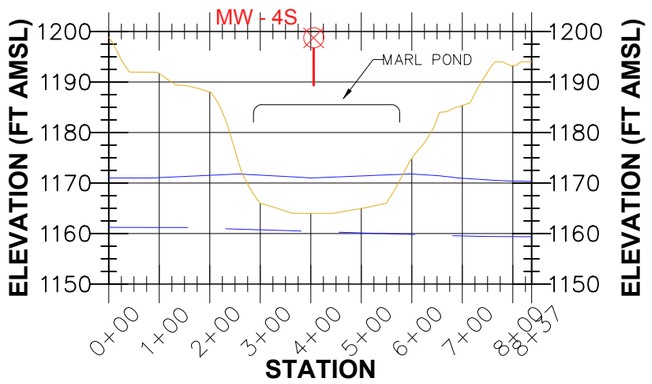
SECTION A-A' PHASE 3





SECTION B-B' PHASE 3



LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME — GROUNDWATER MONITORING WELL

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
	5
	6

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DESIGN BY :	SAS
CHECK BY :	RAH
PROJ. NO :	360.00
SCALE :	1"=300'
DATE :	10-12-2023

PHASE 3 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

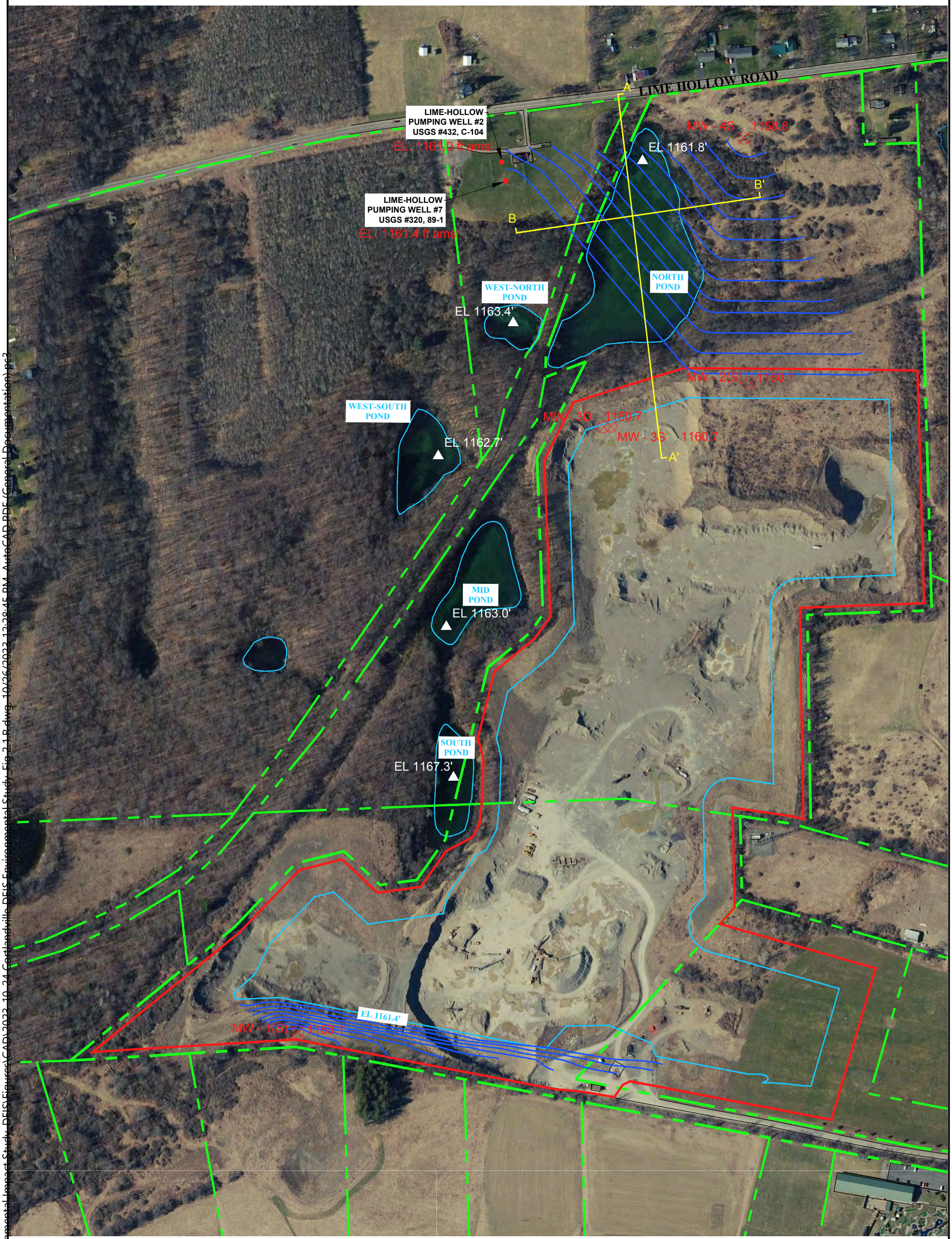
CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST.
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 2.1.R.h

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
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	6

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FINAL CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL LOW

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FIGURE 2.1.R.i

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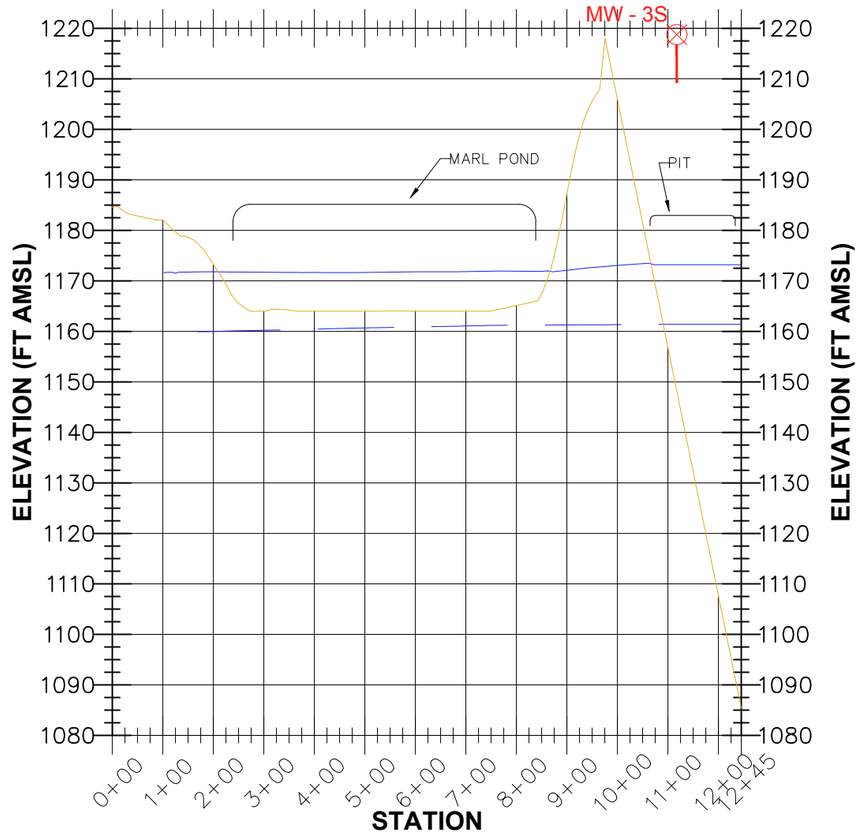
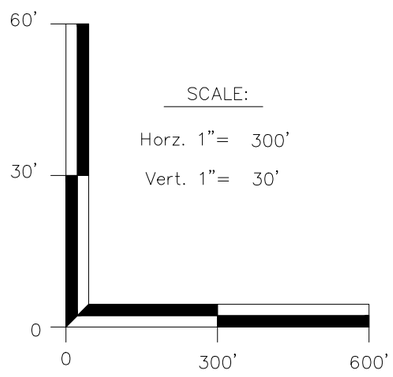
SECTION A-A' PHASE 4





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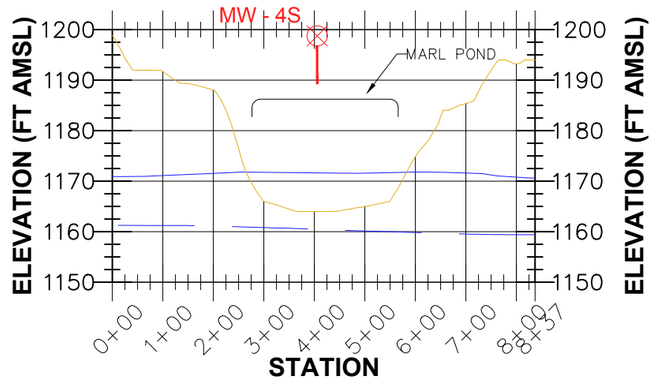

LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME — GROUNDWATER MONITORING WELL

DATE	REVISIONS RECORD/DESCRIPTION
	1
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SCALE :	1"=300'
DATE :	10-12-2023

PHASE 4 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

CORTLANDVILLE SAND & GRAVEL

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FIGURE 2.1.R.i

SHEET 02 OF 02

LIME HOLLOW ROAD

LIME-HOLLOW PUMPING WELL #2
USGS #432, C-104
EL: 1170.6 ft amsl

LIME-HOLLOW PUMPING WELL #7
USGS #320, 89-1
EL: 1170.1 ft amsl

A
A'
B
B'

MW - 4S 1169.3
EL 1161.8'

NORTH POND
EL 1171.8

WEST-NORTH POND
EL 1163.4'

MW - 2(S) 1171.7
MW - 3D 1172.7
MW - 3S 1172.7

WEST-SOUTH POND
EL 1162.7'

MID POND
EL 1163.0'

SOUTH POND
EL 1167.3'

EL 1173.2'
MW - 1(S) 1176.8

LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SURFACE WATER FEATURE
- GROUNDWATER CONTOUR
- CROSS SECTION
- TOWN WELL
- NAME GROUNDWATER ELEVATION (FT AMSL) GROUNDWATER MONITORING WELL

SCALE IN FEET

0 150 300 600

N

DATE	REVISIONS RECORD/DESCRIPTION
	1
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FINAL CONDITIONS WHEN WATER LEVELS ARE AT SEASONAL HIGH

CORTLANDVILLE SAND & GRAVEL

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FIGURE 2.1.R.j

SHEET 01 OF 02

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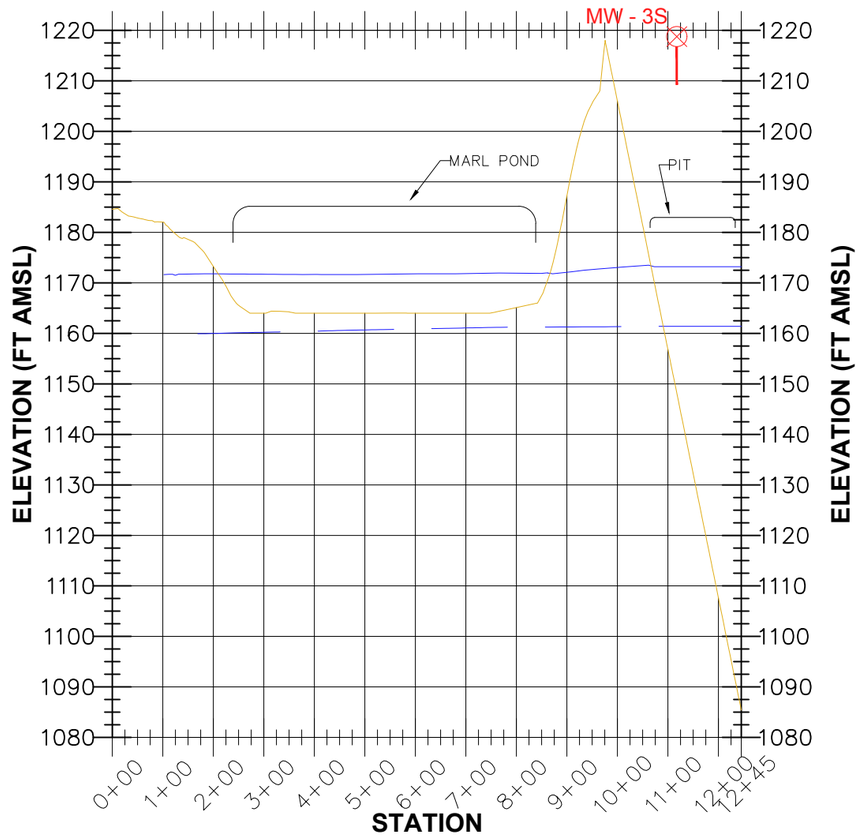
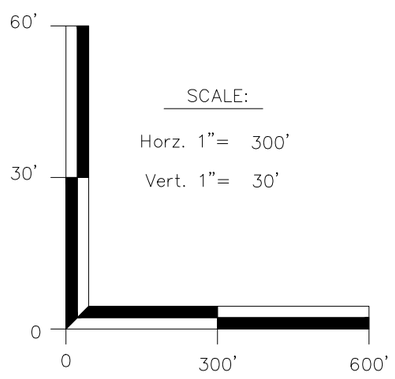
SECTION A-A' PHASE 4





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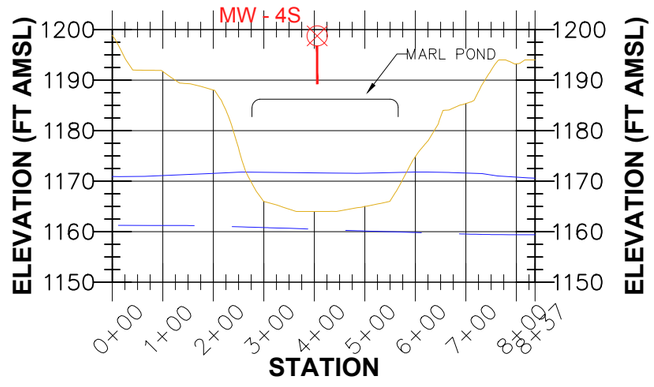

LEGEND

- EXISTING GRADE
- HIGH GROUNDWATER CONTOURS
- LOW GROUNDWATER CONTOURS
- NAME GROUNDWATER MONITORING WELL

DATE	REVISIONS RECORD/DESCRIPTION
	1
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PHASE 4 CONDITION WHEN WATER LEVELS ARE AT SEASONAL HIGH/LOW - SECTIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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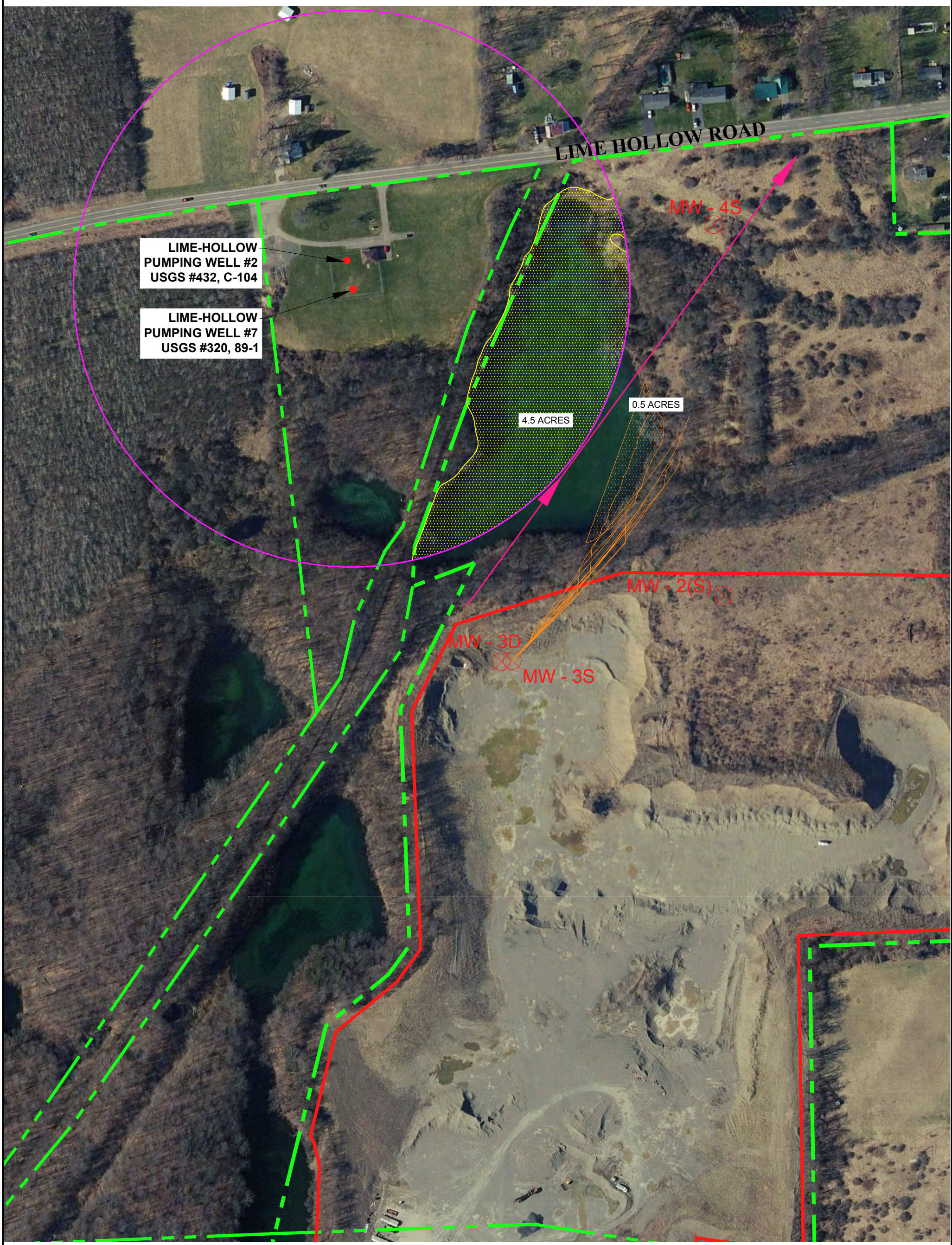
FIGURE 2.1.Rj

SHEET 02 OF 02



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MONITORING WELL
- TOWN WELL
- MEAN GROUNDWATER FLOW DIRECTION
- PARTICLE TRACKING USING ONSITE WELLS
- MAXIMUM RADIUS OF INFLUENCE

N

SCALE IN FEET

0 250 500 1000

DATE	REVISIONS RECORD/DESCRIPTION
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POTENTIAL FOR COMMINGLING IN NORTH MARL POND

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

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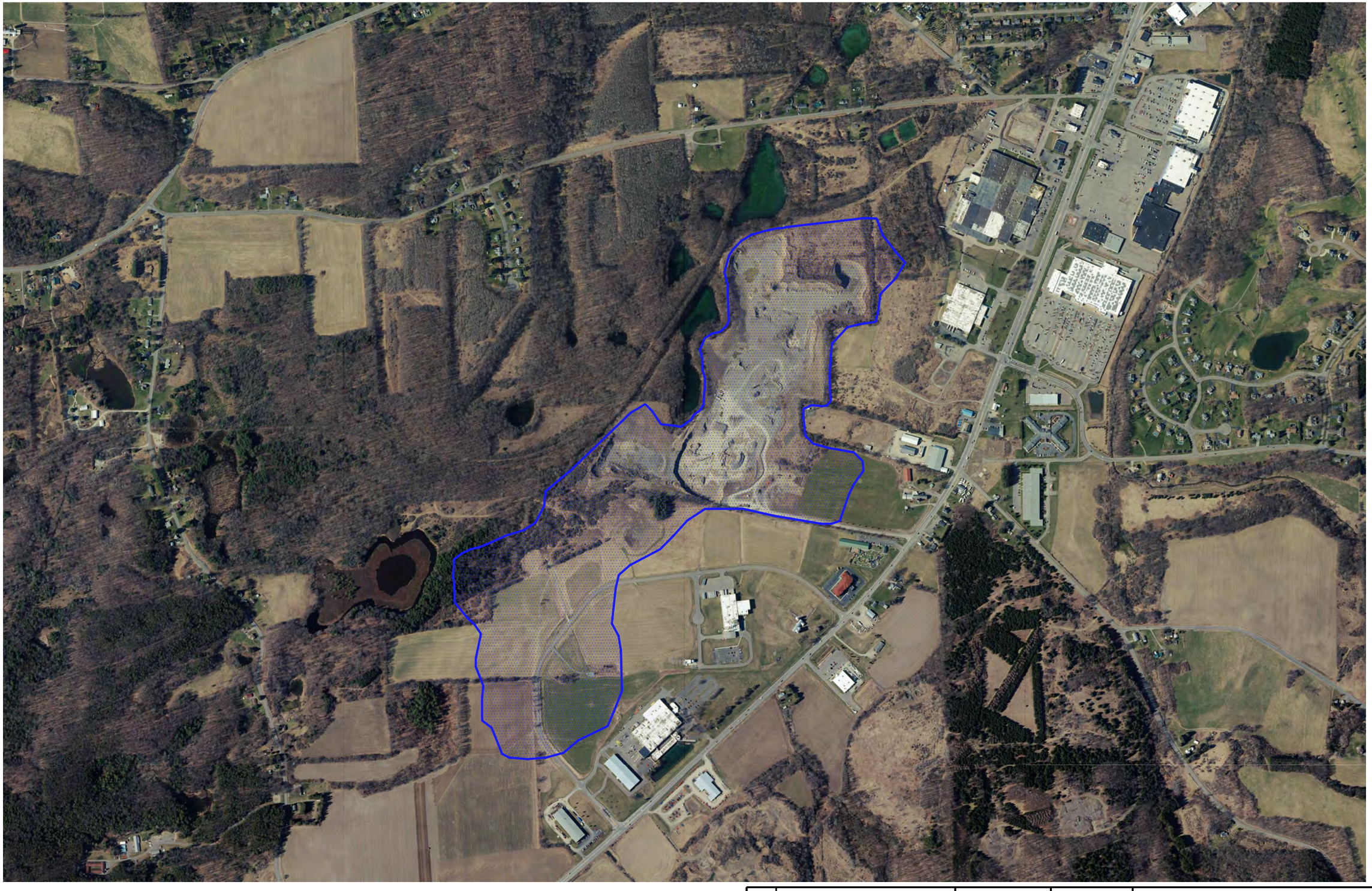
FIGURE 2.1.H

SHEET 1 OF 1



LEGEND

PROPOSED MINE POND WATERSHED

SCALE IN FEET

0 400 800 1600

N

DATE		REVISIONS RECORD/DESCRIPTION
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PROPOSED MINE POND WATERSHED

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
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TROY, NY 12180
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FIGURE 2.2.A

SHEET 1 OF 1

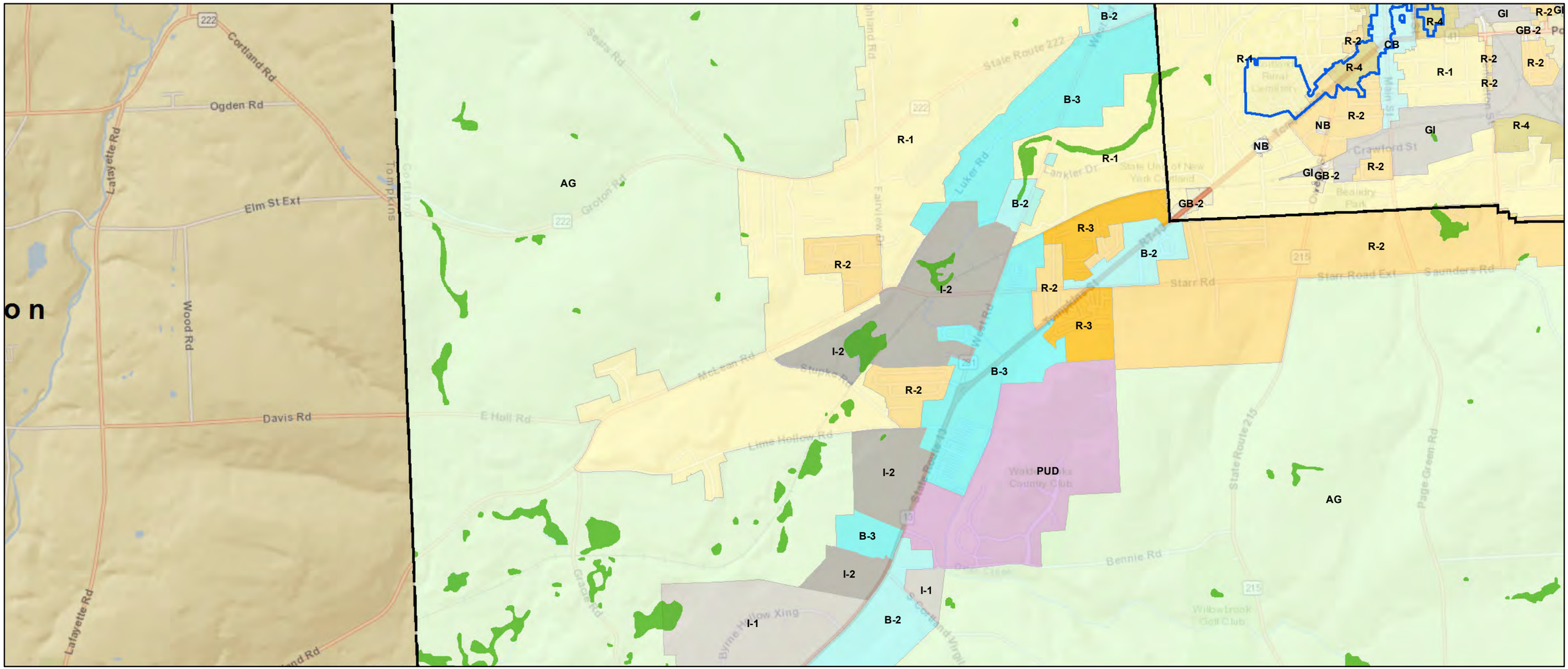
Figure 2.2.B: Zoning Map

Cortland County, NY

October 24, 2023

1 inch = 2219 Feet

0 2219 4438 6657



- USGS Town Line
- Mask
- NWI Wetlands
- Historic Architectural
- R-1
- R-2
- R-3
- R-4
- CB
- B-2
- GI
- B-3
- AG
- I-1
- I-2
- PUD

Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

0 0.15 0.3 0.6 Miles

Lime Hollow Rd.
McLean Rd
McLean Rd
Stupke Rd
Stupke Rd
Stupke Rd
Stupke Rd
N Lamont
Lamont Cir
S Lamont Cir
13
Lime Hollow Rd
Lime Hollow Rd
Lime Hollow Rd
Gunzen Dr
Lowe's
KeyBank
Applebee's
Price Chopper
Radioshack
Osaka Japanese Steakhouse
Wellington Dr
Coventry Ln
Bennie Rd
Bennie Rd
South Cortland
13
S Cortland Virgil Rd
RT-13
13
Byrne Hollow Xing
Byrne Hollow Xing
State Route 13
Gallagher Rd
S Cortland Virgil Rd
State Route 13

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Legend

- Life of Mine Boundary
- Mine Pond Watershed
- Critical Environmental Area
- Chemical Bulk Storage Facility
- Combustion Facilities
- Hazardous Waste Generators
- Permitted and Reclaimed Mines
- Petroleum Bulk Storage Facility
- Remediation Sites
- Scrap Metal Processors
- Water Withdrawal Annual Reports

N

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Cortlandville Sand & Gravel, Cortlandville, New York

NYSDEC Environmental Reference Sites

H2HG-E.com
Troy, New York

Figure 2.2.C
October 2023

0 0.1 0.2 0.4 Miles

Christiansen Bump
Hammond Tiffany
Jens C Stephen
Lime Hollow Rd
Lant
Paul L
McIntyre Trust
Rydzik Nathan
Paul & Kaelee
Edwards Lee & Veronica
Salashnaya Oksana
Collins Frederick J
Chapman Kathryn W
Jackson S E Scott
MARIA J
Farm East LLC
Cortlandville Town of
CORTLAND COUNTY
Christopher Henry Holdings LLC
Cortland Commerce Center, LLC
J M Murray Center Inc
J M MURRAY CENTER INC
CB Cortlandville LLC
Malzman Holdings, LLC
Eziquiel-Shriro Aldegloria
H.S. ASSOCIATES LLC
Clearmideo LLC
Cortlandville Mine Holdings LLC
Burk Timothy C
MCMAHON BRIAN E
Nguyen Phi & Do Kim Anh
Saad M. Saad & Cheryl A
Tuff Hill Associates, LLC
Sky Hospitality LLC
Gabriel Patrick & Michael
Valentin Jennilee & Jose A
Glezen Daniel P
JB Smith Heating & Air Conditioning LLC
CHURCH BEREAN BIBLE
WHITE JEFFREY S & LORRIE S
Student Housing LLC
SILVERNAIL EARL
C'Ville LLC
East Lakes Venture LLC
Pyrotek Inc
654 Rt LLC
Cortland County
Empire Tractor Real Estate Cortland LLC
Lucas James R & Robert C
Route 13 Inc
Byrne Hollow Xing
State Route 13
RT-13
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Legend

- Life of Mine Boundary
- Mine Pond Watershed
- Parcel Boundaries

N

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Cortlandville Sand & Gravel, Cortlandville, New York

Property Parcel Detail

H2HG-E.com
Troy, New York

Figure 2.2.D
October 2023

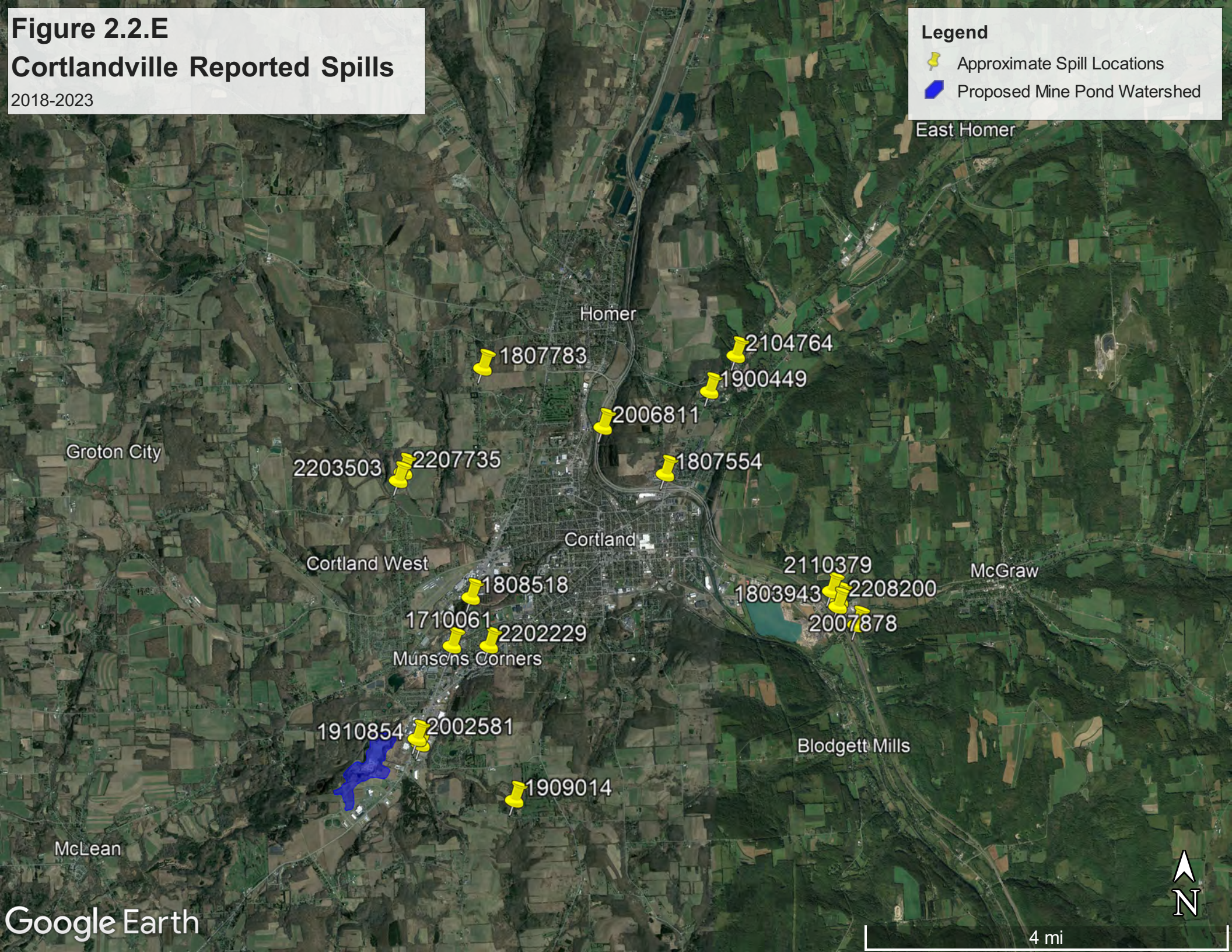
Figure 2.2.E
Cortlandville Reported Spills
2018-2023
Legend
Approximate Spill Locations
Proposed Mine Pond Watershed
East Homer
Homer
1807783
2104764
1900449
2006811
Groton City
2203503
2207735
1807554
Cortland
Cortland West
2110379
McGraw
1808518
1803943
2208200
1710061
2202229
2007878
Munsons Corners
1910854
2002581
Blodgett Mills
1909014
McLean
N
4 mi
Google Earth

0 0.04 0.09 0.17 Miles

H3
H2
H4
1190
U2 U1 H1
North Pond
H6
H5
1170
1180
1220
1210
1200
1190
1180
1220
1230
1180
1230
1180
1180
1220
1190
1180
1200 1190
1190
1190
1190
1200
1210
H7
Middle Pond
H8
H9
1170
1180
1220
1180
1190
1200
1180
1190
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Legend

- Soil Sample
- Surface Water
- Mine Boundary
- Parcel Boundaries
- Buildings
- Paved Road
- Unpaved Road

N

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Cortlandville Sand and Gravel, Cortlandville, Cortland County, New York

Marl Pond Soil Samples

Bowman

Figure 2.3.A

March 2024

0 0.05 0.1 0.2 Miles

Lime Hollow Rd

North Pond

Middle Pond

1170 1180 1190 1200 1210 1220 1230 1240

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Legend

- Surface Water
- Mine Boundary
- Parcel Boundaries
- Buildings
- Paved Road
- Unpaved Road
- Emergence Sampling Transect
- Sampling Transects

N

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Cortlandville Sand and Gravel, Cortlandville, Cortland County, New York

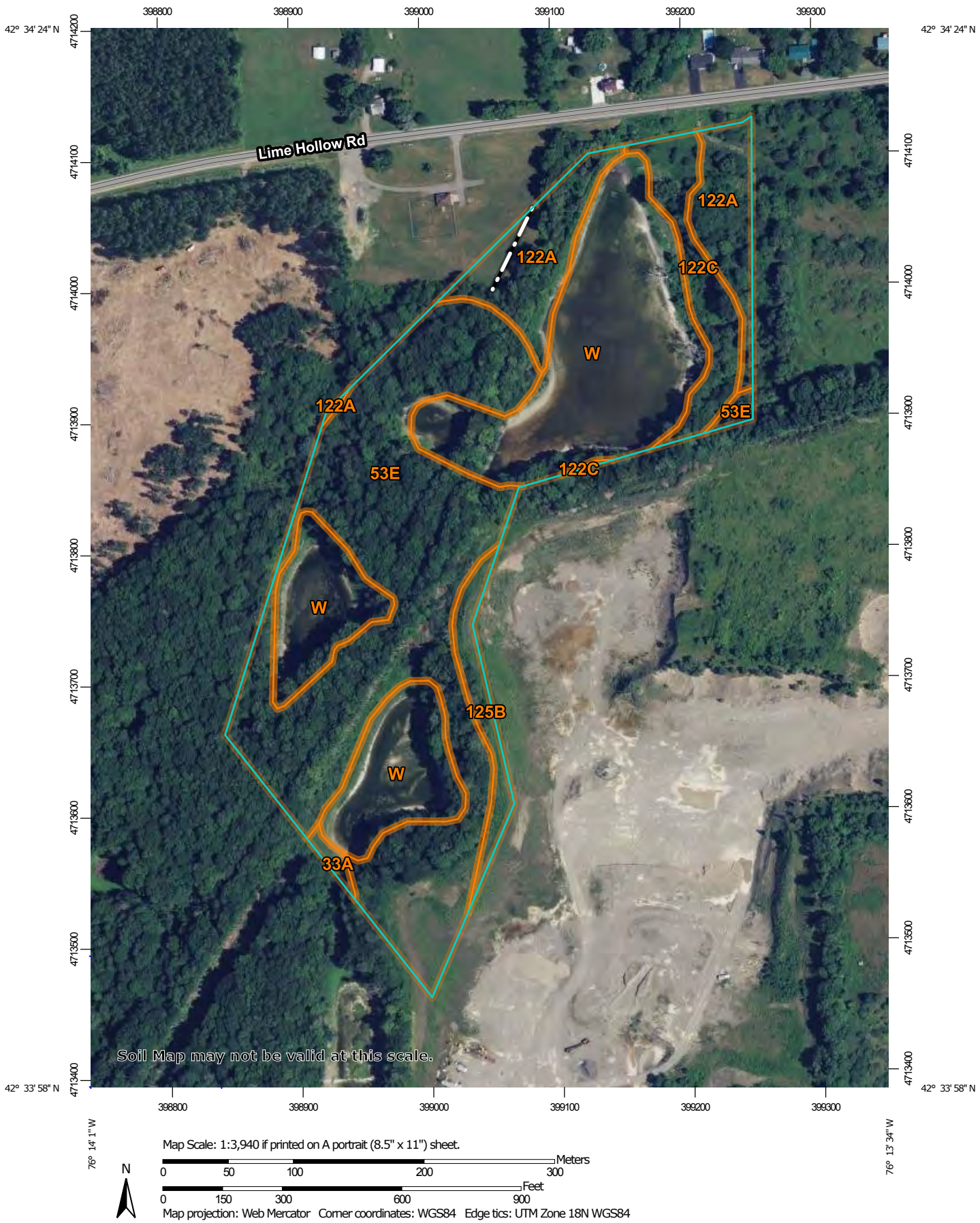
Biological Survey Transects

Bowman

Figure 2.3.B

March 2024

Figure 2.3.D: Soil Map—Cortland County, New York (Cortland Marl Ponds Soils Map)



Map Scale: 1:3,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cortland County, New York
Survey Area Data: Version 20, Aug 29, 2021

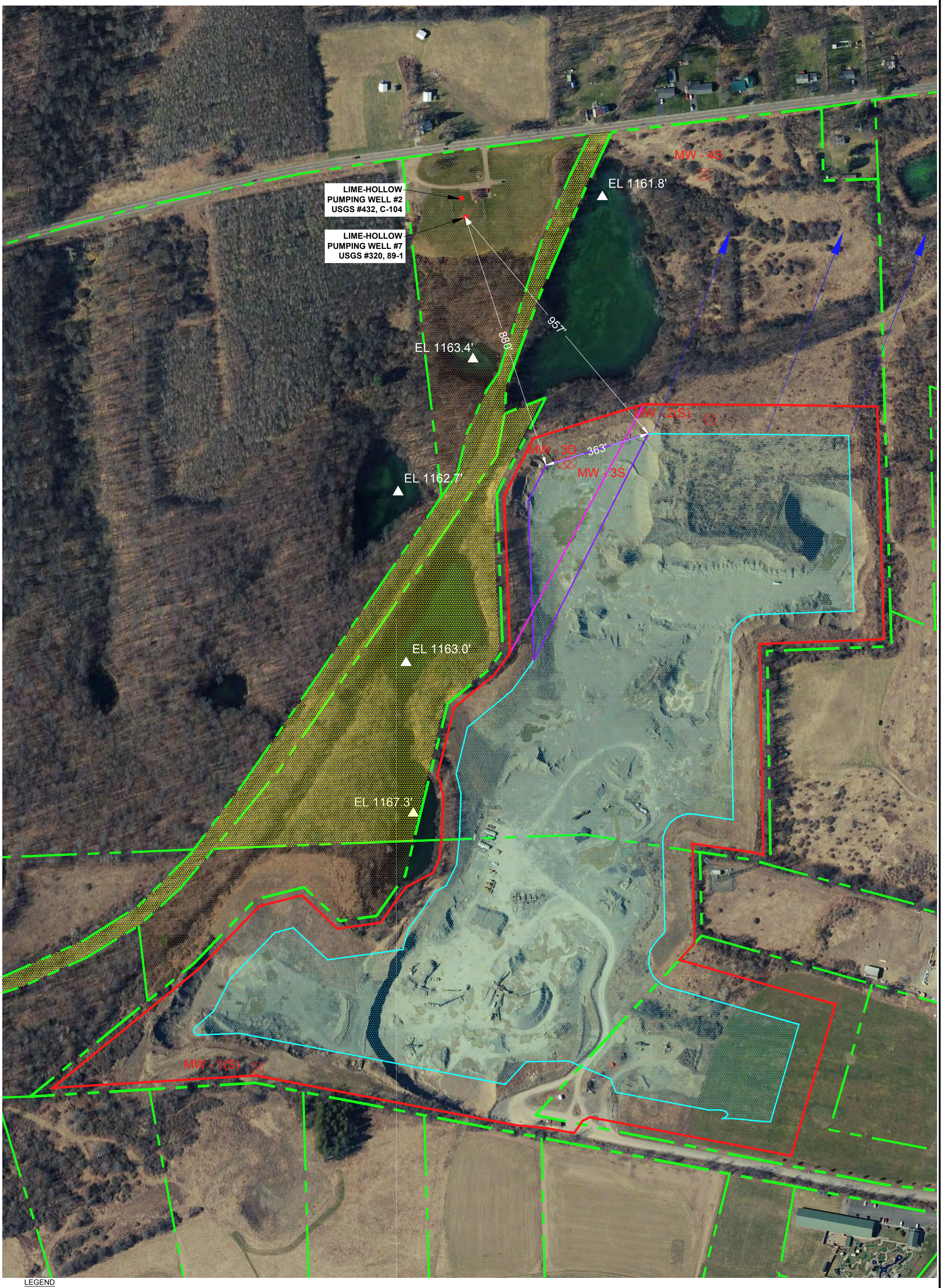
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
33A	Halsey mucky silt loam, 0 to 3 percent slopes	0.2	0.5%
53E	Valois and Howard gravelly loams, 25 to 40 percent slopes	12.5	43.2%
122A	Palmyra gravelly silt loam, 0 to 3 percent slopes	3.3	11.3%
122C	Palmyra gravelly silt loam, 8 to 15 percent slopes	1.7	5.9%
125B	Howard gravelly loam, 3 to 8 percent slopes	0.9	3.1%
W	Water	10.5	36.0%
Totals for Area of Interest		**29.1**	**100.0%**



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MINE POND BOUNDARY
- SCENARIO 2 LIFE OF MINE
- SCENARIO 2 INCREASED SETBACK
- CORTLAND COUNTY PROPERTY (YELLOW)
- CORTLANDVILLE TOWN PROPERTY
- MEAN FLOW DIRECTION
- MONITORING WELL
- TOWN WELL
- MARL POND BOTTOM ELEVATION

SCALE IN FEET

0 150 300 600

N

DATE		REVISIONS RECORD/DESCRIPTION
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	2	
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PROJ. NO :	360.00
SCALE :	1"=300'
DATE :	10-12-2023

ALTERNATIVES ANALYSIS SCENARIO 2

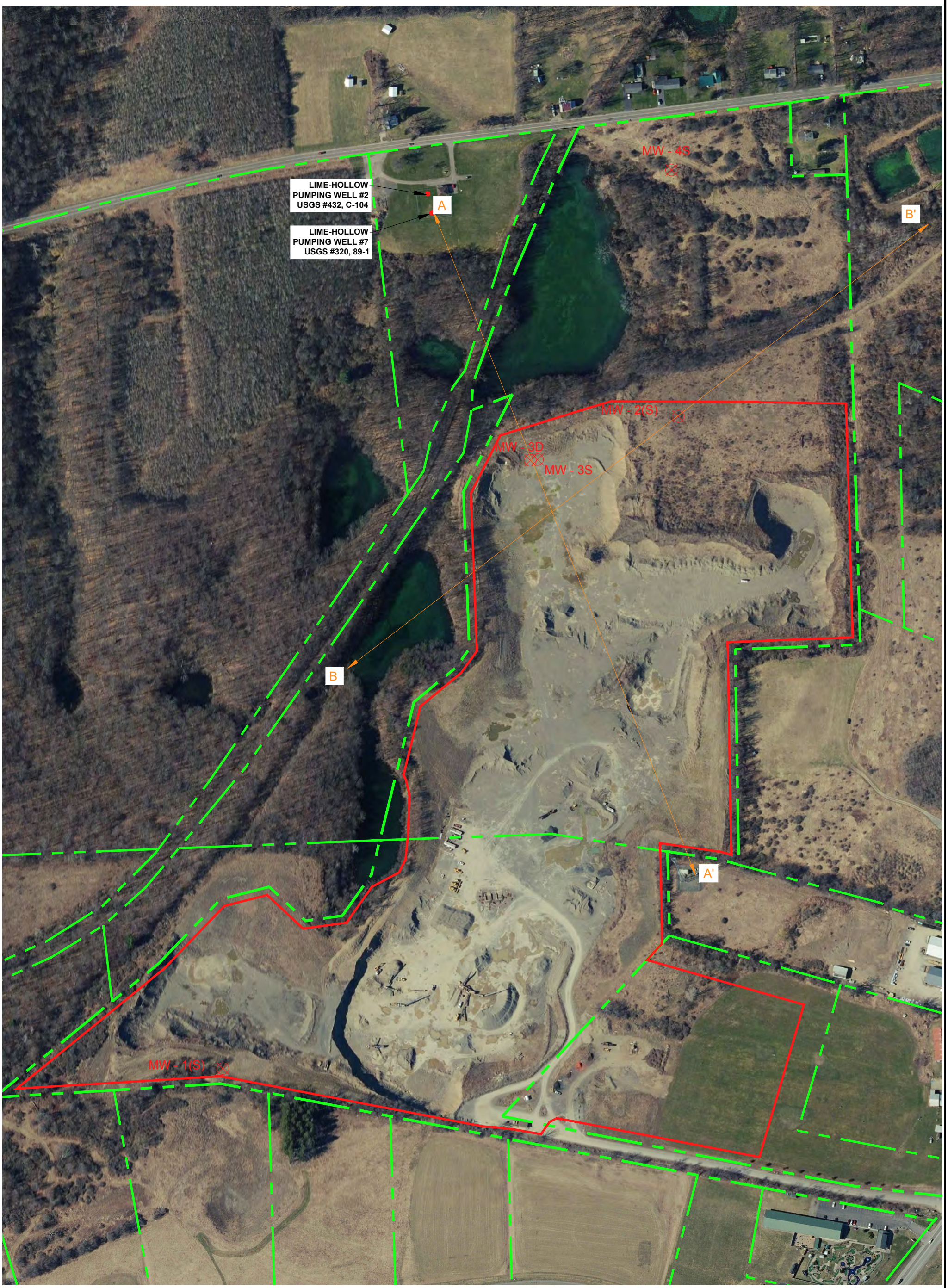
CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 3.2.A

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MONITORING WELL
- TOWN WELL
- CROSS SECTIONS (SEE FIGURE 3.4.B)

SCALE IN FEET

0 150 300 600

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DATE :	10-12-2023

ALTERNATIVES ANALYSIS SCENARIO 3 & 4

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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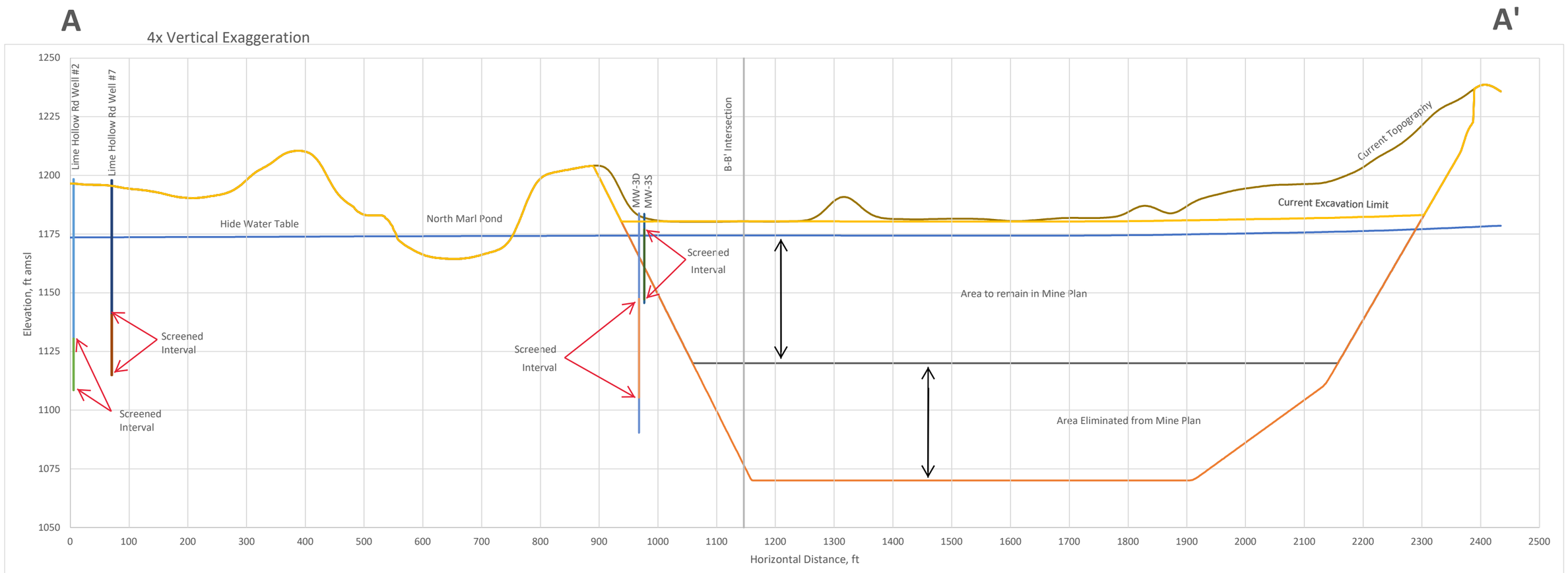
FIGURE 3.4.A

SHEET 1 OF 1

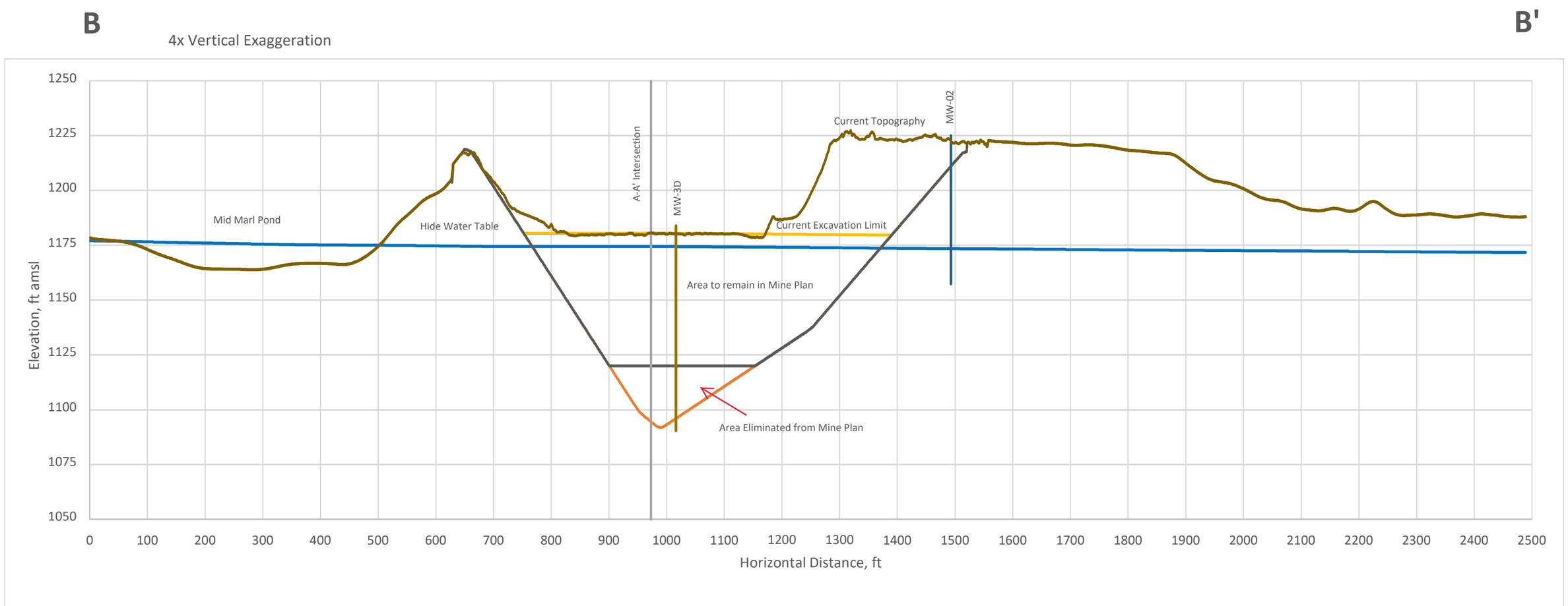
Figure 3.4b - Scenario 4
Decrease Mining Depth Cross Section Along A-A'
Cortlandville Sand and Gravel



Legend

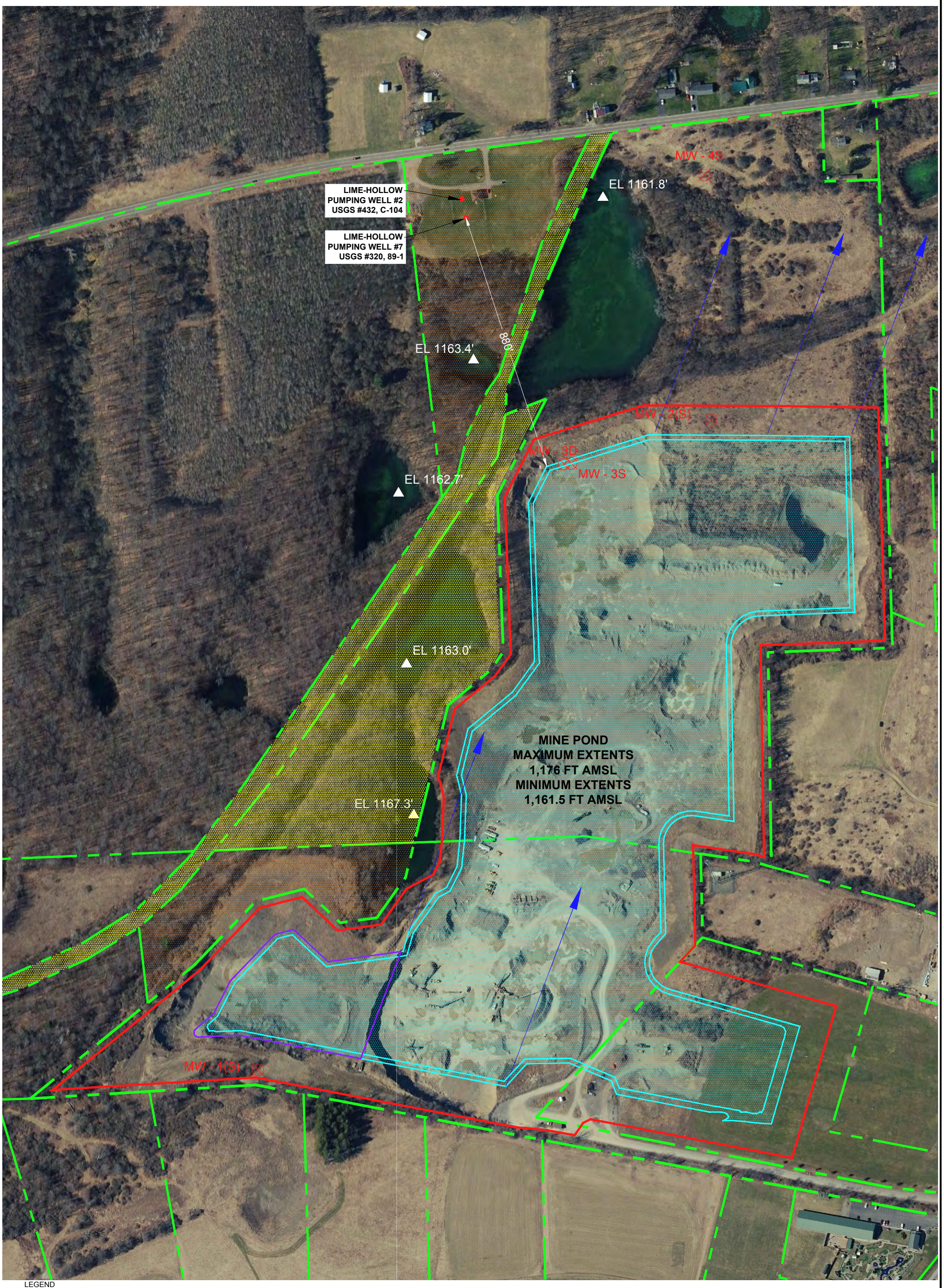
Maximum Groundwater Elevations | Current Mine Excavation Limit | Decresed Mining Depth Scenario | Proposed Excavation Limit | Current Topography | B-B' Intersection

Figure 3.4c - Scenario 4
Decrease Mining Depth Cross Section Along B-B'
Cortlandville Sand and Gravel



Legend

Maximum Groundwater Elevations
Current Mine Excavation Limit
Decresed Mining Depth Scenario
Proposed Excavation Limit
Current Topography
A-A' Intersection



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MINE POND BOUNDARY
- CORTLAND COUNTY PROPERTY (YELLOW)
- CORTLANDVILLE TOWN PROPERTY
- SCENARIO 5 INCREASED SETBACK
- MEAN FLOW DIRECTION
- MONITORING WELL
- TOWN WELL
- MARL POND BOTTOM ELEVATION

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 5

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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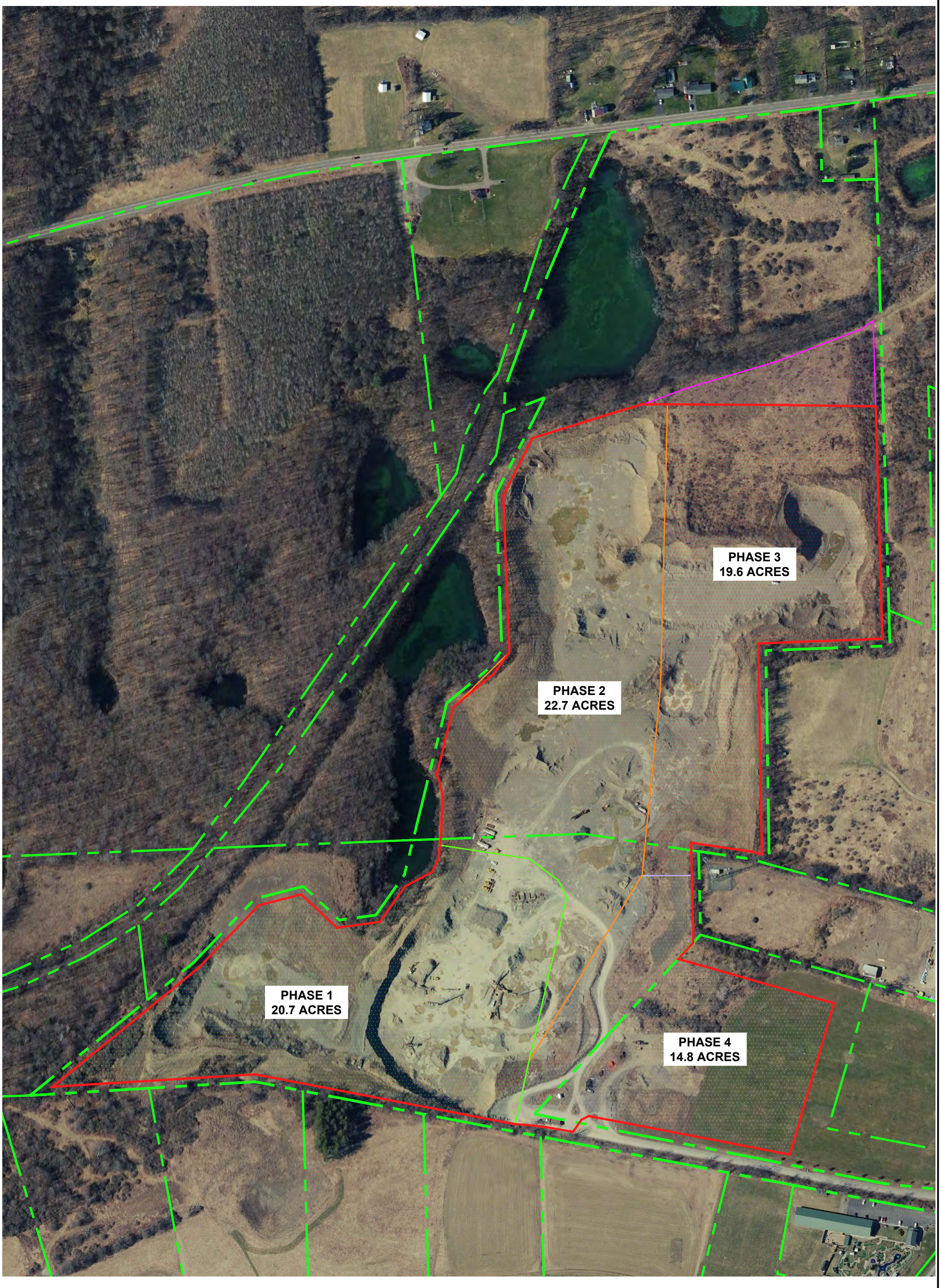
FIGURE 3.5.B

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SHPO EXCLUSION AREA
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 4 AREA

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 7

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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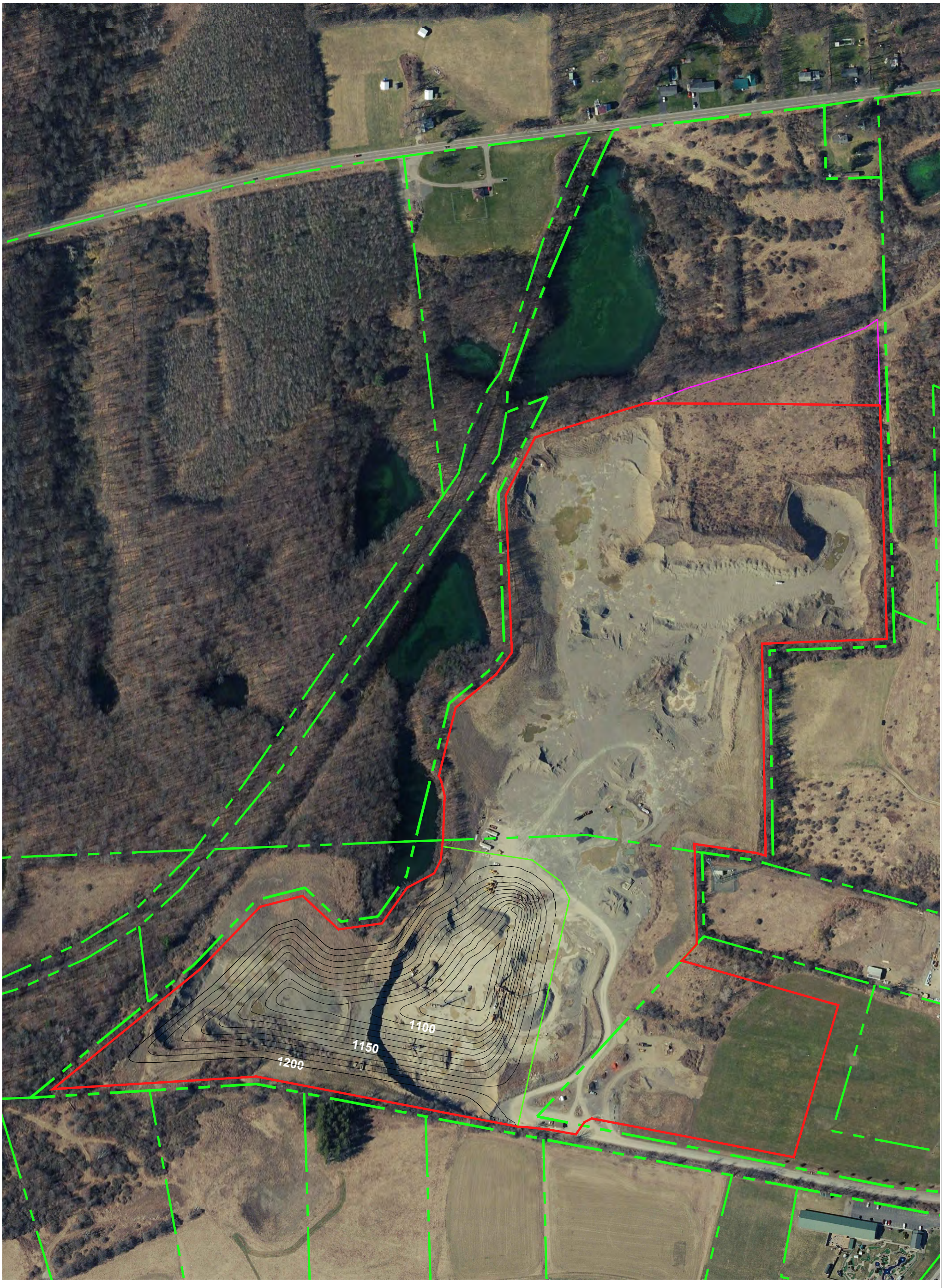
FIGURE 3.7.A

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SHPO EXCLUSION AREA
- PHASE 1 AREA
- PHASE 1 CONTOURS

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 7: PHASE 1

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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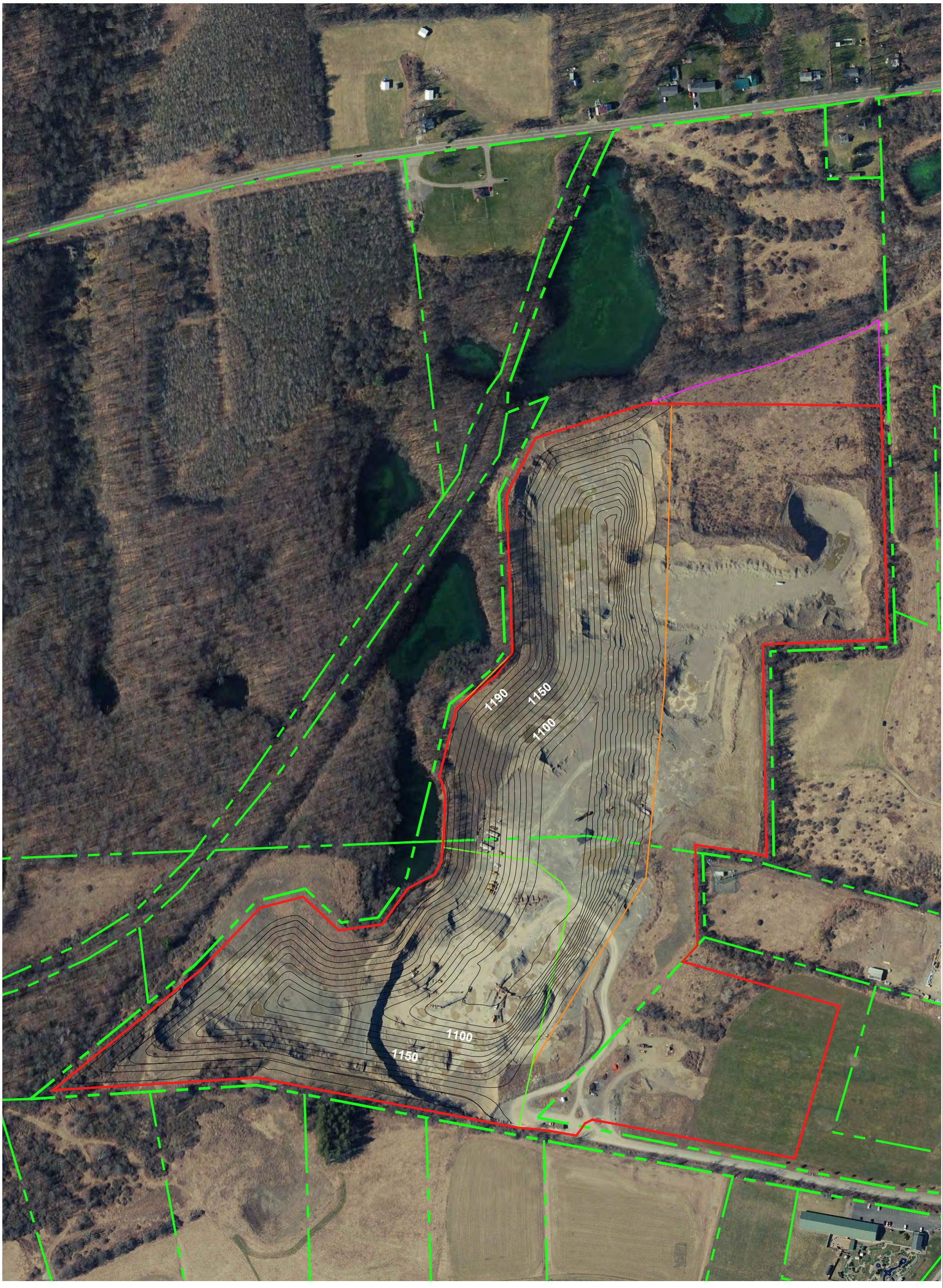
FIGURE 3.7.B

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SHPO EXCLUSION AREA
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 2 CONTOURS

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 7: PHASE 2

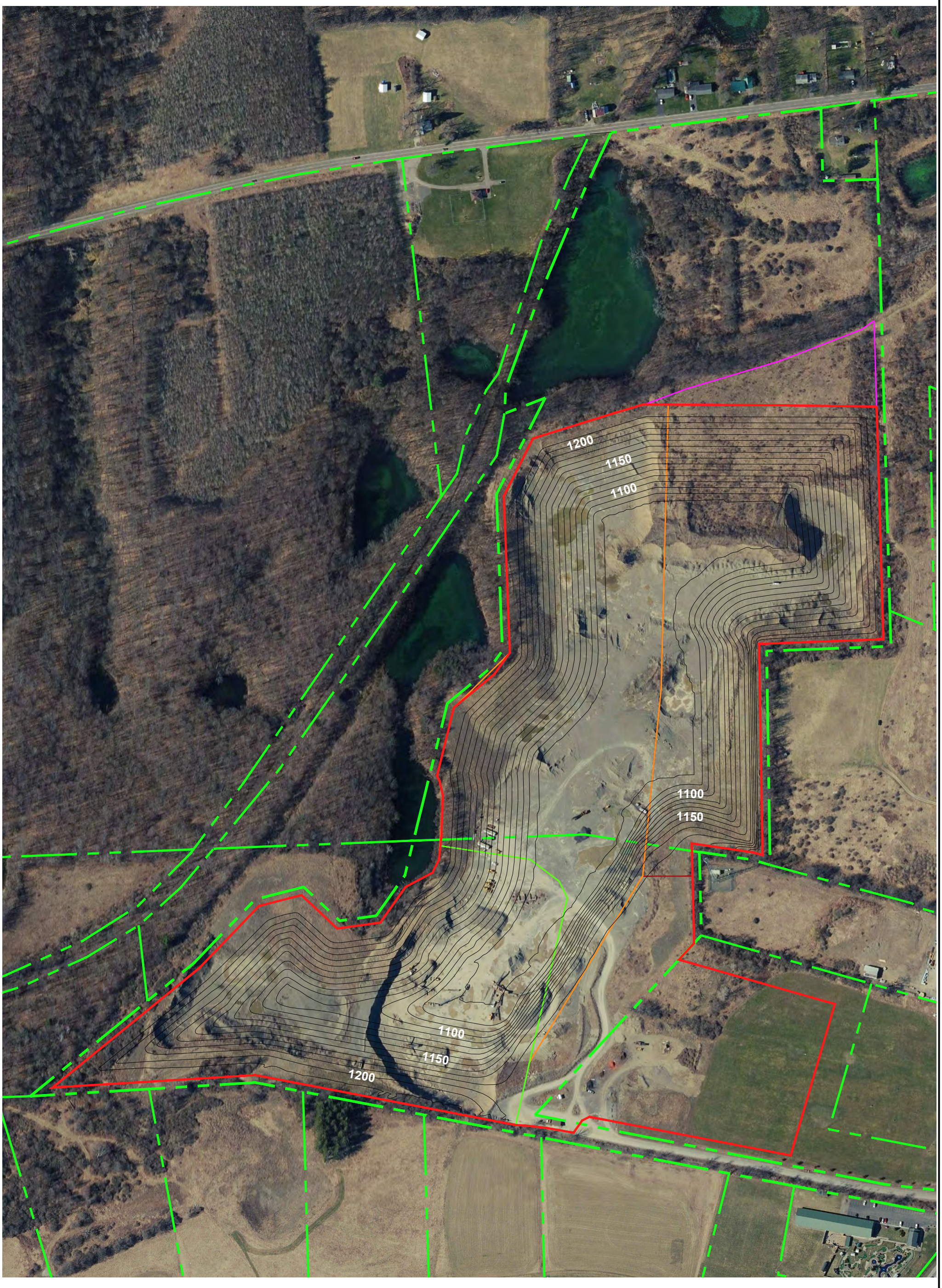
CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 3.7.C

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SHPO EXCLUSION AREA
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 3 CONTOURS

SCALE IN FEET

0 150 300 600

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SCALE :	1"=300'
DATE :	10-12-2023

ALTERNATIVES ANALYSIS SCENARIO 7: PHASE 3

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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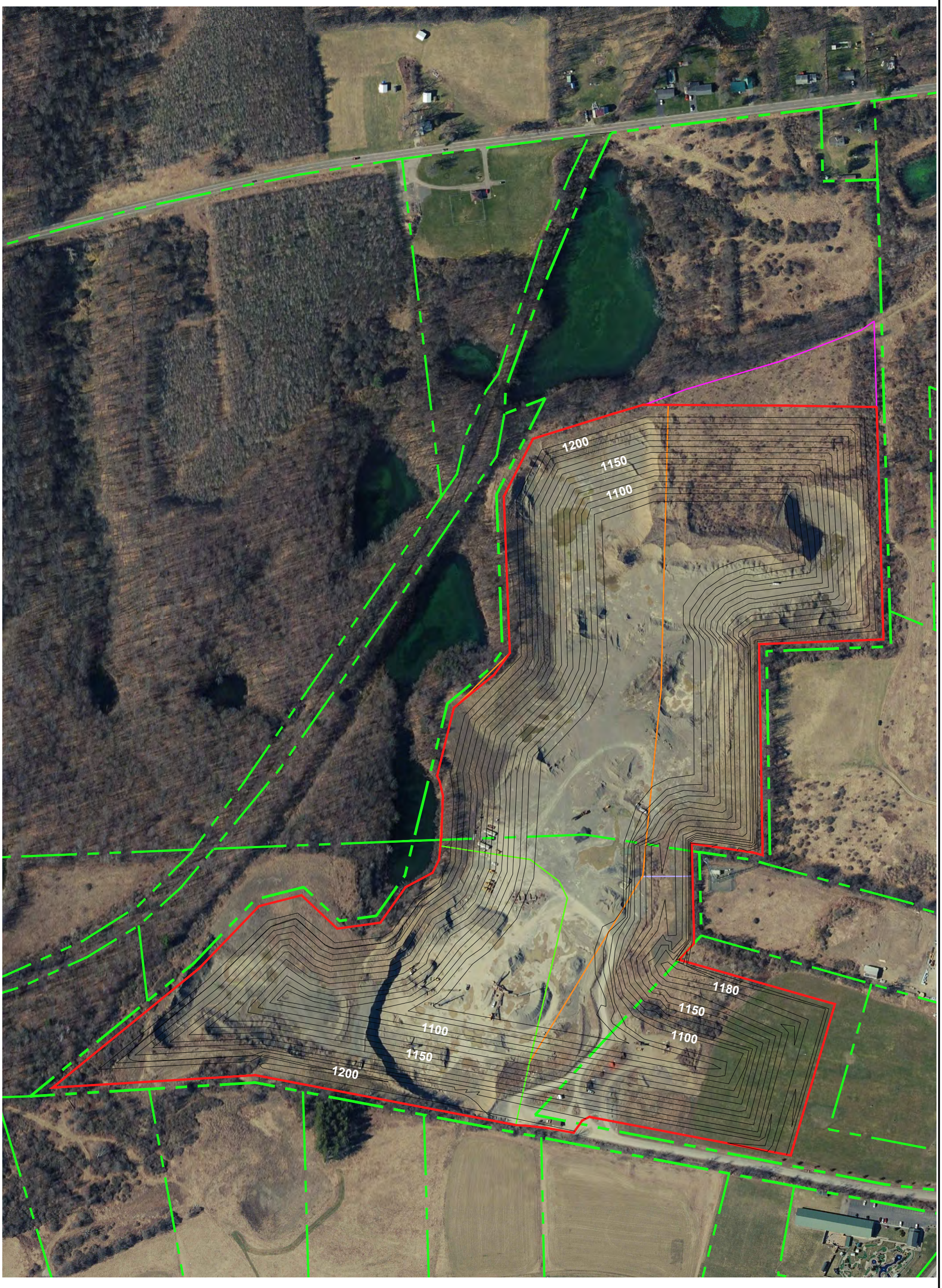
FIGURE 3.7.D

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- SHPO EXCLUSION AREA
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 4 AREA
- PHASE 4 CONTOURS

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 7: PHASE 4

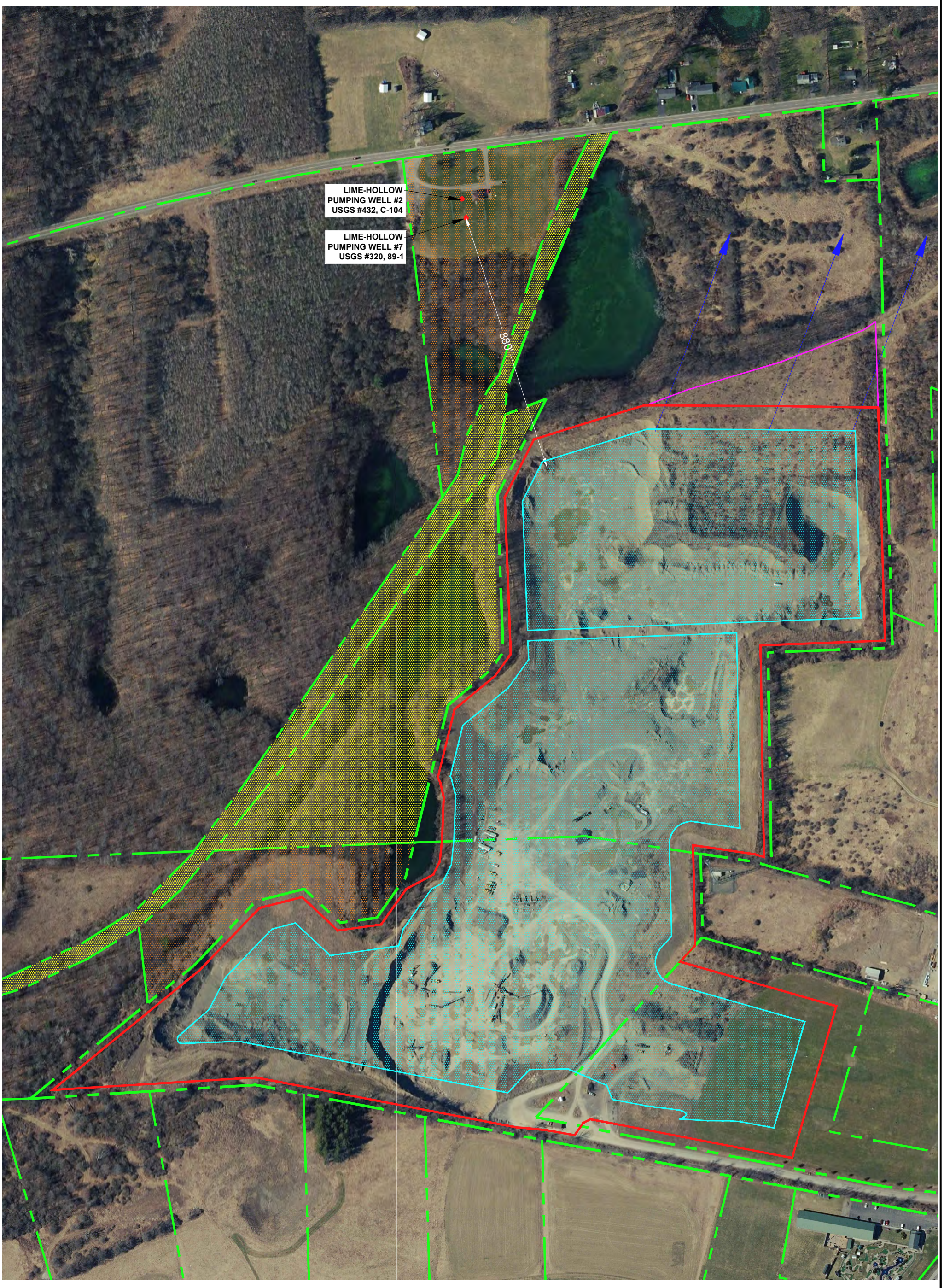
CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 3.7.E

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MINE POND BOUNDARY
- CORTLAND COUNTY PROPERTY (YELLOW)
- CORTLANDVILLE TOWN PROPERTY
- SHPO EXCLUSION AREA
- MEAN FLOW DIRECTION
- MONITORING WELL
- TOWN WELL

SCALE IN FEET

0 150 300 600

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ALTERNATIVES ANALYSIS SCENARIO 8

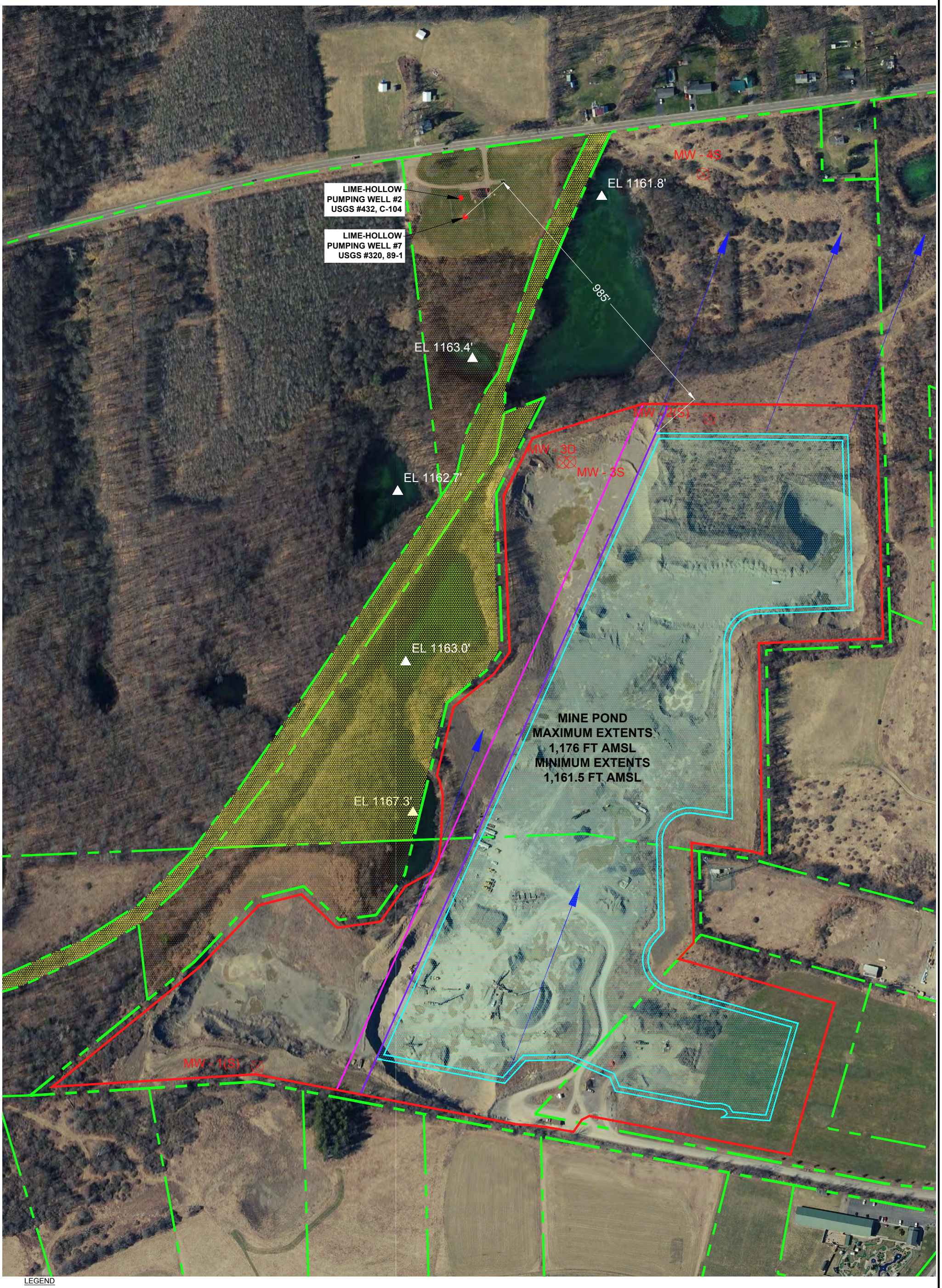
CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.BOWMAN.COM

FIGURE 3.8.A

SHEET 1 OF 1



LEGEND

- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- MINE POND BOUNDARY
- CORTLAND COUNTY PROPERTY (YELLOW)
- CORTLANDVILLE TOWN PROPERTY
- SCENARIO 10 LIFE OF MINE
- SCENARIO 10 INCREASED SETBACK
- MEAN FLOW DIRECTION
- MONITORING WELL
- TOWN WELL
- MARL POND BOTTOM ELEVATION

SCALE IN FEET

0 150 300 600

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SCALE :	1"=300'
DATE :	10-12-2023

ALTERNATIVES ANALYSIS SCENARIO 10

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H a Bowman company
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
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FIGURE 3.10.A

SHEET 1 OF 1

Appendices

Appendix 1.A: 2015 NYSDEC MLR Permit (NYSDEC)

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 7
1285 Fisher Avenue, Cortland, New York 13045-1090
Phone: (607) 753-3095 • **Fax:** (607) 753-8532
Website: www.dec.ny.gov

Joe Martens
Commissioner

APR 30 2015

April 30, 2015

Mr. Christopher Henry
Rt 13 Rocks, LLC
765 St Rte 13
Cortland, NY 13045

RE: DEC Mining Permit Renewal
Cortlandville Sand & Gravel Mine, MLR# 70436
Town of Cortlandville, Cortland County

Dear Mr. Henry:

Enclosed is Part One of the renewed mining permit for the Cortlandville Sand & Gravel Mine. The permit itself consists of two parts. Part One consists of the enclosed permit certificate. Part Two consists of the application, plans and specifications, and other documents on file with the Department including such terms and conditions imposed. As the Permittee, you are responsible for maintaining a copy of the documents constituting Part Two available at your local office for use by Department personnel.

Note the expiration date. The permit may be renewed if an acceptable application is submitted sufficiently prior to that date. A renewal application involving no changes to the original plans should be submitted at least 30 days prior to the expiration of the permit. An application involving any changes to the above plans may be treated as a new application and may require a detailed environmental review, and should be submitted well in advance of the expiration date. If this permit is destroyed, lost or mutilated, contact this office so that a certified copy may be issued.

Be advised, the Uniform Procedures Regulations (6NYCRR Part 621) provide that an applicant may request a public hearing if a permit is denied or contains conditions which are unacceptable to them. Any such request must be made in writing within 30 calendar days of the date of permit issuance and must be addressed to the Regional Permit Administrator at the letterhead address. A copy should also be sent to the Chief Administrative Law Judge at NYSDEC, 625 Broadway, 1st Floor, Albany, NY 12233-1550. If you have any questions, please contact me at 607-753-3095, ext. 233.

Regards,

Joe Dluglenski
Deputy Regional Permit Administrator

Enc. Permit + SIGN
cc: Tom Rigley, DEC Minerals, Syracuse
Supervisor, Town of Cortlandville
File

PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
RT 13 ROCKS LLC
765 ST RTE 13
CORTLAND, NY 13045
(607) 753-8623

Facility:
CORTLANDVILLE SAND & GRAVEL MINE
765 ST RTE 13
SOUTH CORTLAND, NY

Facility Location: in CORTLANDVILLE in CORTLAND COUNTY
Facility Principal Reference Point: NYTM-E: 398.9 NYTM-N: 4713.4
Latitude: 42°33'59.0" Longitude: 76°13'54.2"
Authorized Activity: This permit authorizes mining activity, including specified processing equipment, within a 66.8 acre life-of-mine facility (formerly listed as 70 acre life-of-mine facility but survey recently completed reduced acreage) on a 120 acre parcel of land owned by Christopher Henry Holdings, LLC. Processing includes crushing and screening only.

Permit Authorizations

Mined Land Reclamation - Under Article 23, Title 27
Permit ID 7-1122-00043/00008 (Mined Land ID 70436)
Renewal Effective Date: 7/1/2015 Expiration Date: 6/30/2020

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: JOSEPH M DLUGOLENSKI, Deputy Regional Permit Administrator
Address: NYSDEC REGION 7 CORTLAND SUB-OFFICE
1285 FISHER AVE
CORTLAND, NY 13045 -1090

Authorized Signature: J Dlugolenski Date 4/30/2015

Permit Components

MINED LAND RECLAMATION PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

MINED LAND RECLAMATION PERMIT CONDITIONS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such plans were approved by the Department on various dates and consist of the following items:

A.) Narrative titled: "NYS-DEC and Town of Cortlandville Mining Permit Applications for Gunzenhauser Real Estate" dated June 8, 1987, prepared by Harrington Associates.

B.) Narrative titled: "Mining Permit Renewal Application, Cortlandville Gravel Mining, Inc."; dated March 3`, 1995, prepared by Harrington Associates.

C.) Graphic Plans titled:

1. "Topographic Survey - Cortlandville Mine Holdings, LLC.": dated July 3, 2014: prepared by Reagan Land Surveying and contains Christopher Henry's signature with date of 2/23/15.
2. Revised Reclamation Plan": dated March 1995 with revised date of September 2009; prepared by Harrington Associates.

2. **No Deviation From Approved Plan** The permittee shall not deviate or depart from the approved mined land use plan without approval by the Department of an alteration or modification thereto.

3. **Conditions Prevail Over Plans** If any condition of this permit conflicts with the approved plans, the permit condition shall prevail over the plans.

4. **Permit Does Not Apply to Structures and Safety Aspects** Unless expressly provided for, the issuance of this permit does not apply to any structures contained on the plans or in the specifications, nor does this permit apply to safety aspects of the operation and/or reclamation plan.

5. **Bond, Surety to Remain in Force** Any required reclamation bond or other surety, in an amount determined by the Department, shall be maintained in full force and effect. Such a bond or other surety shall not be terminated until the reclamation of the mined area is approved by the department in writing.

6. **Human or Archaeological Remains** If any human remains or archaeological remains are encountered during excavation, the permittee must immediately cease, or cause to cease, all work in the

area of the remains and notify

Regional Permit Administrator
NYSDEC REGION 7 CORTLAND SUB-OFFICE
1285 FISHER AVE
CORTLAND, NY13045 -1090

Work shall not resume until written permission to do so has been received from the Department.

7. **Post Sign and Permit** The enclosed permit and permit sign must be conspicuously posted in a publicly accessible location at the project site. They must be visible, legible and protected from the elements at all times.

8. **Maintain Area Markers for Permit Term** The permittee shall provide permanent markers such as stakes, posts or other devices acceptable to the Department to identify and delineate the permit area, as outlined on the approved Mining Plan Map. These markers are to be installed prior to the start of mining and shall be maintained for the duration of the permit term.

9. **Install and Maintain Stakes Along LOM Limits** Prior to commencement of any mining or mining related activity under this permit, the limits of the entire life of mine area shall be determined by instrument and staked at all corners, vertices and regular 100-foot intervals. All stakes shall be at least 5 feet in height above ground level so as to make them clearly visible and to help prevent injury. The top of each stake shall be painted with a bright red color so as to make them readily visible in the field. All stakes shall be continuously maintained in good condition throughout the life of this mining operation or until reclamation is accepted by the Department. Trees can be used in place of stakes if the trees are directly inline with the life of mine boundary and all trees are no farther apart than 100 feet.

10. **No Unpermitted Discharge Outside Limits of Mine** There shall be no natural swales or channels or constructed features such as ditches, pipes, etc., that are capable of discharging waters to any offsite areas or to any areas outside the limits of the Life of Mine except those explicitly described and shown in the narrative and graphic portions of the approved Mined Land Use Plan. All silt laden water and storm water generated on, or running across, the site shall be retained within the approved project area. The permittee must comply with all applicable State Pollutant Discharge Elimination System (SPDES) permit requirements and provide necessary notifications for off-site point source discharges.

11. **Strip and Stockpile Soils for Reclamation** Prior to the excavation of previously undisturbed areas, topsoil and overburden shall be stripped, stockpiled separately, and used for reclamation of mined areas. These stockpiles shall be seeded to establish a vegetative cover within 30 days, or as soon as practicable following their construction. The permittee shall locate all overburden stockpiles within the permitted area of the approved Life of Mine. Sufficient quantities of topsoil must be retained on the site for use in reclamation, unless prior approval is granted by the Department.

12. **Dust Control** Water or other approved dust palliatives must be applied to haulageways and other parts of the mine, as often as necessary, to prevent visible dust from leaving the mine property.

13. **Keep Roads Clean** The surface of any paved road that intersects with the entrance/exit to the mine and the entrance/exit areas shall be kept free of any spilled and/or tracked materials which can cause dust, slippery conditions or any other condition that is unhealthy or unsafe.

14. **Minimum 25' Separation From Property Line** No mining activity of any kind, including clearing

and grubbing, shall occur within 25 feet of any adjacent property line or right-of-way. When mining is conducted lower than the adjacent property, the distance from the floor of the mine to the nearest property line shall be no closer than 25 feet plus 1 1/2 times the depth of the excavation.

15. **Mine Operation Periods** Hours of Operation shall be limited to 6 AM to 6 PM, Monday through Friday, and 6 AM to 2 PM Saturday. There shall be no operations on Sundays or on New Year's Day, Memorial Day, July 4, Labor Day, Thanksgiving, or Christmas Day.

16. **Monitoring Wells and Reporting** The on-site monitoring wells labeled as "MW-1" and "MW-2" on the approved plans described in Permit Condition No. 1(C) shall remain functional, in place, and be maintained throughout the duration of the life of mine. An annual report shall be submitted to the Department at the end of each calendar year, which shall record monthly water table levels in each well, referenced to onsite survey datum elevations. The final mine floor elevation is based entirely on maintaining an 8-foot separation from the mean high water table which has not been established. Sampling and reporting of the water table elevations shall continue for a minimum of 5 years from the issuance of this permit, or until otherwise determined by the Department.

17. **Maintain Work Above Groundwater** A minimum of 8 feet of undisturbed material shall be maintained above the mean high groundwater elevation at all locations.

18. **Slope Reclamation** All mine faces shall be reclaimed to slopes no steeper than 2 on 1 (horizontal to vertical) or 26 degrees.

19. **No Backfilling of Sloped Areas** Sufficient materials shall be left in place, in sloped areas along the final limits of this mine, to achieve the final approved grades without backfilling.

20. **Use, Storage of Petroleum Products** There shall be no spillage of petroleum products of any kind. All petroleum products shall be stored in locked and secure enclosures with a containment system in the event of container failure.

21. **Fueling of Equipment and Reporting of Spills** Fueling of equipment shall be controlled to prevent spillage. Any spillage of fuels, waste oils, other petroleum products or hazardous materials shall be reported to the Department's Spill Hotline number (1-800-457-7362) within 2 hours. The permittee shall retain the Department's Spill Response number for immediate access in the permittee's office and at the mine site.

22. **Load Trucks in Conformance with Vehicle and Traffic Law Section 380-a(1)** The permittee shall ensure that all trucks are loaded in conformance with Vehicle and Traffic Law Section 380-a(1). Open trucks or trailers utilized for the transportation of minerals shall be equipped with a cover, tarpaulin or other device which completely closes in the opening of the truck while in operation, unless the load is arranged so that no mineral can fall from or blow out of such truck.

23. **Provide Person during DEC Inspection** The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when notification is provided, be it written or verbal, at least 24 hours prior to such inspection.

24. **File Termination Notice** If the permittee decides to discontinue operation, a termination notice must be filed 60 days prior to the scheduled temporary or permanent cessation of mining.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. Facility Inspection by The Department The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. Relationship of this Permit to Other Department Orders and Determinations Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. Applications For Permit Renewals, Modifications or Transfers The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC REGION 7 CORTLAND SUB-OFFICE
1285 FISHER AVE
CORTLAND, NY13045 -1090

4. Submission of Renewal Application The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Mined Land Reclamation.

5. Permit Modifications, Suspensions and Revocations by the Department The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

Item E: Air Permits at Mine The permittee shall obtain all required permits for non-exempt processing equipment at the mine in accordance with Article 19 of the Environmental Conservation Law and 6NYCRR Part 201.

Appendix 1.B: 2021 Notice of Positive Declaration (NYSDEC)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 7
615 Erie Boulevard West, Syracuse, NY 13204-2400
P: (315) 426-7438 | F: (315) 426-7425
www.dec.ny.gov

NOTICE: POSITIVE DECLARATION

May 26, 2021

Carol Simon
RT 13 Rocks, LLC
765 State Route 13
Cortland, NY 13045

Re: Cortlandville Sand & Gravel Mine
765 State Route 13
South Cortland, NY
DEC Application: 7-1122-00043/00008
Mined Land Reclamation Number: 70436

Dear Carol Simon:

The New York State Department of Environmental Conservation (DEC) has determined that the proposed modification to the above-referenced mine has the potential for significant adverse environmental impacts. Accordingly, DEC has prepared a Positive Declaration pursuant to the requirements of the State Environmental Quality Review Act (SEQR), and a Draft Environmental Impact Statement is being required for the project. Enclosed please find a copy of the Positive Declaration that has been issued.

The Department will use public scoping procedures outlined in the SEQR regulations (6 NYCRR§ 617.8). This will include a public comment period on the scope of the Draft Environmental Impact Statement. It will be necessary for you to submit a proposed scope that contains the items identified in paragraphs 6 NYCRR § 617.8 (f)(1) through (5) of the SEQR regulations. In short, these items include a description of the proposed action, the potential significant adverse impacts, the extent and quality of information needed to address each impact (including the methods for obtaining and analyzing this information), an initial identification of mitigation measures, and the reasonable alternatives to be considered.

Please submit the draft scope for our review to Cynthia.hill@dec.ny.gov and dep.r7@dec.ny.gov. Upon our receipt of the draft scope we will review it and provide any necessary revisions prior to its acceptance for public review. By copy of this letter and enclosure, we are also notifying all involved and interested agencies of the Department's issuance of the Positive Declaration.

Sincerely,

Elizabeth Tracy
Regional Permit Administrator

Enclosure: SEQR Positive Declaration

Distribution List Attached

Agency Use Only [If applicable]

Project : 7-1122-00043/00008

Date : 5-26-21

Full Environmental Assessment Form
Part 2 - Identification of Potential Project Impacts

Part 2 is to be completed by the lead agency. Part 2 is designed to help the lead agency inventory all potential resources that could be affected by a proposed project or action. We recognize that the lead agency's reviewer(s) will not necessarily be environmental professionals. So, the questions are designed to walk a reviewer through the assessment process by providing a series of questions that can be answered using the information found in Part 1. To further assist the lead agency in completing Part 2, the form identifies the most relevant questions in Part 1 that will provide the information needed to answer the Part 2 question. When Part 2 is completed, the lead agency will have identified the relevant environmental areas that may be impacted by the proposed activity.

If the lead agency is a state agency **and** the action is in any Coastal Area, complete the Coastal Assessment Form before proceeding with this assessment.

Tips for completing Part 2:

- Review all of the information provided in Part 1.
- Review any application, maps, supporting materials and the Full EAF Workbook.
- Answer each of the 18 questions in Part 2.
- If you answer "**Yes"** to a numbered question, please complete all the questions that follow in that section.
- If you answer "**No"** to a numbered question, move on to the next numbered question.
- Check appropriate column to indicate the anticipated size of the impact.
- Proposed projects that would exceed a numeric threshold contained in a question should result in the reviewing agency checking the box "Moderate to large impact may occur."
- The reviewer is not expected to be an expert in environmental analysis.
- If you are not sure or undecided about the size of an impact, it may help to review the sub-questions for the general question and consult the workbook.
- When answering a question consider all components of the proposed activity, that is, the "whole action".
- Consider the possibility for long-term and cumulative impacts as well as direct impacts.
- Answer the question in a reasonable manner considering the scale and context of the project.

1. Impact on Land

Proposed action may involve construction on, or physical alteration of, the land surface of the proposed site. (See Part 1. D.1)

☐ NO ☑ YES

If "Yes", answer questions a - j. If "No", move on to Section 2.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may involve construction on land where depth to water table is less than 3 feet.	E2d	☐	☑
b. The proposed action may involve construction on slopes of 15% or greater.	E2f	☑	☐
c. The proposed action may involve construction on land where bedrock is exposed, or generally within 5 feet of existing ground surface.	E2a	☑	☐
d. The proposed action may involve the excavation and removal of more than 1,000 tons of natural material.	D2a	☐	☑
e. The proposed action may involve construction that continues for more than one year or in multiple phases.	D1e	☑	☐
f. The proposed action may result in increased erosion, whether from physical disturbance or vegetation removal (including from treatment by herbicides).	D2e, D2q	☑	☐
g. The proposed action is, or may be, located within a Coastal Erosion hazard area.	B1i	☑	☐
h. Other impacts: _____ _____		☐	☐

2. Impact on Geological Features

The proposed action may result in the modification or destruction of, or inhibit access to, any unique or unusual land forms on the site (e.g., cliffs, dunes, minerals, fossils, caves). (See Part 1. E.2.g) ☐ NO ☑ YES

If "Yes", answer questions a - c. If "No", move on to Section 3.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. Identify the specific land form(s) attached: _____ Marl ponds	E2g	☐	☑
b. The proposed action may affect or is adjacent to a geological feature listed as a registered National Natural Landmark. Specific feature: _____	E3c	☑	☐
c. Other impacts: _____ _____		☐	☐

3. Impacts on Surface Water

The proposed action may affect one or more wetlands or other surface water bodies (e.g., streams, rivers, ponds or lakes). (See Part 1. D.2, E.2.h) ☐ NO ☑ YES

If "Yes", answer questions a - l. If "No", move on to Section 4.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may create a new water body.	D2b, D1h	☐	☑
b. The proposed action may result in an increase or decrease of over 10% or more than a 10 acre increase or decrease in the surface area of any body of water.	D2b	☑	☐
c. The proposed action may involve dredging more than 100 cubic yards of material from a wetland or water body.	D2a	☑	☐
d. The proposed action may involve construction within or adjoining a freshwater or tidal wetland, or in the bed or banks of any other water body.	E2h	☑	☐
e. The proposed action may create turbidity in a waterbody, either from upland erosion, runoff or by disturbing bottom sediments.	D2a, D2h	☑	☐
f. The proposed action may include construction of one or more intake(s) for withdrawal of water from surface water.	D2c	☑	☐
g. The proposed action may include construction of one or more outfall(s) for discharge of wastewater to surface water(s).	D2d	☑	☐
h. The proposed action may cause soil erosion, or otherwise create a source of stormwater discharge that may lead to siltation or other degradation of receiving water bodies.	D2e	☑	☐
i. The proposed action may affect the water quality of any water bodies within or downstream of the site of the proposed action.	E2h	☑	☐
j. The proposed action may involve the application of pesticides or herbicides in or around any water body.	D2q, E2h	☑	☐
k. The proposed action may require the construction of new, or expansion of existing, wastewater treatment facilities.	D1a, D2d	☑	☐

l. Other impacts: Creation of mining pond and changes in hydrology of marl ponds.		☐	☑

4. Impact on groundwater

The proposed action may result in new or additional use of ground water, or may have the potential to introduce contaminants to ground water or an aquifer. (See Part 1. D.2.a, D.2.c, D.2.d, D.2.p, D.2.q, D.2.t) ☐ NO ☑ YES

If "Yes", answer questions a - h. If "No", move on to Section 5.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may require new water supply wells, or create additional demand on supplies from existing water supply wells.	D2c	☑	☐
b. Water supply demand from the proposed action may exceed safe and sustainable withdrawal capacity rate of the local supply or aquifer. Cite Source: _____	D2c	☑	☐
c. The proposed action may allow or result in residential uses in areas without water and sewer services.	D1a, D2c	☑	☐
d. The proposed action may include or require wastewater discharged to groundwater.	D2d, E2l	☑	☐
e. The proposed action may result in the construction of water supply wells in locations where groundwater is, or is suspected to be, contaminated.	D2c, E1f, E1g, E1h	☑	☐
f. The proposed action may require the bulk storage of petroleum or chemical products over ground water or an aquifer.	D2p, E2l	☑	☐
g. The proposed action may involve the commercial application of pesticides within 100 feet of potable drinking water or irrigation sources.	E2h, D2q, E2l, D2c	☑	☐
h. Other impacts: Potential transport of microbes/pathogens to municipal water supply wells via groundwater		☐	☑

5. Impact on Flooding

The proposed action may result in development on lands subject to flooding. (See Part 1. E.2) ☐ NO ☑ YES

If "Yes", answer questions a - g. If "No", move on to Section 6.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may result in development in a designated floodway.	E2i	☑	☐
b. The proposed action may result in development within a 100 year floodplain.	E2j	☑	☐
c. The proposed action may result in development within a 500 year floodplain.	E2k	☑	☐
d. The proposed action may result in, or require, modification of existing drainage patterns.	D2b, D2e	☑	☐
e. The proposed action may change flood water flows that contribute to flooding.	D2b, E2i, E2j, E2k	☑	☐
f. If there is a dam located on the site of the proposed action, is the dam in need of repair, or upgrade?	E1e	☑	☐

g. Other impacts: Changes in hydrology of the marl ponds may cause increased flooding in recreational areas adjacent to marl ponds certain times of the year.		☐	☑

6. Impacts on Air

The proposed action may include a state regulated air emission source. ☑NO ☐YES
(See Part 1. D.2.f., D.2.h, D.2.g)
If "Yes", answer questions a - f. If "No", move on to Section 7.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. If the proposed action requires federal or state air emission permits, the action may also emit one or more greenhouse gases at or above the following levels:			
i. More than 1000 tons/year of carbon dioxide (CO_2)	D2g	☐	☐
ii. More than 3.5 tons/year of nitrous oxide (N_2O)	D2g	☐	☐
iii. More than 1000 tons/year of carbon equivalent of perfluorocarbons (PFCs)	D2g	☐	☐
iv. More than .045 tons/year of sulfur hexafluoride (SF_6)	D2g	☐	☐
v. More than 1000 tons/year of carbon dioxide equivalent of hydrochloroflourocarbons (HFCs) emissions	D2g	☐	☐
vi. 43 tons/year or more of methane	D2h	☐	☐
b. The proposed action may generate 10 tons/year or more of any one designated hazardous air pollutant, or 25 tons/year or more of any combination of such hazardous air pollutants.	D2g	☐	☐
c. The proposed action may require a state air registration, or may produce an emissions rate of total contaminants that may exceed 5 lbs. per hour, or may include a heat source capable of producing more than 10 million BTU's per hour.	D2f, D2g	☐	☐
d. The proposed action may reach 50% of any of the thresholds in "a" through "c", above.	D2g	☐	☐
e. The proposed action may result in the combustion or thermal treatment of more than 1 ton of refuse per hour.	D2s	☐	☐
f. Other impacts: _____		☐	☐

7. Impact on Plants and Animals

The proposed action may result in a loss of flora or fauna. (See Part 1. E.2. m.-q.) ☐NO ☑YES
If "Yes", answer questions a - j. If "No", move on to Section 8.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may cause reduction in population or loss of individuals of any threatened or endangered species, as listed by New York State or the Federal government, that use the site, or are found on, over, or near the site.	E2o	☑	☐
b. The proposed action may result in a reduction or degradation of any habitat used by any rare, threatened or endangered species, as listed by New York State or the federal government.	E2o	☑	☐
c. The proposed action may cause reduction in population, or loss of individuals, of any species of special concern or conservation need, as listed by New York State or the Federal government, that use the site, or are found on, over, or near the site.	E2p	☑	☐
d. The proposed action may result in a reduction or degradation of any habitat used by any species of special concern and conservation need, as listed by New York State or the Federal government.	E2p	☑	☐

e. The proposed action may diminish the capacity of a registered National Natural Landmark to support the biological community it was established to protect.	E3c	☑	☐
f. The proposed action may result in the removal of, or ground disturbance in, any portion of a designated significant natural community. Source: _____	E2n	☑	☐
g. The proposed action may substantially interfere with nesting/breeding, foraging, or over-wintering habitat for the predominant species that occupy or use the project site.	E2m	☑	☐
h. The proposed action requires the conversion of more than 10 acres of forest, grassland or any other regionally or locally important habitat. Habitat type & information source: _____ _____	E1b	☑	☐
i. Proposed action (commercial, industrial or recreational projects, only) involves use of herbicides or pesticides.	D2q	☑	☐
j. Other impacts: Potential impacts on unique biological communities of the marl ponds due to changes in hydrology. _____		☐	☑

8. Impact on Agricultural Resources

The proposed action may impact agricultural resources. (See Part 1. E.3.a. and b.) ☑NO ☐YES

If "Yes", answer questions a - h. If "No", move on to Section 9.

	Relevant Part I Question(s)	**No, or small impact may occur**	**Moderate to large impact may occur**
a. The proposed action may impact soil classified within soil group 1 through 4 of the NYS Land Classification System.	E2c, E3b	☐	☐
b. The proposed action may sever, cross or otherwise limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc).	E1a, Elb	☐	☐
c. The proposed action may result in the excavation or compaction of the soil profile of active agricultural land.	E3b	☐	☐
d. The proposed action may irreversibly convert agricultural land to non-agricultural uses, either more than 2.5 acres if located in an Agricultural District, or more than 10 acres if not within an Agricultural District.	E1b, E3a	☐	☐
e. The proposed action may disrupt or prevent installation of an agricultural land management system.	El a, E1b	☐	☐
f. The proposed action may result, directly or indirectly, in increased development potential or pressure on farmland.	C2c, C3, D2c, D2d	☐	☐
g. The proposed project is not consistent with the adopted municipal Farmland Protection Plan.	C2c	☐	☐
h. Other impacts: _____		☐	☐

9. Impact on Aesthetic Resources

The land use of the proposed action are obviously different from, or are in sharp contrast to, current land use patterns between the proposed project and a scenic or aesthetic resource. (Part 1. E.1.a, E.1.b, E.3.h.)

☑ NO ☐ YES

If "Yes", answer questions a - g. If "No", go to Section 10.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. Proposed action may be visible from any officially designated federal, state, or local scenic or aesthetic resource.	E3h	☐	☐
b. The proposed action may result in the obstruction, elimination or significant screening of one or more officially designated scenic views.	E3h, C2b	☐	☐
c. The proposed action may be visible from publicly accessible vantage points: i. Seasonally (e.g., screened by summer foliage, but visible during other seasons) ii. Year round	E3h	 ☐ ☐	 ☐ ☐
d. The situation or activity in which viewers are engaged while viewing the proposed action is: i. Routine travel by residents, including travel to and from work ii. Recreational or tourism based activities	E3h E2q, E1c	 ☐ ☐	 ☐ ☐
e. The proposed action may cause a diminishment of the public enjoyment and appreciation of the designated aesthetic resource.	E3h	☐	☐
f. There are similar projects visible within the following distance of the proposed project: 0-1/2 mile ½ -3 mile 3-5 mile 5+ mile	D1a, E1a, D1f, D1g	☐	☐
g. Other impacts: _____ _____		☐	☐

10. Impact on Historic and Archeological Resources

The proposed action may occur in or adjacent to a historic or archaeological resource. (Part 1. E.3.e, f. and g.)

☑ NO ☐ YES

If "Yes", answer questions a - e. If "No", go to Section 11.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may occur wholly or partially within, or substantially contiguous to, any buildings, archaeological site or district which is listed on the National or State Register of Historical Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places.	E3e	☐	☐
b. The proposed action may occur wholly or partially within, or substantially contiguous to, an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory.	E3f	☐	☐
c. The proposed action may occur wholly or partially within, or substantially contiguous to, an archaeological site not included on the NY SHPO inventory. Source: _____	E3g	☐	☐

d. Other impacts: _____ _____		☐	☐
e. If any of the above (a-d) are answered "Moderate to large impact may occur", continue with the following questions to help support conclusions in Part 3:			
i. The proposed action may result in the destruction or alteration of all or part of the site or property.	E3e, E3g, E3f	☐	☐
ii. The proposed action may result in the alteration of the property's setting or integrity.	E3e, E3f, E3g, E1a, E1b	☐	☐
iii. The proposed action may result in the introduction of visual elements which are out of character with the site or property, or may alter its setting.	E3e, E3f, E3g, E3h, C2, C3	☐	☐

11. Impact on Open Space and Recreation

The proposed action may result in a loss of recreational opportunities or a reduction of an open space resource as designated in any adopted municipal open space plan.
(See Part 1. C.2.c, E.1.c., E.2.q.)
If "Yes", answer questions a - e. If "No", go to Section 12.

☐ NO ☑ YES

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may result in an impairment of natural functions, or "ecosystem services", provided by an undeveloped area, including but not limited to stormwater storage, nutrient cycling, wildlife habitat.	D2e, E1b E2h, E2m, E2o, E2n, E2p	☐	☑
b. The proposed action may result in the loss of a current or future recreational resource.	C2a, E1c, C2c, E2q	☑	☐
c. The proposed action may eliminate open space or recreational resource in an area with few such resources.	C2a, C2c E1c, E2q	☑	☐
d. The proposed action may result in loss of an area now used informally by the community as an open space resource.	C2c, E1c	☑	☐
e. Other impacts: Impact on recreational trails around marl ponds. _____		☐	☑

12. Impact on Critical Environmental Areas

The proposed action may be located within or adjacent to a critical environmental area (CEA). (See Part 1. E.3.d)
If "Yes", answer questions a - c. If "No", go to Section 13.

☑ NO ☐ YES

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may result in a reduction in the quantity of the resource or characteristic which was the basis for designation of the CEA.	E3d	☐	☐
b. The proposed action may result in a reduction in the quality of the resource or characteristic which was the basis for designation of the CEA.	E3d	☐	☐
c. Other impacts: _____ _____		☐	☐

13. Impact on Transportation

The proposed action may result in a change to existing transportation systems. ☑ NO ☐ YES
(See Part 1. D.2.j)
If "Yes", answer questions a - f. If "No", go to Section 14.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. Projected traffic increase may exceed capacity of existing road network.	D2j	☐	☐
b. The proposed action may result in the construction of paved parking area for 500 or more vehicles.	D2j	☐	☐
c. The proposed action will degrade existing transit access.	D2j	☐	☐
d. The proposed action will degrade existing pedestrian or bicycle accommodations.	D2j	☐	☐
e. The proposed action may alter the present pattern of movement of people or goods.	D2j	☐	☐
f. Other impacts: _____ _____		☐	☐

14. Impact on Energy

The proposed action may cause an increase in the use of any form of energy. ☑ NO ☐ YES
(See Part 1. D.2.k)
If "Yes", answer questions a - e. If "No", go to Section 15.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action will require a new, or an upgrade to an existing, substation.	D2k	☐	☐
b. The proposed action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two-family residences or to serve a commercial or industrial use.	D1f, D1q, D2k	☐	☐
c. The proposed action may utilize more than 2,500 MWhrs per year of electricity.	D2k	☐	☐
d. The proposed action may involve heating and/or cooling of more than 100,000 square feet of building area when completed.	D1g	☐	☐
e. Other Impacts: _____ _____			

15. Impact on Noise, Odor, and Light

The proposed action may result in an increase in noise, odors, or outdoor lighting. ☑ NO ☐ YES
(See Part 1. D.2.m., n., and o.)
If "Yes", answer questions a - f. If "No", go to Section 16.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may produce sound above noise levels established by local regulation.	D2m	☐	☐
b. The proposed action may result in blasting within 1,500 feet of any residence, hospital, school, licensed day care center, or nursing home.	D2m, E1d	☐	☐
c. The proposed action may result in routine odors for more than one hour per day.	D2o	☐	☐

d. The proposed action may result in light shining onto adjoining properties.	D2n	☐	☐
e. The proposed action may result in lighting creating sky-glow brighter than existing area conditions.	D2n, E1a	☐	☐
f. Other impacts: _____ _____		☐	☐

16. Impact on Human Health

The proposed action may have an impact on human health from exposure to new or existing sources of contaminants. (See Part 1.D.2.q., E.1. d. f. g. and h.) ☐ NO ☑ YES

If "Yes", answer questions a - m. If "No", go to Section 17.

	Relevant Part I Question(s)	No,or small impact may cccur	Moderate to large impact may occur
a. The proposed action is located within 1500 feet of a school, hospital, licensed day care center, group home, nursing home or retirement community.	E1d	☑	☐
b. The site of the proposed action is currently undergoing remediation.	E1g, E1h	☑	☐
c. There is a completed emergency spill remediation, or a completed environmental site remediation on, or adjacent to, the site of the proposed action.	E1g, E1h	☑	☐
d. The site of the action is subject to an institutional control limiting the use of the property (e.g., easement or deed restriction).	E1g, E1h	☑	☐
e. The proposed action may affect institutional control measures that were put in place to ensure that the site remains protective of the environment and human health.	E1g, E1h	☑	☐
f. The proposed action has adequate control measures in place to ensure that future generation, treatment and/or disposal of hazardous wastes will be protective of the environment and human health.	D2t	☑	☐
g. The proposed action involves construction or modification of a solid waste management facility.	D2q, E1f	☑	☐
h. The proposed action may result in the unearthing of solid or hazardous waste.	D2q, E1f	☑	☐
i. The proposed action may result in an increase in the rate of disposal, or processing, of solid waste.	D2r, D2s	☑	☐
j. The proposed action may result in excavation or other disturbance within 2000 feet of a site used for the disposal of solid or hazardous waste.	E1f, E1g E1h	☑	☐
k. The proposed action may result in the migration of explosive gases from a landfill site to adjacent off site structures.	E1f, E1g	☑	☐
l. The proposed action may result in the release of contaminated leachate from the project site.	D2s, E1f, D2r	☑	☐
m. Other impacts: Impact from microbes and pathogens that may enter groundwater from mining pond and then enter the municipal water supply system via municipal wells.		☐	☑

17. Consistency with Community Plans

The proposed action is not consistent with adopted land use plans. ☑ NO ☐ YES

(See Part 1. C.1, C.2. and C.3.)

If "Yes", answer questions a - h. If "No", go to Section 18.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action's land use components may be different from, or in sharp contrast to, current surrounding land use pattern(s).	C2, C3, D1a E1a, E1b	☐	☐
b. The proposed action will cause the permanent population of the city, town or village in which the project is located to grow by more than 5%.	C2	☐	☐
c. The proposed action is inconsistent with local land use plans or zoning regulations.	C2, C2, C3	☐	☐
d. The proposed action is inconsistent with any County plans, or other regional land use plans.	C2, C2	☐	☐
e. The proposed action may cause a change in the density of development that is not supported by existing infrastructure or is distant from existing infrastructure.	C3, D1c, D1d, D1f, D1d, Elb	☐	☐
f. The proposed action is located in an area characterized by low density development that will require new or expanded public infrastructure.	C4, D2c, D2d D2j	☐	☐
g. The proposed action may induce secondary development impacts (e.g., residential or commercial development not included in the proposed action)	C2a	☐	☐
h. Other: _____ _____		☐	☐

18. Consistency with Community Character

The proposed project is inconsistent with the existing community character. ☑ NO ☐ YES

(See Part 1. C.2, C.3, D.2, E.3)

If "Yes", answer questions a - g. If "No", proceed to Part 3.

	Relevant Part I Question(s)	No, or small impact may occur	Moderate to large impact may occur
a. The proposed action may replace or eliminate existing facilities, structures, or areas of historic importance to the community.	E3e, E3f, E3g	☐	☐
b. The proposed action may create a demand for additional community services (e.g. schools, police and fire)	C4	☐	☐
c. The proposed action may displace affordable or low-income housing in an area where there is a shortage of such housing.	C2, C3, D1f D1g, E1a	☐	☐
d. The proposed action may interfere with the use or enjoyment of officially recognized or designated public resources.	C2, E3	☐	☐
e. The proposed action is inconsistent with the predominant architectural scale and character.	C2, C3	☐	☐
f. Proposed action is inconsistent with the character of the existing natural landscape.	C2, C3 E1a, E1b E2g, E2h	☐	☐
g. Other impacts: _____ _____		☐	☐

PRINT FULL FORM

Agency Use Only [IfApplicable]

Project : 7-1122-00043/00008

Date : 5-26-21

Full Environmental Assessment Form
Part 3 - Evaluation of the Magnitude and Importance of Project Impacts
and
Determination of Significance

Part 3 provides the reasons in support of the determination of significance. The lead agency must complete Part 3 for every question in Part 2 where the impact has been identified as potentially moderate to large or where there is a need to explain why a particular element of the proposed action will not, or may, result in a significant adverse environmental impact.

Based on the analysis in Part 3, the lead agency must decide whether to require an environmental impact statement to further assess the proposed action or whether available information is sufficient for the lead agency to conclude that the proposed action will not have a significant adverse environmental impact. By completing the certification on the next page, the lead agency can complete its determination of significance.

Reasons Supporting This Determination:

To complete this section:

- Identify the impact based on the Part 2 responses and describe its magnitude. Magnitude considers factors such as severity, size or extent of an impact.
- Assess the importance of the impact. Importance relates to the geographic scope, duration, probability of the impact occurring, number of people affected by the impact and any additional environmental consequences if the impact were to occur.
- The assessment should take into consideration any design element or project changes.
- Repeat this process for each Part 2 question where the impact has been identified as potentially moderate to large or where there is a need to explain why a particular element of the proposed action will not, or may, result in a significant adverse environmental impact.
- Provide the reason(s) why the impact may, or will not, result in a significant adverse environmental impact
- For Conditional Negative Declarations identify the specific condition(s) imposed that will modify the proposed action so that no significant adverse environmental impacts will result.
- Attach additional sheets, as needed.

Please see attached Part 3 Positive Declaration Narrative.

Determination of Significance - Type 1 and Unlisted Actions

SEQR Status: ☑ Type 1 ☐ Unlisted

Identify portions of EAF completed for this Project: ☑ Part 1 ☑ Part 2 ☑ Part 3

Upon review of the information recorded on this EAF, as noted, plus this additional support information

The full public record submitted by the applicant, comments received during the public notice period, and resource information available at the New York State Department of Environmental Conservation.

and considering both the magnitude and importance of each identified potential impact, it is the conclusion of the New York State Department of Environmental Conservation as lead agency that:

☐ A. This project will result in no significant adverse impacts on the environment, and, therefore, an environmental impact statement need not be prepared. Accordingly, this negative declaration is issued.

☐ B. Although this project could have a significant adverse impact on the environment, that impact will be avoided or substantially mitigated because of the following conditions which will be required by the lead agency:

There will, therefore, be no significant adverse impacts from the project as conditioned, and, therefore, this conditioned negative declaration is issued. A conditioned negative declaration may be used only for UNLISTED actions (see 6 NYCRR 617.7(d)).

☑ C. This Project may result in one or more significant adverse impacts on the environment, and an environmental impact statement must be prepared to further assess the impact(s) and possible mitigation and to explore alternatives to avoid or reduce those impacts. Accordingly, this positive declaration is issued.

Name of Action: Cortlandville Sand & Gravel Mine Proposed Modification to Expand Laterally and Below the Water Table

Name of Lead Agency: New York State Department of Environmental Conservation

Name of Responsible Officer in Lead Agency: Dr. Cynthia M. Hill

Title of Responsible Officer: Environmental Analyst

Signature of Responsible Officer in Lead Agency:  Date: 5/26/2021

Signature of Preparer (if different from Responsible Officer) Date:

For Further Information:

Contact Person: Dr. Cynthia M. Hill

Address: 615 Erie Boulevard West, Syracuse, NY 13204-2400

Telephone Number: 315-426-5465

E-mail: cynthia.hill@dec.ny.gov

For Type 1 Actions and Conditioned Negative Declarations, a copy of this Notice is sent to:

Chief Executive Officer of the political subdivision in which the action will be principally located (e.g., Town / City / Village of)
Other involved agencies (if any)
Applicant (if any)
Environmental Notice Bulletin: http://www.dec.ny.gov/enb/enb.html

PRINT FULL FORM

PART 3 POSITIVE DECLARATION NARRATIVE

Impact on Land

The proposed action will involve removal of approximately 12 million tons of sand and gravel. There would be a permanent alteration to the existing topography within the area affected by mining from the removal of in-situ sand and gravel. This impact is unavoidable because of the progressive, consumptive nature of mining; however, this impact is not necessarily significant or adverse.

The proposed action will also involve mining 100 feet below the water table. Lowering the final mine floor elevation to extract additional reserves is a standard mining practice and typically would not result in a significant adverse impact; however, in this location, there could be impacts to municipal water supplies, recreational facilities, and unique flora and fauna of marl ponds, and these potentially significant impacts need to be further evaluated.

Impacts on Surface Water

A final reclamation plan is proposed to restore the site to a 52.4-acre pond with an open water surface. The applicant in the response to public comments reported that the northwestern corner of the proposed mining pond most likely falls within the capture zone of the municipal water wells. There needs to be further evaluation of potentially significant impacts from the creation of the mining pond to the quality and quantity of municipal potable water.

Impact on Geological Features

The creation of the mining pond will change the hydrology and therefore may potentially impact the surface areas of the adjacent marl ponds. The potentially significant impacts of this change need further evaluation.

Impacts on Ground Water/Impacts on Human Health

Potential risks to the sole source aquifer and nearby municipal water supply wells from mining below the water table require additional evaluation. More specifically, potentially significant impacts associated with microbes and pathogens entering the water table from the mining pond need to be further assessed.

Impact on Flooding/Impact on Open Space and Recreation

DEC expects that the mining pond will recharge the North Pond under some circumstances and that, overall, this hydraulic connectivity will make North Pond's water level more consistent over time, with water levels seasonally 1-2 feet higher and with a lower propensity for the pond to dry completely. Furthermore, the applicant's report of the potential energy of the water in the mining pond stated that there will be a greater head in the mining pond than in Mid Pond, thereby causing water from the mining pond to also flow into Mid Pond under some

circumstances. Flooding of recreational trails and other recreational amenities is a potential impact. These hydrologic changes may have potentially significant impacts that need evaluation.

Impacts on Plants and Animals/Associated Impact on Recreation

The potentially significant changes in hydrology of the marl ponds may negatively impact their unique flora and fauna. The unique flora and fauna are the main attraction of the Lime Hollow Nature Preserve, a recreational resource important to biologists and other naturalists. This potentially significant impact needs further evaluation.

State Environmental Quality Review
POSITIVE DECLARATION
Determination of Significance

DEC Project Number: 7-1122-00043/00008 (MLR No. 70436) Date: May 26, 2021

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

DEC, as lead agency, has determined that the proposed action described below may have a potential significant adverse impact on the environment and that a Draft Environmental Impact Statement will be prepared. This positive declaration replaces a negative declaration issued on January 20, 2021 that has been rescinded.

Action: Cortlandville Sand & Gravel Mine Proposed Expansion including Mining Below Water Table

SEQR Status: Type I

Note: A comment period will be announced in the ENB, after receipt of a draft scope of issues.

Location: The project site is owned by Christopher Henry Holdings, LLC, and is located at 765 State Route 13 in the Town of Cortlandville, County of Cortland, southwest of the City of Cortland.

Description of Action: RT 13 Rocks, LLC, operates the Cortlandville Sand & Gravel Mine which is a 66.8-acre life-of mine (LOM) area on approximately 120 acres of land. The applicant proposes (1) a vertical expansion of the existing mine that would include mining sand and gravel up to 100 feet below the local water table, (2) a lateral expansion of 10.1 acres south/southeast of the current LOM area, and (3) the removal of 0.4 acres of unaffected land from the existing LOM in the northwest. The final LOM acreage would be 76.5 acres on approximately 120 acres of land. A final reclamation plan is proposed to restore the site to a 52.4-acre pond with an open water surface, along with graded and revegetated slopes.

Reasons Supporting This Determination (Potentially Significant Impacts):
The proposed action could have potentially significant impacts to municipal water supplies, recreational facilities, and unique flora and fauna of marl ponds.

A final reclamation plan is proposed to restore the site to a 52.4-acre pond with an open water surface. The applicant in the response to public comments reported that the northwestern corner of the proposed mining pond most likely falls within the capture zone of the municipal water wells.

The creation of the mining pond will change the hydrology and therefore may potentially impact the surface areas of the adjacent marl ponds.

Potential risks to the sole source aquifer and nearby municipal water supply wells from mining below the water table require additional evaluation. More specifically, potentially significant impacts associated with microbes and pathogens entering the water table from the mining pond need to be further assessed.

DEC expects that the mining pond will recharge the North Pond under some circumstances and that, overall, this hydraulic connectivity will make North Pond's water level more consistent over time, with water levels seasonally 1-2 feet higher and with a lower propensity for the pond to dry completely.

Furthermore, the applicant's report of the potential energy of the water in the mining pond stated that there will be a greater head in the mining pond than in Mid Pond, thereby causing water from the mining pond to also flow into Mid Pond under some circumstances.

The potentially significant changes in hydrology of the marl ponds may negatively impact their unique flora and fauna.

For Further Information:

Contact Person: Cynthia Hill, Environmental Analyst
Address: NYS DEC Region 7 Permits, 615 Erie Boulevard West, Syracuse, NY 13204
Email: dep.r7@dec.ny.gov

DISTRIBUTION LIST FOR THE POSITIVE DECLARATION
7-1122-00043 Cortlandville Sand & Gravel

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Daniel Lang, NYS Department of Health

Municipal Involved Party (Town of Cortlandville)
Tom Williams, Town Supervisor
John Delvecchio, Attorney
Katherine Wickwire, Town Planning Board
Patty O'Mara, Clerk
Bruce Weber, Town Planner,
Richard Tupper, Former Town Supervisor
John Proud, Former Town Board Member

Interested Parties
Paul Heider, Chairman, Cortland County Legislature
Eric J. Mulvihill, Clerk, Cortland County Legislature
Sarah Hempstead, Deputy Clerk, Cortland County Legislature
Lisa Perfetti, Cortland County Director of Community Health Services
Mike Ryan, Cortland County Director of Environmental Health
Daniel Dineen, Cortland County Planner
Amanda Barber, Cortland County Soil & Water Conservation District
Kathleen McGrath, Water Quality Specialist, Cortland Co. Soil and Water Conservation District
Pat Reidy, Cortland County Soil & Water Conservation District
David Haklar, District Manager, Susquehanna River Basin Commission
Glenn D. Reisweber, Executive Director, Lime Hollow Nature Center
Pam Jenkins, Interested Citizen
Susan Fitts, Interested Citizen
L. D. Matson, P.G., Interested Citizen
Paul H. Griggs, Principal Geologist, Griggs-Lang Consulting Geologists & Engineers, P.C.

Appendix 1.C: 2022 Final Scoping Document for Draft Environmental Impact Statement (NYSDEC)

FINAL SCOPING DOCUMENT FOR DRAFT ENVIRONMENTAL IMPACT STATEMENT

Cortlandville Sand & Gravel Mine
NYSDEC Mine Permit #7-1122-00043/00008
Town of Cortlandville, Cortland County, New York

***SEQR Lead Agency*:**

New York State Department of Environmental Conservation
Region 7
615 Erie Boulevard West
Syracuse, NY 13204
(315) 426-7438
DEP.R7@dec.ny.gov

Applicant:

Route 13 Rocks, LLC
765 State Route 13
Cortland, NY 13045

Applicant's Consultant:

H2H Geoscience Engineering PLLC
179 River Street
Troy, New York 12180
(518) 270-1620
www.h2hg-e.com

Dated May 27, 2022

Introduction

The Cortlandville Sand and Gravel Mine (Mine) is owned and operated by Route 13 Rocks, LLC (Applicant). The Mine is in the Town of Cortlandville (Town), Cortland County, New York, on a parcel west of Route 13, south of Lime Hollow Road, and east of the Lime Hollow Nature Center. The permitted Life of Mine area comprises 66.8 acres. The permitted mine floor elevation of approximately 1,172 feet above mean sea level (amsl) is based on maintaining a minimum 8-foot separation distance above the mean high-water table.

In April 2017, Route 13 Rocks, LLC, applied to the New York State Department of Environmental Conservation (DEC) to modify an existing Mined Land Reclamation Permit for the Cortlandville Sand and Gravel Mine. Applicant is seeking a permit modification to mine an additional 11.9 acres laterally and to mine approximately 100 feet below the water table to the bottom of the sand and gravel outwash deposit, which may be as deep as elevation 1,070 feet amsl. No mining below the water table is currently permitted at the mine, so mining below the water table requires a modification of the current 8-foot separation distance requirement. If the application is approved, the applicant will restore the site to a 52.4-acre pond with an open water surface, along with graded and revegetated slopes.

As proposed at full build-out, the deepened mine would be approximately 50 acres, 400 to 600 feet wide (west-east), 2,500 feet long, and a maximum of 100 feet deep in the middle of the proposed mine pond. Proposed excavation would begin at the north end and extend full depth as mining migrates back and forth, east, and west, and gradually advance to the south. Upland slopes will be required to be reclaimed prior excavation below the water table. The open area of the proposed mine pond would increase gradually as mining progresses. The rate of advancement and overall duration of mining would depend upon market-based demand for sand and gravel.

On May 26, 2021, the Department, as Lead Agency designated pursuant to the New York State Environmental Quality Review Act (SEQR), issued a Positive Declaration for the proposed expansion. This positive declaration requires the applicant to prepare a draft environmental impact statement (DEIS) in accordance with a scoping document. The regulations at 6 NYCRR § 617.8 require DEC to develop this scoping document, which must include "a description of the proposed action, the potential significant adverse impacts, the extent and quality of information needed to address each impact (including the methods for obtaining and analyzing this information), an initial identification of mitigation measures, and the reasonable alternatives to be considered."

Accordingly, a draft scope describing the content and format of the DEIS was published on March 28, 2022 to afford the public an opportunity to make written comments and participate in the process, so that the DEIS will address potentially significant adverse environmental impacts, will include relevant existing information, will include necessary additional information, and will address reasonable alternatives and potential mitigation measures. The resulting DEIS will be the basis for the Lead Agency decision regarding significance of potential environmental impacts associated with the proposal, as well as an evaluation of potential impacts associated with each alternative. As the applicant evaluates new data collected or analyzed for the DEIS, Route 13 Rocks, LLC may add alternatives to the DEIS that the applicant deems will best mitigate or eliminate risks of any potential environmental impacts.

The DEIS will include much information already associated with the pending application. Prior to the Department's issuance of the SEQR Positive Declaration, this proposed mine expansion underwent Departmental review in accordance with the Mined Land Reclamation Act, SEQR regulations, and the Uniform Procedures Act. In response to Notices of Incomplete Application, the applicant in March 2018 retained H2H Geoscience Engineering PLLC (H2H) to conduct a hydrogeologic investigation. The purpose was to evaluate how the proposed modification could potentially affect the quality and quantity of groundwater at the Town's Lime Hollow well field, which is located about 800 feet northwest of the permitted mine. H2H conducted the investigation, collecting data over the one-year period from February 2019 to February 2020, summarizing findings in a progress report in July 2019 and a final report dated March 20, 2020. H2H provided additional findings in a Response to Public Comment Document dated April 16, 2021. The outcome of this research and other data from the application will be summarized in the DEIS along with additional required information.

The final scope of the DEIS for the Cortlandville Sand and Gravel Mine is identified below. It will include the following sections:

1.0 COVER SHEET

Type of document (draft, final), title of project, location, name, and address of SEQR Lead Agency contact person, name and address of document preparer, date of Lead Agency acceptance, date of DEIS hearing, and deadline for acceptance of public and agency comments.

2.0 TABLE OF CONTENTS

3.0 INTRODUCTION

The DEIS will discuss the identified potential environmental issues for the project. These issues will be presented and discussed, as described below.

3.1 **Project Description.** This section will describe the proposed lateral and vertical expansion of the mine and whether they are dependent on each other for the economic viability of the mine.

3.2 **Executive Summary.** This summary will present an overview of the project, provide a brief description of the overall proposed action, and list the following:

3.2.1 Significant Potential Adverse Impacts,

3.2.2 Alternatives Considered, including the No Action Alternative

3.2.3 Mitigation Measures Proposed, and

3.2.4 Matters To Be Decided, including a List of Each Permit or Approval Required.

3.3 **Purpose and Need for the Proposed Action.** The DEIS will identify and discuss the purpose, need, and public benefit of the proposed project.

3.4 **Environmental Review Process.**

3.4.1 **Approvals Required.** This section of the DEIS will provide an overview of the permits and approvals presently anticipated to be required for the proposed project, the agencies responsible for the approvals, and the applicable law or regulations associated with each approval. The information will be provided in a table, and this table may be revised as additional information is obtained. A draft of Table 1.0 is attached to this final scope.

By way of background, the processing of certain environmental permit applications by DEC is governed by the requirements of the Uniform Procedures Regulations within 6 NYCRR Part 621. The intent of the Uniform Procedures Regulations is to ensure timely review of projects requiring DEC environmental permits. Projects

that are also subject to the SEQR regulations must satisfy SEQR requirements before the permit applications reviewed under Part 621 are deemed complete. When DEC, as the SEQR lead agency, determines that a DEIS is required, the acceptance of the DEIS for public review is a pre-requisite for a complete DEC permit application.

3.4.2 State Environmental Quality Review. This section of the DEIS will provide a brief description and chronology of the key SEQR review steps (e.g., lead agency designation, positive declaration, etc.). Copies of key SEQR determinations and documents will be provided in an appendix to the DEIS.

By way of background, the New York State Environmental Quality Review Act (SEQR) and its implementing regulations at 6 NYCRR Part 617 require agencies to assess the potential environmental impacts of proposed projects during the permitting process. Under SEQR, potentially significant adverse environmental impacts are evaluated in a DEIS.

A DEIS is intended to function as a disclosure document to provide information about the potential environmental impacts of the proposed action and provide a basis for informed decisions. The DEIS identifies and addresses the potential environmental impacts of a project and reasonable alternative, if any, and identifies ways to avoid or mitigate any potential adverse impacts to the maximum extent practicable. Also addressed in a DEIS, are irreversible and irretrievable commitments of resources, growth inducing aspects, and the use and conservation of energy.

The DEIS must be written to a level of detail to properly assess the impacts identified and which allows agencies to make reasoned decisions on the action. Many of the issues discussed herein will also be reviewed in accordance with the New York State statutory requirements relating to a particular regulatory program (e.g., DEC's mineral resources permit program; or ECL Article 23, Title 27 [https://www.dec.ny.gov/lands/5020.html]; as well as required local government approvals). In general, the DEIS will follow the content requirements of the SEQR regulations at 6 NYCRR § 617.9(b).

4.0 ENVIRONMENTAL SETTING, SIGNIFICANT ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS

The DEIS will describe the environmental setting (existing conditions), potentially significant environmental impacts, and mitigation measures within each of the topic areas identified below. It will also describe those adverse environmental impacts that cannot be avoided or adequately mitigated if the proposed action is implemented. Technical reports supporting the analysis provided in each section shall be included as appendices to the DEIS in Section 11.0.

The topic areas listed below are drawn from the Notice of Positive Declaration. In that document, the potentially significant environmental impacts of mining 100 feet below the water table include impacts on the underlying aquifer and associated quantity and quality of municipal potable water supplies, impacts on nearby recreational facilities, and impacts on the unique flora and fauna of adjacent marl ponds. The impacts to ground water/human health are summarized as the potential risk to the sole source aquifer and nearby municipal water supply wells, specifically including potentially significant impacts associated with microbes and pathogens that may enter the water table from the mine pond. Accordingly, the topic areas for the DEIS will be the following:

1. Potential that mine pond water could enter the wellheads at Lime Hollow wells and potential risk to the quantity of the municipal potable water supply,
2. Assuming the mine pond water could enter the wellheads at Lime Hollow wells, potential risk to the quality of the municipal potable water supply,
3. Potential for the mine pond to negatively impact the unique flora and fauna of the adjacent marl ponds, and
4. Potential for impact on recreation, scientific education, and scientific research opportunities that are dependent on the unique flora and fauna of the marl ponds.

The first two DEIS topic areas are specifically parsed to separate a) the consideration of flow paths from b) the contamination potential. Thus, the DEIS under Topic 2 will assume, whether true or not, that the mine pond water could enter the wellheads at the Lime Hollow wells.

For each topic area identified above, the DEIS will describe the environmental setting, evaluate potentially significant environmental impacts, and identify impact mitigation measures. Information is provided below regarding how the environmental setting, potentially significant environmental impacts, additional information, and mitigation measures will be developed in the DEIS for each topic. The DEIS will include

but not be limited to the listed methods and mitigation measures. In addition, using new information collected in accordance with this scope, the DEIS will include any changes or additions to the hydrogeologic conceptual model currently presented in application materials and summarized below.

4.1 Groundwater Flows (Topic 1)

The first topic area is the potential that the water from the mine pond will flow via groundwater flow paths to the area of the municipal wellheads and be drawn into the municipal wells to enter the Town's potable water supply. This topic will include a discussion regarding whether groundwater has the potential to flow from the mine pond directly or in a zig-zag path to the wells, and whether groundwater has the potential to flow from the proposed mine pond to an existing marl pond called North Pond and subsequently to the wells. This potential for water to reach the wells and be drawn into the wellheads will be discussed in the context of seasonal and annual variations in the height of the water table. Other items to be addressed when evaluating flow paths include the potential for mixing of mine pond water with other groundwater that flows into the area from west of the mine pond (creating what is called a peripheral flow zone). Furthermore, the DEIS will include consideration of the "mounding effect" that can impact flow paths of groundwater in the vicinity of large surface water bodies such as the proposed mine pond. The DEIS will discuss how the combined presence of a peripheral flow zone and the mounding effect would likely impact groundwater flow paths. It will also include a consideration of preferential groundwater flow that can under local conditions allow water to travel through an aquifer faster than it would through a purely homogeneous sand and gravel aquifer. Predicted flow paths and predicted duration of the flow paths will be discussed with respect not just to current withdrawal regimes but also with respect to the maximum water withdrawals currently permitted for the municipal wells.

Application materials indicate that the risk to the municipal water supply would be greatest when the wells draw down the local water table in a cone of depression and expand the groundwater capture zone to the northwestern part of the proposed mine pond. According to application materials, expansion of the capture zone is most likely to occur under very low water table conditions. A hydraulic gradient is predicted to occur between the mine pond and the wells due to the buildup of water in the water table north of the proposed mine pond (mounding effect). While transport of any mine pond water to the municipal wells may or may not occur because of this hydraulic gradient, the combined effect of mounding and simultaneous drawdown during dry conditions may create a worst-case

scenario that must be addressed in the DEIS.

Environmental Setting

Local Hydrogeologic Setting - The study area overlies a highly productive approximately 100-foot-thick unconfined glacial aquifer system comprised of well-graded, coarse sand and gravel with trace (1.4 to 6.4%) silt and clay, as well as a confined aquifer below a lacustrine deposit that acts as a confining layer between the two aquifers. The unconfined aquifer is in a sparsely populated area near the upgradient head of the local groundwater watershed. This aquifer supplies the primary source of drinking water in the area and has been designated a sole source aquifer.

Natural Resources - The two Lime Hollow well field wells operate alternately to potentially withdraw up to 800 gallons per minute (gpm) of groundwater. The sand and gravel above the water table and below the water table serve as a valuable source of sand and gravel aggregate. Mining has existed at the site for approximately 40 years. The study area thus contains two important natural resources: an aquifer that supplies the principal source of water for the community; and aggregate, a principal component required for maintenance and building of infrastructure and local/regional development projects.

Ambient Groundwater Flow – The applicant calculated the groundwater flow direction using the continual water level measurements in the three shallow monitoring wells at the north end of the proposed mine pond. The data enabled resolution of the apparent groundwater flow direction by day. Applicant analyses indicate groundwater flows horizontally in a northeasterly direction year-round under a seasonally varying hydraulic gradient that averages approximately 0.003.

Town Wells Recharge – Application materials state that the groundwater recharge to the Town wells is predominantly by the natural groundwater flow from the area south and southwest of the well field. Furthermore, application materials state that the width of groundwater flow captured passively by the Town wells varies based on groundwater level and the hydraulic gradient. Assuming well withdrawal of 800 gpm (maximum reported), the applicant has estimated the width of the flow path perpendicular to the flow direction as approximately 600 to 1,260 feet, or a half-width of approximately 300 to 630 feet, in the area east of the well field under varying groundwater level conditions. The application

goes on to say that the Town well is likely recharged periodically to a lesser degree by surface water stored in the North Marl Pond. The application states that the shorelines of that pond range from approximately 345 feet to 570 feet east of the nearest Town well and are thus located seasonally within the Town wells' capture zone. At these times the Town would potentially draw down the surface water level of the North Marl Pond, but this interaction would be mitigated by groundwater recharge to the pond. This effect has not yet been quantified but will be investigated as part of the DEIS scope, especially with respect to whether that recharge water might originate in the proposed Mine Pond. The DEIS will evaluate whether the Town well's radius will reach the North Marl Pond or the Mine Pond under various scenarios of water table height. It will also evaluate whether any mine pond water, if it reaches the wells, would potentially travel to the depth of the intake of the wells. Application materials suggest that groundwater flow paths are predominantly horizontal and that mine pond water would not necessarily travel to the depth of the wellhead intakes even if the water were to reach the wells.

Future Changes to Groundwater Levels and Flow System – Application materials state that the local groundwater levels and flow directions would minimally, gradually change at the north and south ends of the proposed mine pond as the excavation gradually expands. The application provides the following additional details: This expansion will result in the mine pond's surface water level equilibrating with the modified ambient groundwater levels at the north and south ends. The mine pond surface water level will be relatively higher than ambient groundwater at the north end and lower at the south end. Water will flow out of the mine pond at the north end and into the pond at the south end. At proposed full build-out the approximate total elevation difference of groundwater levels at the north and south ends would be approximately 4 feet during low groundwater conditions. The magnitude of the surface and groundwater elevation differences at the two pond ends would therefore be approximately 2 feet. The pond level and groundwater levels should be the same at the midline of the mine pond which would be the vicinity of the Mid Marl Pond. No water flow exchange would be anticipated for this location. The DEIS scope will include re-evaluation of future groundwater levels and flow system.

Wellhead Protection Area - The Town has designated a wellhead protection area that extends in a hydraulically side-gradient direction onto Applicant's property east of the North Marl Pond. The wellhead protection area was developed using a 2002 numerical model that was based on certain assumptions inputted into the model. The DEIS will

include re-assessment of this modeling to maximum extent practicable.

Work Plan

The DEIS may include but not be limited to the following additional data and hydrogeologic analysis, analytical modeling, and evaluation:

- Download data and plot hydrographs for the existing site monitoring wells and compare the water levels with prior data.
- Obtain/assess water level data from the Town monitoring and supply wells and compare with the other data.
- Develop planimetric flow nets for different water level and well pumping conditions.
- Develop hydrogeologic cross-sections for different water level and well pumping conditions and mining scenarios; include the nearest Town well and the proposed mine pond in the cross-section.
- Re-calculate hydraulic gradients, flow velocities, flux rates, travel times, and travel distances for groundwater flowing from the proposed mine pond toward the well field under current and anticipated future conditions while considering the natural ambient groundwater flow between the proposed mine pond and well field. Compare results with prior estimates.
- Estimate hypothetical dilution ratio of groundwater induced to flow toward the nearest Town well from groundwater to the southeast.
- Estimate the distance that the Town well's radius of influence extends onto the mine property for different seasonal scenarios under existing and anticipated future conditions taking into account future influence of climate change and including but not limited to conditions during the 10-year low and 180-day drought conditions.
- Compare the hydrogeologic analysis for the proposed mine expansion with the Town's 2002 numerical model to describe consistencies and discrepancies between the two documents.

Mitigation

Monitoring of groundwater flow direction would be conducted during the life of the mine to continue to assess flow paths. Additional monitoring may include but not be limited to installing permanent pressure transducers in the Town's nearby Lime Hollow wells and

expanding the Town's well-field monitoring program by adding the Town's monitoring well to the overall monitoring program if the well is suitable. It may also include installing additional monitoring wells south and west of the North Marl Pond and east of the Mid Marl Pond and South Marl Pond. The DEIS will include mitigation measures that will be taken if the resulting data indicate that mine pond water could impact the municipal water supply.

4.2 Groundwater Quality (Topic 2)

The second topic area is the risk to the quality of the municipal potable water supply. In this topic area, the assumption will be that mine pond CAN reach the municipal wells and enter the municipal water supply. The analysis in this topic area will include (a) the potential for pollutants, including petroleum and other operational fluids, microbes and pathogens (e.g., *Giardia, Cryptosporidia*, certain bacteria, protozoa, fungi, and viruses), to enter the sole-source aquifer from the mine pond, considering solubility of petroleum and other operational fluids, (b) a substantiation of the thickness of the lacustrine deposit that acts as a confining layer between the confined and unconfined aquifers in the location of the mine and an assessment of the potential for breaching the confining layer through mining activities and resultant impacts to water quality if such breaching occurs, (c) the potential for those pollutants to attenuate and/or survive as they are carried into and through the aquifer via groundwater toward the municipal wellheads, and (d) the potential impact of such microbes and pathogens and any other potential pollutants, assuming they can reach the municipal wells, on the municipal water supply and ultimately on public health or on the need for remediation to protect public health. Remediation is often required if visible color and/or total dissolved solids trigger a regulatory requirement for water filtration and/or for the addition of chemicals that cause precipitation of impurities. In addition to microbes and pathogens, this section will address any pollution risk from toxic algal blooms, which can occur even in low-nutrient settings with phosphorus concentrations as low as 25 ug/L. When evaluating potential impacts on the quality of water, the applicant will distinguish whenever pertinent, the potential impacts during the actual mining of the sand and gravel deposits and potential impacts from the mine pond after reclamation.

The microbes of concern may travel through the aquifer's pore spaces as colloids. Typical size ranges for colloids and some of the microbes of concern are the following:

- Colloids – general term for small particles of the size 0.001 to 10 um; this includes natural clay particles (<2 to5 micrometers (um)) and microbes
- Viruses – 0.004 – 0.25 um size range
- Bacteria – 0.4-10 um size range
- Cyanobacteria – 0.5 to 40 um, blue-green algae that may cause harmful algal blooms if sufficient nutrients and other conditions are present
- *Crypto sporidia* – 4-5 um in diameter, typical source is feces from parasite-infected animals, especially when water is contaminated with animal wastes
- *Giardia* cysts – 10-14 um on average, typical source is feces from infected animals.

Environmental Setting

Proposed Mine Pond Site Hydrology - Based on applicant hydrogeologic and groundwater quality analyses, the proposed mine pond would consist of a relatively nutrient-poor, low dissolved solids groundwater-flow-through lake. Land use indicates an absence of known point and non-point sources of contamination that could pollute this proposed waterbody. No sources of septic field leachate, urban stormwater runoff, fertilizers, pesticides, herbicides, farm animal wastes, landfill leachate, or commercial or industrial point discharges are known to exist.

The DEIS will describe the current raw water treatment process for municipal water drawn from the Lime Hollow well field.

Work Plan

The DEIS will evaluate the potential risk of an impact from microbes, pathogens and other biological and abiotic contaminants, which depends upon exposure and toxicity. The work plan for assessing potential impacts from microbes and other biological and abiotic contaminants will address but not be limited to the following considerations:

- Whether pathogenic microbes and/or other biological or abiotic contaminants will originate from a source (typically wildlife for pathogenic microbes) at the proposed mine pond.
- Whether the removal of the eight (8) foot separation between the mine floor and the water table will increase the probability of microbes and/or other biological or

abiotic contaminants entering groundwater.

- Whether microbes will survive natural attenuation mechanisms within the habitat of the mine pond.
- Whether microbes and/or other biological or abiotic contaminants will be entrained in the pond water that exfiltrates into groundwater from the pond.
- Whether microbes will survive natural attenuation mechanisms within the sand and gravel aquifer from the pond to the Town well intake; these mechanisms may include sorption, filtration, degradation, and senescence.
- Whether microbes and/or other biological and abiotic contaminants will interact with the gravel, sand, silt, and clay particles which may cause them to be transported more slowly than groundwater; the microbes would need to survive the total travel time required for microbe transport to the wells.
- Whether any harmful microbes would survive routine chlorination/treatment at the potable water treatment plant.
- Whether the microbes and/or other biological or abiotic contaminants would have the potential to adversely affect people and animals that drink or use the municipal water.

Additionally, this workplan may include but not be limited to the following:

Acquire field water quality data (pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential) from the existing site monitoring wells for comparison with prior data, and attempt to obtain the same field water quality data for the Town well water for comparison with site groundwater and for assessment of the potential for different types of microbes to migrate to the Town wells under future conditions; for example, some microbes require well-oxygenated conditions and other thrive in oxygen-deficient conditions (less likely present at the site).

Mitigation

Perform additional groundwater sampling and analysis at sentinel wells (MW-3S and MW-3D) so that the potential presence of microbes and pathogens is adequately characterized. The DEIS will propose what the Applicant would do to mitigate any potential issues identified through monitoring.

Summarize the raw water treatment process the Town uses and state whether the current treatment process would eliminate any public health risk from each of these microbes,

pathogens, and other biological and abiotic contaminants, or if the water is determined to be groundwater under the direct influence of surface water.

4.3 Ecological Impacts (Topic 3)

This topic area will include the potential for the proposed mine pond to negatively impact the unique flora and fauna of the marl ponds due to changes in hydrology (in particular, the propensity for and timing of marl pond desiccation) and associated changes in water chemistry. The detail in this section will include but not be limited to a discussion of desiccation of the marl ponds, which must be sufficient to discern whether desiccation of the marl ponds would be more or less likely to occur earlier in any given year or not at all, and whether the duration and frequency of the desiccation would likely change. Furthermore, the detail in this section must be sufficient to determine if the chemistry of the pond water would change. Constituents of concern include but are not limited to pH and nutrient levels and the ratios between N, P, and C, all of which impact aquatic flora and fauna. Finally, the detail must be sufficient to determine whether changes in hydrology or chemistry would impact the unique flora and fauna of the marl ponds.

Environmental Setting

The offsite area immediately west of the mining site is dominated by wetlands, bogs, and marl ponds. Except for the area adjacent to the north end of the proposed mine pond, these natural environmental assets comprise part of the Lime Hollow Nature Center preserve or are managed by the Nature Center under agreement with the Town. The northernmost and largest of the three marl ponds in this habitat, North Pond, is on Applicant's property and generally between the area north of the proposed mine pond's northern shoreline and the Town's well field. The marl ponds are unique post-glacial features that occupy closed depressions generally at and slightly below the water table. Owing to the relatively high seasonal variation of the depth to the water table, the marl pond bottoms are occasionally stranded seasonally above the water table during sufficiently low groundwater periods. During these low groundwater periods, when they occur, the marl ponds dry up (desiccate) until the water table rises again. The flora and fauna of marl ponds are adapted to both the fluctuations in water and the high pH, low nutrient water chemistry of the ponds.

Anticipated North Marl Pond Hydrologic Changes – The basis for the environmental

concern is the potential seasonal rise in groundwater level at the northwestern area of the fully built-out proposed mine pond. Dynamic groundwater - surface water interactions may cause the North Marl Pond water level to slightly increase because of a higher water level in the proposed mine pond located about 200 feet to the southeast (mounding). The spatial rate of attenuation of this groundwater mounding effect with distance away from the mine pond will be estimated in accordance with best assumptions and modelling techniques available plus additional data from transducers. In addition, if data associated with comparable sites exist, ie., if the applicant's consultant can locate sites where mounding influences groundwater flow paths, the DEIS will use information from such sites to infer the potential impact of mounding on groundwater flows into North Pond.

According to application materials, potential impacts of mounding include but may not be limited to: 1) changes in the likelihood of desiccation and the probable duration of desiccation of the North Marl Pond, 2) a higher water level in the North Marl Pond, which would counteract the potential for the Town well's cone of depression from lowering the North Marl Pond's water level during pumping.

Anticipated South Marl Pond Hydrologic Changes – According to application materials, the south end of the fully-built-out pond will act as a localized groundwater sink. The proposed southwest lobe of the proposed mine pond, which is located south-southwest of the South Marl Pond, may therefore intercept ambient groundwater that would otherwise flow northeasterly toward and into the South Marl Pond. The marl pond's water level, its desiccation area, and the frequency and duration of desiccation may be affected.

Work Plan

The work plan may include but not be limited to the following:

The applicant will submit a plan to DEC for the sampling the presence and species of salamanders in the marl pond. While the DEIS will include a sampling of all salamanders, populations of special interest include two-lined salamanders with unique genetic variations. The DEIS will include results of this survey and indicate, based on available literature, the life cycle of the salamanders and the extent to which they are dependent on marl pond ecosystems and/or seasonal access to aquatic environments for survival. The DEIS will include an analysis of potentially significant impacts on salamanders. One factor

that could harm these organisms is increased propensity for the marl ponds to dry during a time in the summer when immature salamanders live in water. Another factor would be a decrease in the propensity of any given marl pond to desiccate. Desiccation eliminates fish, a major predator of salamanders. In other words, the marl pond ecosystems, and the salamanders as part of these ecosystems, are dependent on the ponds drying up periodically.

The DEIS will identify any additional fauna that are dependent on the unique ecosystems of the marl ponds. The presence or absence sampling plan must be submitted to DEC and approved by DEC.

The applicant will submit a plan to DEC for surveying the flora that are unique to the marl ponds.

The work plan will take into consideration that each marl pond is unique. The DEIS will characterize at minimum North and South Marl Pond. The DEIS should also characterize any other marl ponds that could be impacted hydrologically by the mine pond, whether those marl ponds are identified in application materials or not. There is a marl pond west of north pond, for example, that could be impacted hydrologically and thus biologically.

A. Surface Water and Groundwater Levels

i. Determine water level variations continually at all identified marl ponds by manually installing one staff gauge in a stilling well at an accessible location at each marl pond. The staff gauges must be installed manually to avoid disturbance of the steep side slopes. The water levels will be measured using programmable automated pressure transducers with data loggers.

ii. Obtain permission beforehand for staff gauges to be installed on Lime Hollow Nature Center property, i.e., the Mid Pond.

iii. Verify for the period of the study that the measurement frequency matches the pressure transducer measurements in the nearly monitoring wells MW-3S, MW-3D, MW-2s, and MW-4s on Applicant's property.

iv. Monitor water levels for a period of approximately four months.

v. Compare the surface water and groundwater levels and the relative rates of water level changes.

vi. Evaluate the potential effects of current well field operation on water levels

at the North Marl Pond.

B. Topography/Bathymetry

i. Update base map – indicate locations of temporary staff gauges at Marl Ponds, apparent high-water marks and maximal areal extent of Marl Ponds based on vegetation and topography; thus, determine ultimate water level fluctuation range.

ii. Perform topographic/bathymetric survey of marl pond area during staff gauge installation and include area of the pond banks – estimate two field days.

C. Substrate Conditions

i. Inspect substrate at all four sides of North Marl Pond for texture (plasticity – clay vs silt), organic content, pH, stratification, and consistency (penetration resistance).

ii. Evaluate at each location if consistency appears more typical of surface water infiltration or groundwater exfiltration.

iii. Document desiccation cracks.

iv. Assess substrate similarity of North Marl Pond to the Mid Pond and South Pond.

D. Aquatic Habitat

i. Perform an aquatic habitat impact assessment of the marl ponds to identify flora and fauna present to better understand each species microhabitat zones and sensitivity to fluctuations in the water levels, and subsequent desiccation cycles; study to include office research, interviews, fieldwork.

ii. Document boundary of hydric soils using Munsell color charts and historical soil surveys.

iii. Survey and document wildlife.

E. Water Chemistry

i. Sample water in all potentially impacted marl ponds and analyze for field parameters; include south and north ends of North Marl Pond.

Mitigation

Operate permanent staff gauges at the marl ponds. The DEIS will identify measures to take if the staff gauges indicate hydrologic variation outside the parameters of normal variation. The DEIS will include action items to mitigate any impact to the chemistry and to mitigate and unavoidable impact on the unique flora and fauna of the marl ponds.

4.4 Recreational Impacts (Topic 4)

This topic area will include the potential for impact on recreation, including impact on scientific research and education associated with changes in the hydrology and changes in the unique flora and fauna of the marl ponds. Potential impacts on recreation could result from, but not be limited to, a) changes in hydrology that might conceivably cause flooding of trails, or b) changes in hydrology or water chemistry that would lead to a loss of the unique flora and fauna that draw scientists and amateur naturalists to the Lime Hollow Nature Preserve.

Work Plan

The DEIS will include an updated topographic map for existing and proposed future conditions at the mine area and adjacent Lime Hollow Nature Center. Locations and elevations of surface water bodies, wetlands and trail locations will be included on the map. Potential adverse impacts to recreational activities at the Nature Center will be evaluated based on map review and analysis of potential changes in flora and fauna and ecological integrity as identified under Topic 3. The resulting impact on opportunities for recreation, education, and research will be addressed.

Mitigation

The DEIS will propose mitigation for any impacts to recreation, education, and research.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

This section of the DEIS will provide an analysis of reasonable alternatives to the proposed action, in accordance with the SEQR regulations at 6 NYCRRR § 617.9 (b) (5)(v). The alternatives will be compared objectively with respect to their potential impact on the environment. Alternatives will

include evaluation of the following:

5.1 No Action Alternative

5.2 Increase setback from mine pond to Lime Hollow wells and North Pond including exclusion of the northwestern corner of the Life of Mine area from acreage proposed for vertical expansion. This alternative will reduce potential comingling of groundwater from the mine area with public supply well water and reduce the potential for development of a complete exposure pathway from the mine pond to the public water supply. Proposed setback locations and distances will be assessed in the DEIS following additional analyses of the available data. Anticipated future hydrogeologic conditions and assumptions will be documented. This measure would result in a reduction of mine pond area, including a reduction of area in the northwestern corner of the Life of Mine, which was identified in application materials as a potential recharge area of the municipal water supply under dry conditions.

5.3 Phased authorizations regarding allowable depth (if impractical, DEIS will state why this alternative is impractical).

5.4 Mining to a depth of only 50 feet rather than 100 feet below the water table to decrease likelihood that water from the mine pond could potentially travel horizontally in the aquifer to the depth at which water is drawn into the public water supply wells. Application materials state that groundwater flow is predominantly horizontal.

5.5 Increase distance between proposed mine pond and South Pond so that the proposed mine pond is no longer hydraulically upgradient of this marl pond. As currently proposed, upon full build-out of the mine pond, this southwest corner of the proposed mine pond may intercept groundwater that would otherwise flow to South Marl Pond. That could impact unique flora and fauna of the marl pond. Increasing the distance between the proposed mine pond and South Pond modifies the mine pond footprint to prevent this change in the existing groundwater flow field. This alternative may be recommended in combination with other alternatives that address separate potential environmental impacts.

5.6 Modify schedule such that no mining would occur when the water table is low. Avoid active below water mining during the seasonal low groundwater level period during October to

November when the North Marl Pond is essentially dry and the potential groundwater recharge from the mine pond to the Lime Hollow wells is highest. This modification aims to reduce potential for any pollutants from the actual mining operation from travelling to and getting into the municipal drinking water wells.

5.7 Modify mine sequencing by starting mining at the south end. Starting mine pond excavation at the south end of the site would enable additional groundwater level data to be collected during mine pond development to enable real-time assessment of the range of influence of the mine pond excavation on local groundwater levels. This would enable future adjustments to be made in the mining as the excavations progress northward.

5.8 Divide Mine into South and North Excavations: The maximum disturbance of existing groundwater conditions at the north and south ends of the mine pond would occur once the continuous north-south extent of the proposed 2,500-foot-long mine pond is fully built out. The magnitude of the ambient groundwater level changes at the north and south ends of the pond may be mitigated to some degree if the property is mined as two discontinuous mine ponds that do not interconnect.

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITEMENT OF RESOURCES

This section of the DEIS will provide an analysis of the irreversible and irretrievable commitment of resources associated with the proposed action, in accordance with the SEQR regulations.

7.0 GROWTH INDUCING ASPECTS

This section of the DEIS will provide an analysis of any growth inducing aspects of the proposed action, in accordance with the SEQR regulations.

8.0 EFFECT ON THE USE AND CONSERVATION OF ENGERY

This section of the DEIS will provide an analysis of the effect on the use and conservation of energy of the proposed action, in accordance with SEQR regulations, including an assessment on the proposal's consistency with the Climate Leadership and Community Protection Act (CLCPA) and Community Risk and Resiliency Act (CRRA). The analysis shall evaluate whether the proposal is inconsistent with or will interfere with the attainment of the statewide greenhouse gas emissions limits established in article 75 of the Environmental Conservation Law, and how consideration of future physical climate risk was incorporated into the development of the proposal.

9.0 PROMINENT ISSUES THAT WERE REAISED DURING SCOPING, AND DETERMINED TO BE NEITHER RELEVANT NOR ENVIRONMENTALLY SIGNFICANT OR THAT HAVE BEEN ADEQUATELY ADDRESSED IN THE PRIOR ENVIRONMENTAL REVIEW

9.1 Although conformity of the proposal with local zoning is not part of the scope (which is a legal conclusion), the apparent intent of the law is to protect public drinking water. That environmental issue will be covered in the environmental impact statement.

10.0 TABLES AND FIGURES

11.0 REFERENCES

12.0 APPENDICES

Appendices will include materials not suitable for insertion in the main body of the DEIS and shall include key SEQR documents, technical reports, the mined land reclamation permit application materials (including mined land use plan and the Spill Prevention and Response Plan).

The DEIS appendix will include but not be limited to relevant existing and new data, revised base map, well construction details, water level data, hydrographs, groundwater contour maps and flow nets, water quality data, photographs, analytical calculations, groundwater-under-the-direct-influence-of-surface-water assessment, habitat study inventories and findings, microbial assessment, and laboratory analytical reports.

Table 1.0 Final

State Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
NYS DEC	Mined Land Reclamation	ECL 23-2701
Federal Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
Local Government		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
Town of Cortlandville	Site Plan Approval and Conditional Permit	

Appendix 1.D: 2017 Notice of Incomplete Application (NYSDEC)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 7
1285 Fisher Avenue, Cortland, NY 13045-1012
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www.dec.ny.gov

November 10, 2017

Carol Simon
c/o Christopher Henry
RT 13 ROCKS, LLC
765 State Route 13
Cortland, NY 13045

RE: DEC Mining Permit Modification #7-1122-00043
Proposed Expansion, Cortlandville Sand & Gravel Mine, MLR #70436
Town of Cortlandville, Cortland County

Dear Mr. Henry:

This is notice that DEC Region 7 has technically reviewed your pending application and deems it incomplete. Please review the comments listed below provided by our Division of Mineral Resources staff. Your responses to these items will enable staff to make a "determination of significance" of potential impacts to the environment in accordance with the State Environmental Quality Review Act which will determine whether an Environmental Impact Statement will be required.

General Comments:

1. Discrepancy of Reclaimed Acreage: Regarding reclamation acreage, please note that the DEC database only shows 6 acres approved not 7.3 acres as suggested on the modification. This small discrepancy is likely the result of not approving a portion of area shown as reclaimed on the east side of the mine adjacent to parcel # 95.00-10-11.100, specifically the northern section. During a recent inspection the area in question was observed, but at the time did not appear to meet the requirements for approval.

2. Affected Acreage for Permit Term and Financial Security Bonding: The newly submitted graphic plans (Existing and Proposed Mining Plan Map) depict areas as "reclaimed" and "waiting for approval to be reclaimed". After reviewing the Proposed Reclamation Plan, also submitted as part of the graphic plans, it appears that a portion of the "reclaimed" or "waiting for approval to be reclaimed" will be re-affected. Please review and calculate the acreage that will be re-affected so that an accurate permit term and financial security amount can be determined.

Section 2.3 – Groundwater and Surface Water:

3. Please note that DEC has not officially determined the mean high groundwater table, and thus the final floor elevation for the current permit has not been established. As duly noted in your modification plan there's a significant gap of consistent monitoring data which resulted in conditioning the permit to require monthly groundwater gauging events at both monitoring wells. Once it is determined that enough data has been collected the floor elevation will be decided.

4. Because the mine site overlies a mapped Primary Aquifer and is located in a Wellhead Protection Area for a municipal supply well operated by the Town of Cortlandville, the permit was conditioned to include an 8 foot buffer between the mean high groundwater table and the

ground surface to reduce risk of potential impacts to the regional aquifer. Before removal of this condition can be considered, a comprehensive evaluation of the aquifer with supporting data will need to be completed with the following information requested, but not limited to:

Substantial documentation that mining extensively below the groundwater water table will not adversely impact the quality and quantity of this primary aquifer - what effects will the creation of a 54 acre pond have on the aquifer and the supply well that serves the community? Will it alter recharge/discharge patterns or flow direction? Will it affect the chemistry of the aquifer? What about potential impacts from stormwater runoff? Is there risk for a substantial drop in the water table elevation due to evaporation? Is there pumping test data from the supply well that shows the extent of the cone of depression and whether the water table at the mine site is influenced by the pumping? Table 1 shows water elevation drops of over 10 feet, is this from seasonal fluctuations or due to influence from the supply well?

5. As the mine site lies within the Wellhead Protection Area please confirm if there are any local regulations that might prohibit excavation into the primary aquifer.

6. Discuss what impacts, if any, will there be to the marl ponds that abut the mine site to the west? Is there any hydraulic connection, etc.? If not, why not?

Section 3.1 and 3.2 – Current Permit Area and Description of Mining Method:

7. For clarity purposes, maximum floor depth is not permitted for 1174 feet amsl. As noted in the first bullet item in Section 2.3 above, final floor depth for the existing permit will be determined when DEC finalizes the average of the mean high water table.

Section 3.4 – Pollution Control and Prevention of Environmental Impacts:

8. 3.4.4 Noise: It's stated in this section that mining below the grade of the immediate area, and "the high ambient noise sound level of the surrounding commercial area" will assist with diminishing noise impacts. Were any ambient noise level readings collected as part of the modification, and if not, can you decisively say without any such data that noise produced from mining in the proposed expansion area will not impact commercial receptors at levels that would not require mitigation actions? Please clarify. Discuss and depict on graphic plans, if feasible, the location of the nearest residential receptors.

9. 3.4.5 Waste Management: Can you please elaborate on the maintenance and repair practices for heavy equipment and mine vehicles. Will these activities occur at the site, and if so, describe in greater detail where and what precautions would be in place to prevent potential spills of oil and fuel?

10. Additionally there is no discussion on best management practices with respect to potential inadvertent spills that could occur. Is there any contingency plan or protocols in place if such an event did occur? Please describe how refueling of machinery and equipment will be managed. A condition prohibiting the storage of petroleum products at the mine site will likely be included in the permit.

Section 4.1 – Lateral Expansion:

11. 4.1.1 Southeastern Expansion: It's discussed that the top 10 inches of arable soil will be stripped and remain on site for reclamation. Please indicate any such topsoil or overburden stockpiles will be immediately mulched and seeded upon emplacement, silt fencing will

surround the piles until vegetated, and that sufficient topsoil will remain on site for reclamation of all affected area.

Outside the current life of mine on the proposed southeastern expansion property is a screening operation for generating topsoil and mulch products. Please clarify if this business practice will continue on the newly proposed lateral expansion area and if so please provide detail on what type of material would be imported. As noted above, topsoil stripped from the mine is required to remain on-site.

4.1.2 Northern Expansion:

12. Please manage topsoil and overburden in this area as described above in 4.1.1

5.0 – Proposed Mining Sequence:

13. The narrative in this section discusses stripping the newly proposed lateral areas of the mine, but does not provide information on the final disposition of unwanted vegetation. Please clarify.

14. In a previous section (Section 3.4.4) it's indicated that mining below surface grade will reduce visual impacts. Has any consideration been given to constructing berms for further visual screening in the southeastern expansion area, specifically near Route 13 and the northern and southern property line?

15. If mining below the water table is approved, please provide the direction mining will take place when excavation below the water table begins.

16. In the Environmental Assessment Form (Section D.2 (a)(iv)) it is indicated that processing of materials will include utilizing a mobile crusher, and in subsection (f) it's indicated that a portable screener will be utilized. Please clarify all processing that will occur at the mine. Is it going to be a fixed plant or mobile? Will washing occur and if so provide details of where, the type of system to be implemented and management of the fines generated.

6.0 – Reclamation:

17. The reclamation objective, as described in the 1987 approved narrative, calls for reclamation of the land to a physical state compatible with adjacent land use and the regional setting in general, and suggested that this plan would allow the site to be utilized for pasture land. With the construction of a 54 acre pond will the upland slopes still be utilized for pasture land? Is there any objective use for the pond (i.e., recreational purposes)? Please provide an updated land use objective, and if the upland slopes are still to be utilized for pasture the current approved narrative plan indicates it will be following the Cortland County Soil and Water Conservation District (SWCD) recommendations, which are provided as Appendix 4, for returning the site to agricultural productivity.

18. If a new land objective is proposed, please provide information on the type and application rate of the seed proposed for re-vegetating the land. Discuss other products (mulch, lime fertilizers, etc.), if any, that may be used to provided additional organic content for re-vegetation purposes. Will there be any consultation with SWCD?

19. The narrative and graphic reclamation plan discuss and depict a graded slope of 1 vertical to 2 horizontal from the 1200 foot contour and continuing to the bottom of the proposed pond which is proposed at 1070 feet. For safety purposes and easier access to the pond has

consideration been given to creating a terrace/bench like structure between the pond shoreline and the upland slopes?

20. As shown on Table 1 in the modification narrative, water levels have dropped below 1162 feet and 1158 feet in the south and north end of the mine, respectively. With plans to construct the slope at the water's edge at 1:2 what will prevent erosion of the slope when water levels decline? Please consider a gentler slope from the pond shoreline down at least 10 feet below the water, and/or creating shoal like structures in sections of the pond. This would allow for growth of hydrophilic vegetation to help stabilize slopes when the water table is depressed for periods of time, and would also provide an easier ingress/egress from the water body.

To further protect groundwater quality, the permit will be conditioned to require all immediately adjacent upland slopes be reclaimed and accepted as such by Mined Land Reclamation staff before commencement of below water table excavations in the proposed 54 acre pond. It will likely be conditioned to also report any upland slope failure.

Table 1:

21. There appears to be some data that is suspect in this table as there are measurements to the depth of the water table that extend past the total depth of the well, and also consecutive months where the levels are identical.

Please provide three copies of your written response to this office for continued review and contact me if you have any questions.

Sincerely,

Joe Dlugolenski
Deputy Regional Permit Administrator
joe.dlugolenski@dec.ny.gov
607-753-3095 ext 233

ec: Thomas Rigley, DEC Minerals
Supervisor, Town of Cortlandville
Michael Polacco, H2H Associates
File

Appendix 1.E: 2019 Baseline Quarters 1&2 Hydrogeologic Investigation Report (H2H Geoscience Engineering, PLLC)

BASELINE - QUARTERS 1 & 2
HYDROGEOLOGIC INVESTIGATION REPORT
Cortlandville Sand and Gravel Mine

In Support of NOIA for NYSDEC Mine Permit Modification
NYSDEC Mine Permit #7-1122-00043/00008
MLR Mine #70436

July 2019

Prepared for:

Route 13 Rocks LLC
765 State Route 13
Cortland, NY 13045

Prepared by:

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H2H Associates

TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1-1
1.1 PROJECT BACKGROUND 1-1
1.2 PURPOSE 1-1
1.3 SCOPE 1-1

2.0 INVESTIGATION METHODS 2-1
2.1 USGS TOPOGRAPHIC MAP REVIEW 2-1
2.2 NEARBY FORMER SCM SITE REMEDIATION REVIEW 2-1
2.3 RESEARCH OF PUBLISHED HYDROGEOLOGIC INFORMATION 2-1
2.4 EXISTING ONSITE MONITORING WELL EVALUATION 2-2
2.5 SOIL DRILLING AND WELL INSTALLATIONS 2-2
2.6 GRAIN SIZE ANALYSIS 2-3
2.7 POND STAFF GAUGE INSTALLATION 2-4
2.8 SURVEYING 2-4
2.9 WATER LEVEL MEASUREMENTS 2-4
2.10 GROUNDWATER SAMPLING AND ANALYSIS 2-5

3.0 RESULTS 3-1
3.1 AQUIFER LITHOLOGY AND GRAIN SIZE ANALYSES 3-1
3.2 GROUND WATER AND POND LEVELS 3-1
3.3 GROUNDWATER ANALYSES 3-1

4.0 FINDINGS 4-1
4.1 HYDROGEOLOGY 4-1
4.1.1 Aquifer Type and Thickness 4-1
4.1.2 Groundwater Levels, Hydraulic Gradients and Flow Direction 4-1
4.1.3 Groundwater Flow Velocity and Travel Time 4-3
4.1.4 Groundwater Temperature 4-3
4.1.5 Groundwater – Pond Water Interaction 4-4
4.1.6 Water Withdrawal Rates and Recharge at Lime Hollow Road Well Field 4-5
4.1.7 Hydrogeologic Relationship of Site and Well Field 4-6
4.2 GROUNDWATER QUALITY 4-6

5.0 CONTINUING INVESTIGATION AND LONG-TERM MONITORING 5-1
5.1 QUARTER 3 SITE VISIT 5-1
5.2 LONG-TERM MONITORING 5-1

LIST OF TABLES

Table 1 Well Construction Details
Table 2 Grain Size Analyses
Table 3 Monitoring Well Data – Manual Measurements
Table 4 Pond Water Elevations
Table 5 Water Quality Data
Table 6 Relative Percent Differences
Table 7 Well Construction Details for Lime Hollow Road Wells
Table 8 Water Production at Lime Hollow Road Well Field

LIST OF FIGURES

Figure 1 Site Plan Map
Figure 2 North End Plan Map
Figure 3 Topographic Quadrangle Map
Figure 3a Topo Quad – 1200-ft Contour Line
Figure 4 Water Level Hydrographs
Figure 5 Groundwater Thermographs
Figure 6 Water Table Contour Maps
Figure 7 Aerial Photograph May 2013 – High Water Table
Figure 7a Aerial Photograph September 2016 – Low Water Table

LIST OF APPENDICES

Appendix A Work Plan
Appendix B Drilling Logs
Appendix C Well Construction Logs
Appendix D Grain Size Analyses
Appendix E Laboratory Analysis Reports

EXECUTIVE SUMMARY

Route 13 Rocks LLC (Applicant) has filed an application to New York State Department of Environmental Conservation to expand Applicant's permitted Cortlandville Sand & Gravel mine operation laterally and vertically. H2H Associates LLC, Troy, NY, has been retained to act on Applicant's behalf. A hydrogeologic investigation is being conducted to support the application by collecting baseline hydrogeological information to address NYSDEC's and SWCD's comments on the mine permit modification application; confirm the Site's conceptual hydrogeologic model; provide the data needed to assess potential impacts of deeper mining on the quality and quantity of groundwater in the vicinity of the Town's Lime Hollow public water supply wells; support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells; and complete the application. The scope of work was developed to characterize baseline hydrogeologic conditions over a one-year, four-quarter period, sufficiently to meet project objectives. This report presents the initial findings of Quarters 1 and 2.

The available data suggests that the proposed mine pond would have minimal hydraulic interaction with and impact to the Town's wells. This contention is based on the following lines of evidence:

- Topographic contours, USGS hydrogeologic modeling, Site monitoring well water levels, SCM-Cortlandville hydrogeologic data, and groundwater temperature data all indicate that groundwater at the proposed mine pond area flows in a northeasterly direction along flow paths located east of and parallel to flow paths at the well field;
- USGS hydrogeologic simulations for average and low recharge conditions indicate that the area of contribution to the Lime Hollow wells is west to southwest of the Pond-wetland complex and does not involve the Site;
- Hydraulic calculations indicate the water withdrawn from the well field can be made-up completely from groundwater flowing on the west side of the Pond-wetland complex, especially under average to high-recharge conditions;
- The USGS model suggests that the Pond-wetland complex separates flow regimes on the west (including Town well field) from the east (including the Site) and may mitigate their hydraulic interconnection; and
- The continually operating pressure transducers did not detect definitive evidence of pump cycling from the Town's wells located approximately 730 feet to the west although another source of pump cycling was detected, most likely from a location across Lime Hollow Road to the north of MW-4S. Water levels in the deep well screened within the same depth interval as the Town's wells, did not appear significantly different than the shallow well.

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Route 13 Rocks LLC (Applicant) has filed an application to New York State Department of Environmental Conservation (NYSDEC) to expand Applicant's permitted Cortlandville Sand & Gravel mine operation (Site) laterally and vertically (Figure 1). H2H Associates LLC, Troy, NY, has been retained to act on Applicant's behalf.

The permitted Life of Mine currently comprises 66.8 acres and the permitted mine floor elevation is based on maintaining an 8-foot separation from the mean high-water table. Cortlandville S&G is seeking a permit modification to mine an additional 11.9 acres laterally and to mine below the water table to the bottom of the sand and gravel outwash aquifer which may be as deep as elevation 1,070 feet above mean sea level (amsl). The mine would be completed at a shallower elevation if the underlying lacustrine deposits are encountered at a shallower depth. The deepening requires a waiver of the current 8-foot separation distance requirement. The current pit bottom is at approximate elevation 1,185 ft amsl. In response to the initial application and a subsequent submittal, NYSDEC has indicated that additional hydrogeologic information must be submitted to support the application to deepen mining below the water table. Cortland County Soil and Water Conservation District (SWCD), acting on the Town of Cortland's behalf, has also submitted comments on the application.

1.2 PURPOSE

The purpose of this hydrogeologic assessment or investigation is to collect baseline hydrogeological information that would be used to meet the following specific objectives:

- Address NYSDEC's and SWCD's comments on the mine permit modification application;
- Confirm the Site's conceptual hydrogeologic model;
- Provide the data needed to assess potential impacts of deeper mining on the quality and quantity of groundwater in the vicinity of the Town's Lime Hollow public water supply wells;
- Support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells; and
- Complete the application.

1.3 SCOPE

The scope of work was developed to characterize baseline hydrogeologic conditions at the facility over a one-year, four-quarter period, sufficiently to meet project objectives. The scope of work has been modified slightly from the original Work Plan[1] (Appendix A) and consisted of the following tasks:

1. Inspect the two existing aquifer groundwater monitoring wells, MW-1 and MW-2, to confirm that they are suitable for future use;
2. Install permanent aquifer monitoring wells at two additional strategic locations, MW-3 (a shallow and deep well) and MW-4 (shallow well), to enable sampling of the aquifer materials, monitoring of groundwater levels, and sampling and analysis of groundwater;

[1] Changes from original Work Plan are documented in the report text.

3. Collect soil samples from the deepest drill hole nearest the Town's well field and develop borehole logs;
4. Perform grain size analyses for soil samples collected throughout the aquifer and evaluate if petrographic analysis is warranted to characterize aquifer materials;
5. Install pressure transducer-data logger instrumentation in wells to enable continual monitoring of groundwater levels which would enable determination of flow gradients, flow directions, and varying groundwater temperatures during the baseline monitoring period;
6. Measure surface water levels and assess bottom conditions in the north pond between the north end of the Site and the Town's well field to assess surface water - groundwater interactions;
7. Survey the locations and elevations of monitoring points;
8. Collect an initial and quarterly rounds of groundwater samples for analysis to determine baseline spatial and temporal variations of water quality; and
9. Prepare a hydrogeologic assessment report that includes a discussion of groundwater flow directions and rates, potential impacts of deeper mining on the Lime Hollow Road wells, and long-term operational monitoring.

2.0 INVESTIGATION METHODS

Hydrogeologic investigation methods consisted of review of maps and site-relevant publications, evaluation of existing monitoring wells, installation of new monitoring wells, collection of soil samples for gran size analyses, surveying of data collection points, water level measurements, groundwater sampling and analyses, and data analysis and reporting. The following discussion describes what was done, why and how.

2.1 USGS TOPOGRAPHIC MAP REVIEW

H2H reviewed the Cortland, NY 7.5-minute topographic quadrangle map (Figure 3). This map contains geomorphic and elevation information that are relevant to the hydrogeologic study. Tracing of the 1,200-foot topographic contour line in the Site vicinity reveals a low-lying area that pinches closed just west of the south end of the mine and broadens in a northeasterly direction toward the city of Cortland (Figure 3a). The Lime Hollow Road well field is on a slight mound that is part of a low northeast-southwest trending topographic divide that rises to elevations of approximately 1,200 to 1,220 ft amsl within the low-lying area. The divide extends for short distance north of Lime Hollow Road. The area below elevation 1,200 feet amsl east of the divide is occupied by a series of depressions that have developed as wetlands (National Wetlands Inventory) and shallow ponds that are designated in this report as the North, Middle and South Ponds.

The mine is located on a broad low undissected northeasterly-sloping terrace just east of the low-lying area. Ground surface elevations at the Site range from 1,240 ft amsl in the southwest to 1,170 ft amsl in the northeast. The terrace deposits originated as glacial outwash. The divide described above is likely an erosional remnant of the terrace that has been incised by post-glacial northeasterly drainage toward the Tioughnioga River about 3.5 miles to the northeast. Otter Creek flows at the far eastern edge of the terrace. Other than Otter Creek, several small streams draining the eastern uplands terminate upon reaching the permeable terrace deposits as the flow totally infiltrates into the permeable deposit as a source of groundwater recharge. The overall southwest to northeast drainage pattern with easterly bend farther north is readily apparent.

2.2 NEARBY FORMER SCM SITE REMEDIATION REVIEW

The SCM-Cortlandville State Superfund Site No. 712006 is located along Lime Hollow Road northeast of the Site and on the same 10 to 30-foot high glacial outwash terrace above the eroded low-lying areas. The remedial investigation there provides detailed hydrogeologic information for the local area. The sand and gravel aquifer at that location is 80 to 110 feet thick overlying fine-grained glaciolacustrine deposits. Water table depth is 35 to 45-feet. Groundwater flow direction is northeasterly. Recharge basins constructed as part of the remedy can be seen in the northeast corner of Figure 2. H2H infers that the basins are far enough downgradient that they do not impact the Site.

2.3 RESEARCH OF PUBLISHED HYDROGEOLOGIC INFORMATION

H2H reviewed selected publications to supplement the hydrogeologic investigation. A few of the publications provide detailed hydrogeologic information that would not be otherwise available without costly investment of time and resources. Of particular value was a U.S Geological Survey (USGS) Water

Resources Investigations Report 96-4255, published in 1998, *Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York,* by Todd S. Miller, Donald A. Sutherland, Peter M. Jeffers, and Nancy Mueller. This report summarizes aquifer characteristics and includes several plates that depict simulated groundwater contours in the regional area including the Site. Scenarios are presented for low-recharge, average-recharge, and high-recharge conditions. Hydraulic gradients and flow directions can be readily estimated from the contours. This report was supplemented by USGS Fact Sheet FS 054-03, published in April 2004, *Hydrogeology and Simulation of Ground-Water Flow in a Glacial-Aquifer System at Cortland Cunty, New York* that was published in cooperation with the Cortland County Soil and Water Conservation District.

Hydrogeologic information from these reports that H2H used include:

- Major Valley Heads drainage divide is approximately one mile southwest of the Site (FS figure 2);
- Northeast-directed meltwater flow through the site area deposited the sand and gravel outwash plain / terrace (FS figure 3);
- An average aquifer hydraulic conductivity of 880 ft/day was estimated at the Line Hollow Road wells based on an aquifer pumping test performed on 7/16/1991 in Town of Cortlandville well #2, also designated as USGS well 432 (C-#104) (table 2, p.20) which is the northwesternmost well at the Town's well field;
- An effective porosity of 0.30 was estimated for the outwash aquifer (p.29, 58, 59);
- Horizontal hydraulic conductivity was estimated to be 10 times the vertical hydraulic conductivity (p.48);
- For simulated average- and low-recharge conditions the area contributing recharge to the Lime Hollow wells is located west of the ponds and extends southwesterly to the groundwater divide (p.58, plates 3 & 4); and
- Groundwater flow is simulated as northeasterly (plates 2,3,4) based on potentiometric contour maps developed for high-, average, and low recharge conditions.

2.4 EXISTING ONSITE MONITORING WELL EVALUATION

H2H reviewed available information for the two existing monitoring wells at the Site, MW-1 and MW-2[2], that were installed in 1989 (Figures 1 and 2). H2H assessed their usability for the hydrogeologic investigation and future monitoring. H2H determined that they are shallow 2-inch diameter screened wells that are approximately 12 feet to 22 feet shallower than the two new shallow wells. Historically, these wells are designated as USGS ID #348 (MW-1) and USGS ID #349 (MW-2). They are useful for monitoring the water table and shallow groundwater. Well construction details are summarized in Table 1.

2.5 SOIL DRILLING AND WELL INSTALLATIONS

The Work Plan describes the hydrogeologic investigation activities and rationale (Appendix A). New monitoring wells were installed at two locations at the north end of the proposed mine pond in the general vicinity of the Town wells to complement the existing wells. At the location nearest the Town's well field, MW-3, shallow and deep wells were installed to assess possible vertical hydraulic gradients related to the relatively deep Town wells and identify shallow and deep water-quality variations.

[2] Now sometimes referred to as MW-1S and MW-2S to describe their construction.

H2H constructed three groundwater monitoring wells, MW-3S, MW-3D, MW-4S, during the week of December 3, 2018. H2H anticipated potentially difficult drilling conditions owing to the presence of coarse gravel and cobbles and therefore used the Symmetrix drilling system which accommodates such difficulty.

Two-inch diameter PVC well screens with riser pipe were placed in each drill hole. Screen length varied depending upon well objective. MW-3S used a 30-foot long screen for the upper part of the aquifer, MW-3D used a 42-foot screen for the lower part of the aquifer that coincided with the inlet areas for the town's wells. The combined screen lengths for MW-3S and MW-3D cover the full thickness of the aquifer. MW-4S used a 32-foot screen comparable to MW-3S. Well screen design took into account the potential for low groundwater levels such as those that occurred during the summer of 2016 when MW-1 and MW-2 went dry from July through September. Seasonal low groundwater levels that year were nearly 8 feet deeper than usual.

Screen slot size for all wells was 0.20-inch to facilitate well development. Gravel pack was placed adjacent to and extended 2.0 to 2.5 feet above the top of the screen. The wells were sealed with a 1.0 to 2.0-foot thick layer of bentonite and the remainder of the holes grouted. A steel protective casing and locking cap completed the installation. The wells were developed by surge pumping with a 10 gallon per minute pump. All of the wells cleared up nicely which is reflected by the very low turbidities observed later in the new wells during sampling.

Following a period of equilibration to allow the wells to recovery from the effects of drilling, H2H returned to the Site on February 5, 2019. H2H surveyed the wells and installed pressure transducers / data loggers for continuous water level and temperature monitoring. Survey data and well construction details are summarized in Table 1.

The wells were drilled and installed with full-time oversight from an H2H geologist who prepared drilling logs (Appendix B) and well construction diagrams (Appendix C).

2.6 GRAIN SIZE ANALYSIS

The lateral extent and thickness of the coarse -grained, sand and gravel glacial outwash deposit aquifer are well documented. H2H took advantage of the opportunity afforded by drilling new monitoring wells to characterize the nature of the sand and gravel resource at the Site. During drilling H2H collected 10 soil samples from 7 feet to 91 feet (elevation 1,090 ft amsl) deep in MW-3D using a 3-inch diameter split-spoon sampler. Sample locations are indicated on the drilling logs (Appendix B). The sampling interval ranged from 2 feet to 10 feet (mostly). Nine samples, S-1 through S-9, were collected from aquifer material below the water table for grain size analysis adjacent to the screened intervals in MW-3S and MW-3D. H2H examined the cuttings between the sampled intervals to confirm consistency and to identify a need for additional sampling such as at the bottom of the drill hole. H2H sent the samples to a local testing laboratory, SJB Services Inc. in Cortland, NY, for grain size analyses in accordance with ASTM D422. Based on sample examination in the field, the petrographic analyses that were originally proposed in the Work Plan were considered unnecessary for project purposes and were waived.

Soil at the other new well location, MW-4S, was not sampled as proposed in the Work Plan for several reasons. MW-4S is located 1115 feet northeast of MW-3S/3D and east-northeast of the Town's well field. Because MW-4S is a shallow well, is well beyond the limits of mining, and is not potentially hydraulically upgradient of the well field, it was H2H's judgement that sampling it would not provide cost-effective supplemental data. MW-3S soil was not sampled because of its proximity to MW-3D which was sampled.

2.7 POND STAFF GAUGE INSTALLATION

An important element of the hydrogeologic investigation was characterizing the interaction between groundwater and the North, Mid and South Ponds along the western side of the Site (Figures 1 and 2). The North Pond is located between the Site and the Town's well field (Figure 6). The Work Plan originally proposed that temporary staff gauges would be installed at the three ponds to evaluate the interactions, but the staff gauges were not installed. Temporary staff gauges are often not reliable because of subsequent damage and frost heave that could alter their surveyed elevations and lead to misleading data. As an alternative, H2H is measuring pond water levels periodically during the quarterly site visits using a GPS unit which eliminates the potential problems with a staff gauge. Whether a staff gauge was installed or measurements are made with GPS unit, the measurement frequency would be the same.

Based on aerial survey information the bottom elevations of the ponds are approximately as follows: North Pond (1,164 ft amsl), Mid Pond (1,167 ft amsl), South Pond (1,168 ft amsl).

2.8 SURVEYING

Locations of all monitoring wells and the town wells were surveyed using GPS equipment. Horizontal coordinates were based on the State Plane Coordinate System, NAD83, New York Central zone, Horizontal and vertical accuracy was approximately three hundredths of a foot. Vertical elevations were surveyed using the NAVD 88 datum.

All wells were surveyed on February 5, 2019. The re-surveyed measuring point elevations for MW-1 and MW-2 differed slightly from the 1989 survey data. MW-1 was 1,237.37 ft amsl in 1989 and 1,237.28 ft amsl or 0.09 feet lower in February 2019. MW-2 was 1,225.64 ft amsl in 1989 and 1,224.96 ft amsl or 0.68 feet lower in February 2019. After the February 2019 survey well MW-1 was struck by a vehicle and partially bent over. It was straightened and the measuring point re-surveyed on May 20, 2019, at 1,237.60 ft amsl.

2.9 WATER LEVEL MEASUREMENTS

Water levels are measured using two methods – by dedicated instruments deployed within the wells and manually using electronic water level indicators. Transducer instruments measure water pressure converted to water depth and incorporate integrated data loggers to allow continuous water level monitoring. Short-term changes and trends are documented. The manual water level indicators provide "snapshot" water depths and are used to calibrate and set up the transducers.

Decontaminated dedicated transducers and cable assemblies (In Situ Inc.'s Model Level Troll™ 500's with vented cables) were installed in all wells. Transducers were deployed approximately 20 feet below the water table which provided adequate factor of safety below the lowest anticipated water level. The top of each transducer was secured at the top of the well casing. These basic transducers measure temperature as well as water level.

H2H has returned to the Site twice to download and re-program the transducers. This was done on March 13, 2019 and May 20, 2019, to coincide with quarterly groundwater sampling, H2H measured water levels in the wells manually to verify that the transducer data are accurate. The transducers were originally

programmed to collect one measurement per minute and later changed in March to one measurement per 10 minutes to streamline data collection. The transducers have remained at that setting since then.

2.10 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater quality is determined in two ways – by a field instrument (Horiba U-52 Multi-parameter Water Meter) to measure selected water quality parameters real-time and by samples collected for laboratory analysis. The field water quality parameters are: temperature, pH, dissolved oxygen, oxidation-reduction potential, turbidity and specific conductance. The field parameters provide useful hydrogeologic data.

- Temperature – can provide an indication of recharge, flow zones and groundwater age.
- pH – provides an indication of groundwater corrosivity and reactions with aquifer materials and water constituents.
- Dissolved oxygen – related to water temperature, can provide an indication of recharge, flow zones, groundwater age and history, and ability to oxidize certain minerals and support aerobic bacteria.
- Oxidation–reduction potential – can indicate tendencies for certain chemical reactions.
- Turbidity – can provide an indication of how representative the groundwater sample is and help interpret analytical results for metals.
- Specific conductance – provides an indication of water purity and source, as well as an estimate of total dissolved solids content.

H2H collected water samples for Quarters 1 and 2 using the low-flow sampling method. The intent of the first sampling event on March 13, 2019 was to collect water samples from MW-1, MW-3S, MW-3D and MW-4S to provide an indication of the spatial variability of water quality. However, well MW-1 could not be sampled because it had recently been damaged by a vehicle that bent the casing to a degree that sampling equipment could not enter the well. Well MW-2 was sampled instead.

H2H collected samples for the 2nd Quarter on May 20, 2019. At that time the casing for well MW-1 had been straightened out and the well could be sampled. As described in the Work Plan, samples were also collected this Quarter from the shallow and deep wells, MW-3S and MW-3D. These two wells will be sampled again in Quarters 3 and 4 to identify water quality changes with time.

The water samples were collected in laboratory-supplied bottles that contained preservatives as necessary. Trip blank, field blank, and blind duplicate samples were collected for quality control. The samples were stored on ice and delivered to the NYSDOH ELAP-certified laboratory, Con-Test Inc., under chain-of-custody protocol for analyses per the Work Plan.

3.0 RESULTS

3.1 AQUIFER LITHOLOGY AND GRAIN SIZE ANALYSES

Grain size analyses are summarized in Table 2 and the testing reports are included in Appendix D. The visual observations of drill cuttings and grain size analyses for samples from MW-3D confirmed the presence of stratified, well-graded, rounded to sub-rounded coarse sand and gravel throughout the aquifer. Field examination of the gravel identified the expected lithologies, i.e. mostly sub-rounded greywacke, sandstone, and mudstone with some quartzitic and granitic gravels. Angular rock fragments indicated that cobbles were present that were broken during the drilling process. Some isolated thin lenses of clayey silt were observed in the sample from 77-79 feet deep, but sand and gravel extended down to at least the 91-foot (1,090 ft amsl) elevation at the bottom of the drill hole. These observations confirm the presence of a thick highly permeable aquifer free of any significant confining layers. The aquifer likely extends a short distance below the drilled depth.

3.2 GROUND WATER AND POND LEVELS

Groundwater levels have been measured monthly at the Site since October 2010. Recent manual measurements since January 2018 are summarized in Table 3. Based on historical monitoring over a 5-year period, the water table at the mine ranges from approximately 1,173 ft amsl in the southwest to 1,167 ft amsl in the northeast. Exceptionally low groundwater levels were observed July through September 2016 when MW-1 (<1,161.57 ft amsl) and MW-2 (<1,157.44 ft amsl) were dry (Table 1, Figure 7a). The average water table elevation is approximately 1,170 ft amsl. H2H developed groundwater level contour maps for two dates when manual water level data were available for all wells (Figure 6). The contour maps were used to estimate hydraulic gradients and flow directions. Pond water levels (Table 4) were compared with the groundwater levels to discern how the water levels are related and to interpolate expected pond water levels.

Continuous-recording transducers have been operating in the five monitoring wells since February 2019. Water level hydrographs (Figure 4) and water temperature thermographs (Figure 5) indicating variations with time at each well have been developed from the transducer data.

3.3 GROUNDWATER ANALYSES

The field parameter and laboratory analytical water quality data for the Quarter 1 and Quarter 2 samples are summarized in Table 5. Relative percent differences (RPD) for the duplicate quality control samples sent to the lab are summarized in Table 6. The RPDs indicate close correlation between analyses suggesting that the laboratory water quality data are reliable. Laboratory analytical reports are included in Appendix E.

4.0 FINDINGS

Hydrogeologic investigation findings are subdivided into two broad categories – hydrogeology and water quality.

4.1 HYDROGEOLOGY

This section addresses aquifer type; groundwater levels, hydraulic gradients, and flow direction; flow velocity and travel time; groundwater temperatures, groundwater-pond interaction; water withdrawal and recharge at the Town's well field, and hydrogeologic relationship of site and well field.

4.1.1 Aquifer Type and Thickness

The published regional hydrogeologic data, site-specific stratigraphic data, pond level data, and water temperature data all consistently indicate that the aquifer at the Site is unconfined. No confining layers have been identified. The aquifer's potentiometric surface is the water table. It follows that the proposed future mine pond water surface level would coincide with the water table.

Aquifer average thickness is approximately 80 feet based on the difference between the average water table elevation (1,170 ft amsl) and the bottom elevation of the aquifer from drill hole MW-3D (1,090 ft amsl). Aquifer thickness would be greater during high water table conditions and lower during low water table conditions. The typical annual water table fluctuation is 4 to 8 feet. The elevation of the bottom of the outwash deposit may be slightly lower than elevation 1,090 ft amsl which would add to aquifer thickness. USGS cross-section B-B' in WRI Report 96-4255 showed the bottom of the outwash deposit at elevation at 1,085 ft amsl.

No data have been generated that indicate that the Site hydrogeology is inconsistent with the aquifer-wide model, aquifer boundary conditions, recharge and discharge areas, and water budgets documented in the published literature, including the US Geological Survey Water Resources Investigation Report 96—4255 cited above.

4.1.2 Groundwater Levels, Hydraulic Gradients and Flow Direction

Water Levels

The hydrographs (Figure 4) show the relative water level variations with time for the five monitoring wells. The parallel alignments suggest that hydraulic gradients and flow directions are fairly stable with time. During the February through May 2019 monitoring period, water levels were highest in mid-February, lowest in mid-April, and quickly rising in mid-May. Water levels are typically lowest in October but considerable variation occurs year to year based on the historical record.

Close inspection reveals that sinusoidal groundwater level oscillations are observable in the transducer data (Figure 4). The oscillation amplitude is highest in MW-4S where it was estimated as 0.1 to 0.2 feet. MW-4S is located 814 feet from the well field. The amplitudes are approximately the same and much lower in MW-2S and MW-3S. MW-3S is located 900 feet from the well field and MW-2S is located 1,080 feet from the well field. On or about April 2, 2019, the oscillation period changed abruptly from 16 hours to three times as long. The cause for the oscillations and the changed period is unknown. Regardless of source, the

low magnitude 0.1-foot to 0.2-foot oscillations would average out over time and are not expected to have a significant impact on hydraulic gradients or flow directions in this area.

The oscillations do not appear to be caused by the Town's wells based on the following reasoning:

- The maximum amplitude observed at MW-4S and the similar smaller amplitudes at MW-2S and MW-3S suggest that the source is located closer to MW-4S and roughly equidistant from MW-2S and MW-3S. The most likely source area would thus be north of MW-4S and Lime Hollow Road. A search of the NYSDEC's water wells database, which includes wells installed after April 2000, did not reveal the presence of any wells in this area. The database however does not include all operating wells.
- MW-4S is only 86 feet, or 10% closer to the Town wells than MW-3S. Such a large amplitude difference would not be expected over such a small distance difference.
- If the Lime Hollow wells were the source, we would expect measurable higher amplitudes at MW-3S, located 900 feet from the well field, than at MW-2S, located 1,080 feet from the well field.
- The 16-hour to 48-hour oscillation periods do not appear to mimic known operating characteristics of the Town's wells.

Hydraulic Gradients

Horizontal hydraulic gradients can be estimated from the groundwater level contour maps for February 5, 2019 and May 20, 2019 (Figure 6) for the north area of the Site closest to the Town's wells. The scaled hydraulic gradients in this area are 0.0030 for February 5 and 0.0027 for May 20, which gives an average of 0.00285. The contour maps do not include monitoring well MW-1 because of its distance from the north area. However, extrapolating MW-1 data to the north area indicates hydraulic gradients of 0.0018 on both February 5 and May 20.

Potentiometric surface (water table) contour maps are also available for different simulated recharge scenarios developed over a large area of the aquifer and published by the USGS (USGS WRI Report 96-4255). The magnitudes and directions of horizontal gradients scaled in the vicinity of the Town's well field are:

- High recharge conditions (Plate 2): 0.0037, toward approximately north 66º east.
- Average recharge conditions (Plate 3): 0.0030, toward approximately north 67º east.
- Low recharge conditions (Plate 4): 0.0022, toward approximately north 50º east.
- The average hydraulic gradient is 0.0030, which is consistent with the site data.

Vertical hydraulic gradients can be assessed by comparing water levels in the MW-3 well pair. The similarity of water levels for MW-3S and MW-3D confirms that vertical components of flow are minor and groundwater flow is predominantly horizontal in this area (Figure 4, Table 3). The 0.15-foot to 0.19-foot slightly higher water level in MW-3D as compared with MW-3S suggests a very slight upward hydraulic gradient at this location. If this location were affected by pumping from the deep well screen intakes at the Town's wells, one would expect a slight downward hydraulic gradient rather than upward.

Flow Direction

Groundwater flow direction can be estimated from the groundwater contour maps. The inferred flow direction in the north area of the Site is indicated by arrows on Figure 6. The flow direction is to the northeast at north 19º east on February 5 and north 23º east on May 20. These flow directions are subparallel to the railroad track right of way west of the North Pond and are expected to vary only slightly with time. The flow direction from MW-1 to the north area was north 14º east for both February 5 and May 20.

These flow directions are consistent with the USGS model. For the USGS model, the flow direction is also to the northeast as indicated above, but more easterly in the vicinity of the Town's well field and less

easterly in the Site area because of the curved contour lines. The USGS model takes into account a much broader area that conforms with the regional topography and drainage pattern. It also takes into account the City of Cortland's pumping centers far downgradient. Based on the USGS model the southwest-northeast line of ponds and wetlands west of the Site represent a transition zone in the regional flow regime whereby groundwater to the west flows in a more east-northeasterly direction and groundwater to the east flows in a more north-northeasterly direction. This is consistent with the lower more northerly hydraulic gradient in the south part of the Site. Groundwater flow apparently gradually curves northeasterly in a southwest to northeast direction.

The proposed mine pond is located southeast and side-gradient of the Town's well field. Site groundwater is not expected to be significantly involved in the well field's local flow regime.

4.1.3 Groundwater Flow Velocity and Travel Time

Groundwater flow velocity can be estimated form the Darcy relation: velocity equals hydraulic conductivity times hydraulic gradient, divided by effective porosity. The hydraulic conductivity (880 ft/day) and porosity (0.30) are estimated from the USGS WRI Report 96-4255. The hydraulic gradient is estimated from the groundwater contour maps developed from site data and USGS simulations reported in the WRI Report 96-4255. Based on the 0.0030 horizontal gradient, the estimated average groundwater flow velocity is 8.8 ft/day toward the northeast. This velocity is not necessarily the transport velocity of elemental-, chemical-, micro-organism-groundwater constituents because of retardation effects which will slow down transport. Constituent concentrations would be further affected by lateral and vertical dispersion which would be enhanced by the high flow velocity.

At this average flow rate groundwater would course over a 900-foot distance in 102.3 days or 3.4 months. Some water molecules would travel faster and some slower. Most groundwater constituents would typically travel slower. A notable exception is chloride which generally travels at the same rate as groundwater.

The estimated travel time does not apply to constituent migration from the proposed mine pond to the Town's wells because a completed flow path does not exist between these two locations. The well field is not located directly downgradient of the proposed mine pond. Most groundwater flow from the proposed mine pond would flow east of the well field. The mine pond is not expected to have a significant impact on groundwater recharge to the Town's well field.

The higher groundwater levels that would result from the mine pond at the north part of the Site would increase hydraulic gradients and flow velocities away from the mine pond, but it does not appear that there would be a significant effect on recharge to the Town's well field because of the predominantly northeasterly flow direction.

4.1.4 Groundwater Temperature

Groundwater thermographs reflect changing groundwater temperatures with time. (Figure 5). Water temperatures vary with the monitoring well's position in the local flow system. Wells MW-1 and MW-2 are relatively shallow and should reflect seasonal effects, but their data do not show these effects. H2H suspects that there may be a problem with the data and will investigate this in Quarter 3.

The most representative groundwater temperature data is provided by MW-3S and MW-3D. Their temperatures ranged between 46 and 48 F, consistent with the annual average air temperature of 46º to 47º F. The groundwater temperature at this location was rising in late May as air temperatures warmed. The

similarity of groundwater temperatures in the shallow and deep wells suggests an absence of thermal stratification in the aquifer and groundwater that would recharge the proposed mine pond.

A distinct groundwater temperature contrast is observed in MW-4S as compared with the other wells. Its temperature was on the order of 8º to 10º F colder from February through March 20 as seen in both the transducer and field data. MW-4S's temperature gradually rose after March 20 to approximately 55º F in mid-late May. MW-4S's well construction is similar to MW-3S but its temperature is strikingly different. H2H interprets these observations as the result of the well's proximity to the North Pond which serves as a "flow-through" pond as described in the next section. The Pond chills downgradient water in winter, and warms it in summer. The location of MW-4S, only 290 feet northeast of the North Pond, provides independent evidence of a northeasterly groundwater flow direction in this area. The high dissolved oxygen content at MW-4S (Table 5) further suggests a surface water source for some of the groundwater at MW-4S.

Based on these data H2H expects that the temperature of the proposed mine pond water will be relatively cool in summer and relatively warm in winter and will moderate between ambient groundwater and air temperature.

4.1.5 Groundwater – Pond Water Interaction

Surface water in the North Pond generally represents the water table. This is based on the coincidence of the surface water and water table elevations (Table 4), the absence of a surficial confining layer, the observation that the pond rarely freezes over in winter (Figure 6), and the apparently pond-related downgradient water temperatures. When groundwater levels are high the pond level will be high. When groundwater levels are low and below the pond bottom the pond will essentially dry-up except for some residual surface water that may remain perched on the lower permeability organic silty pond bottom deposits. Google Earth aerial photographs reflect pond water levels when groundwater levels were relatively high in May 2013 and low in September 2016 (Figures 7 and 7a).

Seasonal groundwater level fluctuations, which are typically 4 to 8 feet based on the historical MW-1 and MW-2 water level data, would likely be the primary driver for pond level fluctuation. The Pond would dry up when the water table is below the level of the Pond bottom. When groundwater levels are high enough the 800-foot long North Pond may act as a flow-through pond. Higher ambient groundwater levels at the southwest end would drive surface water flow toward the northeast where ambient groundwater levels are lower. Groundwater would up-well into the pond primarily at the southeast end and infiltrate out at the northeast end. Pond water level would equilibrate at a level intermediate between groundwater levels at the two ends of the Pond (Table 4). Pond water level may also be affected to a lesser degree by the balance between direct precipitation recharge, local evapotranspiration discharge and the permeability of the pond bottom.

The water level in the proposed mine pond may act in the same manner, without the potential for drying up. Comparison of the ambient groundwater levels at the two ends of the proposed mine pond (Figure 6) indicates a difference of approximately 6 feet. The mine pond level at the southwest end would thus be approximately 3 feet lower than ambient groundwater level and the northeast end would be approximately 3 feet higher than ambient groundwater. The higher groundwater elevations at the northeast end of the proposed mine pond would increase local hydraulic gradients away from the mine pond and presumably primarily in a northeasterly direction.

The proposed mine pond and North Pond would be hydraulically interconnected. Elevated groundwater at the north end of the mine pond would potentially recharge the southwest end of the North Pond and slightly

raise its level. The North Pond would dry up less frequently. On the other hand, the water level in North Pond would not be affected by a local increase in groundwater levels if the regional water table is low.

The latest pond level data for the Mid and South Ponds indicate higher surface water levels than anticipated based on the ambient groundwater levels (Table 4). The high levels, 1,194 ft amsl, do not seem plausible. Additional pond level data will be collected in Quarters 3 and 4.

4.1.6 Water Withdrawal Rates and Recharge at Lime Hollow Road Well Field

Well construction details for the two Lime Hollow Road wells are summarized in Table 7. Average daily water withdrawal production rates at the Lime Hollow Well Field averaged 496 gpm for the first three months of 2019, with a range of 259 gpm to 800 gpm (Table 8).

Simulated areas of recharge contribution to the Lime Hollow Road wells are presented on maps in USGS WRI Report 86-2955.

The volumetric rate of groundwater flow toward the well field from the southwest can be estimated for different scenarios using the modified Darcy formula: Flow (Q) equals horizontal hydraulic conductivity of aquifer (K) times saturated thickness of aquifer (M) times hydraulic gradient (I) times width of flow path (L). Site specific parameter values are:

- K – 880 ft/day per USGS aquifer pumping test in Lime Hollow well;
- M – 80 feet based on difference between the average water table elevation (1,170 ft amsl) and the bottom elevation of the aquifer from drill hole MW-3D (1,090 ft amsl);
- I – 0.003 scaled from USGS groundwater contour maps and from the site-specific groundwater contour map (Figure 6); and
- L – 729 feet solved for the scenario whereby flow rate is 800 gpm which was the maximum recorded[3] for the first three months of 2019. This equates to a flow path width of 365 feet (L/2) on each side of the wells perpendicular to the ambient groundwater flow direction.

Based on a constant maximum 800 gpm production rate, the eastern terminus of this estimated 365-foot half-width of the flow zone to the Town wells would be located a maximum of 25 feet beyond the western edge of the North Pond. This implies that the North Pond would represent the approximate eastern limit of the contributing area to the well field. This is consistent with USGS simulations for average recharge conditions (Plate 3, USGS WRI Report 96-4255) which show the well field's contributing area west of the North Pond. The proposed mine pond would be located approximately 350 farther east well beyond the apparent area of influence.

The degree to which the Town's well field would induce infiltration from the North Pond under high water table conditions or expand its radius of influence beneath the North Pond toward the proposed mine pond during low groundwater conditions are unknown. In either case, if any induced infiltration occurs it would likely be minor.

During much of the year, it is likely that the flow width necessary to provide the 800 gpm to the well field would be less than 729 feet wide. Under high recharge conditions, the water table would be higher, the

[3] The maximum 800 gpm was reported for well #2 which was where the USGS aquifer pumping test was performed in 1991.

aquifer saturated thickness (M) would be greater, and the hydraulic gradient (I) would be greater. The net result would be a narrower flow width required to produce the 800 gpm.

4.1.7 Hydrogeologic Relationship of Site and Well Field

The available data suggests that the proposed mine pond would have minimal hydraulic interaction with and impact to the Town's wells. This contention is based on the following lines of evidence:

- Topographic contours, USGS hydrogeologic modeling, Site monitoring well water levels, SCM-Cortlandville hydrogeologic data, and groundwater temperature data all indicate that groundwater at the proposed mine pond area flows in a northeasterly direction along flow paths located east of and parallel to the well field;
- USGS hydrogeologic simulations for average and low recharge conditions (Plates 3 and 4 in USGS WRI Report 96-4255) indicate that the area of contribution to the Lime Hollow wells is west to southwest of the Pond-wetland complex and does not involve the Site;
- Hydraulic calculations indicate the water withdrawn from the well field can be made-up completely from groundwater flowing on the west side of the Pond-wetland complex;
- The USGS model suggests that the Pond-wetland complex separates flow regimes on the west (including Town well field) from the east (including the Site) and may mitigate their hydraulic interconnection; and
- The continually operating pressure transducers did not detect definitive evidence of pump cycling from the Town's wells located approximately 815 feet to the west although another source of pump cycling was detected, most likely from a location across Lime Hollow Road to the north of MW-4S. Water levels in deep well MW-3D, screened within the same depth interval as the Town's wells, did not appear significantly different than MW3S.

4.2 GROUNDWATER QUALITY

Groundwater quality data was collected to provide baseline conditions prior to development of the mine pond. Groundwater quality is generally consistent with data available from the Town's Annual Water Quality Reports for the years 2017 and 2018 and with the ranges reported in the USGS's local aquifer Water Resource Investigation Report 96-4255. With the exception of sodium in two wells and iron in one well, all analytes are within NYSDEC standards and guidance values (Table 5). Sodium was slightly elevated in two shallow wells MW-2S and MW-3S and was at the 20 mg/L standard in MW-4S. The deep well, MW-3D, had lower sodium levels that are more consistent with the Town's (A) well water quality. MW-3D was the only monitoring well where iron was detected. The May 21 sample from that well had a concentration of 1.9 mg/L which is well above the 0.3 mg/L standard. MW-3S and MW-3D will be sampled again in Quarter 3.

Other water quality findings:

- The two existing wells, MW-1 and MW-2 had turbidities much higher than the new wells installed by H2H suggesting that these two older wells could benefit from re-development.
- Slight differences are observed between the shallow and deep groundwater at MW-3 but after only two rounds of sampling, it remains to be determined if there is any meaningful water quality variability. These wells will be sampled again in Quarters 3 and 4. Based on the two rounds, the deeper groundwater appears to have lower dissolved oxygen, oxidation-reduction potential, specific conductance, sodium, hardness and alkalinity. The deeper water has higher pH, and barium and iron concentrations.

- Chloride levels in all monitoring wells were slightly above the concentrations reported in the Town's (A) well, but still well below the 250 mg/L standard.
- Volatile organic compounds (VOCs) were detected in shallow groundwater north of the mine, but not in deeper groundwater. The concentrations detected were at trace levels well below drinking water standards. Chloroform was detected in MW-4S. Chloroform is a member of the Trihalomethane family of chemicals that was detected at an order-of-magnitude higher concentration in the Town's drinking water. This chemical may exist as a by-product of drinking water chlorination to kill harmful organisms. The source of the Chloroform in the shallow groundwater is unknown. The other VOC, 1,1,1-Trichloroethane, is a common solvent. It was detected at similar concentrations in both the March and May samples from MW-3S. This well will be re-sampled in Quarters 3 and 4.
- Trace levels of Arsenic, Phosphorus and Ammonia were detected in the shallow groundwater at MW-3S at concentrations well within regulatory limits. Trace level of Arsenic was also detected in shallow groundwater at MW-4S. These elements and compound may be residuals left over from prior land use.

5.0 CONTINUING INVESTIGATION AND LONG-TERM MONITORING

5.1 QUARTER 3 SITE VISIT

Key action items for the Quarter 3 site visit are as follows:

1. Measure and record the groundwater levels and total depths of all wells manually to verify transducer data and assess continued well integrity; download the transducer data; verify that manual and transducer water levels are consistent; verify by repeated measurements the apparent 0.15-foot to 0.19-foot higher water level in MW-3D as compared with MW-3S;

2. Check the transducer temperature sensor sensitivity and programming in MW-1 and MW-2 which appear anomalous in the existing data set;

3. Collect field water quality parameters and groundwater water samples from MW-3S and MW-3D for analysis per the Work Plan;

4. Measure the elevations of the North, Mid, and South Ponds and assess the potential cause for the excessively high pond surface elevations recorded at the Mid Pond and South Pond during Quarter 2; determine if there is a culvert connecting the North Pond with the small pond to the southwest and if so, its invert elevation;

5. Inspect the bottom of the south and north ends of the North Pond to see if the consistency and nature of bottom sediment are different at the two ends, e.g. softer and less silt at southeast end and more compact and thicker organic silt at southeast end;

6. Re-measure and record the measuring point elevations of original monitoring wells MW-1 and MW-2;

7. Inspect monitoring well MW-1 that was previously damaged to determine is the transducer or the well itself has been compromised. Inspection activities include measuring the well's total depth and comparing it with historical data, attempting to sample debris accumulating at the well bottom, pulling the transducer and assessing if the pressure transducer and thermistor are functioning, slug testing the well to assess its responsiveness, using compressed air to re-develop it, and re-checking its measuring point elevation.

5.2 LONG-TERM MONITORING

Based on findings as of the end of Quarter 2, the long-term monitoring (LTM) program will consist of the following:

- Maintain the existing monitoring well network.
- Develop a hydrograph for all reliable water level data for all wells.
- Continue the ongoing monthly groundwater level measurement program and assess changes in groundwater flow gradients and directions as the mine pond develops.
- Sample and analyze groundwater from MW-1, MW-3S and MW-3D quarterly beginning one quarter before the mine is deepened below the water table; analysis shall consist of the field

parameters and gasoline range organics, diesel range organics, sodium, chloride, arsenic, and enterococcus bacteria or as recommended otherwise by the Health Department.

- Sample and analyze mine pond water for the same parameters as groundwater.
- Request Town to track static water levels and drawdown at the Line Hollow Road well field to identify trends as the proposed mine pond develops.
- Develop and submit annual reports, or provide sooner notification if a potentially significant anomaly is detected.

TABLES

TABLE 1
Well Construction Details
Cortlandville Sand Gravel

Monitoring Well	Easting, ft	Northing, ft	Date Installed	Measuring Point Elevation, ft amsl	Grade Elevation, ft amsl	Top of Well Screen		Bottom of Well Screen		Bottom of Well		Bottom of Original Well Bore	
						Depth, ft	Elevation, ft	Depth, ft	Elevation, ft	Depth, ft	Elevation, ft	Depth, ft	Elevation, ft
MW-1	914,504.08	934,452.71	1989	1237.60	1234.57					75.8	1161.57	na	
MW-2	916,069.59	936,677.78	1989	1224.96	1222.69					68.2	1157.44	na	
MW-3S	915,590.78	936,527.72	12/7/2018	1183.60	1181.09	4	**1177.09**	34	**1147.09**			35.5	**1145.59**
MW-3D	915,568.76	936,527.61	12/6/2018	1183.81	1181.39	34	**1147.39**	76	**1071.39**			91	**1090.39**
MW-4S	916,044.21	937,509.77	12/10/2018	1177.81	1175.58	3	**1172.58**	35	**1137.58**			36	**1139.58**

All depths measured from ground surface.
State Plane Coordinate system: horizontal datum - NAD83, zone - New York Central (FIPS 3102); vertical datum - NAVD88
Original measuring point elevations in 1989 were 1237.37 in MW-1 and 1225.64 ft in MW-2. Well bottom elevations are based on these measuring points.
Elevations re-surveyed by H2H on Feb. 5, 2019 are shown above, except for MW-1 which was damaged and re-surveyed on May 20, 2019.

TABLE 2
Grain Size Analyses
Cortlandvile Sand Gravel Mine

Gradation Sample	Sample Depth (ft., bgs)		Sample Length, ft	%Cobbles	% Gravel	% Sand	% Silt / Clay	C_u (Coefficient of Uniformity)	Notes
	from	to							
S-1	17.0	19.0	2.0	0.0	64.6	29.2	5.5	30.4	3" Split Spoon Sample
S-2	27.0	29.0	2.0	0.0	72.3	24.7	3.0	24.1	3" Split Spoon Sample
S-3	29.0	39.0	10.0	0.0	51.3	47.1	1.6	13.4	37.0-39.0' 3" Split Spoon, Cutting Samples 29.0-37.0' same.
S-4	39.0	49.0	10.0	0.0	41.1	52.6	6.3	32.5	47.0 - 49.0' 3" Split Spoon, Cutting Samples 39.0-47.0' same.
S-5	49.0	59.0	10.0	0.0	47.1	51.5	1.4	17.7	57.0-59.0' 3" Split Spoon, Cutting Samples 49.0-57.0' same.
S-6	59.0	69.0	10.0	0.0	45.8	51.2	3.0	17.6	67.0 - 69.0' 3" Split Spoon, Cutting Samples 59.0 - 67.0'.
S-7	69.0	79.0	10.0	0.0	40.3	55.7	4.0	17.5	77.0 - 79.0' 3" Split Spoon, Cutting Samples 69.0 - 77.0'.
S-8	79.0	89.0	10.0	0.0	35.3	58.3	6.4	27.9	87.0 - 89.0' 3" Split Spoon. Cutting Samples 79.0 - 87.0'.
S-9	89.0	91.0	2.0	0.0	54.9	40.4	4.7	49.8	3" Split Spoon.

Notes:
1. MW-3D screened from 34.0' BGS - 76.0 'BGS
2. MW-3S screened from 4' BGS - 34.0' BGS
3. Samples collected from MW-3D
4. MW-3D ground surface elv. 1181.4' amsl / MW-3S ground surface elv. 1181.1'

TABLE 3
Monitoring Well Data - Manual Measurements
Cortlandville Sand Gravel

Well:	MW-1		MW-2		MW-3S		MW-3D		MW-4S	
Ground Surface El., ft amsl		1234.57		1222.69		1181.09		1181.39		1175.58
Measuring Point El., ft amsl		1237.28		1224.96		1183.60		1183.81		1177.81
		1237.60								
Date	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
1/4/2018	65.4	1171.88	56.9	1168.06						
2/7/2018	63.2	1174.08	56.5	1168.46						
3/13/2018	61.4	1175.88	54.6	1170.36						
4/11/2018	60.3	1176.98	53.5	1171.46						
5/15/2018	61.5	1175.78	54.1	1170.86						
6/12/2018	67.7	1169.58	58.7	1166.26						
7/17/2018	68.2	1169.08	59.2	1165.76						
8/14/2018	68.5	1168.78	59.4	1165.56						
9/12/2018	69.2	1168.08	59.9	1165.06						
2/5/2019	61.1	1176.18	53.62	1171.34	11.35	1172.25	11.41	1172.40	8.84	1168.97
3/13/2019	62.73	1174.55	54.89	1170.07	12.69	1170.91	12.71	1171.10	9.98	1167.83
5/20/2019	61.84	1175.76	54.06	1170.90	11.8	1171.80	11.85	1171.96	8.98	1168.83

Elevations above are from H2H re-survey on Feb. 5, 2019.

Original 1989 measuring point elevations were: 1237.37 for MW-1 and 1224.64 for MW-2.

Well MW-1 was damaged, repaired and resurveyed as 1237.60 May 20, 2019

TABLE 4
Pond Water Elevations
Cortlandville Sand Gravel

Pond	Measuring Point	Data Source	Water Elevations, ft amsl			
			2/5/2019	5/20/2019		
North	Pond (1):	Measured	1170.31	1170.06		
	GW MW-4S:	Measured	1168.97	1169.01		
	Interpolated Pond:	Estimated (2)	1170.61	1170.40		
	GW MW-3S:	Measured	1172.25	1171.76		
Mid	Pond (1):	-	-	1194.92		
	GW MW-3S:	Measured	1172.25	1171.80		
	Interpolated Pond:	Estimated (3)	1173.40	1172.40		
	GW MW-1:	Measured	1176.18	1175.16		
South	Pond (1):	-	-	1195.81		
	GW MW-3S	Measured	1172.25	1171.80		
	Interpolated Pond:	Estimated (4)	1174.60	1174.10		
	GW MW-1:	Measured	1176.18	1175.76		

NOTES

1. Pond elevations are measured by GPS.

2. North Pond level is estimated from groundwater level midway between MW-4S and MW-S. Estimate is close to the surveyed level. The interpolated pond level and groundwater level match exactly at a point 60% of the distance from MW-3S to MW-4S.

3. Mid Pond level is estimated from groundwater level at a point 70% of the distance from MW-1 to MW-3S.

4. South Pond level is estimated from groundwater level at a point 41% of the distance from MW-1 to MW-3S.

TABLE 5
Water Quality Data -
Quarters 1 and 2
Cortlandville Sand Gravel

1st & 2nd Quarters 2019			MW-1	MW-2	MW-3S		MW-3D		MW-4S	BLIND DUP - MW-3D	Field Blank		Trip Blank	
Analyte	**Units**	**Ambient Groundwater Standard - Class GA**	**5/21/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**5/21/2019**
FIELD PARAMETERS														
Temperature, ºC	ºC	none	13.9	9.6	7.2	9.8	8.4	10.3	3.0	8.4	na	na	na	na
Temperature, ºF	ºF	none	57.0	49.3	45.0	49.7	47.1	50.5	37.4	47.1	na	na	na	na
pH	s.u.	6.5-8.5	8.14	7.48	7.20	7.53	7.25	8.06	7.54	7.25	na	na	na	na
Dissolved Oxygen (DO)	% Saturation	none	27.4	90.1	67.5	26	45.2	0	91.5	45.2	na	na	na	na
Oxidation-Reduction Potential (ORP)	mV	none	136	58	95	153	89	126	93	89	na	na	na	na
Turbidity (field / lab)	NTU	no adverse	90.2	18.8	5.4	0.0	0.0	0.0	2.0	0.0	na	na	na	na
Estimated Total Dissolved Solids (Field)	mg/L	500	305	335	361	355	292	298	326	292	na	na	na	na
Specific Conductance	uS/cm, 25º C	none	469	523	654	555	450	458	509	450	na	na	na	na
VOCs														
Chloroform	µg/L	7	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0.34 J	<0.17	<0.17	<0.17	<0.17	<0.17
1,1,1-Trichloroethane	µg/L	5	<0.20	<0.20	0.32 J	0.27 J	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
METALS														
Arsenic	mg/L	0.025	<0.0080	<0.0080	0.0084	<0.0080	<0.0080	<0.0080	0.0088	<0.0080	na	na	na	na
Barium	mg/L	1	0.053	0.040	0.045	0.041	0.054	0.048	0.029	0.054	na	na	na	na
Chromium	mg/L	0.05	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	na	na	na	na
Iron	mg/L	0.3	<0.040	<0.040	<0.040	<0.040	<0.040	**1.9**	<0.040	<0.040	na	na	na	na
Lead	mg/L	0.025	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	na	na	na	na
Mercury	mg/L	0.0007	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	na	na	na	na
Sodium	mg/L	20	14	**28**	**21**	**22**	13	18	**20**	13	na	na	na	na
Zinc	mg/L	2	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	0.0069	<0.0052	<0.0052	na	na	na	na
Hardness	mg/L	None	220	240	260	250	230	230	250	230	na	na	na	na
GENERAL ANALYTES														
Alkalinity	mg/L	None	170	220	230	210	160	160	180	180	na	na	na	na
Ammonia as N	mg/L	2	<0.30	<0.30	0.081	<0.030	<0.30	<0.30	<0.30	<0.30	na	na	na	na
Chloride	mg/L	250	42	48	52	51	40	51	54	40	na	na	na	na
Nitrate as N	mg/L	10	1.64	2.9	2.7	1.92	1.8	2.78	1.8	2.1	na	na	na	na
Phosphorus, Total	mg/L	None	<0.049	<0.061	0.081	<0.049	<0.061	<0.049	<0.061	0.074	na	na	na	na
Sulfate	mg/L	250	19	10	9.8	10	17	9.5	8.8	19	na	na	na	na
Total Dissolved Solids	mg/L	500	270	250	232*	330	230	280	242*	224*	na	na	na	na
Total Organic Carbon	mg/L	None	<0.73	<0.73	<0.073	<0.073	<0.73	<0.73	<0.73	<0.73	na	na	na	na

Values in bold font exceed the NYSDEC standard or guidance value; ref. T.O.G.S. 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998

MW-1 was not sampled 3/13/2019 because well damage prevented insertion of sampling equipment. It was sampled on 5/21/2019 after repairs.

For VOCs, SVOCs, Pesticides and Herbicides - only detected analytes are listed

* Samples re-analyzed because the initial results were obviously not representative of acutal water quality.

TABLE 6
Relative Percent Difference
Laboratory Analyses - March 13, 2019 Samples
Cortlandville Sand Gravel

Sampling Event -3/13/2019

Analyte	Units	MW-3D	Dup.	Relative % Difference
FIELD				
Temperature, ºC	ºC	8.4	8.4	**0.0**
pH	s.u.	7.25	7.25	**0.0**
Dissolved Oxygen (DO)	%	45.2	45.2	**0.0**
Oxidation-Reduction Potential (ORP)	mV	89	89	**0.0**
Turbidity (field / lab)	NTU	0.0	0.0	**0.0**
Total Dissolved Solids (Field)	mg/L	292	292	**0.0**
Color	c.u.			**0.0**
Specific Conductance	uS/cm, 25º C	450	450	**0.0**
LAB				
Chloroform	µg/L	<0.17	<0.17	**0.0%**
1,1,1-Trichloroethane	µg/L	<0.20	<0.20	**0.0%**
Arsenic	mg/L	<0.0080	<0.0080	**0.0%**
Barium	mg/L	0.054	0.054	**0.0%**
Iron	mg/L	<0.040	<0.040	**0.0%**
Sodium	mg/L	13	13	**0.0%**
Hardness	mg/L	230	230	**0.0%**
Alkalinity	mg/L	160	180	**11.8%**
Chloride	mg/L	40	40	**0.0%**
Nitrate as N	mg/L	1.8	2.1	**15.4%**
Phosphorus, Total	mg/L	<0.061	0.074	**19.3%**
Sulfate	mg/L	17	19	**11.1%**
Total Dissolved Solids	mg/L	230	224	**2.6%**

TABLE 7
Well Construction Details for Lime Hollow Road Wells
Cortlandville Sand Gravel

Well	Latitude / Longitude	Date Drilled	Elevation of Ground Surface, ft amsl	Diameter of Well, inches	Depth of Well, ft	Depth Drilled, ft	Elevation of Bottom of Well, ft amsl	Elevation Top of Casing, ft amsl	Elevation Top of Screen, ft amsl	Elevation Bottom of Screen, ft amsl	Depth to Ground-water, ft	Elevation of Ground-water, ft amsl	Date	Minimum Aquifer Thickness, ft	Comment
Well No.2 USGS 432 C-104	42 33 51 076 13 52	2/16/1988	1197	12	90	?	1107	1198.11	1130.47	1108.47	31	1167.11	5/18/1988	59	Screen lenth 22 ft; S&G to at least 90 feet, aquifer pumping test by USGS 7/16/1991; aquifer thickness would be about 82 feet
Well No. 7 USGS 320 89-1	42 33 50 076 13 51	11/22/1989	1196	16	90	100	1106	1198.43	1140.63	1114.88	28.87	1169.56	12/29/1989	71	Screen length 25. 75 ft; S&G to 100 feet; cross-section B-B, p.12, shows bottom of S&G at elevation 1085 ft amsl so aquifer thickness would be 84.6 ft

References - Appendix 1, Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York, USGS Water Resources Investigation Report 96-4255, 1998, by Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller. Also files from Town of Cortland, NY.

TABLE 8
Water Production at Lime Hollow Well Field
Q1 - 2019
Cortlandville SG

	Withdrawal Amount, gallons				Water Levels, ft amsl			
Date Reported	Well 2	Well 7	Total	Daily Rate, gpm	Well 2	Well 7	Difference Well 2 - Well 7, ft	Average
1/1/2019	420,000	-	**420,000**	**292**	1172.00	1173.00	**-1.00**	**1172.50**
1/2/2019	-	870,000	**870,000**	**604**	1171.00	1165.00	**6.00**	**1168.00**
1/3/2019	-	482,000	**482,000**	**335**	1172.00	1173.00	**-1.00**	**1172.50**
1/4/2019	848,000	-	**848,000**	**589**	1170.00	1172.00	**-2.00**	**1171.00**
1/5/2019	420,000	221,000	**641,000**	**445**	1172.00	1173.00	**-1.00**	**1172.50**
1/6/2019	-	458,000	**458,000**	**318**	1172.00	1173.00	**-1.00**	**1172.50**
1/7/2019	897,000	-	**897,000**	**623**	1170.00	1172.00	**-2.00**	**1171.00**
1/8/2019	517,000	-	**517,000**	**359**	1171.00	1173.00	**-2.00**	**1172.00**
1/9/2019	-	753,000	**753,000**	**523**	1171.00	1164.00	**7.00**	**1167.50**
1/10/2019	-	562,000	**562,000**	**390**	1172.00	1173.00	**-1.00**	**1172.50**
1/11/2019	725,000	-	**725,000**	**503**	1170.00	1172.00	**-2.00**	**1171.00**
1/12/2019	373,000	-	**373,000**	**259**	1171.00	1173.00	**-2.00**	**1172.00**
1/13/2019	-	769,000	**769,000**	**534**	1172.00	1173.00	**-1.00**	**1172.50**
1/14/2019	962,000	-	**962,000**	**668**	1170.00	1172.00	**-2.00**	**1171.00**
1/15/2019	478,000	-	**478,000**	**332**	1170.00	1165.00	**5.00**	**1167.50**
1/16/2019	-	981,000	**981,000**	**681**	1171.00	1173.00	**-2.00**	**1172.00**
1/17/2019	132,000	448,000	**580,000**	**403**	1170.00	1172.00	**-2.00**	**1171.00**
1/18/2019	863,000	-	**863,000**	**599**	1171.00	1172.00	**-1.00**	**1171.50**
1/19/2019	458,000	-	**458,000**	**318**	1170.00	1174.00	**-4.00**	**1172.00**
1/20/2019	-	440,000	**440,000**	**306**	1169.00	1171.00	**-2.00**	**1170.00**
1/21/2019	613,000	-	**613,000**	**426**	1170.00	1172.00	**-2.00**	**1171.00**
1/22/2019	488,000	-	**488,000**	**339**	1171.00	1172.00	**-1.00**	**1171.50**
1/23/2019	-	989,000	**989,000**	**687**	1171.00	1172.00	**-1.00**	**1171.50**
1/24/2019	-	497,000	**497,000**	**345**	1171.00	1172.00	**-1.00**	**1171.50**
1/25/2019	988,000	-	**988,000**	**686**	1169.00	1171.00	**-2.00**	**1170.00**
1/26/2019	590,000	-	**590,000**	**410**	1171.00	1172.00	**-1.00**	**1171.50**
1/27/2019	-	564,000	**564,000**	**392**	1169.00	1171.00	**-2.00**	**1170.00**
1/28/2019	1,152,000	-	**1,152,000**	**800**	1171.00	1171.00	**0.00**	**1171.00**
1/29/2019	500,000	-	**500,000**	**347**	1171.00	1172.00	**-1.00**	**1171.50**
1/30/2019	-	869,000	**869,000**	**603**	1171.00	1172.00	**-1.00**	**1171.50**
1/31/2019	11,000	469,000	**480,000**	**333**	1169.00	1171.00	**-2.00**	**1170.00**
2/1/2019	955,000	-	**955,000**	**663**	1169.00	1171.00	**-2.00**	**1170.00**
2/2/2019	504,000	174,000	**678,000**	**471**	1171.00	1172.00	**-1.00**	**1171.50**
2/3/2019	57,000	496,000	**553,000**	**384**	1169.00	1171.00	**-2.00**	**1170.00**
2/4/2019	1,024,000	-	**1,024,000**	**711**	1170.00	1172.00	**-2.00**	**1171.00**
2/5/2019	546,000	-	**546,000**	**379**	1171.00	1172.00	**-1.00**	**1171.50**
2/6/2019	-	883,000	**883,000**	**613**	1170.00	1166.00	**4.00**	**1168.00**
2/7/2019	-	475,000	**475,000**	**330**	1171.00	1172.00	**-1.00**	**1171.50**
2/8/2019	965,000	-	**965,000**	**670**	1171.00	1172.00	**-1.00**	**1171.50**
2/9/2019	446,000	-	**446,000**	**310**	1171.00	1173.00	**-2.00**	**1172.00**
2/10/2019	-	504,000	**504,000**	**350**	1170.00	1172.00	**-2.00**	**1171.00**
2/11/2019	561,000	-	**561,000**	**390**	1171.00	1172.00	**-1.00**	**1171.50**
2/12/2019	525,000	-	**525,000**	**365**	1172.00	1173.00	**-1.00**	**1172.50**
2/13/2019	-	889,000	**889,000**	**617**	1171.00	1173.00	**-2.00**	**1172.00**
2/14/2019	-	474,000	**474,000**	**329**	1170.00	1172.00	**-2.00**	**1171.00**
2/15/2019	1,114,000	-	**1,114,000**	**774**	1171.00	1172.00	**-1.00**	**1171.50**
2/16/2019	499,000	-	**499,000**	**347**	1171.00	1165.00	**6.00**	**1168.00**
2/17/2019	-	526,000	**526,000**	**365**	1169.00	1172.00	**-3.00**	**1170.50**
2/18/2019	1,066,000	-	**1,066,000**	**740**	1171.00	1172.00	**-1.00**	**1171.50**
2/19/2019	521,000	-	**521,000**	**362**	1171.00	1172.00	**-1.00**	**1171.50**
2/20/2019	-	893,000	**893,000**	**620**	1170.00	1165.00	**5.00**	**1167.50**
2/21/2019	-	605,000	**605,000**	**420**	1171.00	1172.00	**-1.00**	**1171.50**
2/22/2019	1,014,000	-	**1,014,000**	**704**	1169.00	1171.00	**-2.00**	**1170.00**
2/23/2019	528,000	-	**528,000**	**367**	1171.00	1172.00	**-1.00**	**1171.50**
2/24/2019	-	946,000	**946,000**	**657**	1169.00	1171.00	**-2.00**	**1170.00**
2/25/2019	1,077,000	-	**1,077,000**	**748**	1171.00	1172.00	**-1.00**	**1171.50**
2/26/2019	537,000	-	**537,000**	**373**	1171.00	1172.00	**-1.00**	**1171.50**
2/27/2019	-	889,000	**889,000**	**617**	1170.00	1172.00	**-2.00**	**1171.00**
2/28/2019	26,000	486,000	**512,000**	**356**	1169.00	1171.00	**-2.00**	**1170.00**
3/1/2019	902,000	-	**902,000**	**626**	1169.00	1170.00	**-1.00**	**1169.50**
3/2/2019	674,000	-	**674,000**	**468**	1170.00	1172.00	**-2.00**	**1171.00**
3/3/2019	357,000	498,000	**855,000**	**594**	1168.00	1171.00	**-3.00**	**1169.50**

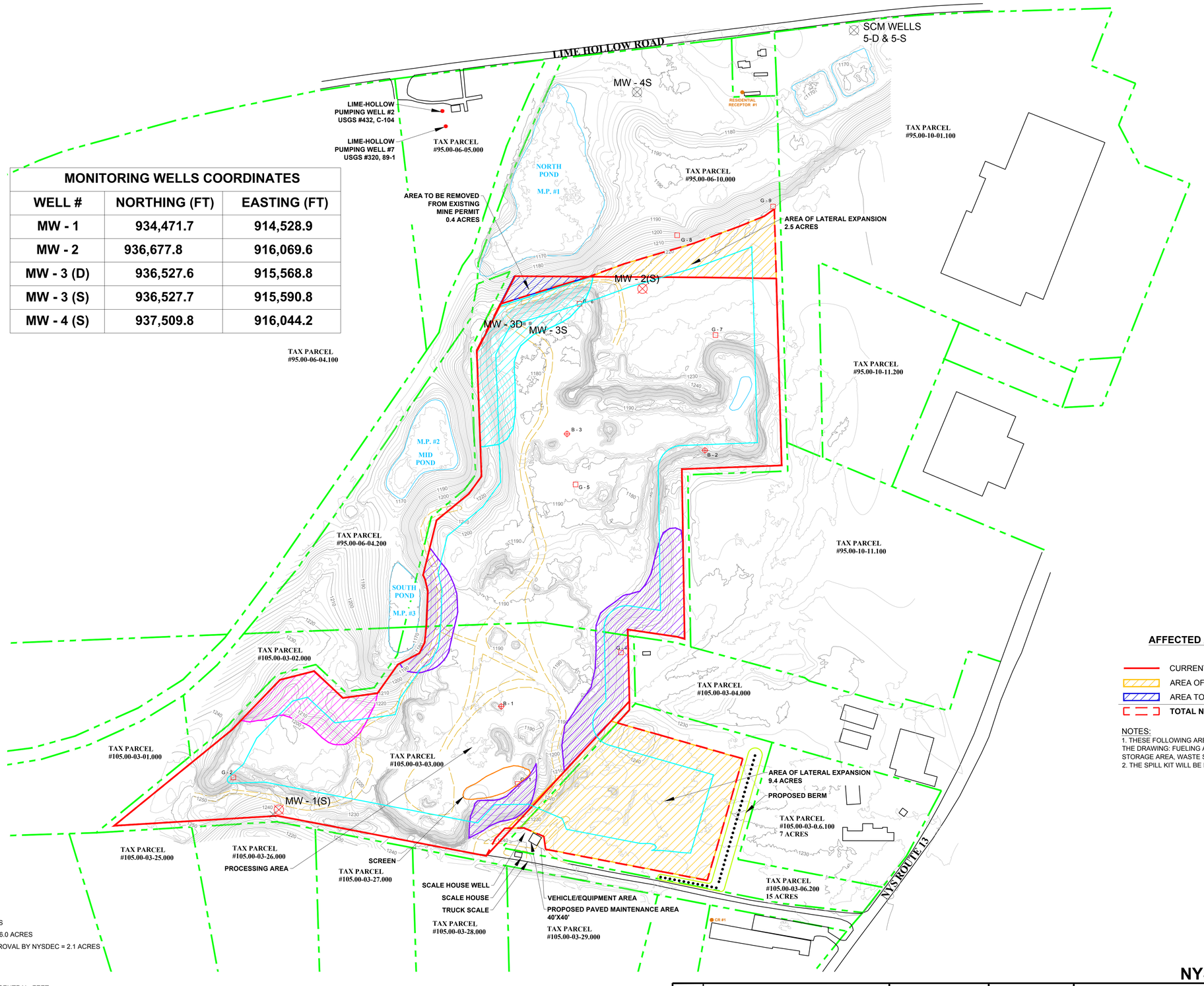
TABLE 8
Water Production at Lime Hollow Well Field
Q1 - 2019
Cortlandville SG

	Withdrawal Amount, gallons				Water Levels, ft amsl			
Date Reported	Well 2	Well 7	Total	Daily Rate, gpm	Well 2	Well 7	Difference Well 2 - Well 7, ft	Average
3/4/2019	613,000	-	**613,000**	**426**	1169.00	1169.00	**0.00**	**1169.00**
3/5/2019	697,000	126,000	**823,000**	**572**	1169.00	1164.00	**5.00**	**1166.50**
3/6/2019	-	814,000	**814,000**	**565**	1169.00	1164.00	**5.00**	**1166.50**
3/7/2019	-	791,000	**791,000**	**549**	1170.00	1171.00	**-1.00**	**1170.50**
3/8/2019	850,000	-	**850,000**	**590**	1168.00	1170.00	**-2.00**	**1169.00**
3/9/2019	619,000	-	**619,000**	**430**	1169.00	1164.00	**5.00**	**1166.50**
3/10/2019	-	848,000	**848,000**	**589**	1170.00	1171.00	**-1.00**	**1170.50**
3/11/2019	712,000	-	**712,000**	**494**	1168.00	1170.00	**-2.00**	**1169.00**
3/12/2019	488,000	-	**488,000**	**339**	1168.00	1163.00	**5.00**	**1165.50**
3/13/2019	-	1,060,000	**1,060,000**	**736**	1170.00	1171.00	**-1.00**	**1170.50**
3/14/2019	-	597,000	**597,000**	**415**	1168.00	1170.00	**-2.00**	**1169.00**
3/15/2019	1,086,000	-	**1,086,000**	**754**	1169.00	1171.00	**-2.00**	**1170.00**
3/16/2019	508,000	-	**508,000**	**353**	1170.00	1171.00	**-1.00**	**1170.50**
3/17/2019	-	641,000	**641,000**	**445**	1170.00	1171.00	**-1.00**	**1170.50**
3/18/2019	1,029,000	-	**1,029,000**	**715**	1168.00	1170.00	**-2.00**	**1169.00**
3/19/2019	547,000	-	**547,000**	**380**	1170.00	1171.00	**-1.00**	**1170.50**
3/20/2019	-	971,000	**971,000**	**674**	1169.00	1170.00	**-1.00**	**1169.50**
3/21/2019	35,000	470,000	**505,000**	**351**	1168.00	1170.00	**-2.00**	**1169.00**
3/22/2019	1,019,000	-	**1,019,000**	**708**	1169.00	1170.00	**-1.00**	**1169.50**
3/23/2019	480,000	-	**480,000**	**333**	1170.00	1171.00	**-1.00**	**1170.50**
3/24/2019	-	511,000	**511,000**	**355**	1168.00	1170.00	**-2.00**	**1169.00**
3/25/2019	1,147,000	-	**1,147,000**	**797**	1167.00	1170.00	**-3.00**	**1168.50**
3/26/2019	525,000	-	**525,000**	**365**	1169.00	1171.00	**-2.00**	**1170.00**
3/27/2019	-	940,000	**940,000**	**653**	1168.00	1163.00	**5.00**	**1165.50**
3/28/2019	-	461,000	**461,000**	**320**	1169.00	1171.00	**-2.00**	**1170.00**
3/29/2019	969,000	-	**969,000**	**673**	1167.00	1170.00	**-3.00**	**1168.50**
3/30/2019	628,000	55,000	**683,000**	**474**	1169.00	1171.00	**-2.00**	**1170.00**
3/31/2019	183,000	481,000	**664,000**	**461**	1167.00	1170.00	**-3.00**	**1168.50**
Totals	**37,468,000**	**26,876,000**	**64,344,000**					
Average	**646,000**	**625,023**	**714,933**	**496**	**1169.9**	**1170.7**	**-0.74**	**1170.3**
Maximum	**1,152,000**	**1,060,000**	**1,152,000**	**800**	**1172**	**1174**		**1172.5**
Minimum	**11,000**	**55,000**	**373,000**	**259**	**1167**	**1163**		**1165.5**
Difference, ft					**5**	**11**		**7.0**

Yellow highlight - days on which both wells produced water part-time.
Red highlight - daily production greater than 700 gpm

FIGURES

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1	934,471.7	914,528.9
MW - 2	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2



LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- 2019 MONITORING WELL
- TEST PIT
- M.P. ## MARL PONDS
- PROPOSED MINE POND
- SCREENING AREA
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 6.0 ACRES
- AREA RECLAIMED; AWAITING REVIEW AND APPROVAL BY NYSDEC = 2.1 ACRES

AFFECTED AREA SUMMARY:

- CURRENTLY PERITTED AFFECTED AREA = 66.8 ACRES
- AREA OF LATERAL EXPANSION = 11.9 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- **TOTAL NEW AFFECTED AREA = 78.3 ACRES**

NOTES:
1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

MAP NOTES:
1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE CENTRAL, FEET
VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
	4	
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

SITE PLAN MAP

TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 1

SHEET 1 OF 1

LIME HOLLOW ROAD

LIME-HOLLOW
PUMPING WELL #2
USGS #432, C-104

LIME-HOLLOW
PUMPING WELL #7
USGS #320, 89-1

TAX PARCEL
#95.00-06-05.000

MW - 4S

RESIDENTIAL
RECEPTOR #1

NORTH
POND

M.P. #1

TAX PARCEL
#95.00-06-10.000

AREA TO BE REMOVED
FROM EXISTING
MINE PERMIT
0.4 ACRES

AREA OF LATERAL EXPANSION
2.5 ACRES

G - 9

G - 8

G - 6

G - 7

MW - 2(S)

MW - 3D

MW - 3S

1170
1180
1190
1200
1210
1220

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- 2019 MONITORING WELL
- TEST PIT
- M.P. ## MARL PONDS
- PROPOSED MINE POND
- SCREENING AREA
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
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6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

SCALE IN FEET
0 37.5 75 150

N

MONITORING WELLS COORDINATES

WELL #	NORTHING (FT)	EASTING (FT)
MW - 1	934,471.7	914,528.9
MW - 2	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
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2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

NYSDEC MLF# 70436

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
5/21/19	3	SCALE BAR UPDATED
6/27/19	4	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

SITE PLAN MAP

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 2

SHEET 1 OF 1

FIGURE 3
USGS Topographic Quadrangle Map – Cortland, NY

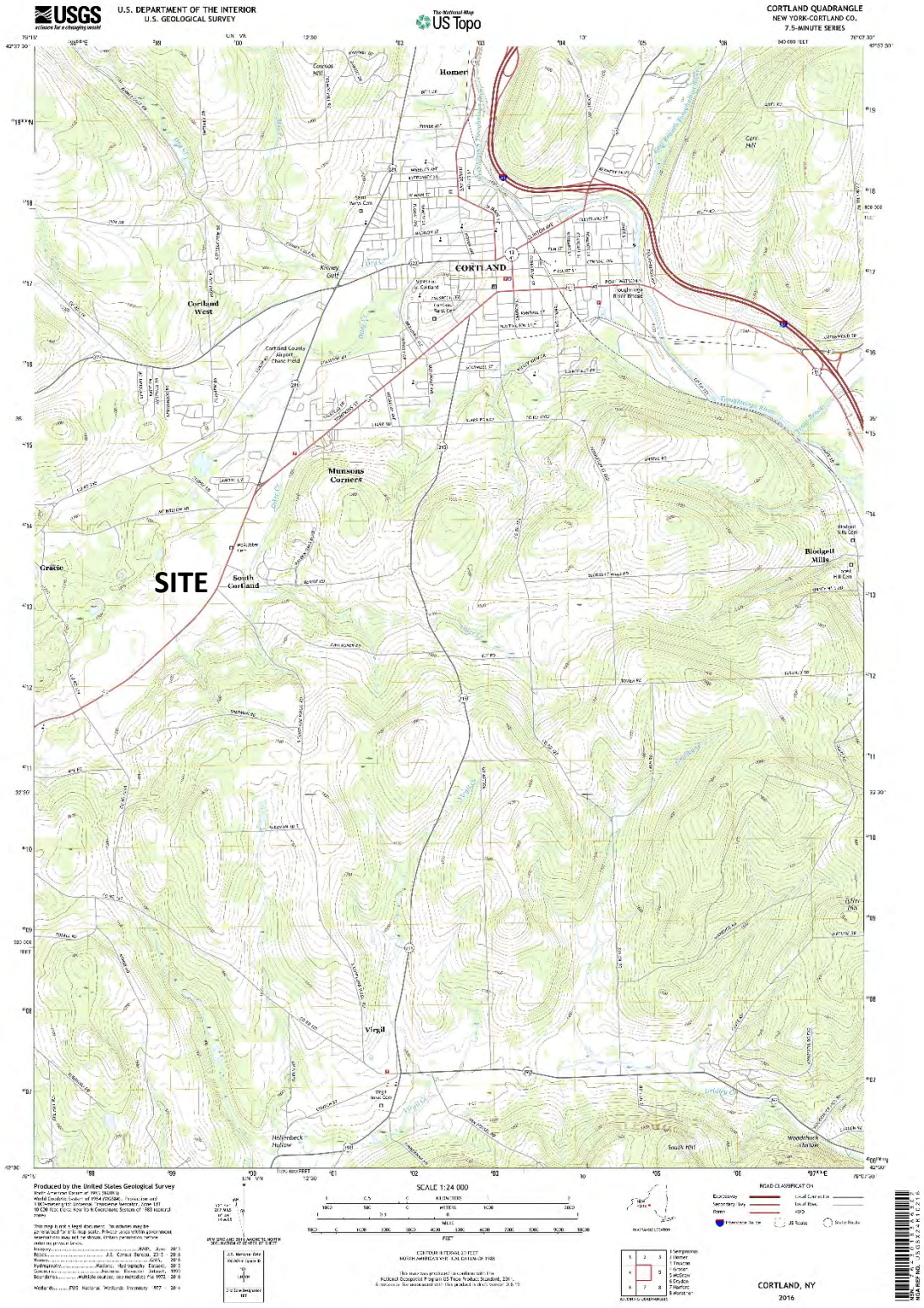


FIGURE 3a

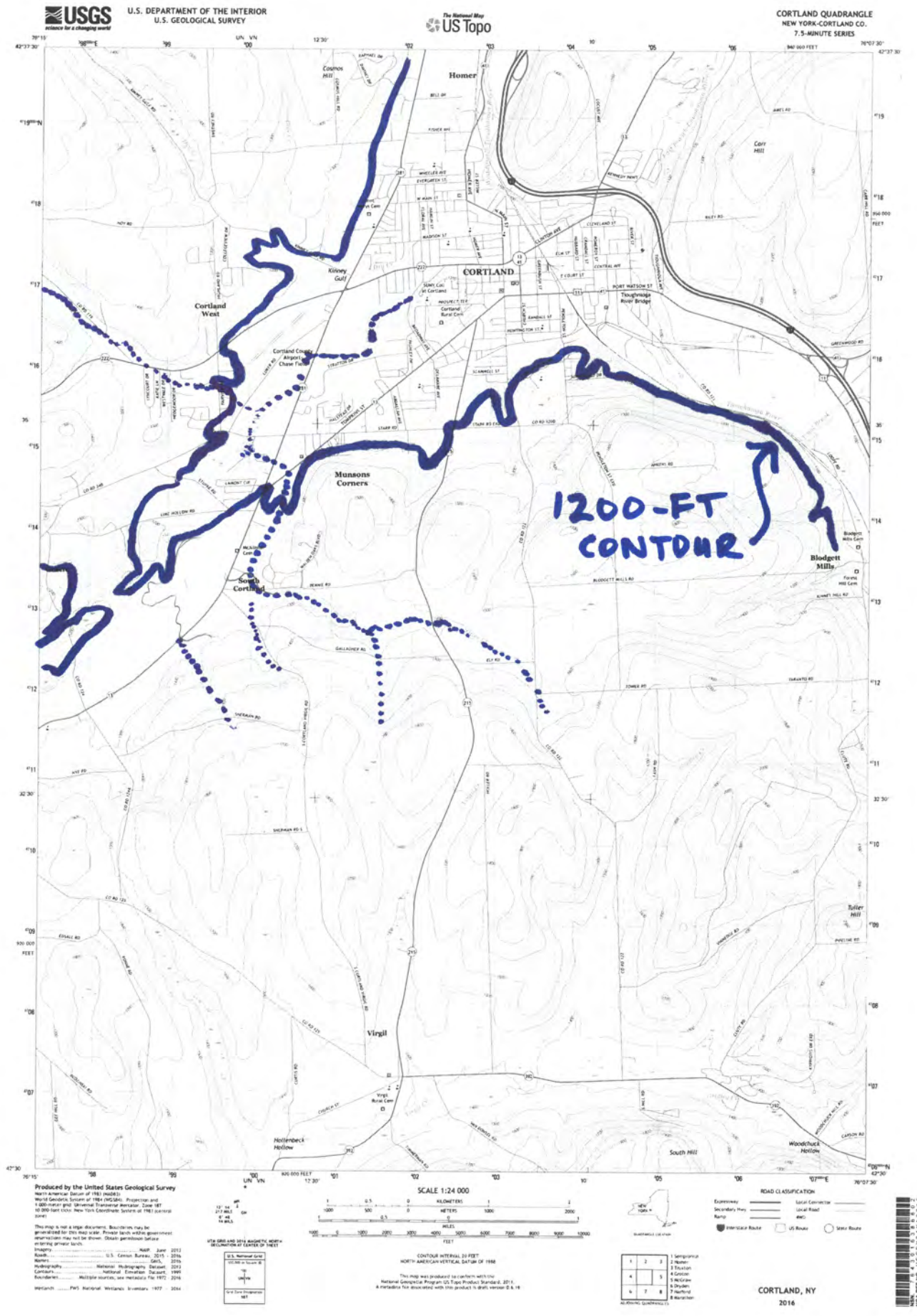

USGS
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
CORTLAND QUADRANGLE
NEW YORK-CORTLAND CO.
7.5-MINUTE SERIES
Homer
Cosmos Hill
Corr Hill
Kinney Gulf
CORTLAND
Cortland West
Cortland County Chase Field Airport
Tioughnioga River Bridge
Munsons Corners
1200-FT CONTOUR
Blodgett Mills
South Cortland
Virgil
Tuller Hill
Hollenbeck Hollow
South Hill
Woodchuck Hollow
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
ROAD CLASSIFICATION
CORTLAND, NY
2016

FIGURE 4
WATER LEVEL HYDROGRAPHS

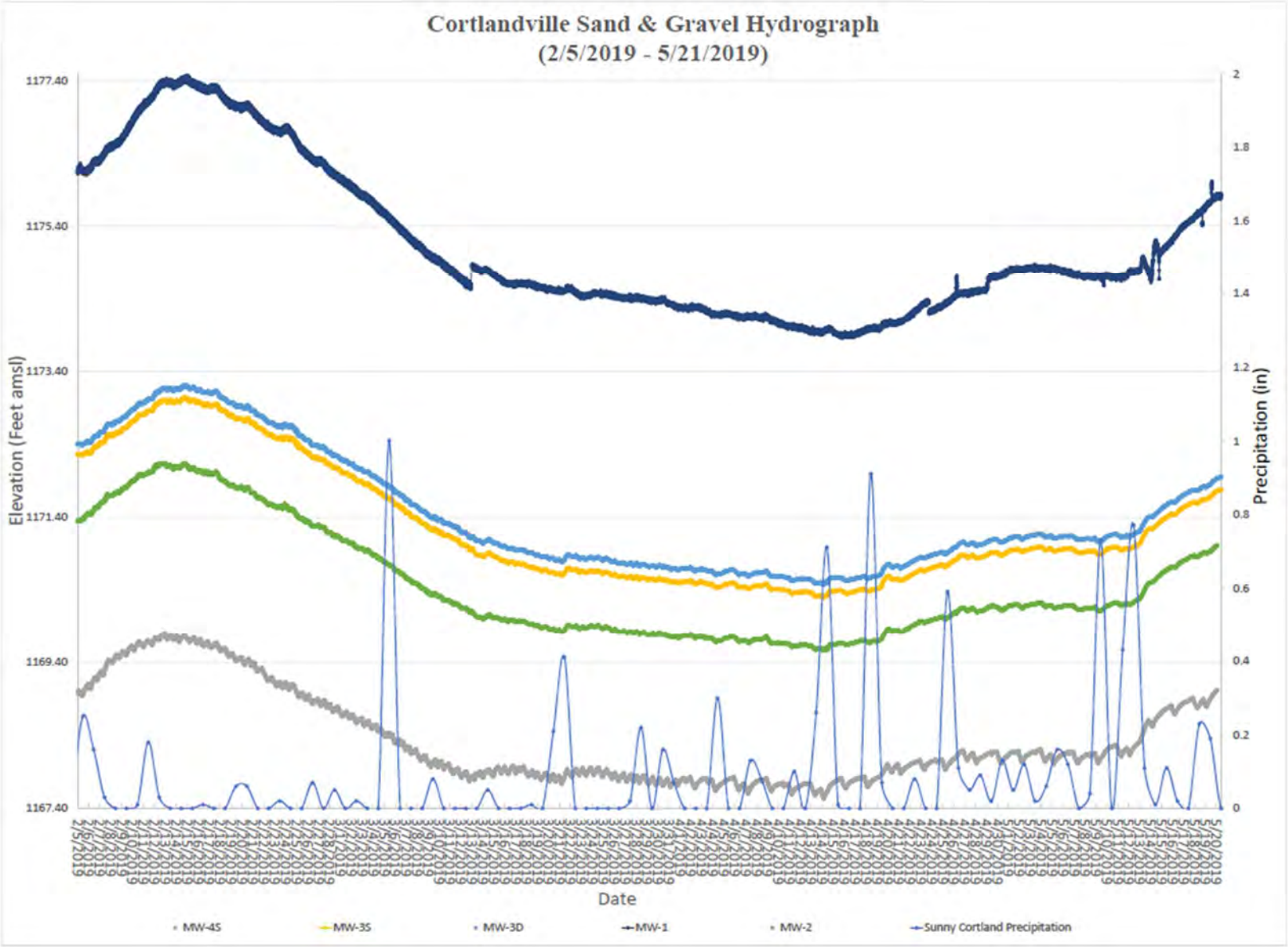


FIGURE 5
GROUNDWATER THERMOGRAPHS

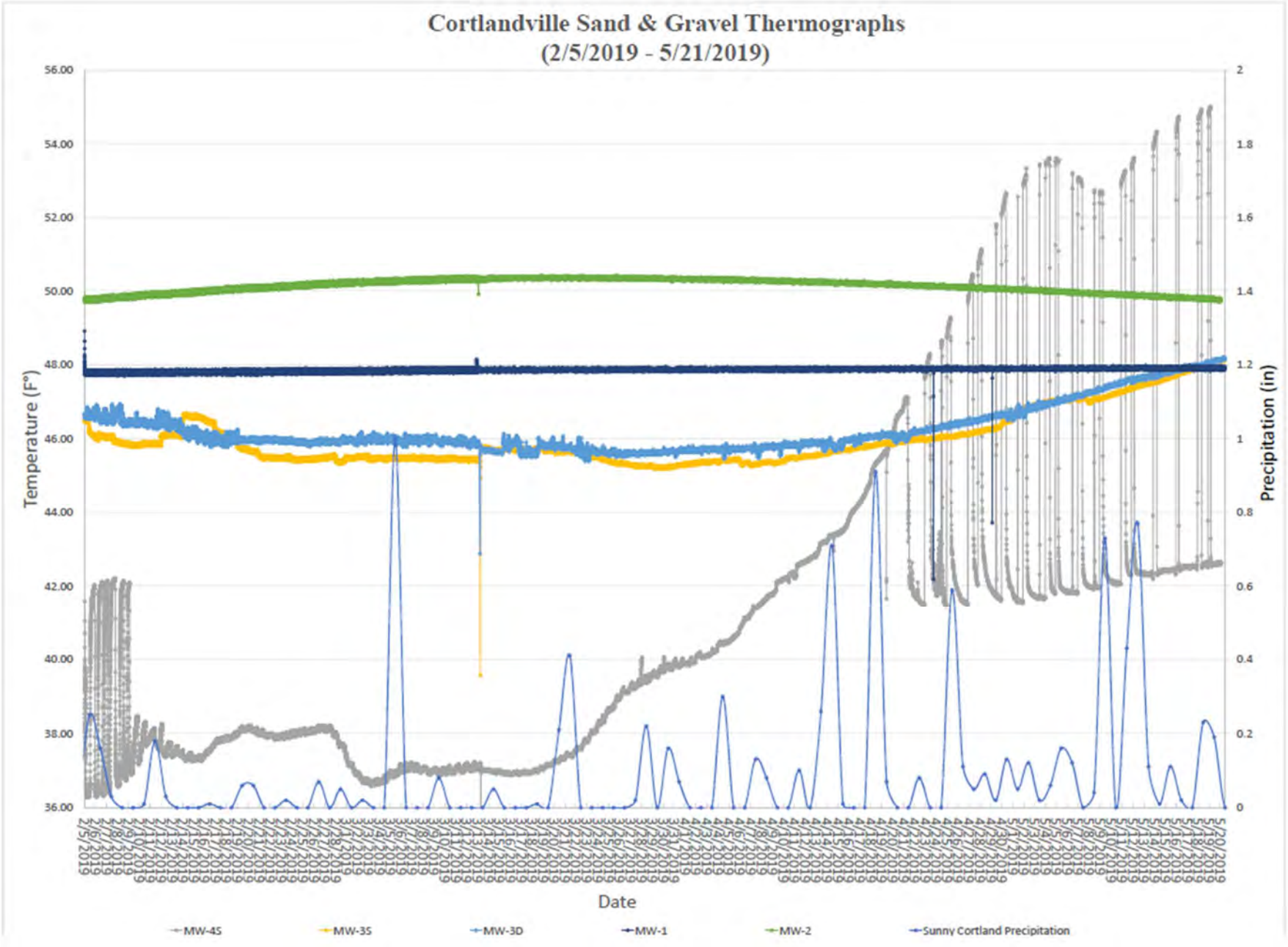
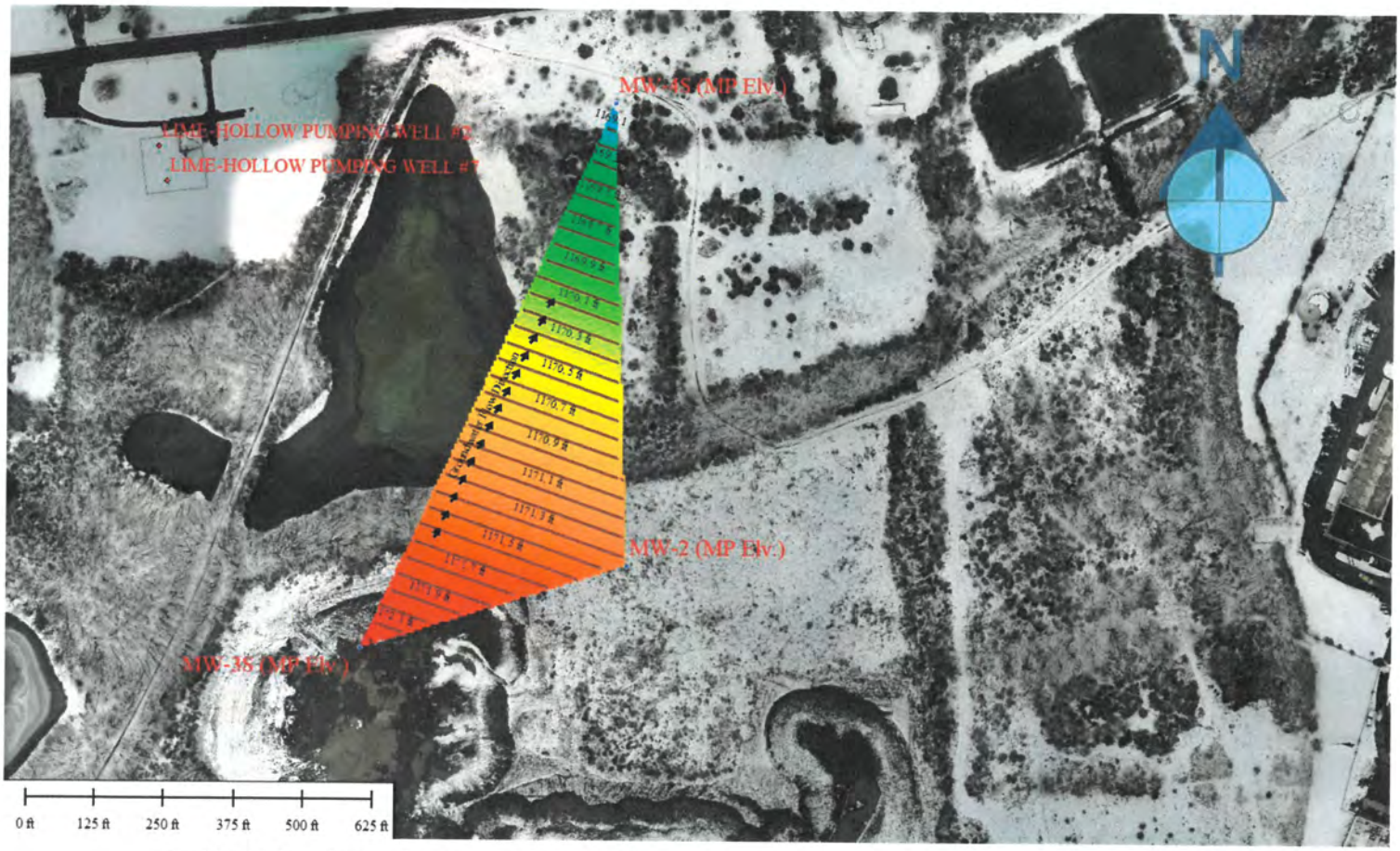
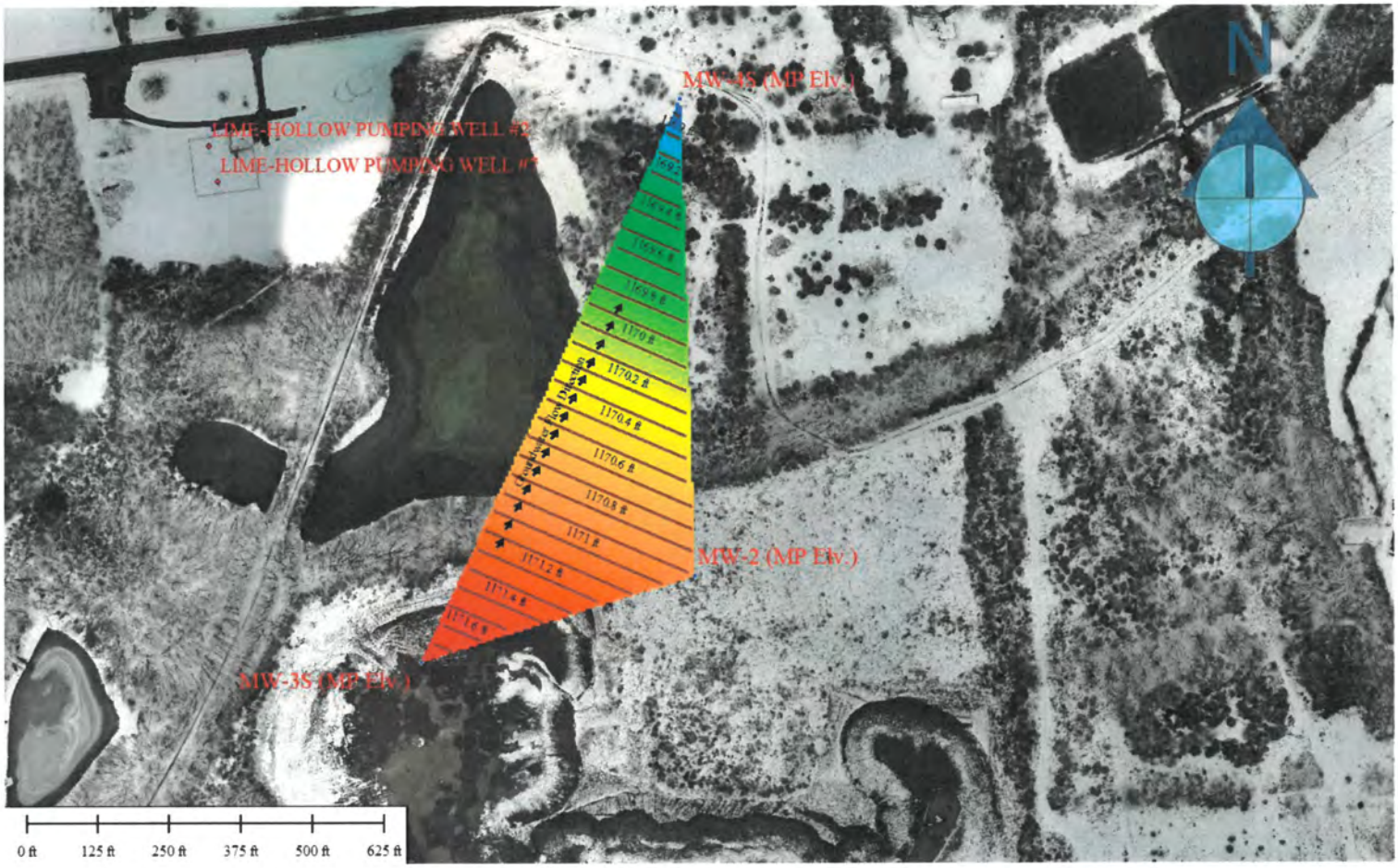


FIGURE 6 – WATER TABLE CONTOUR MAP (2/5/2019)



1. Water Levels based on manual measurements taken on 2/5/2019
2. Aerial Photo from 01-26-2017 Flight by H2H Associates, LLC

FIGURE 6 – WATER TABLE CONTOUR MAP (5/20/2019)



1. Water Levels based on manual measurements taken on 5/20/2019
2. Aerial Photo from 01-26-2017 Flight by H2H Associates, LLC


FIGURE 7 - May 2013
Google Earth
N
800 ft


FIGURE 7a - September 2016
Google Earth
N
800 ft

APPENDICES

APPENDIX A
Work Plan

H2H Associates, LLC
179 River Street, Troy, NY 12180
Geologic Consultants
Environmental Professionals
Construction Services
(518) 270-1620/Fax (518) 270-1672

PROPOSED SCOPE OF WORK – HYDROGEOLOGIC INVESTIGATION
Revised in response to NYSDEC and SWCD comments

Route 13 Rocks LLC (Applicant) has filed an application to NYSDEC to expand its permitted Cortlandville Sand & Gravel mine operation (Site) laterally and vertically (Figure 1). The permitted Life of Mine currently comprises 66.8 acres and the permitted mine floor elevation is based on maintaining an 8-foot separation from the mean high-water table. Cortlandville S&G is seeking a permit modification to mine an additional 11.9 acres laterally and to mine below the water table to the bottom of the sand and gravel outwash aquifer which may be as deep as elevation 1070 feet above mean sea level (amsl). The mine would be completed at a shallower elevation if the underlying lacustrine deposits are encountered at a shallower depth. The deepening requires a waiver of the current 8-foot separation distance requirement. The current pit bottom is at approximate elevation 1185 feet amsl.

In response to the initial application and a subsequent submittal, NYSDEC has indicated that additional hydrogeologic information must be submitted to support the application to deepen mining below the water table. Cortlandville S&G desires to obtain information sufficient to address the NYSDEC's comments, confirm the site's conceptual hydrogeologic model, provide the data needed to assess potential impacts to groundwater quality and quantity, and assess how the modification could potentially affect the Town's Lime-Hollow public water supply wells.

General Scope of Work

This document outlines the proposed work to be completed by H2H to characterize hydrogeologic conditions at the facility. The proposed scope of work, along with the Spill Prevention and Response Plan, is designed to complete the application and to provide sufficient baseline hydrogeologic information to support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells. The proposed scope of work consists of the following subtask activities:

1. Inspect the two existing aquifer groundwater monitoring wells, MW-1 and MW-2, to confirm that they are suitable for future use;
2. Install permanent aquifer monitoring wells at two additional strategic locations, MW-3 (a shallow and deep well) and MW-4 (shallow well), to enable sampling of the aquifer materials, monitoring of groundwater levels, and sampling and analysis of groundwater;
3. Collect soil samples within each new well bore and develop borehole logs;
4. Test "representative" soil samples from the planned screened zone of one shallow and one deep well for grain size and petrographic analysis to characterize aquifer materials;
5. Install pressure transducer-data logger instrumentation in wells to enable continual monitoring of groundwater levels, flow gradients, flow directions, and temperature during the baseline monitoring period;
6. Install staff gauges and assess the relative water levels, bottom conditions and probable groundwater-surface water interactions at the marl ponds adjacent to the mine;
7. Survey the locations and elevations of monitoring points;
8. Collect an initial and quarterly rounds of groundwater samples for analysis to determine baseline spatial and temporal variations of water quality; and
9. Prepare a hydrogeologic assessment report with recommendations for the long-term operational monitoring and groundwater management program.

Following is a detailed description of these subtasks.

Detailed Description of Work Scope

1 - Inspect MW-1 / MW-2 (existing monitoring wells onsite)

Two groundwater monitoring wells are currently located on site (Figure 1). H2H will evaluate the condition and integrity of the well components, and measure the exposed infrastructure and well depths for comparability with the new wells. This will include estimation of the likely well screen elevation (well construction details are unavailable) for comparability with the new wells. Based on this data H2H will document findings and draw conclusions regarding the suitability of the wells for transducer water level measurements and future sampling.

2 - New Monitoring Well Installation

H2H proposes to install new permanent groundwater monitoring wells at two locations (MW-3 & MW-4) in the northern portion of the site (Figures 1 and 2). At the MW-3 location, one well (MW-3S) will be shallow and installed at the water table and the other well (MW-3D) will be deep and installed at the bottom of the aquifer which is the ultimate target horizon for the proposed mine pond. This may be as deep as approximately 100 feet below the water table to approximate elevation 1070 feet amsl. The actual depth will be different depending upon the depth of the bottom of the aquifer. This combination of wells will enable three-dimensional characterization of groundwater in this area and assessment of potential impacts of the proposed mine pond on groundwater quality. Each well will be drilled and installed using appropriate techniques for the anticipated site conditions.

The wells with be constructed of three-inch diameter PVC casing with factory-pre-slotted well screen (nominal 0.020-inch slots) with bottom caps. This casing diameter will facilitate well development and future groundwater sampling. Screen will be provided in 10-foot lengths. The shallow well screen at MW-3S will extend down from approximately 3 feet above the estimated high groundwater level which is nominally 30 feet below grade and varies seasonally. The intent is for the water table to be located within the well screen. Estimated shallow screen length is 30 feet. The deep well will be screened from the bottom of the proposed final pit elevation of 1070' feet amsl to approximately the horizon of the top of the Lime-Hollow public water supply well screens. Estimated deep screen length is 30 feet.

The lower part of the annular space between the well screen and aquifer will be backfilled with a suitably graded filter pack, nominally two-inches thick. The top of the filter pack will be completed two to three feet above the top of the well screen as confirmed by a weighted tag line. Special attention will be directed during well installation to pull back the temporary casing gradually to insure the filter pack remains intact. The annular space above the top of the filter pack will be filled with an approximately two- to three-foot thick bentonite seal. The reminder of the hole will be backfilled with cement-bentonite grout up toward the ground surface. An approximately four-foot thick frost-proof concrete cap will be constructed at the ground surface. The cap will serve as a support base for the permanent surface steel casing with locking cap to protect the PVC well. Precautions will be taken during well construction to prevent unclean or foreign materials from entering the well. This includes cleaning the drilling and other intrusive equipment onsite before well installation commences.

The well will be developed by an appropriate method (e.g. overpumping, surge and bail) to remove drilling residues, improve the interconnection between the screened interval and the adjacent aquifer, and yield relatively clear water for samples. Fluids removed from the well will be monitored visibly for sediment and instrumentally for pH, temperature, specific conductance, and turbidity. The goal is to develop the well until the measured parameters stabilize and the turbidity is reduced to 25 NTUs or lower.

Well drilling, construction and development will be conducted under full-time oversight by an H2H geologist. The new wells will complement the existing monitoring wells located on the downgradient (north) and upgradient (south) ends of the mine.

3 – Soil Samples

The drill cuttings from each proposed well will be monitored and logged to confirm the anticipated sand and gravel stratigraphy in the general area between the proposed mine pond and the municipal wells. Aquifer materials in this general area are well documented in reports published by the United States Geological Survey (USGS). The material is described as an approximately 100-foot thick, coarse grained sand and gravel outwash deposit.

In addition to observing the drill cuttings, H2H will collect split-spoon soil samples (3-inch diameter) at 10-foot intervals below the water table to the bottom of the drill hole at MW-3D for classification and logging. MW-3D will be in close proximity to MW-3S therefore obviating the need for split-spoon samples at MW-3S. Split-spoon sampling is not proposed for MW-4S. Grain size and petrographic analyses will also be completed as described below.

4 – Grain Size and Petrographic Analysis

After soil classification and field logging, H2H will select representative samples from below the water table at MW-3D for grain size and petrographic analyses. The samples should be generally representative of materials in the shallow and deep parts of the aquifer at the north end of the mine. The sample classifications and grain size analyses will be used to characterize changes in aquifer gradation with depth, confirm the adequacy of the monitoring wells' filter pack sand screen designs, and assess resource quality. Petrographic analysis will indicate sand and gravel lithologic composition and provenance.

5 - Install Pressure Transducers

Use of the transducers will provide accurate and well-documented automated water level measurements over the duration of the baseline monitoring period. H2H proposes to install dedicated pressure transducers to measure water levels in all five wells initially. The transducers will be capable of providing a continuous temporal record of the groundwater level in each well. The measurement interval will be set to 30 minutes initially. The intent is to install the transducers to allow data collection during a baseline period of one complete hydrologic cycle, that is, one year. The data will be periodically downloaded to a data collector used to interface with the pressure transducers. The data will be used for the following purposes:

- Provide an indication of the amount of groundwater stored in the aquifer, i.e. water quantity;
- Provide an indication of temporal and spatial variations;
- Reveal if the wells are located within the Town wells' cone of depression;
- Assess the Town wells' radius of influence;
- Assess the Town wells' potential future interaction with mine pond water;
- Develop groundwater contour maps;
- Confirm local groundwater flow directions and horizontal and vertical hydraulic gradients;
- Integrate the new data with data and analyses previously collected by USGS to estimate groundwater flow velocities and travel times; and
- Assess potential vertical components of flow near the Town's wells.

Based on the findings, transducers will be left in place in four wells after one year of monitoring to eliminate the need for manual monthly water level measurements. The logging interval would be adjusted as considered appropriate at that time.

The transducers that would be installed would also have the capability of measuring water temperature at the same time interval as the water levels. This accessory data will be useful for identifying temperature variations, general flow patterns and natural seasonal changes in groundwater recharge.

6 - Surveying

Using its Trimble GPS equipment, H2H will survey the locations of all existing and new wells and staff gauges and determine elevations. Measurements will be reported to the nearest 0.01 feet. Other features relevant to the proposed mine expansion and hydrogeologic assessment will also be surveyed at that time.

7 - Surface Water Feature Inspection & Characterization

H2H proposes to inspect the existing marl ponds located north and west of the proposed mine pond to assess how they might be affected by the proposed mine deepening as a result of surface water-groundwater interaction. H2H will measure pond water levels and their estimated variations using the GPS unit. To the degree practicable, H2H will also assess the pond bottom conditions (e.g. sediment type) as may be pertinent to pond water infiltration/exfiltration. Pond levels will be compared to estimated ground water levels to determine if the ponds are perched, or to what degree they may be directly continuous to the water table and the proposed future mine pond. Perched ponds would not be expected to interact directly with the water table.

One staff gauge will be installed at each of the three ponds. The gauges will consist of a discrete steel fencepost driven approximately four feet into the ground and the top surveyed. Future water level measurements would be made by measuring down from the top of the post to determine water elevations.

8 – Baseline Groundwater Sampling and Analysis

As requested by SWCD, H2H proposes to collect groundwater samples during the one-year baseline period to evaluate spatial and temporal variability of water quality. The sampling and analytical protocol may be revised based on the findings of the MW-1 and W-2 well evaluations.

Spatial Variability
H2H will collect field water quality parameters (temperature, pH, specific conductance, turbidity, dissolved oxygen, redox potential) for all five wells. H2H will also collect one round of four groundwater samples from MW-1, MW-3S, MW-3D, and MW-4S for laboratory chemical analysis. The results will provide an indication of the spatial variability of water quality upgradient and downgradient of the proposed mine pond.

Samples will be extracted from adjacent to the well screens using an appropriate method designed for consistency and efficiency (e.g. via a Redi-Flo 2 or bladder pump). Field water quality parameters will be monitored to determine when sufficient water has been purged from the well prior to sampling. The groundwater samples from each well will be collected in laboratory-provided containers, with preservatives, as appropriate, for analysis in a NYSDOH-approved analytical laboratory. These samples will be kept on ice and transported to the laboratory within standard holding times and under chain of custody protocols.

The samples will be analyzed for total dissolved solids, total organic carbon, alkalinity, hardness, chloride, sulfate, nitrate, phosphorus, ammonia, volatile organic compounds (includes TCE), semi-volatile organic compounds, herbicides/pesticides and metals (including arsenic, barium, chromium, iron, lead, mercury, sodium, zinc). This suite of analytes selected for analysis is derived from several sources: draft comments from NYSDEC, metals reported in the Town's Annual Water Report, metals typically analyzed under the NYSDEC MSGP Sector J Requirements for sand and gravel mines, analyses typically completed to evaluate impacts for other surface mines and associated ponds in NYS, and potential agricultural and atmospheric contaminants.

Temporal Variability
H2H will collect three additional rounds of groundwater samples from MW-3S and MW-3D. These samples will be collected on a quarterly basis intended to characterize the seasonal variability of groundwater quality in the shallow and deep groundwater between the proposed mine pond and the public supply wells.

Baseline Water Quality at Town Wells
H2H will attempt to obtain and review the comprehensive NYSDOH Part 5, Subpart 5-1water quality analyses for the Lime Hollow Road wells prior to finalizing the analyte list. Should any of the spatial or temporal rounds of analysis at the mine identify contaminants during the baseline period, H2H may request permission from the Town to sample its Lime Hollow wells and analyze the water for these parameters.

9 - Hydrogeologic Assessment Report

H2H will prepare a preliminary data summary following completion of the primary field components of the hydrogeologic assessment. The results may suggest how subsequent subtasks should be conducted. The results may also suggest the presence of interim data gaps that may need to be addressed by additional investigatory components.

H2H will prepare a final Hydrogeologic Assessment Report, which will include the following:

- Methodology of individual subtasks;
- Bore hole logs:
- Well construction forms;
- Well development logs;
- Groundwater and surface water feature elevation table;
- Surveyed location and elevation of key monitoring points;
- Maps of groundwater and surface water level elevations;
- Evaluation of all data collected from the site investigation;
- Updated site conceptual model relevant to the mine pond and public water supply wells;
- Conclusions relative to potential water quantity or quality impacts of mine deepening; and
- A proposed long-term groundwater monitoring and management program.

APPENDIX B
Drilling Logs

H2H Associates, LLC 179 River Street Troy, New York 12180 Tel: 518.270-1620 Fax: 518.270-1672	Test Boring Log	Boring No. MW-3D
PROJECT: Hydrogeologic Assessment		Sheet 1 of 5
CLIENT: Cortlandville Sand & Gravel		Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling		Meas. Pt Elev: 1181.39
PURPOSE: Installation of Groundwater Monitoring Wells		Ground Elev: 1181.39
DRILLING METHOD: Symmetrix	SAMPLE / CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE: Cuttings / 2' Split Spoon / Symmetrix	Date Started: 12/03/18
GROUNDWATER DEPTH: 8.2' BGS	DIAM.: 3" / 5"	Date Finished: 12/6/18
MEASURING POINT: Ground Surface	WEIGHT: -	Driller: Steven Laeamee
LOCATION: Cortlandville S&G Mine	FALL: -	Geologist: Michael Polacco

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
5	No Sample					(0.0-7.0') Cuttings, same as 7.0'.	
		30	14	20	50	(7.0-9.0') Very Dark Gray (3/1), Fine to Coarse Sub Rounded Sandy Gravel, Dry, NP.	7.0 - 9.0' Split Spoon sample, cutting samples 0.0-7.0' same.
10						(9.0 - 17.0') Cuttings same 17.0'.	
15							
	S1 17.0-19.0	12	15	22	15	(17.0 - 19.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	17.0 - 19.0' Split Spoon, cutting samples 7.0-17.0' same.
20							

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
25						(19.0 - 27.0') Cuttings same as 27.0'.	
	S2 27.0 - 29.0	35	50	22	18	(27.0 - 29.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	27.0 - 29.0' Split Spoon, Cutting samples 17.0-27.0' same.
30							
						(29.0-37.0') Cuttings same as 37.0'.	
35							
	S3 37.0 - 39.0'	40	31	20	22	(37.0 - 39.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Medium to Coarse Sub Rounded to Rounded Gravel and Sand, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	37.0-39.0' Split Spoon, Cutting Samples 27.0-37.0' same.
40							

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Troy, New York 12180
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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
45						(39.0 - 47.0') Cuttings same as 47.0'.	
	S4 47.0-49.0'					(47.0-49.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Sandy Coarse Gravel, Trace Silt Large Angular Fragments of Rock From Cobbles, Wet, NP.	47.0 - 49.0 Split Spoon, Cutting Samples 37.0-47.0' same.
50						(49.0 - 57.0') Cuttings same as 57.0'.	
55							
	S5 57.0-59.0					(57.0-59.0) Very Dark Gray (3/1), Rounded to Sub Rounded Fine to Course Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	57.0-59.0' Split Spoon, Cutting Samples 47.0-57.0' same.
60						(59.0 - 67.0') Cuttings same as 67.0'.	

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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
	S6 67.0-69.0	14	23	55	50	(67.0 - 69.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Sandy Gravel, Trace Silt, Increase in Large Angular Fragments of Rock From Cobbles, Wet, NP.	67.0 - 69.0' Split Spoon, Cutting Samples 57.0 - 67.0'.
70							
75							
	S7 77.0 -79.0	58	40	23	26	(77.0 - 79.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Gravely Sand,Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP. Lenses of Light Tan, Clayey Silt W,P.	77.0 - 79.0' Split Spoon, Cutting Samples 67.0 - 77.0'.
80							
85							
	S8 87.0-89.0	40	58	26	53	(87.0 - 88.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Coarse Sandy Gravel, Trace Silt, Wet, NP. (88.0 - 89.0') Very Dark Gray (3/1), Rounded to Sub Rounded Gravely Sand, Trace Silt, Wet, NP.	87.0 - 89.0' Split Spoon. Cutting Samples 77.0 - 87.0'.

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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 5 of 5

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
90	S9 89.0-91.0	40	37	35	28	(89.0 - 90.0') Very Dark Gray (3/1), Fine to Course Rounded to Sub rounded Gravely Sand, Trace Silt, Wet, NP. (90.0 - 91.0) Dark Gray (3/1), Fine to Coarse Gravely Sand Rounded to Sub rounded, Trace Silt.	89.0 - 91.0' Split Spoon,
91						**Total Depth - 91.0 Feet Below Ground Surface**	

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179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3S

PROJECT: Hydrogeologic Assessment				Sheet 1 of 2
CLIENT: Cortlandville Sand & Gravel				Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling				Meas. Pt Elev: 1181.09
PURPOSE: Installation of Groundwater Monitoring Wells				Ground Elev: 1181.09
DRILLING METHOD: Symmetrix		SAMPLE	CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE	Cuttings	Symmetrix	Date Started: 12/06/18
GROUNDWATER DEPTH: 8.1' BGS	DIAM.	3"	5"	Date Finished: 12/06/18
MEASURING POINT: Ground Surface	WEIGHT	-		Driller: Steven Laeamee
Location: Courtlandville S&G Mine	FALL	-		Geologist: Michael Polacco

Depth (feet)	Sample Number	Geologic Description	Remarks
5	No Sample	(0-12') Olive Gray (5/2), Fine Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Moist, NP.	Log based on cuttings
10			
15		(12 - 22') Gray (5/5), Fine to Coarse Gravely Sand, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
20			

H2H Associates, LLC
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Troy, New York 12180
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Test Boring Log

Boring No. MW-3S

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 2 of 2

Job No. 360.00

Depth (feet)	Geologic Description	Remarks
25	(22 - 27') Gray (5/5), Fine to Coarse Gravely Sand, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
30	(27 - 32') Dark Gray (4/1), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
35	(32 - 35.5') Dark Gray (4/1), Fine to Coarse Gravely Sand, Rounded to Sub rounded, Wet, NP.	Log based on cuttings

35.5 **Total Depth - 35.5 Feet Below Ground Surface**

H2H Associates, LLC 179 River Street Troy, New York 12180 Tel: 518.270-1620 Fax: 518.270-1672	Test Boring Log	Boring No. MW-4S
PROJECT: Hydrogeologic Assessment		Sheet 1 of 2
CLIENT: Cortlandville Sand & Gravel		Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling		Meas. Pt Elev: 1175.58
PURPOSE: Installation of Groundwater Monitoring Wells		Ground Elev: 1175.58

DRILLING METHOD: Symmetrix		SAMPLE	CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE	Cuttings	Symmetrix	Date Started: 12/07/18
GROUNDWATER DEPTH: 5.8' BGS	DIAM.	3"	5"	Date Finished: 12/07/18
MEASURING POINT: Ground Surface	WEIGHT	-		Driller: Steven Laeamee
	FALL	-		Geologist: Michael Polacco

Depth (feet)	Geologic Description	Remarks
	Fill From Site	
5	(0 - 8') Brown (5/2), Fine Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Moist, NP.	Log based on cuttings.
10	(8 - 13') Brown (5/2), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings.
15	(13 - 18') Dark Brown (3/2), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings.
20		

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-4S

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 2 of 2

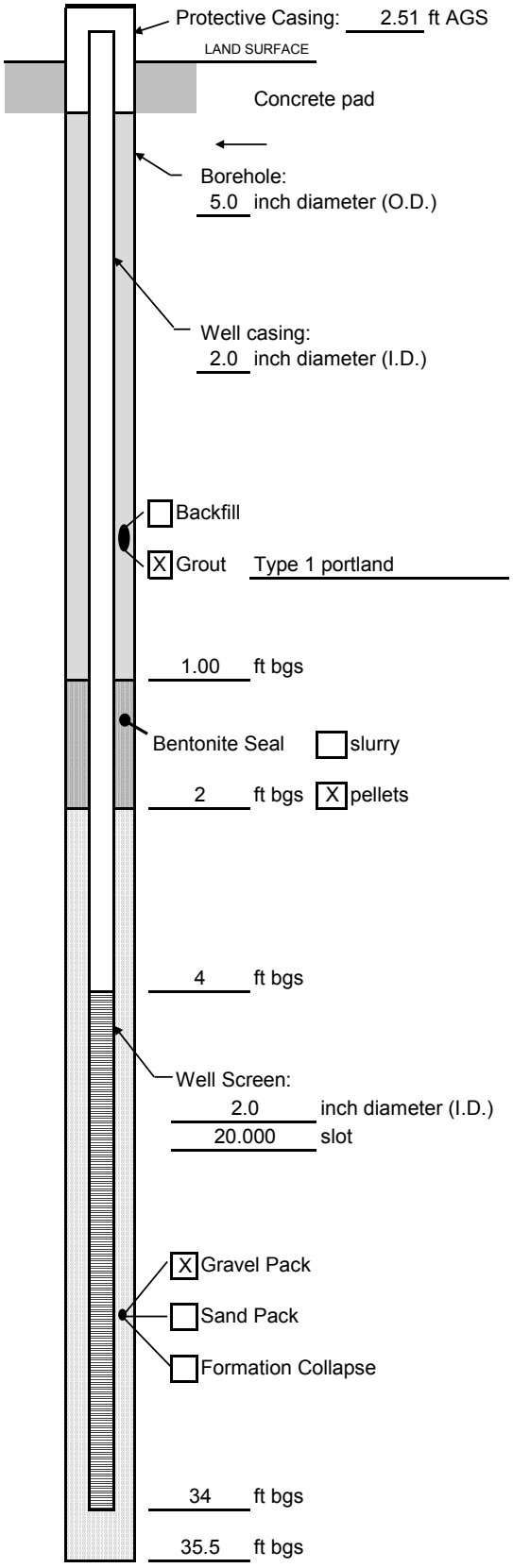
Job No. 360.00

Depth (feet)	Geologic Description	Remarks
	(18 - 23') Dark Brown (3/2), Fine to Coarse Sandy Gravel, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
25	(23 - 28') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
30	(28 - 33') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
35	(33 - 36') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
36	**Total Depth - 36.0 Feet Below Ground Surface**	

APPENDIX C
Well Construction Logs

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-3S

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1181.09 feet [X] Surveyed

Measuring Point Elevation: 1183.60 feet [ ] Estimated

Installation Date(s): 12/7/2018

Drilled Date(s): 12/6/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/11/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

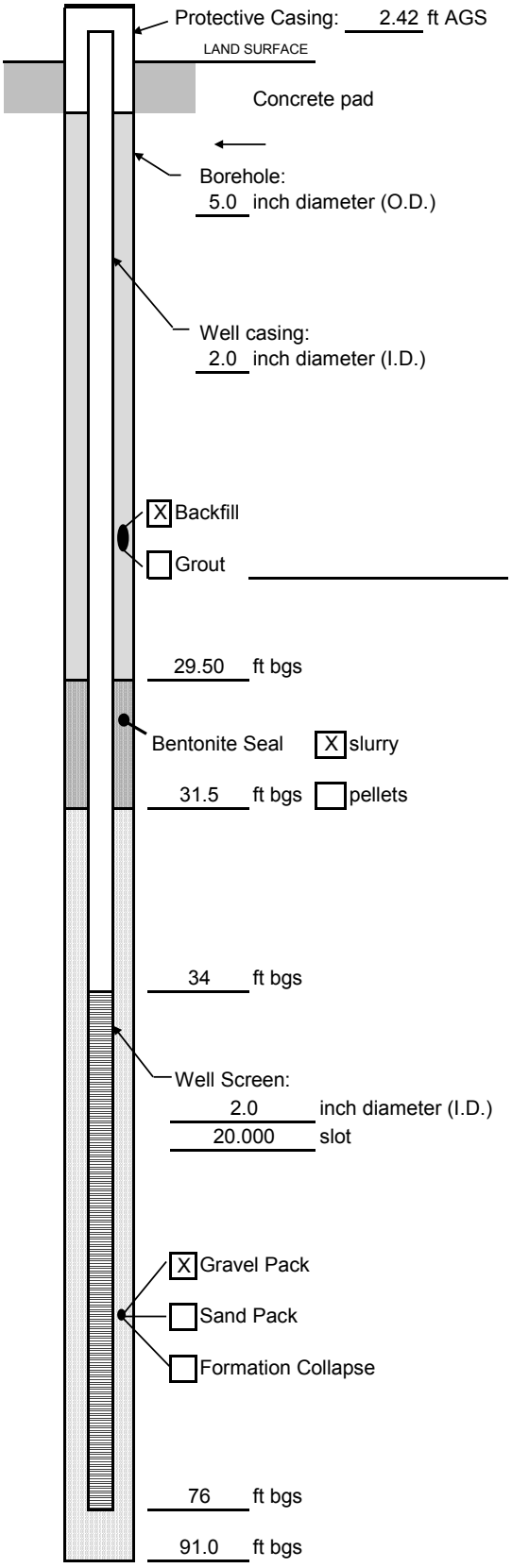
Remarks:

Prepared by:

Michael Polacco

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-3D

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1181.388 feet [X] Surveyed

Measuring Point Elevation: 1183.81 feet [ ] Estimated

Installation Date(s): 12/6/2018

Drilled Date(s): 12/03/2018 - 12/06/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/10/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

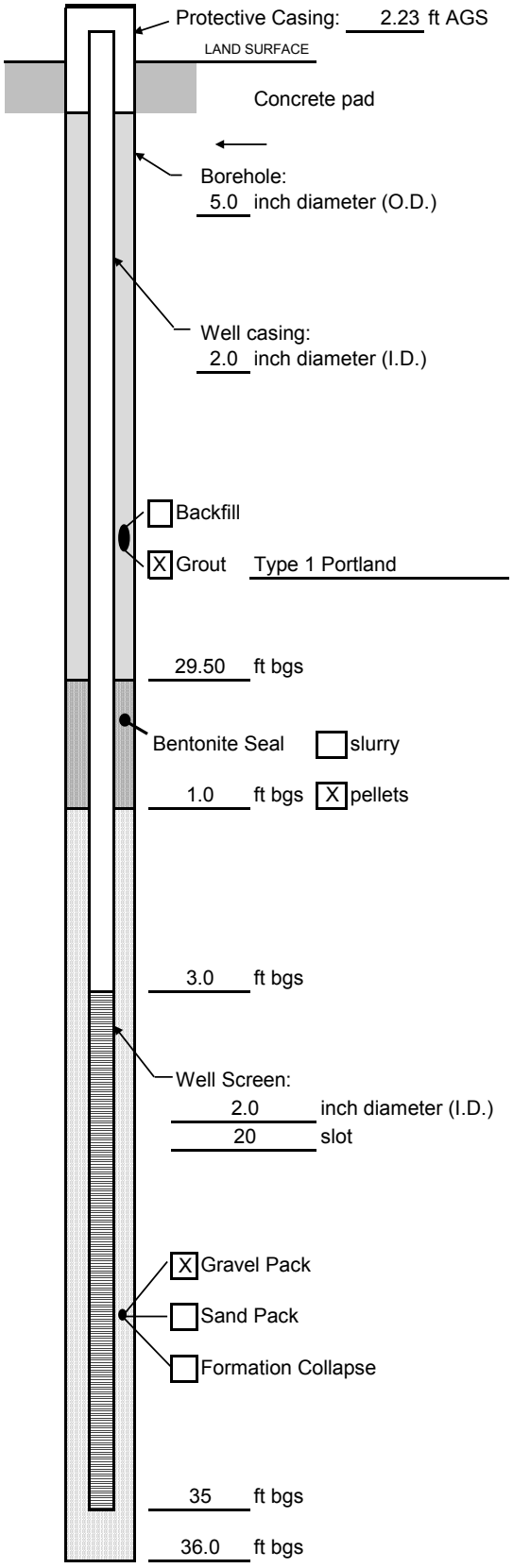
Remarks:

Prepared by:

Michael Polacco

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-4S

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1175.58 feet [X] Surveyed

Measuring Point Elevation: 1177.81 feet [ ] Estimated

Installation Date(s): 12/10/2018

Drilled Date(s): 12/7/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/10/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

Remarks:

Prepared by:

Michael Polacco

APPENDIX D
Grain Size Analyses

Cortlandvile Sand Gravel Mine
Mining Permit Modification
Gradation Analysis

Gradation Sample	Sample Depth (Ft. BGS)		%Cobbles	% Gravel	% Sand	% Silt / Clay	Notes
	from	to					
S-1	17.0	19.0	0.0	64.6	29.2	5.5	3" Split Spoon Sample
S-2	27.0	29.0	0.0	72.3	24.7	3.0	3" Split Spoon Sample
S-3	29.0	39.0	0.0	51.3	47.1	1.6	37.0-39.0' 3" Split Spoon, Cutting Samples 29.0-37.0' same.
S-4	39.0	49.0	0.0	41.1	52.6	6.3	47.0 - 49.0' 3" Split Spoon, Cutting Samples 39.0-47.0' same.
S-5	49.0	59.0	0.0	47.1	51.5	1.4	57.0-59.0' 3" Split Spoon, Cutting Samples 49.0-57.0' same.
S-6	59.0	69.0	0.0	45.8	51.2	3.0	67.0 - 69.0' 3" Split Spoon, Cutting Samples 59.0 - 67.0'.
S-7	69.0	79.0	0.0	40.3	55.7	4.0	77.0 - 79.0' 3" Split Spoon, Cutting Samples 69.0 - 77.0'.
S-8	79.0	89.0	0.0	35.3	58.3	6.4	87.0 - 89.0' 3" Split Spoon. Cutting Samples 79.0 - 87.0'.
S-9	89.0	91.0	0.0	54.9	40.4	4.7	3" Split Spoon.

Notes:
1. MW-3D screened from 34.0' BGS - 76.0 'BGS
2. MW-3S screened from 4' BGS - 34.0' BGS
3. Samples collected from MW-3D
4. MW-3D ground surface elv. 1181.4' amsl / MW-3S ground surface elv. 1181.1'

APPENDIX E
Laboratory Analysis Reports

APPENDIX E-1
Quarter 1
Laboratory Analysis Reports

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

April 3, 2019

Mike Polacco
H2H Associates, LLC
179 River Street
Troy, NY 12180

Project Location: Cortlandville, NY
Client Job Number:
Project Number: 10009
Laboratory Work Order Number: 19C0662

Enclosed are results of analyses for samples received by the laboratory on March 14, 2019. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Aaron L. Benoit
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 7

Sample Results 10

19C0662-01 10

19C0662-02 19

19C0662-03 28

19C0662-04 37

19C0662-05 46

19C0662-06 55

19C0662-07 57

Sample Preparation Information 59

QC Data 62

Volatile Organic Compounds by GC/MS 62

B225949 62

Semivolatile Organic Compounds by GC/MS 67

B226147 67

Organochloride Pesticides by GC/ECD 72

B226044 72

Herbicides by GC/ECD 75

B226019 75

Metals Analyses (Total) 77

B225878 77

B226176 77

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 79

B225801 79

Table of Contents (continued)

B225891 79

B225927 79

B225953 79

B225995 80

B226138 80

B226174 80

B226260 81

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) 82

B225822 82

B227340 82

Pesticides Degradation Report 83

Dual Column RPD Report 85

Flag/Qualifier Summary 91

Certifications 92

Chain of Custody/Sample Receipt 100

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-2	19C0662-01	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-3D	19C0662-02	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-3S	19C0662-03	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-4S	19C0662-04	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
DUP	19C0662-05	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
Field Blank	19C0662-06	Field Blank		SW-846 8260C	
Trip Blank	19C0662-07	Trip Blank Water		SW-846 8260C	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

REVISED REPORT 04/01/2019: Report revised to verify TDS results for 19C0662-03 through 19C0662-05 per client 3/29/19 e-mail request.

For method 8151, samples were derivatized on 03/19/19.

For method 8151, sample analysis bracketed by LCS to monitor esterification. All recoveries in the bracketing LCS met method criteria.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ASTM D516-11

Qualifications:

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Sulfate
B226138-BSD1

EPA 300.0

Qualifications:

MS-07

Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Chloride
19C0662-02[MW-3D], B226260-MS1

SM21-22 2540C

Qualifications:

H-02

Gross violation of holding time. Analysis performed after 2X the allowable holding time.

Analyte & Samples(s) Qualified:

Total Dissolved Solids
19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP]

SW-846 8081B

Qualifications:

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Hexachlorobenzene
B226044-BS1, B226044-BSD1

SW-846 8260C

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Methyl Acetate
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Methyl Acetate
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1, S033642-CCV1

Tetrahydrofuran
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1, S033642-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
B225949-BS1, B225949-BSD1, S033642-CCV1

Dichlorodifluoromethane (Freon 12
B225949-BS1, B225949-BSD1, S033642-CCV1

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V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Methyl Acetate

B225949-BS1, B225949-BSD1, S033642-CCV1

V-36

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Carbon Disulfide

B225949-BS1, B225949-BSD1, S033642-CCV1

SW-846 8270D

Qualifications:

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Benzidine

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

3,3-Dichlorobenzidine

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

3-Nitroaniline

B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

4-Chloroaniline

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

Aniline

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Project Manager

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 15:01
Toluene-d8	102	70-130		3/18/19 15:01
4-Bromofluorobenzene	102	70-130		3/18/19 15:01

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.6	15-110		3/22/19 17:31
Phenol-d6	23.7	15-110		3/22/19 17:31
Nitrobenzene-d5	82.8	30-130		3/22/19 17:31
2-Fluorobiphenyl	89.0	30-130		3/22/19 17:31
2,4,6-Tribromophenol	101	15-110		3/22/19 17:31
p-Terphenyl-d14	114	30-130		3/22/19 17:31

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.20	0.025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Aldrin [1]	ND	0.050	0.017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
alpha-BHC [1]	ND	0.050	0.0032	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
beta-BHC [1]	ND	0.050	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
delta-BHC [1]	ND	0.050	0.030	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
gamma-BHC (Lindane) [1]	ND	0.030	0.014	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Chlordane [1]	ND	0.20	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDD [1]	ND	0.040	0.0018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDE [1]	ND	0.040	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDT [1]	ND	0.040	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Dieldrin [1]	ND	0.0020	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan I [1]	ND	0.050	0.0021	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan II [1]	ND	0.080	0.0029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan sulfate [1]	ND	0.080	0.0025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin [1]	ND	0.080	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin aldehyde [1]	ND	0.080	0.063	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin ketone [1]	ND	0.080	0.0050	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Heptachlor [1]	ND	0.050	0.0046	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Heptachlor epoxide [1]	ND	0.050	0.0040	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Hexachlorobenzene [2]	ND	0.050	0.039	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Methoxychlor [1]	ND	0.50	0.0097	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Toxaphene [1]	ND	1.0	0.66	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.3	30-150		3/23/19 18:55
Decachlorobiphenyl [2]	84.0	30-150		3/23/19 18:55
Tetrachloro-m-xylene [1]	68.2	30-150		3/23/19 18:55
Tetrachloro-m-xylene [2]	66.9	30-150		3/23/19 18:55

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	94.7	30-150		3/19/19 23:45
2,4-Dichlorophenylacetic acid [2]	92.8	30-150		3/19/19 23:45

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Barium	0.040	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:55	TBC
Sodium	28	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Hardness	240			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:39	EJB

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	220	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	48	1.0	0.30	mg/L	1		EPA 300.0	3/22/19	3/22/19 10:40	IS
Nitrate as N	2.9	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 0:10	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/17/19	3/17/19 13:20	AIA
Sulfate	10	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:27	KMV

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	250	10	5.9	mg/L	1		SM21-22 2540C	3/15/19	3/15/19 11:55	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 15:31
Toluene-d8	101	70-130		3/18/19 15:31
4-Bromofluorobenzene	99.7	70-130		3/18/19 15:31

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	36.9	15-110		3/22/19 17:53
Phenol-d6	23.3	15-110		3/22/19 17:53
Nitrobenzene-d5	84.8	30-130		3/22/19 17:53
2-Fluorobiphenyl	90.1	30-130		3/22/19 17:53
2,4,6-Tribromophenol	104	15-110		3/22/19 17:53
p-Terphenyl-d14	121	30-130		3/22/19 17:53

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Aldrin [1]	ND	0.048	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
alpha-BHC [1]	ND	0.048	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
beta-BHC [1]	ND	0.048	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
delta-BHC [1]	ND	0.048	0.029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
gamma-BHC (Lindane) [1]	ND	0.029	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDE [1]	ND	0.038	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan I [1]	ND	0.048	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan II [1]	ND	0.077	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan sulfate [1]	ND	0.077	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin [1]	ND	0.077	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin aldehyde [1]	ND	0.077	0.060	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin ketone [1]	ND	0.077	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Heptachlor [1]	ND	0.048	0.0044	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Heptachlor epoxide [1]	ND	0.048	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Hexachlorobenzene [2]	ND	0.048	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Methoxychlor [1]	ND	0.48	0.0093	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Toxaphene [1]	ND	0.96	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	68.3	30-150		3/23/19 19:22
Decachlorobiphenyl [2]	86.1	30-150		3/23/19 19:22
Tetrachloro-m-xylene [1]	71.9	30-150		3/23/19 19:22
Tetrachloro-m-xylene [2]	70.5	30-150		3/23/19 19:22

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	91.8	30-150		3/20/19 0:24
2,4-Dichlorophenylacetic acid [2]	90.7	30-150		3/20/19 0:24

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D
Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Barium	0.054	0.050	0.0053	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:56	TBC
Sodium	13	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Hardness	230			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:45	EJB

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	160	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	40	1.0	0.30	mg/L	1	MS-07	EPA 300.0	3/22/19	3/22/19 10:54	IS
Nitrate as N	1.8	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 0:39	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/17/19	3/17/19 13:20	AIA
Sulfate	17	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:43	KMV

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	230	10	5.9	mg/L	1		SM21-22 2540C	3/15/19	3/15/19 11:55	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,1-Trichloroethane	0.32	1.0	0.20	µg/L	1	J	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 16:02
Toluene-d8	101	70-130		3/18/19 16:02
4-Bromofluorobenzene	99.4	70-130		3/18/19 16:02

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	38.2	15-110		3/22/19 18:16
Phenol-d6	24.4	15-110		3/22/19 18:16
Nitrobenzene-d5	87.3	30-130		3/22/19 18:16
2-Fluorobiphenyl	91.5	30-130		3/22/19 18:16
2,4,6-Tribromophenol	104	15-110		3/22/19 18:16
p-Terphenyl-d14	119	30-130		3/22/19 18:16

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.21	0.026	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Aldrin [1]	ND	0.052	0.018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
alpha-BHC [1]	ND	0.052	0.0033	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
beta-BHC [1]	ND	0.052	0.025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
delta-BHC [1]	ND	0.052	0.031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
gamma-BHC (Lindane) [1]	ND	0.031	0.014	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Chlordane [1]	ND	0.21	0.13	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDD [1]	ND	0.041	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDE [1]	ND	0.041	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDT [1]	ND	0.041	0.0025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Dieldrin [1]	ND	0.0021	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan I [1]	ND	0.052	0.0022	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan II [1]	ND	0.082	0.0030	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan sulfate [1]	ND	0.082	0.0026	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin [1]	ND	0.082	0.0018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin aldehyde [1]	ND	0.082	0.065	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin ketone [1]	ND	0.082	0.0051	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Heptachlor [1]	ND	0.052	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Heptachlor epoxide [1]	ND	0.052	0.0041	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Hexachlorobenzene [2]	ND	0.052	0.040	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Methoxychlor [1]	ND	0.52	0.010	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Toxaphene [1]	ND	1.0	0.68	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.0	30-150		3/23/19 19:48
Decachlorobiphenyl [2]	76.8	30-150		3/23/19 19:48
Tetrachloro-m-xylene [1]	61.8	30-150		3/23/19 19:48
Tetrachloro-m-xylene [2]	60.9	30-150		3/23/19 19:48

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	95.2	30-150		3/20/19 1:03
2,4-Dichlorophenylacetic acid [2]	94.0	30-150		3/20/19 1:03

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S
Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	0.0084	0.010	0.0080	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Barium	0.045	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:58	TBC
Sodium	21	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Hardness	260			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:51	EJB

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	230	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	52	5.0	1.5	mg/L	5		EPA 300.0	3/22/19	3/22/19 12:06	IS
Nitrate as N	2.7	0.10	0.028	mg/L	1		EPA 300.0	3/14/19	3/14/19 23:42	IS
Phosphorus, Total	0.081	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	9.8	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:59	KMV

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	230	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloroform	0.34	2.0	0.17	µg/L	1	J	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 16:33
Toluene-d8	102	70-130		3/18/19 16:33
4-Bromofluorobenzene	101	70-130		3/18/19 16:33

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.6	15-110		3/22/19 18:38
Phenol-d6	24.3	15-110		3/22/19 18:38
Nitrobenzene-d5	83.6	30-130		3/22/19 18:38
2-Fluorobiphenyl	88.2	30-130		3/22/19 18:38
2,4,6-Tribromophenol	102	15-110		3/22/19 18:38
p-Terphenyl-d14	119	30-130		3/22/19 18:38

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Aldrin [1]	ND	0.047	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
alpha-BHC [1]	ND	0.047	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
beta-BHC [1]	ND	0.047	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
delta-BHC [1]	ND	0.047	0.028	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
gamma-BHC (Lindane) [1]	ND	0.028	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDE [1]	ND	0.038	0.0015	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan I [1]	ND	0.047	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan II [1]	ND	0.076	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan sulfate [1]	ND	0.076	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin [1]	ND	0.076	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin aldehyde [1]	ND	0.076	0.059	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin ketone [1]	ND	0.076	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Heptachlor [1]	ND	0.047	0.0043	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Heptachlor epoxide [1]	ND	0.047	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Hexachlorobenzene [2]	ND	0.047	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Methoxychlor [1]	ND	0.47	0.0092	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Toxaphene [1]	ND	0.95	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.6	30-150		3/23/19 20:15
Decachlorobiphenyl [2]	84.8	30-150		3/23/19 20:15
Tetrachloro-m-xylene [1]	67.0	30-150		3/23/19 20:15
Tetrachloro-m-xylene [2]	65.5	30-150		3/23/19 20:15

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	81.7	30-150		3/20/19 1:43	
2,4-Dichlorophenylacetic acid [2]	81.3	30-150		3/20/19 1:43	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	0.0088	0.010	0.0080	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Barium	0.029	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:59	TBC
Sodium	20	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Hardness	250			mg/L	1		SW-846 6010	3/20/19	3/21/19 11:08	EJB

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	180	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	54	5.0	1.5	mg/L	5		EPA 300.0	3/22/19	3/22/19 12:21	IS
Nitrate as N	1.8	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 1:37	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	8.8	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 12:15	KMV

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	240	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 17:03
Toluene-d8	101	70-130		3/18/19 17:03
4-Bromofluorobenzene	97.2	70-130		3/18/19 17:03

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	36.1	15-110		3/22/19 19:01
Phenol-d6	23.0	15-110		3/22/19 19:01
Nitrobenzene-d5	81.2	30-130		3/22/19 19:01
2-Fluorobiphenyl	86.3	30-130		3/22/19 19:01
2,4,6-Tribromophenol	98.5	15-110		3/22/19 19:01
p-Terphenyl-d14	115	30-130		3/22/19 19:01

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Aldrin [1]	ND	0.048	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
alpha-BHC [1]	ND	0.048	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
beta-BHC [1]	ND	0.048	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
delta-BHC [1]	ND	0.048	0.029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
gamma-BHC (Lindane) [1]	ND	0.029	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDE [1]	ND	0.038	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan I [1]	ND	0.048	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan II [1]	ND	0.077	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan sulfate [1]	ND	0.077	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin [1]	ND	0.077	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin aldehyde [1]	ND	0.077	0.060	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin ketone [1]	ND	0.077	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Heptachlor [1]	ND	0.048	0.0044	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Heptachlor epoxide [1]	ND	0.048	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Hexachlorobenzene [2]	ND	0.048	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Methoxychlor [1]	ND	0.48	0.0093	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Toxaphene [1]	ND	0.96	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.3	30-150		3/23/19 20:42
Decachlorobiphenyl [2]	84.7	30-150		3/23/19 20:42
Tetrachloro-m-xylene [1]	59.7	30-150		3/23/19 20:42
Tetrachloro-m-xylene [2]	58.8	30-150		3/23/19 20:42

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	92.6	30-150		3/20/19	2:22
2,4-Dichlorophenylacetic acid [2]	91.3	30-150		3/20/19	2:22

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Barium	0.054	0.050	0.0053	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 9:01	TBC
Sodium	13	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Hardness	230			mg/L	1		SW-846 6010	3/20/19	3/21/19 11:14	EJB

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	180	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	40	1.0	0.30	mg/L	1		EPA 300.0	3/22/19	3/22/19 12:35	IS
Nitrate as N	2.1	0.10	0.028	mg/L	1		EPA 300.0	3/14/19	3/14/19 23:13	IS
Phosphorus, Total	0.074	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	19	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 12:31	KMV

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	220	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Field Blank | Sampled: 3/13/2019 19:20

Sample ID: 19C0662-06

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Field Blank | Sampled: 3/13/2019 19:20

Sample ID: 19C0662-06

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 11:26
Toluene-d8	101	70-130		3/18/19 11:26
4-Bromofluorobenzene	100	70-130		3/18/19 11:26

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Trip Blank | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-07

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Trip Blank | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-07

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 11:56
Toluene-d8	103	70-130		3/18/19 11:56
4-Bromofluorobenzene	100	70-130		3/18/19 11:56

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

ASTM D516-11

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226138	100	100	03/20/19
19C0662-02 [MW-3D]	B226138	100	100	03/20/19
19C0662-03 [MW-3S]	B226138	100	100	03/20/19
19C0662-04 [MW-4S]	B226138	100	100	03/20/19
19C0662-05 [DUP]	B226138	100	100	03/20/19

Prep Method: EPA 300.0-EPA 300.0

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225801	10.0	10.0	03/15/19
19C0662-02 [MW-3D]	B225801	10.0	10.0	03/15/19
19C0662-03 [MW-3S]	B225801	10.0	10.0	03/14/19
19C0662-04 [MW-4S]	B225801	10.0	10.0	03/15/19
19C0662-05 [DUP]	B225801	10.0	10.0	03/14/19

Prep Method: EPA 300.0-EPA 300.0

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226260	10.0	10.0	03/22/19
19C0662-02 [MW-3D]	B226260	10.0	10.0	03/22/19
19C0662-03 [MW-3S]	B226260	10.0	10.0	03/22/19
19C0662-04 [MW-4S]	B226260	10.0	10.0	03/22/19
19C0662-05 [DUP]	B226260	10.0	10.0	03/22/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225927	50.0	50.0	03/17/19
19C0662-02 [MW-3D]	B225927	50.0	50.0	03/17/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-03 [MW-3S]	B225995	50.0	50.0	03/19/19
19C0662-04 [MW-4S]	B225995	50.0	50.0	03/19/19
19C0662-05 [DUP]	B225995	50.0	50.0	03/19/19

SM 5310B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226174	50.0	50.0	03/20/19
19C0662-02 [MW-3D]	B226174	50.0	50.0	03/20/19
19C0662-03 [MW-3S]	B226174	50.0	50.0	03/20/19
19C0662-04 [MW-4S]	B226174	50.0	50.0	03/20/19
19C0662-05 [DUP]	B226174	50.0	50.0	03/20/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225953	100	100	03/18/19
19C0662-02 [MW-3D]	B225953	100	100	03/18/19
19C0662-03 [MW-3S]	B225953	100	100	03/18/19
19C0662-04 [MW-4S]	B225953	100	100	03/18/19
19C0662-05 [DUP]	B225953	100	100	03/18/19

SM21-22 2320B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225891	100	100	03/15/19
19C0662-02 [MW-3D]	B225891	100	100	03/15/19
19C0662-03 [MW-3S]	B225891	100	100	03/15/19
19C0662-04 [MW-4S]	B225891	100	100	03/15/19
19C0662-05 [DUP]	B225891	100	100	03/15/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-01 [MW-2]	B225822	50.0	03/15/19
19C0662-02 [MW-3D]	B225822	50.0	03/15/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-03 [MW-3S]	B227340	50.0	04/01/19
19C0662-04 [MW-4S]	B227340	50.0	04/01/19
19C0662-05 [DUP]	B227340	50.0	04/01/19

Prep Method: SW-846 3005A-SW-846 6010

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-01 [MW-2]	B226176	50.0	03/20/19
19C0662-02 [MW-3D]	B226176	50.0	03/20/19
19C0662-03 [MW-3S]	B226176	50.0	03/20/19
19C0662-04 [MW-4S]	B226176	50.0	03/20/19
19C0662-05 [DUP]	B226176	50.0	03/20/19

Prep Method: SW-846 3005A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226176	50.0	50.0	03/20/19
19C0662-02 [MW-3D]	B226176	50.0	50.0	03/20/19
19C0662-03 [MW-3S]	B226176	50.0	50.0	03/20/19
19C0662-04 [MW-4S]	B226176	50.0	50.0	03/20/19
19C0662-05 [DUP]	B226176	50.0	50.0	03/20/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 7470A Prep-SW-846 7470A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225878	6.00	6.00	03/18/19
19C0662-02 [MW-3D]	B225878	6.00	6.00	03/18/19
19C0662-03 [MW-3S]	B225878	6.00	6.00	03/18/19
19C0662-04 [MW-4S]	B225878	6.00	6.00	03/18/19
19C0662-05 [DUP]	B225878	6.00	6.00	03/18/19

Prep Method: SW-846 3510C-SW-846 8081B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226044	1000	10.0	03/19/19
19C0662-02 [MW-3D]	B226044	1040	10.0	03/19/19
19C0662-03 [MW-3S]	B226044	970	10.0	03/19/19
19C0662-04 [MW-4S]	B226044	1060	10.0	03/19/19
19C0662-05 [DUP]	B226044	1040	10.0	03/19/19

Prep Method: SW-846 3510C-SW-846 8151A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226019	1020	5.00	03/19/19
19C0662-02 [MW-3D]	B226019	1040	5.00	03/19/19
19C0662-03 [MW-3S]	B226019	1020	5.00	03/19/19
19C0662-04 [MW-4S]	B226019	1040	5.00	03/19/19
19C0662-05 [DUP]	B226019	1040	5.00	03/19/19

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225949	5	5.00	03/18/19
19C0662-02 [MW-3D]	B225949	5	5.00	03/18/19
19C0662-03 [MW-3S]	B225949	5	5.00	03/18/19
19C0662-04 [MW-4S]	B225949	5	5.00	03/18/19
19C0662-05 [DUP]	B225949	5	5.00	03/18/19
19C0662-06 [Field Blank]	B225949	5	5.00	03/18/19
19C0662-07 [Trip Blank]	B225949	5	5.00	03/18/19

Prep Method: SW-846 3510C-SW-846 8270D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226147	1000	1.00	03/20/19
19C0662-02 [MW-3D]	B226147	1000	1.00	03/20/19
19C0662-03 [MW-3S]	B226147	1000	1.00	03/20/19
19C0662-04 [MW-4S]	B226147	1000	1.00	03/20/19
19C0662-05 [DUP]	B226147	1000	1.00	03/20/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225949 - SW-846 5030B										
Blank (B225949-BLK1)				Prepared & Analyzed: 03/18/19						
Acetone	ND	50	µg/L							
Acrylonitrile	ND	5.0	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	0.50	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							L-04, V-05

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B											
Blank (B225949-BLK1)				Prepared & Analyzed: 03/18/19							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L								
Methyl Cyclohexane	ND	1.0	µg/L								
Methylene Chloride	ND	5.0	µg/L								
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L								
Naphthalene	ND	2.0	µg/L								
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L							V-05	
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*25.6*		µg/L	25.0		102	70-130				
Surrogate: Toluene-d8	*25.4*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100	70-130				
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19							
Acetone	118	50	µg/L	100		118	70-160				†
Acrylonitrile	9.53	5.0	µg/L	10.0		95.3	70-130				
tert-Amyl Methyl Ether (TAME)	10.8	0.50	µg/L	10.0		108	70-130				
Benzene	10.5	1.0	µg/L	10.0		105	70-130				
Bromobenzene	11.0	1.0	µg/L	10.0		110	70-130				
Bromochloromethane	11.8	1.0	µg/L	10.0		118	70-130				
Bromodichloromethane	11.4	0.50	µg/L	10.0		114	70-130				
Bromoform	10.1	1.0	µg/L	10.0		101	70-130				
Bromomethane	7.53	2.0	µg/L	10.0		75.3	40-160				†
2-Butanone (MEK)	96.6	20	µg/L	100		96.6	40-160				†
tert-Butyl Alcohol (TBA)	99.8	20	µg/L	100		99.8	40-160				†
n-Butylbenzene	10.5	1.0	µg/L	10.0		105	70-130				
sec-Butylbenzene	10.6	1.0	µg/L	10.0		106	70-130				
tert-Butylbenzene	10.1	1.0	µg/L	10.0		101	70-130				
tert-Butyl Ethyl Ether (TBEE)	10.6	0.50	µg/L	10.0		106	70-130				
Carbon Disulfide	11.1	5.0	µg/L	10.0		111	70-130			V-36	
Carbon Tetrachloride	11.1	5.0	µg/L	10.0		111	70-130				
Chlorobenzene	10.8	1.0	µg/L	10.0		108	70-130				
Chlorodibromomethane	11.0	0.50	µg/L	10.0		110	70-130				
Chloroethane	11.0	2.0	µg/L	10.0		110	70-130				
Chloroform	10.6	2.0	µg/L	10.0		106	70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B												
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19								
Chloromethane	9.03	2.0	µg/L	10.0		90.3		40-160				†
2-Chlorotoluene	11.1	1.0	µg/L	10.0		111		70-130				
4-Chlorotoluene	11.3	1.0	µg/L	10.0		113		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	9.98	5.0	µg/L	10.0		99.8		70-130				
1,2-Dibromoethane (EDB)	10.9	0.50	µg/L	10.0		109		70-130				
Dibromomethane	11.6	1.0	µg/L	10.0		116		70-130				
1,2-Dichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130				
1,3-Dichlorobenzene	10.9	1.0	µg/L	10.0		109		70-130				
1,4-Dichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130				
trans-1,4-Dichloro-2-butene	11.1	2.0	µg/L	10.0		111		70-130				
Dichlorodifluoromethane (Freon 12)	10.3	2.0	µg/L	10.0		103		40-160			V-20	†
1,1-Dichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
1,2-Dichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,1-Dichloroethylene	12.0	1.0	µg/L	10.0		120		70-130				
cis-1,2-Dichloroethylene	11.0	1.0	µg/L	10.0		110		70-130				
trans-1,2-Dichloroethylene	11.5	1.0	µg/L	10.0		115		70-130				
1,2-Dichloropropane	10.7	1.0	µg/L	10.0		107		70-130				
1,3-Dichloropropane	10.8	0.50	µg/L	10.0		108		70-130				
2,2-Dichloropropane	12.4	1.0	µg/L	10.0		124		40-130			V-20	†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107		70-130				
cis-1,3-Dichloropropene	10.9	0.50	µg/L	10.0		109		70-130				
trans-1,3-Dichloropropene	11.0	0.50	µg/L	10.0		110		70-130				
Diethyl Ether	11.3	2.0	µg/L	10.0		113		70-130				
Diisopropyl Ether (DIPE)	10.0	0.50	µg/L	10.0		100		70-130				
1,4-Dioxane	99.6	50	µg/L	100		99.6		40-130				†
Ethylbenzene	10.7	1.0	µg/L	10.0		107		70-130				
Hexachlorobutadiene	10.1	0.60	µg/L	10.0		101		70-130				
2-Hexanone (MBK)	99.4	10	µg/L	100		99.4		70-160				†
Isopropylbenzene (Cumene)	11.1	1.0	µg/L	10.0		111		70-130				
p-Isopropyltoluene (p-Cymene)	10.3	1.0	µg/L	10.0		103		70-130				
Methyl Acetate	5.83	1.0	µg/L	10.0		**58.3**	*	70-130			L-04, V-05, V-34	
Methyl tert-Butyl Ether (MTBE)	10.8	1.0	µg/L	10.0		108		70-130				
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107		70-130				
Methylene Chloride	9.90	5.0	µg/L	10.0		99.0		70-130				
4-Methyl-2-pentanone (MIBK)	92.9	10	µg/L	100		92.9		70-160				†
Naphthalene	11.3	2.0	µg/L	10.0		113		40-130				†
n-Propylbenzene	11.0	1.0	µg/L	10.0		110		70-130				
Styrene	10.9	1.0	µg/L	10.0		109		70-130				
1,1,1,2-Tetrachloroethane	10.9	1.0	µg/L	10.0		109		70-130				
1,1,2,2-Tetrachloroethane	11.7	0.50	µg/L	10.0		117		70-130				
Tetrachloroethylene	11.5	1.0	µg/L	10.0		115		70-130				
Tetrahydrofuran	8.53	10	µg/L	10.0		85.3		70-130			V-05, J	
Toluene	10.8	1.0	µg/L	10.0		108		70-130				
1,2,3-Trichlorobenzene	11.6	5.0	µg/L	10.0		116		70-130				
1,2,4-Trichlorobenzene	11.2	1.0	µg/L	10.0		112		70-130				
1,3,5-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130				
1,1,1-Trichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,1,2-Trichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
Trichloroethylene	10.6	1.0	µg/L	10.0		106		70-130				
Trichlorofluoromethane (Freon 11)	10.0	2.0	µg/L	10.0		100		70-130				
1,2,3-Trichloropropane	10.3	2.0	µg/L	10.0		103		70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B											
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.7	1.0	µg/L	10.0		107	70-130				
1,2,4-Trimethylbenzene	10.1	1.0	µg/L	10.0		101	70-130				
1,3,5-Trimethylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
Vinyl Chloride	9.91	2.0	µg/L	10.0		99.1	40-160				†
m+p Xylene	21.7	2.0	µg/L	20.0		108	70-130				
o-Xylene	10.8	1.0	µg/L	10.0		108	70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.4*		µg/L	25.0		102	70-130				
Surrogate: Toluene-d8	*25.2*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.4	70-130				
LCS Dup (B225949-BSD1)				Prepared & Analyzed: 03/18/19							
Acetone	119	50	µg/L	100		119	70-160	0.641	25		†
Acrylonitrile	9.65	5.0	µg/L	10.0		96.5	70-130	1.25	25		
tert-Amyl Methyl Ether (TAME)	10.7	0.50	µg/L	10.0		107	70-130	0.466	25		
Benzene	10.4	1.0	µg/L	10.0		104	70-130	0.957	25		
Bromobenzene	11.0	1.0	µg/L	10.0		110	70-130	0.818	25		
Bromochloromethane	11.8	1.0	µg/L	10.0		118	70-130	0.338	25		
Bromodichloromethane	11.3	0.50	µg/L	10.0		113	70-130	0.883	25		
Bromoform	10.1	1.0	µg/L	10.0		101	70-130	0.0988	25		
Bromomethane	8.73	2.0	µg/L	10.0		87.3	40-160	14.8	25		†
2-Butanone (MEK)	94.1	20	µg/L	100		94.1	40-160	2.60	25		†
tert-Butyl Alcohol (TBA)	96.1	20	µg/L	100		96.1	40-160	3.85	25		†
n-Butylbenzene	10.3	1.0	µg/L	10.0		103	70-130	1.73	25		
sec-Butylbenzene	10.4	1.0	µg/L	10.0		104	70-130	2.09	25		
tert-Butylbenzene	10.0	1.0	µg/L	10.0		100	70-130	1.29	25		
tert-Butyl Ethyl Ether (TBEE)	10.2	0.50	µg/L	10.0		102	70-130	3.17	25		
Carbon Disulfide	10.8	5.0	µg/L	10.0		108	70-130	2.74	25	V-36	
Carbon Tetrachloride	10.6	5.0	µg/L	10.0		106	70-130	4.33	25		
Chlorobenzene	11.0	1.0	µg/L	10.0		110	70-130	2.01	25		
Chlorodibromomethane	10.8	0.50	µg/L	10.0		108	70-130	1.29	25		
Chloroethane	10.7	2.0	µg/L	10.0		107	70-130	3.03	25		
Chloroform	10.5	2.0	µg/L	10.0		105	70-130	0.662	25		
Chloromethane	8.93	2.0	µg/L	10.0		89.3	40-160	1.11	25		†
2-Chlorotoluene	11.1	1.0	µg/L	10.0		111	70-130	0.0904	25		
4-Chlorotoluene	11.1	1.0	µg/L	10.0		111	70-130	1.88	25		
1,2-Dibromo-3-chloropropane (DBCP)	10.1	5.0	µg/L	10.0		101	70-130	1.29	25		
1,2-Dibromoethane (EDB)	10.5	0.50	µg/L	10.0		105	70-130	3.27	25		
Dibromomethane	11.3	1.0	µg/L	10.0		113	70-130	2.62	25		
1,2-Dichlorobenzene	10.7	1.0	µg/L	10.0		107	70-130	0.650	25		
1,3-Dichlorobenzene	10.9	1.0	µg/L	10.0		109	70-130	0.459	25		
1,4-Dichlorobenzene	10.6	1.0	µg/L	10.0		106	70-130	0.377	25		
trans-1,4-Dichloro-2-butene	10.8	2.0	µg/L	10.0		108	70-130	2.01	25		
Dichlorodifluoromethane (Freon 12)	9.76	2.0	µg/L	10.0		97.6	40-160	5.58	25	V-20	†
1,1-Dichloroethane	10.8	1.0	µg/L	10.0		108	70-130	3.17	25		
1,2-Dichloroethane	10.7	1.0	µg/L	10.0		107	70-130	2.59	25		
1,1-Dichloroethylene	11.4	1.0	µg/L	10.0		114	70-130	4.79	25		
cis-1,2-Dichloroethylene	10.9	1.0	µg/L	10.0		109	70-130	1.37	25		
trans-1,2-Dichloroethylene	11.2	1.0	µg/L	10.0		112	70-130	2.47	25		
1,2-Dichloropropane	10.6	1.0	µg/L	10.0		106	70-130	0.563	25		
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104	70-130	3.49	25		
2,2-Dichloropropane	12.1	1.0	µg/L	10.0		121	40-130	2.70	25	V-20	†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107	70-130	0.654	25		

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B												
LCS Dup (B225949-BSD1)				Prepared & Analyzed: 03/18/19								
cis-1,3-Dichloropropene	10.9	0.50	µg/L	10.0		109		70-130	0.275	25		
trans-1,3-Dichloropropene	10.5	0.50	µg/L	10.0		105		70-130	4.66	25		
Diethyl Ether	11.4	2.0	µg/L	10.0		114		70-130	0.264	25		
Diisopropyl Ether (DIPE)	9.83	0.50	µg/L	10.0		98.3		70-130	1.91	25		
1,4-Dioxane	94.4	50	µg/L	100		94.4		40-130	5.41	50		† ‡
Ethylbenzene	10.5	1.0	µg/L	10.0		105		70-130	2.07	25		
Hexachlorobutadiene	10.2	0.60	µg/L	10.0		102		70-130	0.492	25		
2-Hexanone (MBK)	94.4	10	µg/L	100		94.4		70-160	5.18	25		†
Isopropylbenzene (Cumene)	10.7	1.0	µg/L	10.0		107		70-130	3.03	25		
p-Isopropyltoluene (p-Cymene)	10.2	1.0	µg/L	10.0		102		70-130	0.878	25		
Methyl Acetate	5.84	1.0	µg/L	10.0		**58.4**	*	70-130	0.171	25	L-04, V-05, V-34	
Methyl tert-Butyl Ether (MTBE)	11.0	1.0	µg/L	10.0		110		70-130	1.55	25		
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107		70-130	0.0932	25		
Methylene Chloride	9.91	5.0	µg/L	10.0		99.1		70-130	0.101	25		
4-Methyl-2-pentanone (MIBK)	90.2	10	µg/L	100		90.2		70-160	2.94	25		†
Naphthalene	11.3	2.0	µg/L	10.0		113		40-130	0.354	25		†
n-Propylbenzene	10.9	1.0	µg/L	10.0		109		70-130	0.547	25		
Styrene	11.1	1.0	µg/L	10.0		111		70-130	1.54	25		
1,1,1,2-Tetrachloroethane	10.9	1.0	µg/L	10.0		109		70-130	0.458	25		
1,1,2,2-Tetrachloroethane	11.4	0.50	µg/L	10.0		114		70-130	2.69	25		
Tetrachloroethylene	11.0	1.0	µg/L	10.0		110		70-130	4.17	25		
Tetrahydrofuran	8.61	10	µg/L	10.0		86.1		70-130	0.933	25	V-05, J	
Toluene	10.5	1.0	µg/L	10.0		105		70-130	2.92	25		
1,2,3-Trichlorobenzene	11.6	5.0	µg/L	10.0		116		70-130	0.431	25		
1,2,4-Trichlorobenzene	11.4	1.0	µg/L	10.0		114		70-130	2.22	25		
1,3,5-Trichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130	1.65	25		
1,1,1-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130	0.729	25		
1,1,2-Trichloroethane	11.0	1.0	µg/L	10.0		110		70-130	1.35	25		
Trichloroethylene	10.2	1.0	µg/L	10.0		102		70-130	3.65	25		
Trichlorofluoromethane (Freon 11)	9.75	2.0	µg/L	10.0		97.5		70-130	2.83	25		
1,2,3-Trichloropropane	10.8	2.0	µg/L	10.0		108		70-130	4.36	25		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.8	1.0	µg/L	10.0		108		70-130	0.743	25		
1,2,4-Trimethylbenzene	10.1	1.0	µg/L	10.0		101		70-130	0.198	25		
1,3,5-Trimethylbenzene	10.7	1.0	µg/L	10.0		107		70-130	1.95	25		
Vinyl Chloride	9.85	2.0	µg/L	10.0		98.5		40-160	0.607	25		†
m+p Xylene	21.4	2.0	µg/L	20.0		107		70-130	1.35	25		
o-Xylene	10.9	1.0	µg/L	10.0		109		70-130	0.276	25		
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100		70-130				
Surrogate: Toluene-d8	*25.0*		µg/L	25.0		100		70-130				
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		100		70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226147 - SW-846 3510C										
Blank (B226147-BLK1)				Prepared: 03/20/19 Analyzed: 03/22/19						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	5.0	µg/L							V-34
Anthracene	ND	5.0	µg/L							
Benzidine	ND	20	µg/L							V-05
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Benzoic Acid	ND	10	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
Carbazole	ND	10	µg/L							
4-Chloroaniline	ND	10	µg/L							V-34
4-Chloro-3-methylphenol	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							V-34
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							
Hexachloroethane	ND	10	µg/L							
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
1-Methylnaphthalene	ND	5.0	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226147 - SW-846 3510C										
Blank (B226147-BLK1)				Prepared: 03/20/19 Analyzed: 03/22/19						
2-Methylphenol	ND	10	µg/L							
3/4-Methylphenol	ND	10	µg/L							
Naphthalene	ND	5.0	µg/L							
2-Nitroaniline	ND	10	µg/L							
3-Nitroaniline	ND	10	µg/L							V-34
4-Nitroaniline	ND	10	µg/L							
Nitrobenzene	ND	10	µg/L							
2-Nitrophenol	ND	10	µg/L							
4-Nitrophenol	ND	10	µg/L							
N-Nitrosodimethylamine	ND	10	µg/L							
N-Nitrosodiphenylamine/Diphenylamine	ND	10	µg/L							
N-Nitrosodi-n-propylamine	ND	10	µg/L							
Pentachloronitrobenzene	ND	10	µg/L							
Pentachlorophenol	ND	10	µg/L							
Phenanthrene	ND	5.0	µg/L							
Phenol	ND	10	µg/L							
Pyrene	ND	5.0	µg/L							
Pyridine	ND	5.0	µg/L							
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L							
1,2,4-Trichlorobenzene	ND	5.0	µg/L							
2,4,5-Trichlorophenol	ND	10	µg/L							
2,4,6-Trichlorophenol	ND	10	µg/L							
Surrogate: 2-Fluorophenol	*90.7*		µg/L	200		45.4	15-110			
Surrogate: Phenol-d6	*64.1*		µg/L	200		32.0	15-110			
Surrogate: Nitrobenzene-d5	*82.7*		µg/L	100		82.7	30-130			
Surrogate: 2-Fluorobiphenyl	*84.3*		µg/L	100		84.3	30-130			
Surrogate: 2,4,6-Tribromophenol	*199*		µg/L	200		99.4	15-110			
Surrogate: p-Terphenyl-d14	*105*		µg/L	100		105	30-130			
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19						
Acenaphthene	40.0	5.0	µg/L	50.0		80.0	40-140			
Acenaphthylene	39.0	5.0	µg/L	50.0		78.0	40-140			
Acetophenone	40.3	10	µg/L	50.0		80.5	40-140			
Aniline	30.8	5.0	µg/L	50.0		61.6	40-140			V-34
Anthracene	41.7	5.0	µg/L	50.0		83.3	40-140			
Benzidine	36.3	20	µg/L	50.0		72.6	40-140			V-05
Benzo(a)anthracene	41.0	5.0	µg/L	50.0		82.0	40-140			
Benzo(a)pyrene	44.2	5.0	µg/L	50.0		88.3	40-140			
Benzo(b)fluoranthene	41.9	5.0	µg/L	50.0		83.9	40-140			
Benzo(g,h,i)perylene	49.6	5.0	µg/L	50.0		99.2	40-140			
Benzo(k)fluoranthene	43.2	5.0	µg/L	50.0		86.4	40-140			
Benzoic Acid	18.2	10	µg/L	50.0		36.3	10-130			†
Bis(2-chloroethoxy)methane	47.1	10	µg/L	50.0		94.2	40-140			
Bis(2-chloroethyl)ether	42.2	10	µg/L	50.0		84.4	40-140			
Bis(2-chloroisopropyl)ether	46.3	10	µg/L	50.0		92.6	40-140			
Bis(2-Ethylhexyl)phthalate	46.7	10	µg/L	50.0		93.4	40-140			
4-Bromophenylphenylether	42.6	10	µg/L	50.0		85.2	40-140			
Butylbenzylphthalate	45.8	10	µg/L	50.0		91.6	40-140			
Carbazole	41.0	10	µg/L	50.0		82.0	40-140			
4-Chloroaniline	39.0	10	µg/L	50.0		78.1	40-140			V-34
4-Chloro-3-methylphenol	41.3	10	µg/L	50.0		82.6	30-130			
2-Chloronaphthalene	36.3	10	µg/L	50.0		72.5	40-140			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19							
2-Chlorophenol	37.0	10	µg/L	50.0		74.0	30-130				
4-Chlorophenylphenylether	43.6	10	µg/L	50.0		87.3	40-140				
Chrysene	42.4	5.0	µg/L	50.0		84.7	40-140				
Dibenz(a,h)anthracene	45.3	5.0	µg/L	50.0		90.5	40-140				
Dibenzofuran	40.9	5.0	µg/L	50.0		81.9	40-140				
Di-n-butylphthalate	44.8	10	µg/L	50.0		89.5	40-140				
1,2-Dichlorobenzene	35.0	5.0	µg/L	50.0		70.0	40-140				
1,3-Dichlorobenzene	33.5	5.0	µg/L	50.0		67.0	40-140				
1,4-Dichlorobenzene	34.0	5.0	µg/L	50.0		68.0	40-140				
3,3-Dichlorobenzidine	47.3	10	µg/L	50.0		94.6	40-140			V-34	
2,4-Dichlorophenol	38.3	10	µg/L	50.0		76.5	30-130				
Diethylphthalate	44.8	10	µg/L	50.0		89.5	40-140				
2,4-Dimethylphenol	38.1	10	µg/L	50.0		76.3	30-130				
Dimethylphthalate	43.9	10	µg/L	50.0		87.8	40-140				
4,6-Dinitro-2-methylphenol	41.0	10	µg/L	50.0		81.9	30-130				
2,4-Dinitrophenol	45.7	10	µg/L	50.0		91.4	30-130				
2,4-Dinitrotoluene	42.7	10	µg/L	50.0		85.4	40-140				
2,6-Dinitrotoluene	43.6	10	µg/L	50.0		87.2	40-140				
Di-n-octylphthalate	45.2	10	µg/L	50.0		90.4	40-140				
1,2-Diphenylhydrazine/Azobenzene	41.4	10	µg/L	50.0		82.7	40-140				
Fluoranthene	42.4	5.0	µg/L	50.0		84.8	40-140				
Fluorene	42.0	5.0	µg/L	50.0		84.1	40-140				
Hexachlorobenzene	40.4	10	µg/L	50.0		80.8	40-140				
Hexachlorobutadiene	37.6	10	µg/L	50.0		75.2	40-140				
Hexachlorocyclopentadiene	36.8	10	µg/L	50.0		73.5	30-140				†
Hexachloroethane	35.9	10	µg/L	50.0		71.7	40-140				
Indeno(1,2,3-cd)pyrene	46.2	5.0	µg/L	50.0		92.5	40-140				
Isophorone	42.5	10	µg/L	50.0		85.0	40-140				
1-Methylnaphthalene	36.2	5.0	µg/L	50.0		72.5	40-140				
2-Methylnaphthalene	40.8	5.0	µg/L	50.0		81.7	40-140				
2-Methylphenol	27.5	10	µg/L	50.0		54.9	30-130				
3/4-Methylphenol	30.0	10	µg/L	50.0		60.1	30-130				
Naphthalene	38.5	5.0	µg/L	50.0		77.0	40-140				
2-Nitroaniline	48.8	10	µg/L	50.0		97.6	40-140				
3-Nitroaniline	41.7	10	µg/L	50.0		83.4	40-140			V-34	
4-Nitroaniline	42.8	10	µg/L	50.0		85.5	40-140				
Nitrobenzene	38.0	10	µg/L	50.0		75.9	40-140				
2-Nitrophenol	40.6	10	µg/L	50.0		81.2	30-130				
4-Nitrophenol	22.3	10	µg/L	50.0		44.6	10-130				†
N-Nitrosodimethylamine	23.4	10	µg/L	50.0		46.7	40-140				
N-Nitrosodiphenylamine/Diphenylamine	43.7	10	µg/L	50.0		87.4	40-140				
N-Nitrosodi-n-propylamine	41.4	10	µg/L	50.0		82.8	40-140				
Pentachloronitrobenzene	40.5	10	µg/L	50.0		81.1	40-140				
Pentachlorophenol	43.6	10	µg/L	50.0		87.1	30-130				
Phenanthrene	41.5	5.0	µg/L	50.0		83.0	40-140				
Phenol	16.9	10	µg/L	50.0		33.8	20-130				†
Pyrene	42.8	5.0	µg/L	50.0		85.5	40-140				
Pyridine	16.1	5.0	µg/L	50.0		32.2	10-140				†
1,2,4,5-Tetrachlorobenzene	39.3	10	µg/L	50.0		78.6	40-140				
1,2,4-Trichlorobenzene	38.1	5.0	µg/L	50.0		76.3	40-140				
2,4,5-Trichlorophenol	40.8	10	µg/L	50.0		81.6	30-130				
2,4,6-Trichlorophenol	43.3	10	µg/L	50.0		86.6	30-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Surrogate: 2-Fluorophenol	*92.5*		µg/L	200		46.2	15-110				
Surrogate: Phenol-d6	*66.6*		µg/L	200		33.3	15-110				
Surrogate: Nitrobenzene-d5	*80.6*		µg/L	100		80.6	30-130				
Surrogate: 2-Fluorobiphenyl	*85.0*		µg/L	100		85.0	30-130				
Surrogate: 2,4,6-Tribromophenol	*190*		µg/L	200		94.8	15-110				
Surrogate: p-Terphenyl-d14	*95.1*		µg/L	100		95.1	30-130				
LCS Dup (B226147-BSD1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Acenaphthene	38.7	5.0	µg/L	50.0		77.5	40-140	3.23	20		
Acenaphthylene	38.7	5.0	µg/L	50.0		77.4	40-140	0.772	20		
Acetophenone	39.4	10	µg/L	50.0		78.7	40-140	2.24	20		
Aniline	31.2	5.0	µg/L	50.0		62.5	40-140	1.45	50	V-34	‡
Anthracene	41.4	5.0	µg/L	50.0		82.8	40-140	0.650	20		
Benzidine	40.0	20	µg/L	50.0		80.0	40-140	9.78	20	V-05	
Benzo(a)anthracene	39.3	5.0	µg/L	50.0		78.5	40-140	4.29	20		
Benzo(a)pyrene	42.6	5.0	µg/L	50.0		85.2	40-140	3.64	20		
Benzo(b)fluoranthene	40.6	5.0	µg/L	50.0		81.1	40-140	3.37	20		
Benzo(g,h,i)perylene	47.7	5.0	µg/L	50.0		95.4	40-140	3.99	20		
Benzo(k)fluoranthene	42.2	5.0	µg/L	50.0		84.4	40-140	2.29	20		
Benzoic Acid	19.1	10	µg/L	50.0		38.2	10-130	5.00	50		† ‡
Bis(2-chloroethoxy)methane	47.2	10	µg/L	50.0		94.4	40-140	0.191	20		
Bis(2-chloroethyl)ether	42.0	10	µg/L	50.0		84.0	40-140	0.404	20		
Bis(2-chloroisopropyl)ether	45.9	10	µg/L	50.0		91.8	40-140	0.867	20		
Bis(2-Ethylhexyl)phthalate	44.6	10	µg/L	50.0		89.3	40-140	4.53	20		
4-Bromophenylphenylether	42.0	10	µg/L	50.0		84.0	40-140	1.35	20		
Butylbenzylphthalate	43.7	10	µg/L	50.0		87.4	40-140	4.72	20		
Carbazole	40.0	10	µg/L	50.0		79.9	40-140	2.52	20		
4-Chloroaniline	39.0	10	µg/L	50.0		78.0	40-140	0.128	20	V-34	
4-Chloro-3-methylphenol	41.4	10	µg/L	50.0		82.8	30-130	0.169	20		
2-Chloronaphthalene	36.0	10	µg/L	50.0		72.0	40-140	0.775	20		
2-Chlorophenol	37.2	10	µg/L	50.0		74.5	30-130	0.593	20		
4-Chlorophenylphenylether	43.4	10	µg/L	50.0		86.8	40-140	0.505	20		
Chrysene	40.3	5.0	µg/L	50.0		80.6	40-140	4.93	20		
Dibenz(a,h)anthracene	43.6	5.0	µg/L	50.0		87.3	40-140	3.67	20		
Dibenzofuran	40.2	5.0	µg/L	50.0		80.3	40-140	1.92	20		
Di-n-butylphthalate	43.5	10	µg/L	50.0		87.0	40-140	2.83	20		
1,2-Dichlorobenzene	35.3	5.0	µg/L	50.0		70.5	40-140	0.797	20		
1,3-Dichlorobenzene	33.9	5.0	µg/L	50.0		67.8	40-140	1.25	20		
1,4-Dichlorobenzene	34.0	5.0	µg/L	50.0		68.0	40-140	0.00	20		
3,3-Dichlorobenzidine	45.8	10	µg/L	50.0		91.7	40-140	3.18	20	V-34	
2,4-Dichlorophenol	38.4	10	µg/L	50.0		76.7	30-130	0.235	20		
Diethylphthalate	43.3	10	µg/L	50.0		86.7	40-140	3.22	20		
2,4-Dimethylphenol	39.0	10	µg/L	50.0		78.0	30-130	2.18	20		
Dimethylphthalate	42.2	10	µg/L	50.0		84.4	40-140	4.04	50		‡
4,6-Dinitro-2-methylphenol	41.3	10	µg/L	50.0		82.5	30-130	0.705	50		‡
2,4-Dinitrophenol	43.8	10	µg/L	50.0		87.7	30-130	4.11	50		‡
2,4-Dinitrotoluene	40.7	10	µg/L	50.0		81.4	40-140	4.82	20		
2,6-Dinitrotoluene	42.3	10	µg/L	50.0		84.6	40-140	3.00	20		
Di-n-octylphthalate	43.7	10	µg/L	50.0		87.5	40-140	3.26	20		
1,2-Diphenylhydrazine/Azobenzene	41.0	10	µg/L	50.0		82.0	40-140	0.825	20		
Fluoranthene	41.2	5.0	µg/L	50.0		82.5	40-140	2.73	20		
Fluorene	41.0	5.0	µg/L	50.0		81.9	40-140	2.60	20		

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS Dup (B226147-BSD1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Hexachlorobenzene	41.0	10	µg/L	50.0		82.1	40-140	1.62	20		
Hexachlorobutadiene	38.4	10	µg/L	50.0		76.8	40-140	2.08	20		
Hexachlorocyclopentadiene	36.9	10	µg/L	50.0		73.7	30-140	0.299	50		† ‡
Hexachloroethane	36.8	10	µg/L	50.0		73.7	40-140	2.70	50		‡
Indeno(1,2,3-cd)pyrene	45.0	5.0	µg/L	50.0		89.9	40-140	2.83	50		‡
Isophorone	42.0	10	µg/L	50.0		84.1	40-140	1.09	20		
1-Methylnaphthalene	35.7	5.0	µg/L	50.0		71.4	40-140	1.58	20		
2-Methylnaphthalene	41.0	5.0	µg/L	50.0		82.0	40-140	0.440	20		
2-Methylphenol	28.2	10	µg/L	50.0		56.3	30-130	2.55	20		
3/4-Methylphenol	30.8	10	µg/L	50.0		61.6	30-130	2.50	20		
Naphthalene	38.3	5.0	µg/L	50.0		76.6	40-140	0.443	20		
2-Nitroaniline	47.0	10	µg/L	50.0		94.0	40-140	3.74	20		
3-Nitroaniline	40.3	10	µg/L	50.0		80.6	40-140	3.51	20	V-34	
4-Nitroaniline	41.4	10	µg/L	50.0		82.8	40-140	3.21	20		
Nitrobenzene	37.5	10	µg/L	50.0		75.0	40-140	1.25	20		
2-Nitrophenol	40.5	10	µg/L	50.0		80.9	30-130	0.345	20		
4-Nitrophenol	22.8	10	µg/L	50.0		45.6	10-130	2.35	50		† ‡
N-Nitrosodimethylamine	24.1	10	µg/L	50.0		48.1	40-140	2.95	20		
N-Nitrosodiphenylamine/Diphenylamine	43.4	10	µg/L	50.0		86.9	40-140	0.620	20		
N-Nitrosodi-n-propylamine	41.8	10	µg/L	50.0		83.6	40-140	0.865	20		
Pentachloronitrobenzene	40.2	10	µg/L	50.0		80.3	40-140	0.942	20		
Pentachlorophenol	43.1	10	µg/L	50.0		86.1	30-130	1.18	50		‡
Phenanthrene	41.2	5.0	µg/L	50.0		82.4	40-140	0.822	20		
Phenol	17.9	10	µg/L	50.0		35.8	20-130	5.68	20		†
Pyrene	40.9	5.0	µg/L	50.0		81.9	40-140	4.35	20		
Pyridine	17.0	5.0	µg/L	50.0		33.9	10-140	5.14	50		† ‡
1,2,4,5-Tetrachlorobenzene	38.8	10	µg/L	50.0		77.7	40-140	1.15	20		
1,2,4-Trichlorobenzene	37.1	5.0	µg/L	50.0		74.2	40-140	2.71	20		
2,4,5-Trichlorophenol	40.4	10	µg/L	50.0		80.9	30-130	0.862	20		
2,4,6-Trichlorophenol	42.3	10	µg/L	50.0		84.7	30-130	2.27	50		‡
Surrogate: 2-Fluorophenol	*95.7*		µg/L	200		47.8	15-110				
Surrogate: Phenol-d6	*68.5*		µg/L	200		34.3	15-110				
Surrogate: Nitrobenzene-d5	*78.9*		µg/L	100		78.9	30-130				
Surrogate: 2-Fluorobiphenyl	*82.4*		µg/L	100		82.4	30-130				
Surrogate: 2,4,6-Tribromophenol	*183*		µg/L	200		91.4	15-110				
Surrogate: p-Terphenyl-d14	*90.4*		µg/L	100		90.4	30-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
Blank (B226044-BLK1)				Prepared: 03/19/19 Analyzed: 03/20/19						
Alachlor	ND	0.20	µg/L							
Alachlor [2C]	ND	0.20	µg/L							
Aldrin	ND	0.050	µg/L							
Aldrin [2C]	ND	0.050	µg/L							
alpha-BHC	ND	0.050	µg/L							
alpha-BHC [2C]	ND	0.050	µg/L							
beta-BHC	ND	0.050	µg/L							
beta-BHC [2C]	ND	0.050	µg/L							
delta-BHC	ND	0.050	µg/L							
delta-BHC [2C]	ND	0.050	µg/L							
gamma-BHC (Lindane)	ND	0.030	µg/L							
gamma-BHC (Lindane) [2C]	ND	0.030	µg/L							
Chlordane	ND	0.20	µg/L							
Chlordane [2C]	ND	0.20	µg/L							
4,4'-DDD	ND	0.040	µg/L							
4,4'-DDD [2C]	ND	0.040	µg/L							
4,4'-DDE	ND	0.040	µg/L							
4,4'-DDE [2C]	ND	0.040	µg/L							
4,4'-DDT	ND	0.040	µg/L							
4,4'-DDT [2C]	ND	0.040	µg/L							
Dieldrin	ND	0.0020	µg/L							
Dieldrin [2C]	ND	0.0020	µg/L							
Endosulfan I	ND	0.050	µg/L							
Endosulfan I [2C]	ND	0.050	µg/L							
Endosulfan II	ND	0.080	µg/L							
Endosulfan II [2C]	ND	0.080	µg/L							
Endosulfan Sulfate	ND	0.080	µg/L							
Endosulfan Sulfate [2C]	ND	0.080	µg/L							
Endrin	ND	0.080	µg/L							
Endrin [2C]	ND	0.080	µg/L							
Endrin Aldehyde	ND	0.080	µg/L							
Endrin Aldehyde [2C]	ND	0.080	µg/L							
Endrin Ketone	ND	0.080	µg/L							
Endrin Ketone [2C]	ND	0.080	µg/L							
Heptachlor	ND	0.050	µg/L							
Heptachlor [2C]	ND	0.050	µg/L							
Heptachlor Epoxide	ND	0.050	µg/L							
Heptachlor Epoxide [2C]	ND	0.050	µg/L							
Hexachlorobenzene	ND	0.050	µg/L							
Hexachlorobenzene [2C]	ND	0.050	µg/L							
Methoxychlor	ND	0.50	µg/L							
Methoxychlor [2C]	ND	0.50	µg/L							
Toxaphene	ND	1.0	µg/L							
Toxaphene [2C]	ND	1.0	µg/L							
Surrogate: Decachlorobiphenyl	*1.75*		µg/L	2.00		87.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.95*		µg/L	2.00		97.7	30-150			
Surrogate: Tetrachloro-m-xylene	*1.72*		µg/L	2.00		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.68*		µg/L	2.00		83.9	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
LCS (B226044-BS1)				Prepared: 03/19/19 Analyzed: 03/20/19						
alpha-Chlordane	0.94	0.050	µg/L	1.00		94.2	0-200			
alpha-Chlordane [2C]	0.94	0.050	µg/L	1.00		93.8	0-200			
gamma-Chlordane	0.94	0.050	µg/L	1.00		94.0	0-200			
gamma-Chlordane [2C]	0.95	0.050	µg/L	1.00		94.7	0-200			
Alachlor	0.90	0.20	µg/L	1.00		90.1	40-140			
Alachlor [2C]	0.92	0.20	µg/L	1.00		91.6	40-140			
Aldrin	0.94	0.050	µg/L	1.00		94.4	40-140			
Aldrin [2C]	0.90	0.050	µg/L	1.00		89.9	40-140			
alpha-BHC	0.82	0.050	µg/L	1.00		81.9	40-140			
alpha-BHC [2C]	0.85	0.050	µg/L	1.00		84.8	40-140			
beta-BHC	0.88	0.050	µg/L	1.00		88.5	40-140			
beta-BHC [2C]	0.89	0.050	µg/L	1.00		88.9	40-140			
delta-BHC	0.93	0.050	µg/L	1.00		92.6	40-140			
delta-BHC [2C]	0.89	0.050	µg/L	1.00		89.1	40-140			
gamma-BHC (Lindane)	0.88	0.030	µg/L	1.00		88.2	40-140			
gamma-BHC (Lindane) [2C]	0.85	0.030	µg/L	1.00		85.1	40-140			
4,4'-DDD	1.0	0.040	µg/L	1.00		103	40-140			
4,4'-DDD [2C]	0.98	0.040	µg/L	1.00		97.6	40-140			
4,4'-DDE	1.0	0.040	µg/L	1.00		104	40-140			
4,4'-DDE [2C]	0.98	0.040	µg/L	1.00		97.5	40-140			
4,4'-DDT	1.0	0.040	µg/L	1.00		103	40-140			
4,4'-DDT [2C]	1.0	0.040	µg/L	1.00		102	40-140			
Dieldrin	0.94	0.0020	µg/L	1.00		93.6	40-140			
Dieldrin [2C]	0.89	0.0020	µg/L	1.00		89.4	40-140			
Endosulfan I	0.94	0.050	µg/L	1.00		94.2	40-140			
Endosulfan I [2C]	0.94	0.050	µg/L	1.00		93.8	40-140			
Endosulfan II	0.98	0.080	µg/L	1.00		97.8	40-140			
Endosulfan II [2C]	0.96	0.080	µg/L	1.00		96.2	40-140			
Endosulfan Sulfate	1.0	0.080	µg/L	1.00		101	40-140			
Endosulfan Sulfate [2C]	0.98	0.080	µg/L	1.00		97.7	40-140			
Endrin	0.97	0.080	µg/L	1.00		97.5	40-140			
Endrin [2C]	0.96	0.080	µg/L	1.00		96.2	40-140			
Endrin Aldehyde	0.93	0.080	µg/L	1.00		93.4	40-140			
Endrin Aldehyde [2C]	0.93	0.080	µg/L	1.00		93.3	40-140			
Endrin Ketone	1.0	0.080	µg/L	1.00		102	40-140			
Endrin Ketone [2C]	1.0	0.080	µg/L	1.00		99.6	40-140			
Heptachlor	0.90	0.050	µg/L	1.00		89.7	40-140			
Heptachlor [2C]	0.87	0.050	µg/L	1.00		87.3	40-140			
Heptachlor Epoxide	0.93	0.050	µg/L	1.00		93.4	40-140			
Heptachlor Epoxide [2C]	0.91	0.050	µg/L	1.00		90.9	40-140			
Hexachlorobenzene	1.1	0.050	µg/L	1.00		113	40-140			V-06
Hexachlorobenzene [2C]	1.1	0.050	µg/L	1.00		106	40-140			
Methoxychlor	1.0	0.50	µg/L	1.00		105	40-140			
Methoxychlor [2C]	1.0	0.50	µg/L	1.00		104	40-140			
Surrogate: Decachlorobiphenyl	*1.81*		µg/L	2.00		90.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.02*		µg/L	2.00		101	30-150			
Surrogate: Tetrachloro-m-xylene	*1.72*		µg/L	2.00		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.67*		µg/L	2.00		83.6	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
LCS Dup (B226044-BSD1)				Prepared: 03/19/19 Analyzed: 03/20/19						
alpha-Chlordane	0.93	0.050	µg/L	1.00		92.7	0-200	1.64		
alpha-Chlordane [2C]	0.93	0.050	µg/L	1.00		92.8	0-200	1.06		
gamma-Chlordane	0.92	0.050	µg/L	1.00		92.5	0-200	1.68		
gamma-Chlordane [2C]	0.93	0.050	µg/L	1.00		93.4	0-200	1.32		
Alachlor	0.89	0.20	µg/L	1.00		89.1	40-140	1.06	20	
Alachlor [2C]	0.93	0.20	µg/L	1.00		92.6	40-140	1.07	20	
Aldrin	0.91	0.050	µg/L	1.00		91.1	40-140	3.63	20	
Aldrin [2C]	0.87	0.050	µg/L	1.00		87.2	40-140	3.08	20	
alpha-BHC	0.80	0.050	µg/L	1.00		80.1	40-140	2.19	20	
alpha-BHC [2C]	0.82	0.050	µg/L	1.00		82.3	40-140	3.05	20	
beta-BHC	0.87	0.050	µg/L	1.00		87.4	40-140	1.29	20	
beta-BHC [2C]	0.88	0.050	µg/L	1.00		88.0	40-140	1.05	20	
delta-BHC	0.92	0.050	µg/L	1.00		92.1	40-140	0.623	20	
delta-BHC [2C]	0.89	0.050	µg/L	1.00		88.8	40-140	0.317	20	
gamma-BHC (Lindane)	0.86	0.030	µg/L	1.00		85.7	40-140	2.93	20	
gamma-BHC (Lindane) [2C]	0.83	0.030	µg/L	1.00		83.4	40-140	1.98	20	
4,4'-DDD	1.0	0.040	µg/L	1.00		102	40-140	1.07	20	
4,4'-DDD [2C]	0.97	0.040	µg/L	1.00		97.1	40-140	0.525	20	
4,4'-DDE	1.0	0.040	µg/L	1.00		102	40-140	1.53	20	
4,4'-DDE [2C]	0.95	0.040	µg/L	1.00		95.4	40-140	2.19	20	
4,4'-DDT	1.0	0.040	µg/L	1.00		103	40-140	0.410	20	
4,4'-DDT [2C]	1.0	0.040	µg/L	1.00		101	40-140	0.692	20	
Dieldrin	0.92	0.0020	µg/L	1.00		91.9	40-140	1.81	20	
Dieldrin [2C]	0.89	0.0020	µg/L	1.00		88.7	40-140	0.762	20	
Endosulfan I	0.93	0.050	µg/L	1.00		93.0	40-140	1.24	20	
Endosulfan I [2C]	0.93	0.050	µg/L	1.00		92.8	40-140	1.01	20	
Endosulfan II	0.97	0.080	µg/L	1.00		97.0	40-140	0.878	20	
Endosulfan II [2C]	0.95	0.080	µg/L	1.00		95.4	40-140	0.908	20	
Endosulfan Sulfate	1.0	0.080	µg/L	1.00		100	40-140	0.460	20	
Endosulfan Sulfate [2C]	0.97	0.080	µg/L	1.00		96.8	40-140	0.963	20	
Endrin	0.97	0.080	µg/L	1.00		97.1	40-140	0.401	20	
Endrin [2C]	0.96	0.080	µg/L	1.00		95.8	40-140	0.481	20	
Endrin Aldehyde	0.94	0.080	µg/L	1.00		94.1	40-140	0.753	20	
Endrin Aldehyde [2C]	0.94	0.080	µg/L	1.00		93.9	40-140	0.625	20	
Endrin Ketone	1.0	0.080	µg/L	1.00		101	40-140	0.767	20	
Endrin Ketone [2C]	0.99	0.080	µg/L	1.00		98.6	40-140	0.961	20	
Heptachlor	0.87	0.050	µg/L	1.00		87.1	40-140	2.95	20	
Heptachlor [2C]	0.85	0.050	µg/L	1.00		85.1	40-140	2.50	20	
Heptachlor Epoxide	0.92	0.050	µg/L	1.00		92.1	40-140	1.39	20	
Heptachlor Epoxide [2C]	0.90	0.050	µg/L	1.00		89.7	40-140	1.38	20	
Hexachlorobenzene	1.1	0.050	µg/L	1.00		109	40-140	4.21	20	V-06
Hexachlorobenzene [2C]	1.0	0.050	µg/L	1.00		102	40-140	4.32	20	
Methoxychlor	1.0	0.50	µg/L	1.00		104	40-140	0.0727	20	
Methoxychlor [2C]	1.0	0.50	µg/L	1.00		104	40-140	0.200	20	
Surrogate: Decachlorobiphenyl	*1.75*		µg/L	2.00		87.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.96*		µg/L	2.00		98.1	30-150			
Surrogate: Tetrachloro-m-xylene	*1.61*		µg/L	2.00		80.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.56*		µg/L	2.00		78.2	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226019 - SW-846 3510C										
Blank (B226019-BLK1)				Prepared & Analyzed: 03/19/19						
2,4-D	ND	0.50	µg/L							
2,4-D [2C]	ND	0.50	µg/L							
2,4-DB	ND	0.50	µg/L							
2,4-DB [2C]	ND	0.50	µg/L							
2,4,5-TP (Silvex)	ND	0.050	µg/L							
2,4,5-TP (Silvex) [2C]	ND	0.050	µg/L							
2,4,5-T	ND	0.10	µg/L							
2,4,5-T [2C]	ND	0.10	µg/L							
Dalapon	ND	1.2	µg/L							
Dalapon [2C]	ND	1.2	µg/L							
Dicamba	ND	0.050	µg/L							
Dicamba [2C]	ND	0.050	µg/L							
Dichloroprop	ND	0.50	µg/L							
Dichloroprop [2C]	ND	0.50	µg/L							
Dinoseb	ND	0.25	µg/L							
Dinoseb [2C]	ND	0.25	µg/L							
MCPA	ND	50	µg/L							
MCPA [2C]	ND	50	µg/L							
MCPP	ND	50	µg/L							
MCPP [2C]	ND	50	µg/L							
Surrogate: 2,4-Dichlorophenylacetic acid	*1.76*		µg/L	2.00		88.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.73*		µg/L	2.00		86.6	30-150			
LCS (B226019-BS1)				Prepared & Analyzed: 03/19/19						
2,4-D	2.45	0.50	µg/L	2.50		98.1	40-140			
2,4-D [2C]	2.51	0.50	µg/L	2.50		100	40-140			
2,4-DB	2.37	0.50	µg/L	2.50		94.9	40-140			
2,4-DB [2C]	2.39	0.50	µg/L	2.50		95.6	40-140			
2,4,5-TP (Silvex)	0.247	0.050	µg/L	0.250		99.0	40-140			
2,4,5-TP (Silvex) [2C]	0.247	0.050	µg/L	0.250		98.8	40-140			
2,4,5-T	0.248	0.10	µg/L	0.250		99.2	40-140			
2,4,5-T [2C]	0.247	0.10	µg/L	0.250		98.7	40-140			
Dalapon	4.81	1.2	µg/L	6.25		76.9	40-140			
Dalapon [2C]	4.79	1.2	µg/L	6.25		76.6	40-140			
Dicamba	0.242	0.050	µg/L	0.250		97.0	40-140			
Dicamba [2C]	0.244	0.050	µg/L	0.250		97.6	40-140			
Dichloroprop	2.54	0.50	µg/L	2.50		102	40-140			
Dichloroprop [2C]	2.54	0.50	µg/L	2.50		102	40-140			
Dinoseb	0.800	0.25	µg/L	1.25		64.0	10-140			
Dinoseb [2C]	0.745	0.25	µg/L	1.25		59.6	10-140			
MCPA	222	50	µg/L	250		89.0	40-140			
MCPA [2C]	218	50	µg/L	250		87.0	40-140			
MCPP	240	50	µg/L	250		96.0	40-140			
MCPP [2C]	227	50	µg/L	250		90.8	40-140			
Surrogate: 2,4-Dichlorophenylacetic acid	*1.86*		µg/L	2.00		93.2	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.89*		µg/L	2.00		94.6	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226019 - SW-846 3510C										
LCS Dup (B226019-BSD1)				Prepared & Analyzed: 03/19/19						
2,4-D	2.40	0.50	µg/L	2.50		96.0	40-140	2.17	20	
2,4-D [2C]	2.46	0.50	µg/L	2.50		98.2	40-140	2.20	20	
2,4-DB	2.25	0.50	µg/L	2.50		90.1	40-140	5.26	20	
2,4-DB [2C]	2.36	0.50	µg/L	2.50		94.4	40-140	1.31	20	
2,4,5-TP (Silvex)	0.242	0.050	µg/L	0.250		96.6	40-140	2.39	20	
2,4,5-TP (Silvex) [2C]	0.240	0.050	µg/L	0.250		96.2	40-140	2.64	20	
2,4,5-T	0.247	0.10	µg/L	0.250		98.7	40-140	0.538	20	
2,4,5-T [2C]	0.239	0.10	µg/L	0.250		95.7	40-140	3.11	20	
Dalapon	4.71	1.2	µg/L	6.25		75.4	40-140	2.05	20	
Dalapon [2C]	4.68	1.2	µg/L	6.25		75.0	40-140	2.23	20	
Dicamba	0.235	0.050	µg/L	0.250		94.1	40-140	2.99	20	
Dicamba [2C]	0.238	0.050	µg/L	0.250		95.0	40-140	2.71	20	
Dichloroprop	2.48	0.50	µg/L	2.50		99.1	40-140	2.52	20	
Dichloroprop [2C]	2.48	0.50	µg/L	2.50		99.1	40-140	2.58	20	
Dinoseb	0.940	0.25	µg/L	1.25		75.2	10-140	16.1	20	
Dinoseb [2C]	0.881	0.25	µg/L	1.25		70.5	10-140	16.7	20	
MCPA	218	50	µg/L	250		87.1	40-140	2.15	20	
MCPA [2C]	212	50	µg/L	250		84.9	40-140	2.44	20	
MCPP	233	50	µg/L	250		93.4	40-140	2.76	20	
MCPP [2C]	222	50	µg/L	250		88.7	40-140	2.35	20	
Surrogate: 2,4-Dichlorophenylacetic acid	*1.87*		µg/L	2.00		93.6	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.93*		µg/L	2.00		96.5	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225878 - SW-846 7470A Prep										
Blank (B225878-BLK1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	ND	0.00010	mg/L							
LCS (B225878-BS1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	0.00393	0.00010	mg/L	0.00400		98.2	80-120			
LCS Dup (B225878-BSD1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	0.00382	0.00010	mg/L	0.00400		95.4	80-120	2.87	20	
Batch B226176 - SW-846 3005A										
Blank (B226176-BLK1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	ND	0.010	mg/L							
Barium	ND	0.050	mg/L							
Chromium	ND	0.010	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
Sodium	ND	2.0	mg/L							
Zinc	ND	0.020	mg/L							
LCS (B226176-BS1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.462	0.010	mg/L	0.500		92.5	80-120			
Barium	0.503	0.050	mg/L	0.500		101	80-120			
Chromium	0.490	0.010	mg/L	0.500		98.1	80-120			
Iron	4.01	0.050	mg/L	4.00		100	80-120			
Lead	0.488	0.010	mg/L	0.500		97.7	80-120			
Sodium	3.75	2.0	mg/L	4.00		93.6	80-120			
Zinc	0.982	0.020	mg/L	1.00		98.2	80-120			
LCS Dup (B226176-BSD1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.472	0.010	mg/L	0.500		94.3	80-120	1.98	20	
Barium	0.516	0.050	mg/L	0.500		103	80-120	2.60	20	
Chromium	0.504	0.010	mg/L	0.500		101	80-120	2.75	20	
Iron	3.99	0.050	mg/L	4.00		99.8	80-120	0.457	20	
Lead	0.500	0.010	mg/L	0.500		100	80-120	2.42	20	
Sodium	3.70	2.0	mg/L	4.00		92.6	80-120	1.16	20	
Zinc	1.01	0.020	mg/L	1.00		101	80-120	2.30	20	
Duplicate (B226176-DUP1)	**Source: 19C0662-01**			Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.00853	0.010	mg/L		ND			NC	20	J
Barium	0.0393	0.050	mg/L		0.0396			0.626	20	J
Chromium	ND	0.010	mg/L		ND			NC	20	
Iron	ND	0.050	mg/L		ND			NC	20	
Lead	ND	0.010	mg/L		ND			NC	20	
Sodium	26.6	2.0	mg/L		27.8			4.26	20	
Zinc	ND	0.020	mg/L		ND			NC	20	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226176 - SW-846 3005A										
Matrix Spike (B226176-MS1)		**Source: 19C0662-01**		Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.493	0.010	mg/L	0.500	ND	98.6	75-125			
Barium	0.551	0.050	mg/L	0.500	0.0396	102	75-125			
Chromium	0.504	0.010	mg/L	0.500	ND	101	75-125			
Iron	4.16	0.050	mg/L	4.00	ND	104	75-125			
Lead	0.493	0.010	mg/L	0.500	ND	98.6	75-125			
Sodium	32.5	2.0	mg/L	4.00	27.8	119	75-125			
Zinc	1.01	0.020	mg/L	1.00	ND	101	75-125			

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225801 - EPA 300.0										
Blank (B225801-BLK1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	ND	0.10	mg/L							
LCS (B225801-BS1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	0.99	0.10	mg/L	1.00		99.3	90-110			
LCS Dup (B225801-BSD1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	0.99	0.10	mg/L	1.00		99.4	90-110	0.131	20	
Batch B225891 - SM21-22 2320B										
Blank (B225891-BLK1)				Prepared & Analyzed: 03/15/19						
Alkalinity	ND	1.0	mg/L							
LCS (B225891-BS1)				Prepared & Analyzed: 03/15/19						
Alkalinity	190	1.0	mg/L	194		96.9	86.2-110			
LCS Dup (B225891-BSD1)				Prepared & Analyzed: 03/15/19						
Alkalinity	200	1.0	mg/L	194		101	86.2-110	4.17	5.57	
Batch B225927 - SM 21-22 4500 P E										
Blank (B225927-BLK1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	ND	0.050	mg/L							
LCS (B225927-BS1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	0.21	0.050	mg/L	0.205		102	86.5-124			
LCS Dup (B225927-BSD1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	0.22	0.050	mg/L	0.205		109	86.5-124	5.79	11	
Batch B225953 - SM19-22 4500 NH3 C										
Blank (B225953-BLK1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B225953-BS1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	4.9	0.30	mg/L	5.00		98.0	81.5-113			
LCS Dup (B225953-BSD1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	81.5-113	2.82	11.4	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B225995 - SM 21-22 4500 P E											
Blank (B225995-BLK1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	ND	0.050	mg/L								
LCS (B225995-BS1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	0.22	0.050	mg/L	0.205		108	86.5-124				
LCS Dup (B225995-BSD1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	0.22	0.050	mg/L	0.205		107	86.5-124	0.848		11	
Batch B226138 - ASTM D516-11											
Blank (B226138-BLK1)				Prepared & Analyzed: 03/20/19							
Sulfate	ND	2.0	mg/L								
LCS (B226138-BS1)				Prepared & Analyzed: 03/20/19							
Sulfate	18	2.0	mg/L	20.0		92.4	85.6-110				
LCS Dup (B226138-BSD1)				Prepared & Analyzed: 03/20/19							
Sulfate	20	2.0	mg/L	20.0		99.1	85.6-110	**6.94**	*	5.55	R-05
Duplicate (B226138-DUP1)	**Source: 19C0662-01**			Prepared & Analyzed: 03/20/19							
Sulfate	8.7	2.0	mg/L		10			16.0		16	
Matrix Spike (B226138-MS1)	**Source: 19C0662-01**			Prepared & Analyzed: 03/20/19							
Sulfate	27	2.0	mg/L	20.0	10	81.7	45.6-127				
Batch B226174 - SM 5310B											
Blank (B226174-BLK1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	ND	1.0	mg/L								
LCS (B226174-BS1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	10.8	1.0	mg/L	10.0		108	85.1-116				
LCS Dup (B226174-BSD1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	10.9	1.0	mg/L	10.0		109	85.1-116	0.561		7.86	
Duplicate (B226174-DUP1)	**Source: 19C0662-05**			Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	ND	1.0	mg/L		ND			NC		23.4	
Matrix Spike (B226174-MS1)	**Source: 19C0662-05**			Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	5.86	1.0	mg/L	5.00	ND	117	49.1-151				

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B226260 - EPA 300.0											
Blank (B226260-BLK1)				Prepared & Analyzed: 03/22/19							
Chloride	ND	1.0	mg/L								
LCS (B226260-BS1)				Prepared & Analyzed: 03/22/19							
Chloride	4.8	1.0	mg/L	5.00		96.7		90-110			
LCS Dup (B226260-BSD1)				Prepared & Analyzed: 03/22/19							
Chloride	5.0	1.0	mg/L	5.00		100		90-110	3.57	20	
Duplicate (B226260-DUP1)	**Source: 19C0662-02**			Prepared & Analyzed: 03/22/19							
Chloride	40	1.0	mg/L		40				0.0190	20	
Matrix Spike (B226260-MS1)	**Source: 19C0662-02**			Prepared & Analyzed: 03/22/19							
Chloride	41	1.0	mg/L	5.00	40	**24.7**	*	80-120			MS-07

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B225822 - SM21-22 2540C											
Blank (B225822-BLK1)				Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	ND	10	mg/L								
LCS (B225822-BS1)				Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	230	10	mg/L	293		78.2	61.4-114				
Duplicate (B225822-DUP1)	**Source: 19C0662-04**			Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	82	10	mg/L		240			**98.8**	*	5	
Batch B227340 - SM21-22 2540C											
Blank (B227340-BLK1)				Prepared & Analyzed: 04/01/19							
Total Dissolved Solids	ND	10	mg/L								
LCS (B227340-BS1)				Prepared & Analyzed: 04/01/19							
Total Dissolved Solids	230	10	mg/L	293		79.2	61.4-114				

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BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM1** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.69
Endrin [1]	3.58

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	2.13
Endrin [2]	3.82

BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM2** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	2.00
Endrin [1]	4.09

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	2.48
Endrin [2]	4.33

BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM3** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.86
Endrin [1]	4.16

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BREAKDOWN REPORT

Lab Sample ID:	S033722-PEM3	Analyzed:	03/20/2019

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.30
Endrin [2]	3.73

BREAKDOWN REPORT

Lab Sample ID:	S033857-PEM1	Analyzed:	03/23/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.84
Endrin [1]	4.11

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	3.57
Endrin [2]	4.48

BREAKDOWN REPORT

Lab Sample ID:	S033857-PEM2	Analyzed:	03/23/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	3.12
Endrin [1]	4.63

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	3.77
Endrin [2]	4.55

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS

Lab Sample ID: B226019-BS1 Date(s) Analyzed: 03/19/2019 03/19/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	16.717	0.000	0.000	0.248	
	2	16.662	0.000	0.000	0.247	1.2
2,4,5-TP (Silvex)	1	16.170	0.000	0.000	0.247	
	2	15.854	0.000	0.000	0.247	1.2
2,4-D	1	14.281	0.000	0.000	2.45	
	2	14.066	0.000	0.000	2.51	0.4
2,4-DB	1	17.212	0.000	0.000	2.37	
	2	17.138	0.000	0.000	2.39	0.4
Dalapon	1	4.822	0.000	0.000	4.81	
	2	4.425	0.000	0.000	4.79	0.2
Dicamba	1	12.100	0.000	0.000	0.242	
	2	11.797	0.000	0.000	0.244	1.7
Dichloroprop	1	13.760	0.000	0.000	2.54	
	2	13.372	0.000	0.000	2.54	1.6
Dinoseb	1	17.809	0.000	0.000	0.800	
	2	17.334	0.000	0.000	0.745	7.1
MCPA	1	12.946	0.000	0.000	222	
	2	12.657	0.000	0.000	218	0.9
MCPP	1	12.605	0.000	0.000	240	
	2	12.143	0.000	0.000	227	5.6

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS Dup

Lab Sample ID: B226019-BSD1 Date(s) Analyzed: 03/19/2019 03/19/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	16.717	0.000	0.000	0.247	
	2	16.660	0.000	0.000	0.239	4.5
2,4,5-TP (Silvex)	1	16.170	0.000	0.000	0.242	
	2	15.853	0.000	0.000	0.240	0.0
2,4-D	1	14.281	0.000	0.000	2.40	
	2	14.067	0.000	0.000	2.46	2.5
2,4-DB	1	17.210	0.000	0.000	2.25	
	2	17.138	0.000	0.000	2.36	2.6
Dalapon	1	4.823	0.000	0.000	4.71	
	2	4.426	0.000	0.000	4.68	0.4
Dicamba	1	12.102	0.000	0.000	0.235	
	2	11.797	0.000	0.000	0.238	0.8
Dichloroprop	1	13.760	0.000	0.000	2.48	
	2	13.371	0.000	0.000	2.48	0.8
Dinoseb	1	17.807	0.000	0.000	0.940	
	2	17.334	0.000	0.000	0.881	6.5
MCPA	1	12.946	0.000	0.000	218	
	2	12.655	0.000	0.000	212	3.7
MCPP	1	12.605	0.000	0.000	233	
	2	12.142	0.000	0.000	222	3.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B226044-BS1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.086	7.055	7.115	1.0	
	2	6.999	6.969	7.029	0.98	2.0
4,4'-DDE	1	6.652	6.622	6.682	1.0	
	2	6.584	6.553	6.613	0.98	2.0
4,4'-DDT	1	7.296	7.264	7.324	1.0	
	2	7.231	7.201	7.261	1.0	0.0
Alachlor	1	6.102	6.071	6.131	0.90	
	2	5.808	5.778	5.838	0.92	2.2
Aldrin	1	6.003	5.971	6.031	0.94	
	2	5.858	5.828	5.888	0.90	4.4
alpha-BHC	1	5.318	5.288	5.348	0.82	
	2	5.207	5.177	5.237	0.85	3.6
alpha-Chlordane	1	6.592	6.561	6.621	0.94	
	2	6.453	6.423	6.483	0.94	0.0
beta-BHC	1	5.564	5.533	5.593	0.88	
	2	5.456	5.427	5.487	0.89	0.0
delta-BHC	1	5.674	5.644	5.704	0.93	
	2	5.626	5.596	5.656	0.89	4.4
Dieldrin	1	6.858	6.827	6.887	0.94	
	2	6.677	6.647	6.707	0.89	5.5
Endosulfan I	1	6.686	6.656	6.716	0.94	
	2	6.487	6.456	6.516	0.94	0.0
Endosulfan II	1	7.192	7.161	7.221	0.98	
	2	7.046	7.016	7.076	0.96	2.1
Endosulfan Sulfate	1	7.846	7.814	7.874	1.0	
	2	7.513	7.482	7.542	0.98	2.0
Endrin	1	7.026	6.995	7.055	0.97	
	2	6.889	6.859	6.919	0.96	2.1
Endrin Aldehyde	1	7.510	7.478	7.538	0.93	
	2	7.299	7.269	7.329	0.93	0.0
Endrin Ketone	1	8.048	8.017	8.077	1.0	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B226044-BS1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	7.911	7.880	7.940	1.0	0.0
gamma-BHC (Lindane)	1	5.510	5.479	5.539	0.88	
	2	5.405	5.375	5.435	0.85	3.5
gamma-Chlordane	1	6.499	6.469	6.529	0.94	
	2	6.354	6.324	6.384	0.95	1.1
Heptachlor	1	5.807	5.777	5.837	0.90	
	2	5.663	5.632	5.692	0.87	3.4
Heptachlor Epoxide	1	6.412	6.380	6.440	0.93	
	2	6.225	6.195	6.255	0.91	2.2
Hexachlorobenzene	1	5.217	5.186	5.246	1.1	
	2	5.130	5.100	5.160	1.1	0.0
Methoxychlor	1	7.680	7.649	7.709	1.0	
	2	7.775	7.744	7.804	1.0	9.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B226044-BSD1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.086	7.055	7.115	1.0	
	2	7.000	6.969	7.029	0.97	3.1
4,4'-DDE	1	6.653	6.622	6.682	1.0	
	2	6.584	6.553	6.613	0.95	5.1
4,4'-DDT	1	7.296	7.264	7.324	1.0	
	2	7.232	7.201	7.261	1.0	0.0
Alachlor	1	6.102	6.071	6.131	0.89	
	2	5.808	5.778	5.838	0.93	4.4
Aldrin	1	6.003	5.971	6.031	0.91	
	2	5.858	5.828	5.888	0.87	4.5
alpha-BHC	1	5.319	5.288	5.348	0.80	
	2	5.208	5.177	5.237	0.82	2.5
alpha-Chlordane	1	6.592	6.561	6.621	0.93	
	2	6.454	6.423	6.483	0.93	0.0
beta-BHC	1	5.564	5.533	5.593	0.87	
	2	5.456	5.427	5.487	0.88	1.1
delta-BHC	1	5.674	5.644	5.704	0.92	
	2	5.626	5.596	5.656	0.89	3.3
Dieldrin	1	6.859	6.827	6.887	0.92	
	2	6.678	6.647	6.707	0.89	3.3
Endosulfan I	1	6.687	6.656	6.716	0.93	
	2	6.487	6.456	6.516	0.93	0.0
Endosulfan II	1	7.193	7.161	7.221	0.97	
	2	7.047	7.016	7.076	0.95	2.1
Endosulfan Sulfate	1	7.847	7.814	7.874	1.0	
	2	7.513	7.482	7.542	0.97	3.1
Endrin	1	7.026	6.995	7.055	0.97	
	2	6.890	6.859	6.919	0.96	1.0
Endrin Aldehyde	1	7.510	7.478	7.538	0.94	
	2	7.300	7.269	7.329	0.94	0.0
Endrin Ketone	1	8.048	8.017	8.077	1.0	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B226044-BSD1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	7.910	7.880	7.940	0.99	1.0
gamma-BHC (Lindane)	1	5.510	5.479	5.539	0.86	
	2	5.405	5.375	5.435	0.83	3.6
gamma-Chlordane	1	6.499	6.469	6.529	0.92	
	2	6.355	6.324	6.384	0.93	0.0
Heptachlor	1	5.808	5.777	5.837	0.87	
	2	5.663	5.632	5.692	0.85	2.3
Heptachlor Epoxide	1	6.412	6.380	6.440	0.92	
	2	6.226	6.195	6.255	0.90	2.2
Hexachlorobenzene	1	5.216	5.186	5.246	1.1	
	2	5.130	5.100	5.160	1.0	9.5
Methoxychlor	1	7.680	7.649	7.709	1.0	
	2	7.775	7.744	7.804	1.0	0.0

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
H-02	Gross violation of holding time. Analysis performed after 2X the allowable holding time.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
MS-07	Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-36	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
ASTM D516-11 in Water	
Sulfate	NY,NH,MA,CT,RI,VA,NC
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
Nitrate as N	NC,NY,MA,VA,ME,NH,CT,RI
SM 21-22 4500 P E in Water	
Phosphorus, Total	CT,MA,NH,NY,RI,NC,ME,VA
SM 5310B in Water	
Total Organic Carbon	CT,NH,NY,RI,NC,MA,VA
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 2320B in Water	
Alkalinity	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SW-846 6010 in Water	
Hardness	CT,MA,NH,NY
SW-846 6010D in Water	
Arsenic	CT,NH,NY,ME,VA,RI,NC
Barium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Sodium	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8081B in Water	
Alachlor	NC
Alachlor [2C]	NC
Aldrin	CT,NH,NY,ME,NC,VA
Aldrin [2C]	CT,NH,NY,ME,NC,VA
alpha-BHC	CT,NH,NY,ME,NC,VA
alpha-BHC [2C]	CT,NH,NY,ME,NC,VA
beta-BHC	CT,NH,NY,ME,NC,VA
beta-BHC [2C]	CT,NH,NY,ME,NC,VA
delta-BHC	CT,NH,NY,ME,NC,VA
delta-BHC [2C]	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane)	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane) [2C]	CT,NH,NY,ME,NC,VA
Chlordane	CT,NH,NY,ME,NC,VA
Chlordane [2C]	CT,NH,NY,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Water	
4,4'-DDD	CT,NH,NY,ME,NC,VA
4,4'-DDD [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDE	CT,NH,NY,ME,NC,VA
4,4'-DDE [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDT	CT,NH,NY,ME,NC,VA
4,4'-DDT [2C]	CT,NH,NY,ME,NC,VA
Dieldrin	CT,NH,NY,ME,NC,VA
Dieldrin [2C]	CT,NH,NY,ME,NC,VA
Endosulfan I	CT,NH,NY,ME,NC,VA
Endosulfan I [2C]	CT,NH,NY,ME,NC,VA
Endosulfan II	CT,NH,NY,ME,NC,VA
Endosulfan II [2C]	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate [2C]	CT,NH,NY,ME,NC,VA
Endrin	CT,NH,NY,ME,NC,VA
Endrin [2C]	CT,NH,NY,ME,NC,VA
Endrin Aldehyde	CT,NH,NY,ME,NC,VA
Endrin Aldehyde [2C]	CT,NH,NY,ME,NC,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NH,NY,ME,NC,VA
Heptachlor [2C]	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide [2C]	CT,NH,NY,ME,NC,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NH,NY,ME,NC,VA
Methoxychlor [2C]	CT,NH,NY,ME,NC,VA
Toxaphene	CT,NH,NY,ME,NC,VA
Toxaphene [2C]	CT,NH,NY,ME,NC,VA
SW-846 8151A in Water	
2,4-D	ME,NC,NH,CT,NY,VA
2,4-D [2C]	ME,NC,NH,CT,NY,VA
2,4-DB	ME,NC,NH,CT,NY,VA
2,4-DB [2C]	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex)	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex) [2C]	ME,NC,NH,CT,NY,VA
2,4,5-T	ME,NC,NH,CT,NY,VA
2,4,5-T [2C]	ME,NC,NH,CT,NY,VA
Dalapon	ME,NC,NH,CT,NY,VA
Dalapon [2C]	ME,NC,NH,CT,NY,VA
Dicamba	ME,NC,NH,CT,NY,VA
Dicamba [2C]	ME,NC,NH,CT,NY,VA
Dichloroprop	ME,NC,NH,CT,NY,VA
Dichloroprop [2C]	ME,NC,NH,CT,NY,VA
Dinoseb	ME,NC,NH,CT,NY,VA

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8151A in Water	
Dinoseb [2C]	ME,NC,NH,CT,NY,VA
MCPA	NC,CT
MCPA [2C]	NC,CT
MCPP	NC,CT
MCPP [2C]	NC,CT
SW-846 8260C in Water	
Acetone	CT,ME,NH,VA,NY
Acrylonitrile	CT,ME,NH,VA,NY
tert-Amyl Methyl Ether (TAME)	ME,NH,VA,NY
Benzene	CT,ME,NH,VA,NY
Bromobenzene	NY
Bromochloromethane	ME,NH,VA,NY
Bromodichloromethane	CT,ME,NH,VA,NY
Bromoform	CT,ME,NH,VA,NY
Bromomethane	CT,ME,NH,VA,NY
2-Butanone (MEK)	CT,ME,NH,VA,NY
tert-Butyl Alcohol (TBA)	ME,NH,VA,NY
n-Butylbenzene	ME,VA,NY
sec-Butylbenzene	ME,VA,NY
tert-Butylbenzene	ME,VA,NY
tert-Butyl Ethyl Ether (TBEE)	ME,NH,VA,NY
Carbon Disulfide	CT,ME,NH,VA,NY
Carbon Tetrachloride	CT,ME,NH,VA,NY
Chlorobenzene	CT,ME,NH,VA,NY
Chlorodibromomethane	CT,ME,NH,VA,NY
Chloroethane	CT,ME,NH,VA,NY
Chloroform	CT,ME,NH,VA,NY
Chloromethane	CT,ME,NH,VA,NY
2-Chlorotoluene	ME,NH,VA,NY
4-Chlorotoluene	ME,NH,VA,NY
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	ME,NH,VA,NY
1,2-Dichlorobenzene	CT,ME,NH,VA,NY
1,3-Dichlorobenzene	CT,ME,NH,VA,NY
1,4-Dichlorobenzene	CT,ME,NH,VA,NY
trans-1,4-Dichloro-2-butene	ME,NH,VA,NY
Dichlorodifluoromethane (Freon 12)	ME,NH,VA,NY
1,1-Dichloroethane	CT,ME,NH,VA,NY
1,2-Dichloroethane	CT,ME,NH,VA,NY
1,1-Dichloroethylene	CT,ME,NH,VA,NY
cis-1,2-Dichloroethylene	ME,NY
trans-1,2-Dichloroethylene	CT,ME,NH,VA,NY
1,2-Dichloropropane	CT,ME,NH,VA,NY
1,3-Dichloropropane	ME,VA,NY
2,2-Dichloropropane	ME,NH,VA,NY

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C in Water	
1,1-Dichloropropene	ME,NH,VA,NY
cis-1,3-Dichloropropene	CT,ME,NH,VA,NY
trans-1,3-Dichloropropene	CT,ME,NH,VA,NY
Diethyl Ether	NY
Diisopropyl Ether (DIPE)	ME,NH,VA,NY
1,4-Dioxane	NY
Ethylbenzene	CT,ME,NH,VA,NY
Hexachlorobutadiene	CT,ME,NH,VA,NY
2-Hexanone (MBK)	CT,ME,NH,VA,NY
Isopropylbenzene (Cumene)	ME,VA,NY
p-Isopropyltoluene (p-Cymene)	CT,ME,NH,VA,NY
Methyl Acetate	NY
Methyl tert-Butyl Ether (MTBE)	CT,ME,NH,VA,NY
Methyl Cyclohexane	NY
Methylene Chloride	CT,ME,NH,VA,NY
4-Methyl-2-pentanone (MIBK)	CT,ME,NH,VA,NY
Naphthalene	ME,NH,VA,NY
n-Propylbenzene	CT,ME,NH,VA,NY
Styrene	CT,ME,NH,VA,NY
1,1,1,2-Tetrachloroethane	CT,ME,NH,VA,NY
1,1,2,2-Tetrachloroethane	CT,ME,NH,VA,NY
Tetrachloroethylene	CT,ME,NH,VA,NY
Toluene	CT,ME,NH,VA,NY
1,2,3-Trichlorobenzene	ME,NH,VA,NY
1,2,4-Trichlorobenzene	CT,ME,NH,VA,NY
1,3,5-Trichlorobenzene	ME
1,1,1-Trichloroethane	CT,ME,NH,VA,NY
1,1,2-Trichloroethane	CT,ME,NH,VA,NY
Trichloroethylene	CT,ME,NH,VA,NY
Trichlorofluoromethane (Freon 11)	CT,ME,NH,VA,NY
1,2,3-Trichloropropane	ME,NH,VA,NY
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	VA,NY
1,2,4-Trimethylbenzene	ME,VA,NY
1,3,5-Trimethylbenzene	ME,VA,NY
Vinyl Chloride	CT,ME,NH,VA,NY
m+p Xylene	CT,ME,NH,VA,NY
o-Xylene	CT,ME,NH,VA,NY
SW-846 8270D in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Acetophenone	NY,NH,ME,NC,VA
Aniline	NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzidine	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8270D in Soil	
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Benzoic Acid	NY,NH,ME,NC,VA
Bis(2-chloroethoxy)methane	CT,NY,NH,ME,NC,VA
Bis(2-chloroethyl)ether	CT,NY,NH,ME,NC,VA
Bis(2-chloroisopropyl)ether	CT,NY,NH,ME,NC,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NH,ME,NC,VA
4-Bromophenylphenylether	CT,NY,NH,ME,NC,VA
Butylbenzylphthalate	CT,NY,NH,ME,NC,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NH,ME,NC,VA
4-Chloro-3-methylphenol	CT,NY,NH,ME,NC,VA
2-Chloronaphthalene	CT,NY,NH,NC,VA
2-Chlorophenol	CT,NY,NH,ME,NC,VA
4-Chlorophenylphenylether	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Dibenzofuran	CT,NY,NH,ME,NC,VA
Di-n-butylphthalate	CT,NY,NH,ME,NC,VA
1,2-Dichlorobenzene	NY,NH,ME,NC,VA
1,3-Dichlorobenzene	NY,NH,ME,NC,VA
1,4-Dichlorobenzene	NY,NH,ME,NC,VA
3,3-Dichlorobenzidine	CT,NY,NH,ME,NC,VA
2,4-Dichlorophenol	CT,NY,NH,ME,NC,VA
Diethylphthalate	CT,NY,NH,ME,NC,VA
2,4-Dimethylphenol	CT,NY,NH,ME,NC,VA
Dimethylphthalate	CT,NY,NH,ME,NC,VA
4,6-Dinitro-2-methylphenol	CT,NY,NH,ME,NC,VA
2,4-Dinitrophenol	CT,NY,NH,ME,NC,VA
2,4-Dinitrotoluene	CT,NY,NH,ME,NC,VA
2,6-Dinitrotoluene	CT,NY,NH,ME,NC,VA
Di-n-octylphthalate	CT,NY,NH,ME,NC,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	NY,NH,ME,NC,VA
Hexachlorobenzene	CT,NY,NH,ME,NC,VA
Hexachlorobutadiene	CT,NY,NH,ME,NC,VA
Hexachlorocyclopentadiene	CT,NY,NH,ME,NC,VA
Hexachloroethane	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
Isophorone	CT,NY,NH,ME,NC,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
2-Methylphenol	CT,NY,NH,ME,NC,VA
3/4-Methylphenol	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8270D in Soil	
2-Nitroaniline	CT,NY,NH,ME,NC,VA
3-Nitroaniline	CT,NY,NH,ME,NC,VA
4-Nitroaniline	CT,NY,NH,ME,NC,VA
Nitrobenzene	CT,NY,NH,ME,NC,VA
2-Nitrophenol	CT,NY,NH,ME,NC,VA
4-Nitrophenol	CT,NY,NH,ME,NC,VA
N-Nitrosodimethylamine	CT,NY,NH,ME,NC,VA
N-Nitrosodi-n-propylamine	CT,NY,NH,ME,NC,VA
Pentachloronitrobenzene	NY,NC
Pentachlorophenol	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Phenol	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
Pyridine	CT,NY,NH,ME,NC,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NH,ME,NC,VA
2,4,5-Trichlorophenol	CT,NY,NH,ME,NC,VA
2,4,6-Trichlorophenol	CT,NY,NH,ME,NC,VA
2-Fluorophenol	NC
SW-846 8270D in Water	
Acenaphthene	CT,NY,NC,ME,NH,VA
Acenaphthylene	CT,NY,NC,ME,NH,VA
Acetophenone	NY,NC
Aniline	CT,NY,NC,ME,VA
Anthracene	CT,NY,NC,ME,NH,VA
Benzidine	CT,NY,NC,ME,NH,VA
Benzo(a)anthracene	CT,NY,NC,ME,NH,VA
Benzo(a)pyrene	CT,NY,NC,ME,NH,VA
Benzo(b)fluoranthene	CT,NY,NC,ME,NH,VA
Benzo(g,h,i)perylene	CT,NY,NC,ME,NH,VA
Benzo(k)fluoranthene	CT,NY,NC,ME,NH,VA
Benzoic Acid	NY,NC,ME,NH,VA
Bis(2-chloroethoxy)methane	CT,NY,NC,ME,NH,VA
Bis(2-chloroethyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-chloroisopropyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NC,ME,NH,VA
4-Bromophenylphenylether	CT,NY,NC,ME,NH,VA
Butylbenzylphthalate	CT,NY,NC,ME,NH,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NC,ME,NH,VA
4-Chloro-3-methylphenol	CT,NY,NC,ME,NH,VA
2-Chloronaphthalene	CT,NY,NC,ME,NH,VA
2-Chlorophenol	CT,NY,NC,ME,NH,VA
4-Chlorophenylphenylether	CT,NY,NC,ME,NH,VA
Chrysene	CT,NY,NC,ME,NH,VA
Dibenz(a,h)anthracene	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8270D in Water	
Dibenzofuran	CT,NY,NC,ME,NH,VA
Di-n-butylphthalate	CT,NY,NC,ME,NH,VA
1,2-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,3-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,4-Dichlorobenzene	CT,NY,NC,ME,NH,VA
3,3-Dichlorobenzidine	CT,NY,NC,ME,NH,VA
2,4-Dichlorophenol	CT,NY,NC,ME,NH,VA
Diethylphthalate	CT,NY,NC,ME,NH,VA
2,4-Dimethylphenol	CT,NY,NC,ME,NH,VA
Dimethylphthalate	CT,NY,NC,ME,NH,VA
4,6-Dinitro-2-methylphenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrophenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrotoluene	CT,NY,NC,ME,NH,VA
2,6-Dinitrotoluene	CT,NY,NC,ME,NH,VA
Di-n-octylphthalate	CT,NY,NC,ME,NH,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NC
Fluoranthene	CT,NY,NC,ME,NH,VA
Fluorene	NY,NC,ME,NH,VA
Hexachlorobenzene	CT,NY,NC,ME,NH,VA
Hexachlorobutadiene	CT,NY,NC,ME,NH,VA
Hexachlorocyclopentadiene	CT,NY,NC,ME,NH,VA
Hexachloroethane	CT,NY,NC,ME,NH,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NC,ME,NH,VA
Isophorone	CT,NY,NC,ME,NH,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NC,ME,NH,VA
2-Methylphenol	CT,NY,NC,NH,VA
3/4-Methylphenol	CT,NY,NC,NH,VA
Naphthalene	CT,NY,NC,ME,NH,VA
2-Nitroaniline	CT,NY,NC,ME,NH,VA
3-Nitroaniline	CT,NY,NC,ME,NH,VA
4-Nitroaniline	CT,NY,NC,ME,NH,VA
Nitrobenzene	CT,NY,NC,ME,NH,VA
2-Nitrophenol	CT,NY,NC,ME,NH,VA
4-Nitrophenol	CT,NY,NC,ME,NH,VA
N-Nitrosodimethylamine	CT,NY,NC,ME,NH,VA
N-Nitrosodi-n-propylamine	CT,NY,NC,ME,NH,VA
Pentachloronitrobenzene	NC
Pentachlorophenol	CT,NY,NC,ME,NH,VA
Phenanthrene	CT,NY,NC,ME,NH,VA
Phenol	CT,NY,NC,ME,NH,VA
Pyrene	CT,NY,NC,ME,NH,VA
Pyridine	CT,NY,NC,ME,NH,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NC,ME,NH,VA
2,4,5-Trichlorophenol	CT,NY,NC,ME,NH,VA
2,4,6-Trichlorophenol	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
2-Fluorophenol	NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2020
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2020
RI	Rhode Island Department of Health	LAO00112	12/30/2019
NC	North Carolina Div. of Water Quality	652	12/31/2019
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2019
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2019
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2019
NC-DW	North Carolina Department of Health	25703	07/31/2019

ALB 19C0662

con-test ANALYTICAL LABORATORY

http://www.contestlabs.com Doc # 380 Rev 1_03242017

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2M Associates
Address: H2M 179 River St Suite 1, Troy, NY 12180
Phone: (518) 270-1672 x114
Project Name: Cortlandville Sand + Gravel
Project Location: Cortlandville, NY
Project Number: 10009
Project Manager: Mike Pollaco
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: W. Bakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☐ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To:
Fax To #:

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/Time	~~Ending~~ Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	# of Containers	[2] Preservation Code	[3] Container Code	VOC	Pesticides	TOC	Alkalinity	Herbicides	SVOC	NO_3/Phos/NH_3	TKN/Cl/Boy/NO_3	Metals/Hardness
1	MW-2	3/13/19	1475		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
2	MW-3D	3/13/19	1710		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
3	MW-3S	3/13/19	1840		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
4	MW-4S	3/13/19	2010		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
5	DUP	3/13/19	—		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
6	Field Blank	3/13/19	1920			DI	C	3	-	-	-	-	-	-	-	-	-	-	
7	Trip Blank					DI	C	2	-	-	-	-	-	-	-	-	-	-	

Comments:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
☐ Lab to Filter

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] Container Codes:
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Relinquished by: (signature)	W. Bakes	Date/Time: 3/14/19 @ 9:50
Received by: (signature)		Date/Time: 3-14-19 12PM
Relinquished by: (signature)		Date/Time: 3.14.19 1300
Received by: (signature)		Date/Time: 1302
Relinquished by: (signature)		Date/Time: 1700
Received by: (signature)		Date/Time: 1700

Regulatory & Reporting Information
☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
☐ NY Restricted Use
☐ NY Unrestricted Use
☐ NY Part 375

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD

Other
NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP, LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Page 100 of 101

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client 1124 A

Received By SL Date 3/14/19 Time 1700

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 5 Actual Temp -3.0, 2.6, 5.2, 8.2

By Blank # _____ Actual Temp -

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? T Who was notified? Myriah

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? IC

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? T On COC? T

Do all samples have the proper pH? Acid ICL Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	20	1 Liter Plastic		16 oz Amb.	
HCL-	26	500 mL Amb.		500 mL Plastic	10	8oz Amb/Clear	
Meoh-		250 mL Amb.	5	250 mL Plastic	10	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	10	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

APPENDIX E-2
Quarter 2
Laboratory Analysis Reports

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 10, 2019

John Gansfuss
H2H Associates, LLC
179 River Street
Troy, NY 12180

Project Location: Cortlandville, NY
Client Job Number:
Project Number: 10009
Laboratory Work Order Number: 19E1264

Enclosed are results of analyses for samples received by the laboratory on May 22, 2019. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 6

Sample Results 10

19E1264-01 10

19E1264-02 20

19E1264-03 30

19E1264-04 40

19E1264-05 42

Sample Preparation Information 44

QC Data 47

Volatile Organic Compounds by GC/MS 47

B231545 47

B231691 51

Semivolatile Organic Compounds by GC/MS 57

B231813 57

Organochloride Pesticides by GC/ECD 62

B231811 62

Herbicides by GC/ECD 65

B231543 65

Metals Analyses (Total) 67

B231628 67

B232189 67

B232424 67

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 69

B231762 69

Table of Contents (continued)

B231851 69

B232034 69

B232197 69

B232246 70

B232285 70

B232845 70

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) 72

B231560 72

Pesticides Degradation Report 73

Dual Column RPD Report 75

Flag/Qualifier Summary 81

Certifications 82

Chain of Custody/Sample Receipt 88

con-test® ANALYTICAL LABORATORY
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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: John Gansfuss

REPORT DATE: 6/10/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19E1264

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-01	19E1264-01	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-3S	19E1264-02	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: John Gansfuss

REPORT DATE: 6/10/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19E1264

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-3D	19E1264-03	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
Field Blank	19E1264-04	Field Blank		SW-846 8260C	
Trip Blank	19E1264-05	Trip Blank Water		SW-846 8260C	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8151 samples were derivatized on 05/24/19.

For method 8151 sample analysis bracketed by LCS to monitor esterification. All recoveries in the bracketing LCS met method criteria.

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SW-846 8151A

Qualifications:

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Dinoseb [2C]
B231543-BS1, B231543-BSD1

SW-846 8260C

Qualifications:

L-02

Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.

Analyte & Samples(s) Qualified:

Methyl Acetate
B231545-BS1, B231545-BSD1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Methyl Acetate
B231691-BS1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Bromomethane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

Chloromethane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

n-Butylbenzene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

trans-1,3-Dichloropropene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

trans-1,4-Dichloro-2-butene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bromomethane
B231545-BS1, B231545-BSD1, S036333-CCV1

Chloromethane
B231545-BS1, B231545-BSD1, S036333-CCV1

V-36

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Carbon Disulfide
B231691-BS1, B231691-BSD1, S036349-CCV1

SW-846 8270D

Qualifications:

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L-05

Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the high side.

Analyte & Samples(s) Qualified:

Benzidine

B231813-BLK1, B231813-BS1, B231813-BSD1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine

B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Aniline

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

N-Nitrosodimethylamine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], S036618-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Benzoic Acid

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], S036618-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

3,3-Dichlorobenzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

4-Chloroaniline

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

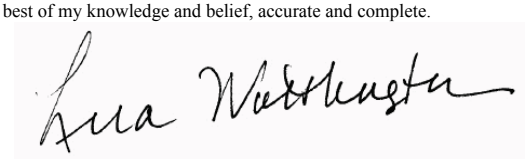
Analyte & Samples(s) Qualified:

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Technical Representative

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	105	70-130		5/25/19 7:51
Toluene-d8	105	70-130		5/25/19 7:51
4-Bromofluorobenzene	99.1	70-130		5/25/19 7:51

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Aniline	ND	5.0	3.7	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzidine	ND	20	12	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzoic Acid	ND	10	8.8	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	39.6	15-110		6/3/19 18:08
Phenol-d6	29.0	15-110		6/3/19 18:08
Nitrobenzene-d5	57.9	30-130		6/3/19 18:08
2-Fluorobiphenyl	68.3	30-130		6/3/19 18:08
2,4,6-Tribromophenol	75.6	15-110		6/3/19 18:08
p-Terphenyl-d14	86.8	30-130		6/3/19 18:08

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.29	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Aldrin [1]	ND	0.071	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
alpha-BHC [1]	ND	0.071	0.0046	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
beta-BHC [1]	ND	0.071	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
delta-BHC [1]	ND	0.071	0.043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
gamma-BHC (Lindane) [1]	ND	0.043	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Chlordane [1]	ND	0.29	0.17	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDD [1]	ND	0.057	0.0026	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDE [1]	ND	0.057	0.0023	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDT [1]	ND	0.057	0.0034	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Dieldrin [1]	ND	0.0029	0.0028	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan I [1]	ND	0.071	0.0030	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan II [1]	ND	0.11	0.0041	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan sulfate [1]	ND	0.11	0.0035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin [1]	ND	0.11	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin aldehyde [1]	ND	0.11	0.090	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin ketone [1]	ND	0.11	0.0071	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Heptachlor [1]	ND	0.071	0.0065	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Heptachlor epoxide [1]	ND	0.071	0.0057	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Hexachlorobenzene [1]	ND	0.071	0.056	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Methoxychlor [1]	ND	0.71	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Toxaphene [1]	ND	1.4	0.94	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	103	30-150		6/6/19 5:10
Decachlorobiphenyl [2]	103	30-150		6/6/19 5:10
Tetrachloro-m-xylene [1]	92.5	30-150		6/6/19 5:10
Tetrachloro-m-xylene [2]	94.7	30-150		6/6/19 5:10

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.51	0.11	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4-DB [1]	ND	0.51	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4,5-TP (Silvex) [1]	ND	0.051	0.010	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4,5-T [1]	ND	0.10	0.025	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dalalpon [1]	ND	1.3	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dicamba [1]	ND	0.051	0.016	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dichloroprop [1]	ND	0.51	0.19	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dinoseb [1]	ND	0.26	0.048	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
MCPA [1]	ND	51	9.6	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
MCPP [1]	ND	51	10	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	91.0	30-150		5/24/19 20:28
2,4-Dichlorophenylacetic acid [2]	93.0	30-150		5/24/19 20:28

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01
Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Barium	0.053	0.050	0.0053	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 10:57	AJL
Sodium	14	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:05	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Hardness	220			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	170	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	6/3/19	6/4/19 11:00	EC
Chloride	42	2.0		mg/L	2		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	19	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 14:41	DJM

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	270	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

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Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01
Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	1.64	0.05	0.01	mg/L	1		E300.0		5/23/19 21:16	PEL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,1-Trichloroethane	0.27	1.0	0.20	µg/L	1	J	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	103	70-130		5/25/19 8:22
Toluene-d8	106	70-130		5/25/19 8:22
4-Bromofluorobenzene	96.8	70-130		5/25/19 8:22

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Aniline	ND	5.0	3.7	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzidine	ND	20	12	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzoic Acid	ND	10	8.8	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	38.2	15-110		6/3/19 18:34
Phenol-d6	28.3	15-110		6/3/19 18:34
Nitrobenzene-d5	53.1	30-130		6/3/19 18:34
2-Fluorobiphenyl	65.0	30-130		6/3/19 18:34
2,4,6-Tribromophenol	72.9	15-110		6/3/19 18:34
p-Terphenyl-d14	89.8	30-130		6/3/19 18:34

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.30	0.037	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Aldrin [1]	ND	0.074	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
alpha-BHC [1]	ND	0.074	0.0048	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
beta-BHC [1]	ND	0.074	0.036	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
delta-BHC [1]	ND	0.074	0.044	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
gamma-BHC (Lindane) [1]	ND	0.044	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Chlordane [1]	ND	0.30	0.18	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDD [1]	ND	0.059	0.0027	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDE [1]	ND	0.059	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDT [1]	ND	0.059	0.0036	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Dieldrin [1]	ND	0.0030	0.0029	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan I [1]	ND	0.074	0.0031	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan II [1]	ND	0.12	0.0043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan sulfate [1]	ND	0.12	0.0037	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin [1]	ND	0.12	0.0025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin aldehyde [1]	ND	0.12	0.093	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin ketone [1]	ND	0.12	0.0073	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Heptachlor [1]	ND	0.074	0.0068	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Heptachlor epoxide [1]	ND	0.074	0.0059	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Hexachlorobenzene [1]	ND	0.074	0.058	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Methoxychlor [1]	ND	0.74	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Toxaphene [1]	ND	1.5	0.98	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.3	30-150		6/6/19 5:37
Decachlorobiphenyl [2]	94.7	30-150		6/6/19 5:37
Tetrachloro-m-xylene [1]	84.3	30-150		6/6/19 5:37
Tetrachloro-m-xylene [2]	86.7	30-150		6/6/19 5:37

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	88.1	30-150		5/24/19 21:07
2,4-Dichlorophenylacetic acid [2]	92.6	30-150		5/24/19 21:07

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S
Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Barium	0.041	0.050	0.0053	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 10:59	AJL
Sodium	22	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:12	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Hardness	250			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	210	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	6/3/19	6/4/19 11:00	EC
Chloride	51	2.0		mg/L	2		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	10	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 14:56	DJM

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	330	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S
Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	1.92	0.05	0.01	mg/L	1		E300.0		5/23/19 21:24	PEL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	103	70-130		5/25/19 8:52
Toluene-d8	106	70-130		5/25/19 8:52
4-Bromofluorobenzene	99.2	70-130		5/25/19 8:52

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Acenaphthylene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Acetophenone	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Aniline	ND	5.4	4.0	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Anthracene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzidine	ND	22	13	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(a)anthracene	ND	5.4	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(a)pyrene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(b)fluoranthene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(g,h,i)perylene	ND	5.4	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(k)fluoranthene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzoic Acid	ND	11	9.5	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroethoxy)methane	ND	11	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroethyl)ether	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroisopropyl)ether	ND	11	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-Ethylhexyl)phthalate	ND	11	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Bromophenylphenylether	ND	11	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Butylbenzylphthalate	ND	11	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Carbazole	ND	11	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chloroaniline	ND	11	2.4	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chloro-3-methylphenol	ND	11	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Chloronaphthalene	ND	11	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Chlorophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chlorophenylphenylether	ND	11	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Chrysene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dibenz(a,h)anthracene	ND	5.4	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dibenzofuran	ND	5.4	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Di-n-butylphthalate	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2-Dichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,3-Dichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,4-Dichlorobenzene	ND	5.4	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3,3-Dichlorobenzidine	ND	11	3.8	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dichlorophenol	ND	11	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Diethylphthalate	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dimethylphenol	ND	11	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dimethylphthalate	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4,6-Dinitro-2-methylphenol	ND	11	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dinitrophenol	ND	11	8.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dinitrotoluene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,6-Dinitrotoluene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Di-n-octylphthalate	ND	11	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	11	5.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Fluoranthene	ND	5.4	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Fluorene	ND	5.4	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	11	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachlorobutadiene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachlorocyclopentadiene	ND	11	8.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachloroethane	ND	11	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Indeno(1,2,3-cd)pyrene	ND	5.4	4.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Isophorone	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1-Methylnaphthalene	ND	5.4	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Methylnaphthalene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Methylphenol	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3/4-Methylphenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Naphthalene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Nitroaniline	ND	11	3.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3-Nitroaniline	ND	11	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Nitroaniline	ND	11	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Nitrobenzene	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Nitrophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Nitrophenol	ND	11	4.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodimethylamine	ND	11	3.4	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	11	6.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodi-n-propylamine	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pentachloronitrobenzene	ND	11	5.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pentachlorophenol	ND	11	8.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Phenanthrene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Phenol	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pyrene	ND	5.4	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pyridine	ND	5.4	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2,4,5-Tetrachlorobenzene	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2,4-Trichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4,5-Trichlorophenol	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4,6-Trichlorophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.3	15-110		6/3/19 18:59
Phenol-d6	28.1	15-110		6/3/19 18:59
Nitrobenzene-d5	53.9	30-130		6/3/19 18:59
2-Fluorobiphenyl	65.2	30-130		6/3/19 18:59
2,4,6-Tribromophenol	75.6	15-110		6/3/19 18:59
p-Terphenyl-d14	94.5	30-130		6/3/19 18:59

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.29	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Aldrin [1]	ND	0.071	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
alpha-BHC [1]	ND	0.071	0.0046	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
beta-BHC [1]	ND	0.071	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
delta-BHC [1]	ND	0.071	0.043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
gamma-BHC (Lindane) [1]	ND	0.043	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Chlordane [1]	ND	0.29	0.17	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDD [1]	ND	0.057	0.0026	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDE [1]	ND	0.057	0.0023	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDT [1]	ND	0.057	0.0034	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Dieldrin [1]	ND	0.0029	0.0028	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan I [1]	ND	0.071	0.0030	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan II [1]	ND	0.11	0.0041	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan sulfate [1]	ND	0.11	0.0035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin [1]	ND	0.11	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin aldehyde [1]	ND	0.11	0.090	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin ketone [1]	ND	0.11	0.0071	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Heptachlor [1]	ND	0.071	0.0065	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Heptachlor epoxide [1]	ND	0.071	0.0057	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Hexachlorobenzene [1]	ND	0.071	0.056	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Methoxychlor [1]	ND	0.71	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Toxaphene [1]	ND	1.4	0.94	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	92.7	30-150		6/6/19 6:04
Decachlorobiphenyl [2]	91.5	30-150		6/6/19 6:04
Tetrachloro-m-xylene [1]	84.9	30-150		6/6/19 6:04
Tetrachloro-m-xylene [2]	87.5	30-150		6/6/19 6:04

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.099	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0096	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4,5-T [1]	ND	0.095	0.023	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dicamba [1]	ND	0.048	0.014	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dinoseb [1]	ND	0.24	0.044	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
MCPA [1]	ND	48	9.0	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
MCPP [1]	ND	48	9.3	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	81.4	30-150		5/24/19 21:46
2,4-Dichlorophenylacetic acid [2]	82.6	30-150		5/24/19 21:46

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Barium	0.048	0.050	0.0053	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Iron	1.9	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 11:05	AJL
Sodium	18	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:20	EJB
Zinc	0.0069	0.020	0.0052	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Hardness	230			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	160	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	5/30/19	5/31/19 10:00	EC
Chloride	51	5.0		mg/L	5		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	9.5	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 15:12	DJM

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	280	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

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Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D
Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	2.78	0.05	0.01	mg/L	1		E300.0		5/23/19 21:33	PEL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Field Blank | Sampled: 5/21/2019 11:20

Sample ID: 19E1264-04

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Field Blank | Sampled: 5/21/2019 11:20

Sample ID: 19E1264-04

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		5/23/19 14:11
Toluene-d8	100	70-130		5/23/19 14:11
4-Bromofluorobenzene	98.2	70-130		5/23/19 14:11

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Trip Blank | Sampled: 5/21/2019 00:00

Sample ID: 19E1264-05

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Trip Blank | Sampled: 5/21/2019 00:00

Sample ID: 19E1264-05

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		5/23/19 14:38
Toluene-d8	99.3	70-130		5/23/19 14:38
4-Bromofluorobenzene	98.4	70-130		5/23/19 14:38

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Sample Extraction Data

ASTM D516-11

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231851	100	100	05/28/19
19E1264-02 [MW-3S]	B231851	100	100	05/28/19
19E1264-03 [MW-3D]	B231851	100	100	05/28/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231762	50.0	50.0	05/27/19
19E1264-02 [MW-3S]	B231762	50.0	50.0	05/27/19
19E1264-03 [MW-3D]	B231762	50.0	50.0	05/27/19

SM 5310B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232246	50.0	50.0	06/02/19
19E1264-02 [MW-3S]	B232246	50.0	50.0	06/02/19
19E1264-03 [MW-3D]	B232246	50.0	50.0	06/02/19

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-03 [MW-3D]	B232034	100	100	05/30/19

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232285	100	100	06/03/19
19E1264-02 [MW-3S]	B232285	100	100	06/03/19

SM21-22 2320B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232197	100	100	05/31/19
19E1264-02 [MW-3S]	B232197	100	100	05/31/19
19E1264-03 [MW-3D]	B232197	100	100	05/31/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19E1264-01 [MW-01]	B231560	50.0	05/23/19
19E1264-02 [MW-3S]	B231560	50.0	05/23/19
19E1264-03 [MW-3D]	B231560	50.0	05/23/19

SM21-22 4500 CL B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

SM21-22 4500 CL B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232845	100	100	06/07/19
19E1264-02 [MW-3S]	B232845	100	100	06/07/19
19E1264-03 [MW-3D]	B232845	100	100	06/07/19

Prep Method: SW-846 3005A-SW-846 6010

Lab Number [Field ID]	Batch	Initial [mL]	Date
19E1264-01 [MW-01]	B232189	50.0	05/31/19
19E1264-02 [MW-3S]	B232189	50.0	05/31/19
19E1264-03 [MW-3D]	B232189	50.0	05/31/19

Prep Method: SW-846 3005A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232189	50.0	50.0	05/31/19
19E1264-02 [MW-3S]	B232189	50.0	50.0	05/31/19
19E1264-03 [MW-3D]	B232189	50.0	50.0	05/31/19

Prep Method: SW-846 3015A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01RE1 [MW-01]	B232424	45.0	50.0	06/04/19
19E1264-02RE1 [MW-3S]	B232424	45.0	50.0	06/04/19
19E1264-03RE1 [MW-3D]	B232424	45.0	50.0	06/04/19

Prep Method: SW-846 7470A Prep-SW-846 7470A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231628	6.00	6.00	05/23/19
19E1264-02 [MW-3S]	B231628	6.00	6.00	05/23/19
19E1264-03 [MW-3D]	B231628	6.00	6.00	05/23/19

Prep Method: SW-846 3510C-SW-846 8081B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231811	140	2.00	05/28/19
19E1264-02 [MW-3S]	B231811	135	2.00	05/28/19
19E1264-03 [MW-3D]	B231811	140	2.00	05/28/19

Prep Method: SW-846 3510C-SW-846 8151A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231543	980	5.00	05/23/19
19E1264-02 [MW-3S]	B231543	1020	5.00	05/23/19
19E1264-03 [MW-3D]	B231543	1050	5.00	05/23/19

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Sample Extraction Data

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-04 [Field Blank]	B231545	5	5.00	05/23/19
19E1264-05 [Trip Blank]	B231545	5	5.00	05/23/19

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231691	5	5.00	05/24/19
19E1264-02 [MW-3S]	B231691	5	5.00	05/24/19
19E1264-03 [MW-3D]	B231691	5	5.00	05/24/19

Prep Method: SW-846 3510C-SW-846 8270D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231813	1000	1.00	05/28/19
19E1264-02 [MW-3S]	B231813	1000	1.00	05/28/19
19E1264-03 [MW-3D]	B231813	930	1.00	05/28/19

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231545 - SW-846 5030B										
Blank (B231545-BLK1)				Prepared & Analyzed: 05/23/19						
Acetone	ND	50	µg/L							
Acrylonitrile	ND	5.0	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	0.50	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B											
Blank (B231545-BLK1)				Prepared & Analyzed: 05/23/19							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L								
Methyl Cyclohexane	ND	1.0	µg/L								
Methylene Chloride	ND	5.0	µg/L								
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L								
Naphthalene	ND	2.0	µg/L								
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*26.3*		µg/L	25.0		105	70-130				
Surrogate: Toluene-d8	*24.8*		µg/L	25.0		99.2	70-130				
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100	70-130				
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19							
Acetone	160	50	µg/L	100		160	70-160				†
Acrylonitrile	9.79	5.0	µg/L	10.0		97.9	70-130				
tert-Amyl Methyl Ether (TAME)	10.2	0.50	µg/L	10.0		102	70-130				
Benzene	10.6	1.0	µg/L	10.0		106	70-130				
Bromobenzene	10.4	1.0	µg/L	10.0		104	70-130				
Bromochloromethane	11.6	1.0	µg/L	10.0		116	70-130				
Bromodichloromethane	10.8	0.50	µg/L	10.0		108	70-130				
Bromoform	9.92	1.0	µg/L	10.0		99.2	70-130				
Bromomethane	7.36	2.0	µg/L	10.0		73.6	40-160			V-20	†
2-Butanone (MEK)	119	20	µg/L	100		119	40-160				†
tert-Butyl Alcohol (TBA)	90.7	20	µg/L	100		90.7	40-160				†
n-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
sec-Butylbenzene	11.2	1.0	µg/L	10.0		112	70-130				
tert-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
tert-Butyl Ethyl Ether (TBEE)	9.87	0.50	µg/L	10.0		98.7	70-130				
Carbon Disulfide	11.8	5.0	µg/L	10.0		118	70-130				
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130				
Chlorobenzene	10.6	1.0	µg/L	10.0		106	70-130				
Chlorodibromomethane	10.0	0.50	µg/L	10.0		100	70-130				
Chloroethane	10.6	2.0	µg/L	10.0		106	70-130				
Chloroform	10.7	2.0	µg/L	10.0		107	70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B												
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19								
Chloromethane	9.52	2.0	µg/L	10.0		95.2		40-160			V-20	†
2-Chlorotoluene	10.6	1.0	µg/L	10.0		106		70-130				
4-Chlorotoluene	10.6	1.0	µg/L	10.0		106		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	10.4	5.0	µg/L	10.0		104		70-130				
1,2-Dibromoethane (EDB)	10.8	0.50	µg/L	10.0		108		70-130				
Dibromomethane	10.7	1.0	µg/L	10.0		107		70-130				
1,2-Dichlorobenzene	11.3	1.0	µg/L	10.0		113		70-130				
1,3-Dichlorobenzene	11.3	1.0	µg/L	10.0		113		70-130				
1,4-Dichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130				
trans-1,4-Dichloro-2-butene	10.2	2.0	µg/L	10.0		102		70-130				
Dichlorodifluoromethane (Freon 12)	10.3	2.0	µg/L	10.0		103		40-160				†
1,1-Dichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,2-Dichloroethane	10.7	1.0	µg/L	10.0		107		70-130				
1,1-Dichloroethylene	11.2	1.0	µg/L	10.0		112		70-130				
cis-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
trans-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107		70-130				
1,2-Dichloropropane	10.8	1.0	µg/L	10.0		108		70-130				
1,3-Dichloropropane	10.3	0.50	µg/L	10.0		103		70-130				
2,2-Dichloropropane	9.69	1.0	µg/L	10.0		96.9		40-130				†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107		70-130				
cis-1,3-Dichloropropene	10.2	0.50	µg/L	10.0		102		70-130				
trans-1,3-Dichloropropene	10.4	0.50	µg/L	10.0		104		70-130				
Diethyl Ether	10.4	2.0	µg/L	10.0		104		70-130				
Diisopropyl Ether (DIPE)	10.6	0.50	µg/L	10.0		106		70-130				
1,4-Dioxane	95.2	50	µg/L	100		95.2		40-130				†
Ethylbenzene	10.5	1.0	µg/L	10.0		105		70-130				
Hexachlorobutadiene	11.3	0.60	µg/L	10.0		113		70-130				
2-Hexanone (MBK)	111	10	µg/L	100		111		70-160				†
Isopropylbenzene (Cumene)	10.8	1.0	µg/L	10.0		108		70-130				
p-Isopropyltoluene (p-Cymene)	11.0	1.0	µg/L	10.0		110		70-130				
Methyl Acetate	13.1	1.0	µg/L	10.0		**131**	*	70-130			L-02	
Methyl tert-Butyl Ether (MTBE)	11.0	1.0	µg/L	10.0		110		70-130				
Methyl Cyclohexane	11.1	1.0	µg/L	10.0		111		70-130				
Methylene Chloride	10.3	5.0	µg/L	10.0		103		70-130				
4-Methyl-2-pentanone (MIBK)	103	10	µg/L	100		103		70-160				†
Naphthalene	10.9	2.0	µg/L	10.0		109		40-130				†
n-Propylbenzene	10.8	1.0	µg/L	10.0		108		70-130				
Styrene	10.4	1.0	µg/L	10.0		104		70-130				
1,1,1,2-Tetrachloroethane	10.6	1.0	µg/L	10.0		106		70-130				
1,1,2,2-Tetrachloroethane	10.6	0.50	µg/L	10.0		106		70-130				
Tetrachloroethylene	11.1	1.0	µg/L	10.0		111		70-130				
Tetrahydrofuran	11.2	10	µg/L	10.0		112		70-130				
Toluene	10.9	1.0	µg/L	10.0		109		70-130				
1,2,3-Trichlorobenzene	11.1	5.0	µg/L	10.0		111		70-130				
1,2,4-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130				
1,3,5-Trichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130				
1,1,1-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130				
1,1,2-Trichloroethane	11.4	1.0	µg/L	10.0		114		70-130				
Trichloroethylene	11.4	1.0	µg/L	10.0		114		70-130				
Trichlorofluoromethane (Freon 11)	9.93	2.0	µg/L	10.0		99.3		70-130				
1,2,3-Trichloropropane	10.3	2.0	µg/L	10.0		103		70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B											
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.2	1.0	µg/L	10.0		112	70-130				
1,2,4-Trimethylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
1,3,5-Trimethylbenzene	10.6	1.0	µg/L	10.0		106	70-130				
Vinyl Chloride	9.68	2.0	µg/L	10.0		96.8	40-160				†
m+p Xylene	21.3	2.0	µg/L	20.0		106	70-130				
o-Xylene	10.8	1.0	µg/L	10.0		108	70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.7*		µg/L	25.0		103	70-130				
Surrogate: Toluene-d8	*25.4*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*24.9*		µg/L	25.0		99.5	70-130				
LCS Dup (B231545-BSD1)				Prepared & Analyzed: 05/23/19							
Acetone	160	50	µg/L	100		160	70-160	0.400	25		†
Acrylonitrile	10.6	5.0	µg/L	10.0		106	70-130	7.47	25		
tert-Amyl Methyl Ether (TAME)	10.5	0.50	µg/L	10.0		105	70-130	2.13	25		
Benzene	10.4	1.0	µg/L	10.0		104	70-130	1.71	25		
Bromobenzene	10.3	1.0	µg/L	10.0		103	70-130	1.06	25		
Bromochloromethane	11.4	1.0	µg/L	10.0		114	70-130	1.83	25		
Bromodichloromethane	10.5	0.50	µg/L	10.0		105	70-130	2.35	25		
Bromoform	9.58	1.0	µg/L	10.0		95.8	70-130	3.49	25		
Bromomethane	8.30	2.0	µg/L	10.0		83.0	40-160	12.0	25	V-20	†
2-Butanone (MEK)	123	20	µg/L	100		123	40-160	2.65	25		†
tert-Butyl Alcohol (TBA)	95.2	20	µg/L	100		95.2	40-160	4.83	25		†
n-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130	0.183	25		
sec-Butylbenzene	11.2	1.0	µg/L	10.0		112	70-130	0.445	25		
tert-Butylbenzene	10.8	1.0	µg/L	10.0		108	70-130	0.644	25		
tert-Butyl Ethyl Ether (TBEE)	10.0	0.50	µg/L	10.0		100	70-130	1.71	25		
Carbon Disulfide	11.4	5.0	µg/L	10.0		114	70-130	3.27	25		
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130	0.00	25		
Chlorobenzene	10.5	1.0	µg/L	10.0		105	70-130	0.945	25		
Chlorodibromomethane	9.79	0.50	µg/L	10.0		97.9	70-130	2.32	25		
Chloroethane	10.4	2.0	µg/L	10.0		104	70-130	1.34	25		
Chloroform	10.5	2.0	µg/L	10.0		105	70-130	1.42	25		
Chloromethane	9.93	2.0	µg/L	10.0		99.3	40-160	4.22	25	V-20	†
2-Chlorotoluene	10.7	1.0	µg/L	10.0		107	70-130	0.844	25		
4-Chlorotoluene	10.9	1.0	µg/L	10.0		109	70-130	2.14	25		
1,2-Dibromo-3-chloropropane (DBCP)	11.6	5.0	µg/L	10.0		116	70-130	10.8	25		
1,2-Dibromoethane (EDB)	11.0	0.50	µg/L	10.0		110	70-130	1.93	25		
Dibromomethane	10.3	1.0	µg/L	10.0		103	70-130	4.38	25		
1,2-Dichlorobenzene	11.2	1.0	µg/L	10.0		112	70-130	0.801	25		
1,3-Dichlorobenzene	11.4	1.0	µg/L	10.0		114	70-130	0.967	25		
1,4-Dichlorobenzene	11.2	1.0	µg/L	10.0		112	70-130	3.00	25		
trans-1,4-Dichloro-2-butene	10.5	2.0	µg/L	10.0		105	70-130	3.57	25		
Dichlorodifluoromethane (Freon 12)	9.93	2.0	µg/L	10.0		99.3	40-160	3.66	25		†
1,1-Dichloroethane	10.7	1.0	µg/L	10.0		107	70-130	2.22	25		
1,2-Dichloroethane	10.6	1.0	µg/L	10.0		106	70-130	0.848	25		
1,1-Dichloroethylene	11.1	1.0	µg/L	10.0		111	70-130	0.810	25		
cis-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108	70-130	0.371	25		
trans-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107	70-130	0.375	25		
1,2-Dichloropropane	10.5	1.0	µg/L	10.0		105	70-130	3.47	25		
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104	70-130	0.771	25		
2,2-Dichloropropane	9.44	1.0	µg/L	10.0		94.4	40-130	2.61	25		†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107	70-130	0.187	25		

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B												
LCS Dup (B231545-BSD1)				Prepared & Analyzed: 05/23/19								
cis-1,3-Dichloropropene	10.0	0.50	µg/L	10.0		100		70-130	1.68	25		
trans-1,3-Dichloropropene	10.0	0.50	µg/L	10.0		100		70-130	3.34	25		
Diethyl Ether	10.5	2.0	µg/L	10.0		105		70-130	0.575	25		
Diisopropyl Ether (DIPE)	10.5	0.50	µg/L	10.0		105		70-130	0.285	25		
1,4-Dioxane	107	50	µg/L	100		107		40-130	11.9	50		† ‡
Ethylbenzene	10.4	1.0	µg/L	10.0		104		70-130	1.53	25		
Hexachlorobutadiene	11.8	0.60	µg/L	10.0		118		70-130	4.57	25		
2-Hexanone (MBK)	111	10	µg/L	100		111		70-160	0.595	25		†
Isopropylbenzene (Cumene)	10.7	1.0	µg/L	10.0		107		70-130	1.67	25		
p-Isopropyltoluene (p-Cymene)	10.9	1.0	µg/L	10.0		109		70-130	0.640	25		
Methyl Acetate	13.4	1.0	µg/L	10.0		**134**	*	70-130	2.19	25	L-02	
Methyl tert-Butyl Ether (MTBE)	10.9	1.0	µg/L	10.0		109		70-130	0.913	25		
Methyl Cyclohexane	10.5	1.0	µg/L	10.0		105		70-130	5.00	25		
Methylene Chloride	10.7	5.0	µg/L	10.0		107		70-130	4.29	25		
4-Methyl-2-pentanone (MIBK)	105	10	µg/L	100		105		70-160	2.13	25		†
Naphthalene	11.1	2.0	µg/L	10.0		111		40-130	2.45	25		†
n-Propylbenzene	10.7	1.0	µg/L	10.0		107		70-130	0.835	25		
Styrene	10.5	1.0	µg/L	10.0		105		70-130	0.573	25		
1,1,1,2-Tetrachloroethane	10.5	1.0	µg/L	10.0		105		70-130	0.475	25		
1,1,2,2-Tetrachloroethane	11.1	0.50	µg/L	10.0		111		70-130	3.87	25		
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107		70-130	3.77	25		
Tetrahydrofuran	11.4	10	µg/L	10.0		114		70-130	1.51	25		
Toluene	10.4	1.0	µg/L	10.0		104		70-130	4.23	25		
1,2,3-Trichlorobenzene	11.0	5.0	µg/L	10.0		110		70-130	0.452	25		
1,2,4-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130	0.545	25		
1,3,5-Trichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130	0.284	25		
1,1,1-Trichloroethane	10.8	1.0	µg/L	10.0		108		70-130	0.184	25		
1,1,2-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130	4.13	25		
Trichloroethylene	10.8	1.0	µg/L	10.0		108		70-130	4.96	25		
Trichlorofluoromethane (Freon 11)	9.78	2.0	µg/L	10.0		97.8		70-130	1.52	25		
1,2,3-Trichloropropane	10.4	2.0	µg/L	10.0		104		70-130	1.06	25		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.8	1.0	µg/L	10.0		108		70-130	3.37	25		
1,2,4-Trimethylbenzene	10.6	1.0	µg/L	10.0		106		70-130	2.04	25		
1,3,5-Trimethylbenzene	10.6	1.0	µg/L	10.0		106		70-130	0.378	25		
Vinyl Chloride	9.93	2.0	µg/L	10.0		99.3		40-160	2.55	25		†
m+p Xylene	21.3	2.0	µg/L	20.0		106		70-130	0.00	25		
o-Xylene	11.0	1.0	µg/L	10.0		110		70-130	1.56	25		
Surrogate: 1,2-Dichloroethane-d4	*25.8*		µg/L	25.0		103		70-130				
Surrogate: Toluene-d8	*24.7*		µg/L	25.0		98.8		70-130				
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.4		70-130				
Batch B231691 - SW-846 5030B												
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Acetone	ND	50	µg/L									
Acrylonitrile	ND	5.0	µg/L									
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L									
Benzene	ND	1.0	µg/L									
Bromobenzene	ND	1.0	µg/L									
Bromochloromethane	ND	1.0	µg/L									
Bromodichloromethane	ND	0.50	µg/L									
Bromoform	ND	1.0	µg/L									

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231691 - SW-846 5030B										
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19						
Bromomethane	ND	2.0	µg/L							R-05
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							V-05
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							V-05
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							V-05
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							V-05
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							V-05
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							
Methyl Cyclohexane	ND	1.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L							
Naphthalene	0.32	2.0	µg/L							J
n-Propylbenzene	ND	1.0	µg/L							
Styrene	ND	1.0	µg/L							
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L							

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231691 - SW-846 5030B											
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19							
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*26.4*		µg/L	25.0		106	70-130				
Surrogate: Toluene-d8	*26.1*		µg/L	25.0		105	70-130				
Surrogate: 4-Bromofluorobenzene	*24.4*		µg/L	25.0		97.4	70-130				
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19							
Acetone	132	50	µg/L	100		132	70-160				†
Acrylonitrile	11.3	5.0	µg/L	10.0		113	70-130				
tert-Amyl Methyl Ether (TAME)	8.66	0.50	µg/L	10.0		86.6	70-130				
Benzene	9.72	1.0	µg/L	10.0		97.2	70-130				
Bromobenzene	9.74	1.0	µg/L	10.0		97.4	70-130				
Bromochloromethane	11.0	1.0	µg/L	10.0		110	70-130				
Bromodichloromethane	9.65	0.50	µg/L	10.0		96.5	70-130				
Bromoform	8.74	1.0	µg/L	10.0		87.4	70-130				
Bromomethane	4.84	2.0	µg/L	10.0		48.4	40-160			R-05	†
2-Butanone (MEK)	110	20	µg/L	100		110	40-160				†
tert-Butyl Alcohol (TBA)	104	20	µg/L	100		104	40-160				†
n-Butylbenzene	7.99	1.0	µg/L	10.0		79.9	70-130			V-05	
sec-Butylbenzene	8.54	1.0	µg/L	10.0		85.4	70-130				
tert-Butylbenzene	8.48	1.0	µg/L	10.0		84.8	70-130				
tert-Butyl Ethyl Ether (TBEE)	8.87	0.50	µg/L	10.0		88.7	70-130				
Carbon Disulfide	10.5	5.0	µg/L	10.0		105	70-130			V-36	
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130				
Chlorobenzene	10.0	1.0	µg/L	10.0		100	70-130				
Chlorodibromomethane	10.3	0.50	µg/L	10.0		103	70-130				
Chloroethane	10.5	2.0	µg/L	10.0		105	70-130				
Chloroform	9.92	2.0	µg/L	10.0		99.2	70-130				
Chloromethane	6.93	2.0	µg/L	10.0		69.3	40-160			V-05	†
2-Chlorotoluene	9.65	1.0	µg/L	10.0		96.5	70-130				
4-Chlorotoluene	9.32	1.0	µg/L	10.0		93.2	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	9.31	5.0	µg/L	10.0		93.1	70-130				
1,2-Dibromoethane (EDB)	9.97	0.50	µg/L	10.0		99.7	70-130				
Dibromomethane	11.0	1.0	µg/L	10.0		110	70-130				
1,2-Dichlorobenzene	9.61	1.0	µg/L	10.0		96.1	70-130				
1,3-Dichlorobenzene	9.39	1.0	µg/L	10.0		93.9	70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231691 - SW-846 5030B												
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19								
1,4-Dichlorobenzene	9.27	1.0	µg/L	10.0		92.7		70-130				
trans-1,4-Dichloro-2-butene	8.17	2.0	µg/L	10.0		81.7		70-130			V-05	
Dichlorodifluoromethane (Freon 12)	9.94	2.0	µg/L	10.0		99.4		40-160				†
1,1-Dichloroethane	10.0	1.0	µg/L	10.0		100		70-130				
1,2-Dichloroethane	10.8	1.0	µg/L	10.0		108		70-130				
1,1-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
cis-1,2-Dichloroethylene	9.80	1.0	µg/L	10.0		98.0		70-130				
trans-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
1,2-Dichloropropane	9.92	1.0	µg/L	10.0		99.2		70-130				
1,3-Dichloropropane	9.95	0.50	µg/L	10.0		99.5		70-130				
2,2-Dichloropropane	6.25	1.0	µg/L	10.0		62.5		40-130			V-05	†
1,1-Dichloropropene	9.86	2.0	µg/L	10.0		98.6		70-130				
cis-1,3-Dichloropropene	8.49	0.50	µg/L	10.0		84.9		70-130				
trans-1,3-Dichloropropene	8.18	0.50	µg/L	10.0		81.8		70-130			V-05	
Diethyl Ether	10.9	2.0	µg/L	10.0		109		70-130				
Diisopropyl Ether (DIPE)	9.88	0.50	µg/L	10.0		98.8		70-130				
1,4-Dioxane	125	50	µg/L	100		125		40-130				†
Ethylbenzene	9.66	1.0	µg/L	10.0		96.6		70-130				
Hexachlorobutadiene	9.68	0.60	µg/L	10.0		96.8		70-130				
2-Hexanone (MBK)	107	10	µg/L	100		107		70-160				†
Isopropylbenzene (Cumene)	9.73	1.0	µg/L	10.0		97.3		70-130				
p-Isopropyltoluene (p-Cymene)	8.46	1.0	µg/L	10.0		84.6		70-130				
Methyl Acetate	13.8	1.0	µg/L	10.0		**138**	*	70-130			L-07	
Methyl tert-Butyl Ether (MTBE)	9.69	1.0	µg/L	10.0		96.9		70-130				
Methyl Cyclohexane	10.4	1.0	µg/L	10.0		104		70-130				
Methylene Chloride	10.2	5.0	µg/L	10.0		102		70-130				
4-Methyl-2-pentanone (MIBK)	108	10	µg/L	100		108		70-160				†
Naphthalene	9.65	2.0	µg/L	10.0		96.5		40-130				†
n-Propylbenzene	9.25	1.0	µg/L	10.0		92.5		70-130				
Styrene	9.56	1.0	µg/L	10.0		95.6		70-130				
1,1,1,2-Tetrachloroethane	9.44	1.0	µg/L	10.0		94.4		70-130				
1,1,2,2-Tetrachloroethane	9.96	0.50	µg/L	10.0		99.6		70-130				
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107		70-130				
Tetrahydrofuran	10.6	10	µg/L	10.0		106		70-130				
Toluene	9.91	1.0	µg/L	10.0		99.1		70-130				
1,2,3-Trichlorobenzene	9.67	5.0	µg/L	10.0		96.7		70-130				
1,2,4-Trichlorobenzene	9.16	1.0	µg/L	10.0		91.6		70-130				
1,3,5-Trichlorobenzene	9.17	1.0	µg/L	10.0		91.7		70-130				
1,1,1-Trichloroethane	9.84	1.0	µg/L	10.0		98.4		70-130				
1,1,2-Trichloroethane	10.1	1.0	µg/L	10.0		101		70-130				
Trichloroethylene	10.4	1.0	µg/L	10.0		104		70-130				
Trichlorofluoromethane (Freon 11)	9.98	2.0	µg/L	10.0		99.8		70-130				
1,2,3-Trichloropropane	9.88	2.0	µg/L	10.0		98.8		70-130				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12.0	1.0	µg/L	10.0		120		70-130				
1,2,4-Trimethylbenzene	8.39	1.0	µg/L	10.0		83.9		70-130				
1,3,5-Trimethylbenzene	8.90	1.0	µg/L	10.0		89.0		70-130				
Vinyl Chloride	9.29	2.0	µg/L	10.0		92.9		40-160				†
m+p Xylene	19.2	2.0	µg/L	20.0		96.0		70-130				
o-Xylene	9.54	1.0	µg/L	10.0		95.4		70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.2*		µg/L	25.0		101		70-130				
Surrogate: Toluene-d8	*25.2*		µg/L	25.0		101		70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes	
Batch B231691 - SW-846 5030B												
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		100	70-130					
LCS Dup (B231691-BSD1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Acetone	115	50	µg/L	100		115	70-160	13.9		25		†
Acrylonitrile	10.6	5.0	µg/L	10.0		106	70-130	5.75		25		
tert-Amyl Methyl Ether (TAME)	8.40	0.50	µg/L	10.0		84.0	70-130	3.05		25		
Benzene	9.19	1.0	µg/L	10.0		91.9	70-130	5.61		25		
Bromobenzene	9.48	1.0	µg/L	10.0		94.8	70-130	2.71		25		
Bromochloromethane	10.7	1.0	µg/L	10.0		107	70-130	3.41		25		
Bromodichloromethane	9.35	0.50	µg/L	10.0		93.5	70-130	3.16		25		
Bromoform	8.47	1.0	µg/L	10.0		84.7	70-130	3.14		25		
Bromomethane	6.28	2.0	µg/L	10.0		62.8	40-160	**25.9**	*	25	R-05	†
2-Butanone (MEK)	102	20	µg/L	100		102	40-160	8.36		25		†
tert-Butyl Alcohol (TBA)	94.5	20	µg/L	100		94.5	40-160	9.25		25		†
n-Butylbenzene	8.10	1.0	µg/L	10.0		81.0	70-130	1.37		25	V-05	
sec-Butylbenzene	8.49	1.0	µg/L	10.0		84.9	70-130	0.587		25		
tert-Butylbenzene	8.53	1.0	µg/L	10.0		85.3	70-130	0.588		25		
tert-Butyl Ethyl Ether (TBEE)	8.41	0.50	µg/L	10.0		84.1	70-130	5.32		25		
Carbon Disulfide	9.94	5.0	µg/L	10.0		99.4	70-130	5.48		25	V-36	
Carbon Tetrachloride	9.56	5.0	µg/L	10.0		95.6	70-130	6.87		25		
Chlorobenzene	9.97	1.0	µg/L	10.0		99.7	70-130	0.500		25		
Chlorodibromomethane	9.80	0.50	µg/L	10.0		98.0	70-130	4.59		25		
Chloroethane	9.72	2.0	µg/L	10.0		97.2	70-130	8.00		25		
Chloroform	9.57	2.0	µg/L	10.0		95.7	70-130	3.59		25		
Chloromethane	6.73	2.0	µg/L	10.0		67.3	40-160	2.93		25	V-05	†
2-Chlorotoluene	9.50	1.0	µg/L	10.0		95.0	70-130	1.57		25		
4-Chlorotoluene	9.31	1.0	µg/L	10.0		93.1	70-130	0.107		25		
1,2-Dibromo-3-chloropropane (DBCP)	9.23	5.0	µg/L	10.0		92.3	70-130	0.863		25		
1,2-Dibromoethane (EDB)	9.65	0.50	µg/L	10.0		96.5	70-130	3.26		25		
Dibromomethane	10.6	1.0	µg/L	10.0		106	70-130	4.44		25		
1,2-Dichlorobenzene	9.50	1.0	µg/L	10.0		95.0	70-130	1.15		25		
1,3-Dichlorobenzene	9.40	1.0	µg/L	10.0		94.0	70-130	0.106		25		
1,4-Dichlorobenzene	9.22	1.0	µg/L	10.0		92.2	70-130	0.541		25		
trans-1,4-Dichloro-2-butene	7.88	2.0	µg/L	10.0		78.8	70-130	3.61		25	V-05	
Dichlorodifluoromethane (Freon 12)	9.83	2.0	µg/L	10.0		98.3	40-160	1.11		25		†
1,1-Dichloroethane	9.75	1.0	µg/L	10.0		97.5	70-130	2.73		25		
1,2-Dichloroethane	10.4	1.0	µg/L	10.0		104	70-130	3.58		25		
1,1-Dichloroethylene	10.2	1.0	µg/L	10.0		102	70-130	5.62		25		
cis-1,2-Dichloroethylene	9.24	1.0	µg/L	10.0		92.4	70-130	5.88		25		
trans-1,2-Dichloroethylene	10.2	1.0	µg/L	10.0		102	70-130	5.92		25		
1,2-Dichloropropane	9.99	1.0	µg/L	10.0		99.9	70-130	0.703		25		
1,3-Dichloropropane	9.68	0.50	µg/L	10.0		96.8	70-130	2.75		25		
2,2-Dichloropropane	5.94	1.0	µg/L	10.0		59.4	40-130	5.09		25	V-05	†
1,1-Dichloropropene	9.24	2.0	µg/L	10.0		92.4	70-130	6.49		25		
cis-1,3-Dichloropropene	8.34	0.50	µg/L	10.0		83.4	70-130	1.78		25		
trans-1,3-Dichloropropene	7.90	0.50	µg/L	10.0		79.0	70-130	3.48		25	V-05	
Diethyl Ether	10.6	2.0	µg/L	10.0		106	70-130	2.61		25		
Diisopropyl Ether (DIPE)	9.41	0.50	µg/L	10.0		94.1	70-130	4.87		25		
1,4-Dioxane	118	50	µg/L	100		118	40-130	6.28		50		† ‡
Ethylbenzene	9.45	1.0	µg/L	10.0		94.5	70-130	2.20		25		
Hexachlorobutadiene	9.66	0.60	µg/L	10.0		96.6	70-130	0.207		25		
2-Hexanone (MBK)	100	10	µg/L	100		100	70-160	6.61		25		†

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231691 - SW-846 5030B										
LCS Dup (B231691-BSD1)				Prepared: 05/24/19 Analyzed: 05/25/19						
Isopropylbenzene (Cumene)	9.60	1.0	µg/L	10.0		96.0	70-130	1.35	25	
p-Isopropyltoluene (p-Cymene)	8.37	1.0	µg/L	10.0		83.7	70-130	1.07	25	
Methyl Acetate	13.0	1.0	µg/L	10.0		130	70-130	5.45	25	
Methyl tert-Butyl Ether (MTBE)	9.26	1.0	µg/L	10.0		92.6	70-130	4.54	25	
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107	70-130	3.23	25	
Methylene Chloride	9.90	5.0	µg/L	10.0		99.0	70-130	3.38	25	
4-Methyl-2-pentanone (MIBK)	100	10	µg/L	100		100	70-160	7.99	25	†
Naphthalene	9.51	2.0	µg/L	10.0		95.1	40-130	1.46	25	†
n-Propylbenzene	9.22	1.0	µg/L	10.0		92.2	70-130	0.325	25	
Styrene	9.27	1.0	µg/L	10.0		92.7	70-130	3.08	25	
1,1,1,2-Tetrachloroethane	9.25	1.0	µg/L	10.0		92.5	70-130	2.03	25	
1,1,2,2-Tetrachloroethane	9.68	0.50	µg/L	10.0		96.8	70-130	2.85	25	
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107	70-130	0.374	25	
Tetrahydrofuran	10.1	10	µg/L	10.0		101	70-130	4.72	25	
Toluene	9.51	1.0	µg/L	10.0		95.1	70-130	4.12	25	
1,2,3-Trichlorobenzene	9.97	5.0	µg/L	10.0		99.7	70-130	3.05	25	
1,2,4-Trichlorobenzene	9.47	1.0	µg/L	10.0		94.7	70-130	3.33	25	
1,3,5-Trichlorobenzene	9.08	1.0	µg/L	10.0		90.8	70-130	0.986	25	
1,1,1-Trichloroethane	9.37	1.0	µg/L	10.0		93.7	70-130	4.89	25	
1,1,2-Trichloroethane	9.75	1.0	µg/L	10.0		97.5	70-130	3.82	25	
Trichloroethylene	9.75	1.0	µg/L	10.0		97.5	70-130	6.55	25	
Trichlorofluoromethane (Freon 11)	9.40	2.0	µg/L	10.0		94.0	70-130	5.99	25	
1,2,3-Trichloropropane	9.57	2.0	µg/L	10.0		95.7	70-130	3.19	25	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.8	1.0	µg/L	10.0		118	70-130	1.09	25	
1,2,4-Trimethylbenzene	8.41	1.0	µg/L	10.0		84.1	70-130	0.238	25	
1,3,5-Trimethylbenzene	8.69	1.0	µg/L	10.0		86.9	70-130	2.39	25	
Vinyl Chloride	8.95	2.0	µg/L	10.0		89.5	40-160	3.73	25	†
m+p Xylene	18.9	2.0	µg/L	20.0		94.6	70-130	1.42	25	
o-Xylene	9.42	1.0	µg/L	10.0		94.2	70-130	1.27	25	
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100	70-130			
Surrogate: Toluene-d8	*25.0*		µg/L	25.0		100	70-130			
Surrogate: 4-Bromofluorobenzene	*25.5*		µg/L	25.0		102	70-130			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C										
Blank (B231813-BLK1)				Prepared: 05/28/19 Analyzed: 05/30/19						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	5.0	µg/L							V-05
Anthracene	ND	5.0	µg/L							
Benzidine	ND	20	µg/L							L-05, R-05, V-04, V-05, V-35
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Benzoic Acid	ND	10	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
Carbazole	ND	10	µg/L							
4-Chloroaniline	ND	10	µg/L							V-34
4-Chloro-3-methylphenol	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							V-34
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							
Hexachloroethane	ND	10	µg/L							
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
1-Methylnaphthalene	ND	5.0	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C											
Blank (B231813-BLK1)				Prepared: 05/28/19 Analyzed: 05/30/19							
2-Methylphenol	ND	10	µg/L								
3/4-Methylphenol	ND	10	µg/L								
Naphthalene	ND	5.0	µg/L								
2-Nitroaniline	ND	10	µg/L								
3-Nitroaniline	ND	10	µg/L								
4-Nitroaniline	ND	10	µg/L								
Nitrobenzene	ND	10	µg/L								
2-Nitrophenol	ND	10	µg/L								
4-Nitrophenol	ND	10	µg/L								
N-Nitrosodimethylamine	ND	10	µg/L								
N-Nitrosodiphenylamine/Diphenylamine	ND	10	µg/L								
N-Nitrosodi-n-propylamine	ND	10	µg/L								
Pentachloronitrobenzene	ND	10	µg/L								
Pentachlorophenol	ND	10	µg/L								
Phenanthrene	ND	5.0	µg/L								
Phenol	ND	10	µg/L								
Pyrene	ND	5.0	µg/L								
Pyridine	ND	5.0	µg/L								
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L								
1,2,4-Trichlorobenzene	ND	5.0	µg/L								
2,4,5-Trichlorophenol	ND	10	µg/L								
2,4,6-Trichlorophenol	ND	10	µg/L								
Surrogate: 2-Fluorophenol	*100*		µg/L	200		50.0		15-110			
Surrogate: Phenol-d6	*72.3*		µg/L	200		36.2		15-110			
Surrogate: Nitrobenzene-d5	*67.2*		µg/L	100		67.2		30-130			
Surrogate: 2-Fluorobiphenyl	*85.0*		µg/L	100		85.0		30-130			
Surrogate: 2,4,6-Tribromophenol	*191*		µg/L	200		95.3		15-110			
Surrogate: p-Terphenyl-d14	*98.7*		µg/L	100		98.7		30-130			
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19							
Acenaphthene	40.0	5.0	µg/L	50.0		79.9		40-140			
Acenaphthylene	40.4	5.0	µg/L	50.0		80.8		40-140			
Acetophenone	38.2	10	µg/L	50.0		76.4		40-140			
Aniline	38.0	5.0	µg/L	50.0		76.1		40-140			V-05
Anthracene	43.1	5.0	µg/L	50.0		86.2		40-140			
Benzidine	93.1	20	µg/L	50.0		**186**	*	40-140			L-05, R-05, V-04, V-05, V-35
Benzo(a)anthracene	42.0	5.0	µg/L	50.0		84.0		40-140			
Benzo(a)pyrene	44.9	5.0	µg/L	50.0		89.8		40-140			
Benzo(b)fluoranthene	41.4	5.0	µg/L	50.0		82.7		40-140			
Benzo(g,h,i)perylene	48.0	5.0	µg/L	50.0		96.0		40-140			
Benzo(k)fluoranthene	42.0	5.0	µg/L	50.0		84.0		40-140			
Benzoic Acid	21.7	10	µg/L	50.0		43.4		10-130			†
Bis(2-chloroethoxy)methane	44.7	10	µg/L	50.0		89.4		40-140			
Bis(2-chloroethyl)ether	36.0	10	µg/L	50.0		72.0		40-140			
Bis(2-chloroisopropyl)ether	38.8	10	µg/L	50.0		77.5		40-140			
Bis(2-Ethylhexyl)phthalate	35.4	10	µg/L	50.0		70.8		40-140			
4-Bromophenylphenylether	42.6	10	µg/L	50.0		85.1		40-140			
Butylbenzylphthalate	39.3	10	µg/L	50.0		78.5		40-140			
Carbazole	43.9	10	µg/L	50.0		87.7		40-140			
4-Chloroaniline	43.3	10	µg/L	50.0		86.6		40-140			V-34
4-Chloro-3-methylphenol	41.0	10	µg/L	50.0		82.0		30-130			
2-Chloronaphthalene	38.7	10	µg/L	50.0		77.3		40-140			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231813 - SW-846 3510C											
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19							
2-Chlorophenol	39.9	10	µg/L	50.0		79.8	30-130				
4-Chlorophenylphenylether	43.1	10	µg/L	50.0		86.3	40-140				
Chrysene	41.2	5.0	µg/L	50.0		82.5	40-140				
Dibenz(a,h)anthracene	42.5	5.0	µg/L	50.0		84.9	40-140				
Dibenzofuran	41.1	5.0	µg/L	50.0		82.2	40-140				
Di-n-butylphthalate	38.6	10	µg/L	50.0		77.1	40-140				
1,2-Dichlorobenzene	39.9	5.0	µg/L	50.0		79.7	40-140				
1,3-Dichlorobenzene	39.1	5.0	µg/L	50.0		78.2	40-140				
1,4-Dichlorobenzene	39.8	5.0	µg/L	50.0		79.5	40-140				
3,3-Dichlorobenzidine	51.4	10	µg/L	50.0		103	40-140			V-34	
2,4-Dichlorophenol	44.8	10	µg/L	50.0		89.6	30-130				
Diethylphthalate	39.4	10	µg/L	50.0		78.9	40-140				
2,4-Dimethylphenol	43.3	10	µg/L	50.0		86.6	30-130				
Dimethylphthalate	40.5	10	µg/L	50.0		81.1	40-140				
4,6-Dinitro-2-methylphenol	42.0	10	µg/L	50.0		83.9	30-130				
2,4-Dinitrophenol	39.3	10	µg/L	50.0		78.6	30-130				
2,4-Dinitrotoluene	44.0	10	µg/L	50.0		87.9	40-140				
2,6-Dinitrotoluene	45.8	10	µg/L	50.0		91.6	40-140				
Di-n-octylphthalate	35.7	10	µg/L	50.0		71.4	40-140				
1,2-Diphenylhydrazine/Azobenzene	35.4	10	µg/L	50.0		70.9	40-140				
Fluoranthene	44.8	5.0	µg/L	50.0		89.7	40-140				
Fluorene	42.6	5.0	µg/L	50.0		85.2	40-140				
Hexachlorobenzene	43.2	10	µg/L	50.0		86.3	40-140				
Hexachlorobutadiene	37.2	10	µg/L	50.0		74.5	40-140				
Hexachlorocyclopentadiene	35.5	10	µg/L	50.0		71.0	30-140				†
Hexachloroethane	34.6	10	µg/L	50.0		69.3	40-140				
Indeno(1,2,3-cd)pyrene	46.4	5.0	µg/L	50.0		92.8	40-140				
Isophorone	40.8	10	µg/L	50.0		81.6	40-140				
1-Methylnaphthalene	41.6	5.0	µg/L	50.0		83.2	40-140				
2-Methylnaphthalene	42.9	5.0	µg/L	50.0		85.8	40-140				
2-Methylphenol	38.6	10	µg/L	50.0		77.2	30-130				
3/4-Methylphenol	34.4	10	µg/L	50.0		68.8	30-130				
Naphthalene	40.2	5.0	µg/L	50.0		80.4	40-140				
2-Nitroaniline	32.0	10	µg/L	50.0		64.0	40-140				
3-Nitroaniline	44.2	10	µg/L	50.0		88.4	40-140				
4-Nitroaniline	48.2	10	µg/L	50.0		96.4	40-140				
Nitrobenzene	35.7	10	µg/L	50.0		71.5	40-140				
2-Nitrophenol	41.5	10	µg/L	50.0		83.0	30-130				
4-Nitrophenol	20.4	10	µg/L	50.0		40.8	10-130				†
N-Nitrosodimethylamine	22.0	10	µg/L	50.0		43.9	40-140				
N-Nitrosodiphenylamine/Diphenylamine	44.8	10	µg/L	50.0		89.7	40-140				
N-Nitrosodi-n-propylamine	34.3	10	µg/L	50.0		68.6	40-140				
Pentachloronitrobenzene	45.9	10	µg/L	50.0		91.8	40-140				
Pentachlorophenol	42.0	10	µg/L	50.0		84.0	30-130				
Phenanthrene	43.3	5.0	µg/L	50.0		86.6	40-140				
Phenol	19.6	10	µg/L	50.0		39.3	20-130				†
Pyrene	44.5	5.0	µg/L	50.0		89.0	40-140				
Pyridine	22.4	5.0	µg/L	50.0		44.7	10-140				†
1,2,4,5-Tetrachlorobenzene	38.9	10	µg/L	50.0		77.7	40-140				
1,2,4-Trichlorobenzene	42.1	5.0	µg/L	50.0		84.1	40-140				
2,4,5-Trichlorophenol	44.5	10	µg/L	50.0		89.0	30-130				
2,4,6-Trichlorophenol	41.8	10	µg/L	50.0		83.7	30-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes	
Batch B231813 - SW-846 3510C													
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19									
Surrogate: 2-Fluorophenol	*121*		µg/L	200		60.7		15-110					
Surrogate: Phenol-d6	*86.5*		µg/L	200		43.2		15-110					
Surrogate: Nitrobenzene-d5	*77.8*		µg/L	100		77.8		30-130					
Surrogate: 2-Fluorobiphenyl	*91.5*		µg/L	100		91.5		30-130					
Surrogate: 2,4,6-Tribromophenol	*205*		µg/L	200		103		15-110					
Surrogate: p-Terphenyl-d14	*98.8*		µg/L	100		98.8		30-130					
LCS Dup (B231813-BSD1)				Prepared: 05/28/19 Analyzed: 05/30/19									
Acenaphthene	38.2	5.0	µg/L	50.0		76.5		40-140	4.43		20		
Acenaphthylene	38.8	5.0	µg/L	50.0		77.6		40-140	3.97		20		
Acetophenone	34.2	10	µg/L	50.0		68.5		40-140	10.9		20		
Aniline	34.1	5.0	µg/L	50.0		68.2		40-140	10.9		50	V-05	‡
Anthracene	41.1	5.0	µg/L	50.0		82.3		40-140	4.65		20		
Benzidine	72.8	20	µg/L	50.0		**146**	*	40-140	**24.5**	*	20	L-05, R-05, V-04, V-05, V-35	
Benzo(a)anthracene	39.6	5.0	µg/L	50.0		79.3		40-140	5.83		20		
Benzo(a)pyrene	42.2	5.0	µg/L	50.0		84.4		40-140	6.27		20		
Benzo(b)fluoranthene	39.0	5.0	µg/L	50.0		78.0		40-140	5.92		20		
Benzo(g,h,i)perylene	44.7	5.0	µg/L	50.0		89.4		40-140	7.14		20		
Benzo(k)fluoranthene	39.3	5.0	µg/L	50.0		78.5		40-140	6.72		20		
Benzoic Acid	19.2	10	µg/L	50.0		38.3		10-130	12.3		50		† ‡
Bis(2-chloroethoxy)methane	41.0	10	µg/L	50.0		82.1		40-140	8.49		20		
Bis(2-chloroethyl)ether	34.1	10	µg/L	50.0		68.2		40-140	5.45		20		
Bis(2-chloroisopropyl)ether	35.5	10	µg/L	50.0		71.0		40-140	8.83		20		
Bis(2-Ethylhexyl)phthalate	33.4	10	µg/L	50.0		66.9		40-140	5.69		20		
4-Bromophenylphenylether	40.5	10	µg/L	50.0		81.0		40-140	4.93		20		
Butylbenzylphthalate	36.7	10	µg/L	50.0		73.4		40-140	6.79		20		
Carbazole	41.6	10	µg/L	50.0		83.3		40-140	5.22		20		
4-Chloroaniline	39.6	10	µg/L	50.0		79.1		40-140	9.00		20	V-34	
4-Chloro-3-methylphenol	37.5	10	µg/L	50.0		75.0		30-130	8.94		20		
2-Chloronaphthalene	37.7	10	µg/L	50.0		75.5		40-140	2.43		20		
2-Chlorophenol	36.4	10	µg/L	50.0		72.7		30-130	9.31		20		
4-Chlorophenylphenylether	41.3	10	µg/L	50.0		82.6		40-140	4.38		20		
Chrysene	38.7	5.0	µg/L	50.0		77.4		40-140	6.33		20		
Dibenz(a,h)anthracene	41.8	5.0	µg/L	50.0		83.6		40-140	1.57		20		
Dibenzofuran	39.4	5.0	µg/L	50.0		78.8		40-140	4.25		20		
Di-n-butylphthalate	36.9	10	µg/L	50.0		73.8		40-140	4.43		20		
1,2-Dichlorobenzene	36.0	5.0	µg/L	50.0		71.9		40-140	10.3		20		
1,3-Dichlorobenzene	35.2	5.0	µg/L	50.0		70.4		40-140	10.5		20		
1,4-Dichlorobenzene	35.4	5.0	µg/L	50.0		70.9		40-140	11.5		20		
3,3-Dichlorobenzidine	48.1	10	µg/L	50.0		96.1		40-140	6.70		20	V-34	
2,4-Dichlorophenol	41.4	10	µg/L	50.0		82.7		30-130	7.96		20		
Diethylphthalate	37.2	10	µg/L	50.0		74.5		40-140	5.69		20		
2,4-Dimethylphenol	38.5	10	µg/L	50.0		77.1		30-130	11.7		20		
Dimethylphthalate	38.2	10	µg/L	50.0		76.5		40-140	5.79		50		‡
4,6-Dinitro-2-methylphenol	39.6	10	µg/L	50.0		79.2		30-130	5.81		50		‡
2,4-Dinitrophenol	37.7	10	µg/L	50.0		75.5		30-130	4.08		50		‡
2,4-Dinitrotoluene	42.1	10	µg/L	50.0		84.2		40-140	4.30		20		
2,6-Dinitrotoluene	43.2	10	µg/L	50.0		86.4		40-140	5.87		20		
Di-n-octylphthalate	34.4	10	µg/L	50.0		68.8		40-140	3.74		20		
1,2-Diphenylhydrazine/Azobenzene	33.5	10	µg/L	50.0		66.9		40-140	5.72		20		
Fluoranthene	42.9	5.0	µg/L	50.0		85.7		40-140	4.47		20		
Fluorene	40.4	5.0	µg/L	50.0		80.8		40-140	5.35		20		

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C										
LCS Dup (B231813-BSD1)				Prepared: 05/28/19 Analyzed: 05/30/19						
Hexachlorobenzene	41.1	10	µg/L	50.0		82.3	40-140	4.82	20	
Hexachlorobutadiene	34.1	10	µg/L	50.0		68.3	40-140	8.66	20	
Hexachlorocyclopentadiene	33.1	10	µg/L	50.0		66.1	30-140	7.17	50	† ‡
Hexachloroethane	31.3	10	µg/L	50.0		62.6	40-140	10.1	50	‡
Indeno(1,2,3-cd)pyrene	43.1	5.0	µg/L	50.0		86.2	40-140	7.40	50	‡
Isophorone	38.0	10	µg/L	50.0		76.0	40-140	7.01	20	
1-Methylnaphthalene	38.7	5.0	µg/L	50.0		77.4	40-140	7.30	20	
2-Methylnaphthalene	38.8	5.0	µg/L	50.0		77.5	40-140	10.1	20	
2-Methylphenol	34.4	10	µg/L	50.0		68.8	30-130	11.6	20	
3/4-Methylphenol	30.8	10	µg/L	50.0		61.6	30-130	11.0	20	
Naphthalene	36.3	5.0	µg/L	50.0		72.7	40-140	10.1	20	
2-Nitroaniline	30.8	10	µg/L	50.0		61.6	40-140	3.95	20	
3-Nitroaniline	42.8	10	µg/L	50.0		85.6	40-140	3.31	20	
4-Nitroaniline	45.2	10	µg/L	50.0		90.4	40-140	6.40	20	
Nitrobenzene	32.9	10	µg/L	50.0		65.8	40-140	8.22	20	
2-Nitrophenol	39.8	10	µg/L	50.0		79.6	30-130	4.13	20	
4-Nitrophenol	19.1	10	µg/L	50.0		38.2	10-130	6.43	50	† ‡
N-Nitrosodimethylamine	21.3	10	µg/L	50.0		42.6	40-140	3.10	20	
N-Nitrosodiphenylamine/Diphenylamine	42.7	10	µg/L	50.0		85.4	40-140	4.82	20	
N-Nitrosodi-n-propylamine	30.8	10	µg/L	50.0		61.6	40-140	10.8	20	
Pentachloronitrobenzene	43.6	10	µg/L	50.0		87.2	40-140	5.18	20	
Pentachlorophenol	39.3	10	µg/L	50.0		78.6	30-130	6.57	50	‡
Phenanthrene	41.0	5.0	µg/L	50.0		82.1	40-140	5.41	20	
Phenol	17.4	10	µg/L	50.0		34.9	20-130	11.9	20	†
Pyrene	41.2	5.0	µg/L	50.0		82.5	40-140	7.63	20	
Pyridine	19.4	5.0	µg/L	50.0		38.8	10-140	14.3	50	† ‡
1,2,4,5-Tetrachlorobenzene	36.7	10	µg/L	50.0		73.5	40-140	5.61	20	
1,2,4-Trichlorobenzene	38.4	5.0	µg/L	50.0		76.9	40-140	8.99	20	
2,4,5-Trichlorophenol	43.1	10	µg/L	50.0		86.1	30-130	3.33	20	
2,4,6-Trichlorophenol	40.5	10	µg/L	50.0		81.1	30-130	3.16	50	‡
Surrogate: 2-Fluorophenol	*107*		µg/L	200		53.4	15-110			
Surrogate: Phenol-d6	*76.5*		µg/L	200		38.3	15-110			
Surrogate: Nitrobenzene-d5	*71.0*		µg/L	100		71.0	30-130			
Surrogate: 2-Fluorobiphenyl	*87.4*		µg/L	100		87.4	30-130			
Surrogate: 2,4,6-Tribromophenol	*201*		µg/L	200		100	15-110			
Surrogate: p-Terphenyl-d14	*92.4*		µg/L	100		92.4	30-130			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
Blank (B231811-BLK1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	ND	0.080	µg/L							
alpha-Chlordane [2C]	ND	0.080	µg/L							
gamma-Chlordane	ND	0.080	µg/L							
gamma-Chlordane [2C]	ND	0.080	µg/L							
Alachlor	ND	0.32	µg/L							
Alachlor [2C]	ND	0.32	µg/L							
Aldrin	ND	0.016	µg/L							
Aldrin [2C]	ND	0.016	µg/L							
alpha-BHC	ND	0.080	µg/L							
alpha-BHC [2C]	ND	0.080	µg/L							
beta-BHC	ND	0.080	µg/L							
beta-BHC [2C]	ND	0.080	µg/L							
delta-BHC	ND	0.080	µg/L							
delta-BHC [2C]	ND	0.080	µg/L							
gamma-BHC (Lindane)	ND	0.016	µg/L							
gamma-BHC (Lindane) [2C]	ND	0.016	µg/L							
Chlordane	ND	0.16	µg/L							
Chlordane [2C]	ND	0.16	µg/L							
4,4'-DDD	ND	0.016	µg/L							
4,4'-DDD [2C]	ND	0.016	µg/L							
4,4'-DDE	ND	0.016	µg/L							
4,4'-DDE [2C]	ND	0.016	µg/L							
4,4'-DDT	ND	0.016	µg/L							
4,4'-DDT [2C]	ND	0.016	µg/L							
Dieldrin	ND	0.0016	µg/L							
Dieldrin [2C]	ND	0.0016	µg/L							
Endosulfan I	ND	0.080	µg/L							
Endosulfan I [2C]	ND	0.080	µg/L							
Endosulfan II	ND	0.080	µg/L							
Endosulfan II [2C]	ND	0.080	µg/L							
Endosulfan Sulfate	ND	0.080	µg/L							
Endosulfan Sulfate [2C]	ND	0.080	µg/L							
Endrin	ND	0.080	µg/L							
Endrin [2C]	ND	0.080	µg/L							
Endrin Aldehyde	ND	0.080	µg/L							
Endrin Aldehyde [2C]	ND	0.080	µg/L							
Endrin Ketone	ND	0.080	µg/L							
Endrin Ketone [2C]	ND	0.080	µg/L							
Heptachlor	ND	0.016	µg/L							
Heptachlor [2C]	ND	0.016	µg/L							
Heptachlor Epoxide	ND	0.016	µg/L							
Heptachlor Epoxide [2C]	ND	0.016	µg/L							
Hexachlorobenzene	ND	0.064	µg/L							
Hexachlorobenzene [2C]	ND	0.064	µg/L							
Methoxychlor	ND	0.32	µg/L							
Methoxychlor [2C]	ND	0.32	µg/L							
Toxaphene	ND	0.80	µg/L							
Toxaphene [2C]	ND	0.80	µg/L							
Surrogate: Decachlorobiphenyl	*3.11*		µg/L	3.20		97.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*3.09*		µg/L	3.20		96.5	30-150			
Surrogate: Tetrachloro-m-xylene	*2.83*		µg/L	3.20		88.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.92*		µg/L	3.20		91.1	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
LCS (B231811-BS1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	1.3	0.080	µg/L	1.60		83.7	0-200			
alpha-Chlordane [2C]	1.3	0.080	µg/L	1.60		83.0	0-200			
gamma-Chlordane	1.3	0.080	µg/L	1.60		78.6	0-200			
gamma-Chlordane [2C]	1.4	0.080	µg/L	1.60		84.6	0-200			
Alachlor	1.3	0.32	µg/L	1.60		83.5	40-140			
Alachlor [2C]	1.3	0.32	µg/L	1.60		79.0	40-140			
Aldrin	1.3	0.016	µg/L	1.60		80.6	40-140			
Aldrin [2C]	1.3	0.016	µg/L	1.60		80.7	40-140			
alpha-BHC	1.2	0.080	µg/L	1.60		77.9	40-140			
alpha-BHC [2C]	1.3	0.080	µg/L	1.60		81.6	40-140			
beta-BHC	1.3	0.080	µg/L	1.60		83.8	40-140			
beta-BHC [2C]	1.3	0.080	µg/L	1.60		78.8	40-140			
delta-BHC	1.4	0.080	µg/L	1.60		86.9	40-140			
delta-BHC [2C]	1.4	0.080	µg/L	1.60		85.5	40-140			
gamma-BHC (Lindane)	1.3	0.016	µg/L	1.60		82.4	40-140			
gamma-BHC (Lindane) [2C]	1.3	0.016	µg/L	1.60		84.0	40-140			
4,4'-DDD	1.4	0.016	µg/L	1.60		86.9	40-140			
4,4'-DDD [2C]	1.4	0.016	µg/L	1.60		88.0	40-140			
4,4'-DDE	1.4	0.016	µg/L	1.60		87.4	40-140			
4,4'-DDE [2C]	1.4	0.016	µg/L	1.60		87.0	40-140			
4,4'-DDT	1.4	0.016	µg/L	1.60		86.5	40-140			
4,4'-DDT [2C]	1.4	0.016	µg/L	1.60		86.1	40-140			
Dieldrin	1.4	0.0016	µg/L	1.60		84.7	40-140			
Dieldrin [2C]	1.3	0.0016	µg/L	1.60		83.9	40-140			
Endosulfan I	1.3	0.080	µg/L	1.60		78.9	40-140			
Endosulfan I [2C]	1.3	0.080	µg/L	1.60		79.9	40-140			
Endosulfan II	1.3	0.080	µg/L	1.60		82.8	40-140			
Endosulfan II [2C]	1.3	0.080	µg/L	1.60		82.3	40-140			
Endosulfan Sulfate	1.5	0.080	µg/L	1.60		92.5	40-140			
Endosulfan Sulfate [2C]	1.3	0.080	µg/L	1.60		83.0	40-140			
Endrin	1.3	0.080	µg/L	1.60		84.0	40-140			
Endrin [2C]	1.3	0.080	µg/L	1.60		81.8	40-140			
Endrin Aldehyde	1.2	0.080	µg/L	1.60		71.9	40-140			
Endrin Aldehyde [2C]	1.3	0.080	µg/L	1.60		79.9	40-140			
Endrin Ketone	1.4	0.080	µg/L	1.60		89.8	40-140			
Endrin Ketone [2C]	1.4	0.080	µg/L	1.60		85.7	40-140			
Heptachlor	1.2	0.016	µg/L	1.60		77.7	40-140			
Heptachlor [2C]	1.3	0.016	µg/L	1.60		78.9	40-140			
Heptachlor Epoxide	1.3	0.016	µg/L	1.60		81.0	40-140			
Heptachlor Epoxide [2C]	1.3	0.016	µg/L	1.60		79.7	40-140			
Hexachlorobenzene	1.4	0.064	µg/L	1.60		86.3	40-140			
Hexachlorobenzene [2C]	1.3	0.064	µg/L	1.60		80.3	40-140			
Methoxychlor	1.4	0.32	µg/L	1.60		84.9	40-140			
Methoxychlor [2C]	1.4	0.32	µg/L	1.60		86.3	40-140			
Surrogate: Decachlorobiphenyl	*2.83*		µg/L	3.20		88.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.76*		µg/L	3.20		86.2	30-150			
Surrogate: Tetrachloro-m-xylene	*2.61*		µg/L	3.20		81.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.65*		µg/L	3.20		82.8	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
LCS Dup (B231811-BSD1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	1.4	0.080	µg/L	1.60		88.1	0-200	5.08		
alpha-Chlordane [2C]	1.4	0.080	µg/L	1.60		87.0	0-200	4.70		
gamma-Chlordane	1.3	0.080	µg/L	1.60		83.4	0-200	5.94		
gamma-Chlordane [2C]	1.4	0.016	µg/L	1.60		89.3	0-200	5.34		
Alachlor	1.4	0.32	µg/L	1.60		84.9	40-140	1.68	20	
Alachlor [2C]	1.3	0.32	µg/L	1.60		81.4	40-140	2.98	20	
Aldrin	1.4	0.016	µg/L	1.60		84.8	40-140	5.01	20	
Aldrin [2C]	1.3	0.016	µg/L	1.60		84.3	40-140	4.30	20	
alpha-BHC	1.3	0.080	µg/L	1.60		81.4	40-140	4.38	20	
alpha-BHC [2C]	1.4	0.080	µg/L	1.60		86.5	40-140	5.78	20	
beta-BHC	1.4	0.080	µg/L	1.60		89.0	40-140	5.97	20	
beta-BHC [2C]	1.3	0.080	µg/L	1.60		83.2	40-140	5.51	20	
delta-BHC	1.5	0.080	µg/L	1.60		92.4	40-140	6.18	20	
delta-BHC [2C]	1.4	0.080	µg/L	1.60		90.4	40-140	5.53	20	
gamma-BHC (Lindane)	1.4	0.016	µg/L	1.60		86.5	40-140	4.90	20	
gamma-BHC (Lindane) [2C]	1.4	0.016	µg/L	1.60		88.5	40-140	5.23	20	
4,4'-DDD	1.5	0.016	µg/L	1.60		90.8	40-140	4.41	20	
4,4'-DDD [2C]	1.5	0.016	µg/L	1.60		90.8	40-140	3.11	20	
4,4'-DDE	1.5	0.016	µg/L	1.60		91.5	40-140	4.52	20	
4,4'-DDE [2C]	1.5	0.016	µg/L	1.60		91.1	40-140	4.56	20	
4,4'-DDT	1.4	0.016	µg/L	1.60		89.9	40-140	3.85	20	
4,4'-DDT [2C]	1.4	0.016	µg/L	1.60		89.0	40-140	3.22	20	
Dieldrin	1.4	0.0016	µg/L	1.60		88.4	40-140	4.31	20	
Dieldrin [2C]	1.4	0.0016	µg/L	1.60		86.8	40-140	3.43	20	
Endosulfan I	1.3	0.080	µg/L	1.60		82.5	40-140	4.50	20	
Endosulfan I [2C]	1.3	0.080	µg/L	1.60		82.8	40-140	3.47	20	
Endosulfan II	1.4	0.080	µg/L	1.60		86.2	40-140	4.02	20	
Endosulfan II [2C]	1.4	0.080	µg/L	1.60		84.7	40-140	2.81	20	
Endosulfan Sulfate	1.5	0.080	µg/L	1.60		96.6	40-140	4.38	20	
Endosulfan Sulfate [2C]	1.4	0.080	µg/L	1.60		85.9	40-140	3.42	20	
Endrin	1.4	0.080	µg/L	1.60		87.8	40-140	4.37	20	
Endrin [2C]	1.4	0.080	µg/L	1.60		84.5	40-140	3.34	20	
Endrin Aldehyde	1.2	0.080	µg/L	1.60		75.1	40-140	4.36	20	
Endrin Aldehyde [2C]	1.3	0.080	µg/L	1.60		82.4	40-140	3.07	20	
Endrin Ketone	1.5	0.080	µg/L	1.60		93.5	40-140	4.02	20	
Endrin Ketone [2C]	1.4	0.080	µg/L	1.60		89.0	40-140	3.73	20	
Heptachlor	1.3	0.016	µg/L	1.60		81.6	40-140	4.91	20	
Heptachlor [2C]	1.3	0.016	µg/L	1.60		82.2	40-140	4.12	20	
Heptachlor Epoxide	1.4	0.016	µg/L	1.60		84.7	40-140	4.57	20	
Heptachlor Epoxide [2C]	1.3	0.016	µg/L	1.60		82.7	40-140	3.71	20	
Hexachlorobenzene	1.4	0.064	µg/L	1.60		89.4	40-140	3.56	20	
Hexachlorobenzene [2C]	1.3	0.064	µg/L	1.60		83.6	40-140	3.96	20	
Methoxychlor	1.4	0.32	µg/L	1.60		87.9	40-140	3.51	20	
Methoxychlor [2C]	1.4	0.32	µg/L	1.60		88.7	40-140	2.71	20	
Surrogate: Decachlorobiphenyl	*2.98*		µg/L	3.20		93.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.97*		µg/L	3.20		92.7	30-150			
Surrogate: Tetrachloro-m-xylene	*2.77*		µg/L	3.20		86.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.86*		µg/L	3.20		89.3	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231543 - SW-846 3510C										
Blank (B231543-BLK1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	ND	0.50	µg/L							
2,4-D [2C]	ND	0.50	µg/L							
2,4-DB	ND	0.50	µg/L							
2,4-DB [2C]	ND	0.50	µg/L							
2,4,5-TP (Silvex)	ND	0.050	µg/L							
2,4,5-TP (Silvex) [2C]	ND	0.050	µg/L							
2,4,5-T	ND	0.10	µg/L							
2,4,5-T [2C]	ND	0.10	µg/L							
Dalapon	ND	1.2	µg/L							
Dalapon [2C]	ND	1.2	µg/L							
Dicamba	ND	0.050	µg/L							
Dicamba [2C]	ND	0.050	µg/L							
Dichloroprop	ND	0.50	µg/L							
Dichloroprop [2C]	ND	0.50	µg/L							
Dinoseb	ND	0.25	µg/L							
Dinoseb [2C]	ND	0.25	µg/L							
MCPA	ND	50	µg/L							
MCPA [2C]	ND	50	µg/L							
MCPP	ND	50	µg/L							
MCPP [2C]	ND	50	µg/L							
Surrogate: 2,4-Dichlorophenylacetic acid	*1.86*		µg/L	2.00		93.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.93*		µg/L	2.00		96.3	30-150			
LCS (B231543-BS1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	2.53	0.50	µg/L	2.50		101	40-140			
2,4-D [2C]	2.46	0.50	µg/L	2.50		98.4	40-140			
2,4-DB	2.93	0.50	µg/L	2.50		117	40-140			
2,4-DB [2C]	2.73	0.50	µg/L	2.50		109	40-140			
2,4,5-TP (Silvex)	0.260	0.050	µg/L	0.250		104	40-140			
2,4,5-TP (Silvex) [2C]	0.238	0.050	µg/L	0.250		95.1	40-140			
2,4,5-T	0.258	0.10	µg/L	0.250		103	40-140			
2,4,5-T [2C]	0.248	0.10	µg/L	0.250		99.3	40-140			
Dalapon	4.93	1.2	µg/L	6.25		78.8	40-140			
Dalapon [2C]	4.78	1.2	µg/L	6.25		76.5	40-140			
Dicamba	0.225	0.050	µg/L	0.250		90.0	40-140			
Dicamba [2C]	0.234	0.050	µg/L	0.250		93.4	40-140			
Dichloroprop	2.62	0.50	µg/L	2.50		105	40-140			
Dichloroprop [2C]	2.49	0.50	µg/L	2.50		99.6	40-140			
Dinoseb	1.04	0.25	µg/L	1.25		83.3	10-140			
Dinoseb [2C]	0.933	0.25	µg/L	1.25		74.7	10-140			V-06
MCPA	238	50	µg/L	250		95.1	40-140			
MCPA [2C]	217	50	µg/L	250		87.0	40-140			
MCPP	257	50	µg/L	250		103	40-140			
MCPP [2C]	221	50	µg/L	250		88.3	40-140			
Surrogate: 2,4-Dichlorophenylacetic acid	*2.04*		µg/L	2.00		102	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.95*		µg/L	2.00		97.5	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231543 - SW-846 3510C										
LCS Dup (B231543-BSD1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	2.28	0.50	µg/L	2.50		91.3	40-140	10.5	20	
2,4-D [2C]	2.20	0.50	µg/L	2.50		88.0	40-140	11.1	20	
2,4-DB	2.58	0.50	µg/L	2.50		103	40-140	12.7	20	
2,4-DB [2C]	2.43	0.50	µg/L	2.50		97.2	40-140	11.8	20	
2,4,5-TP (Silvex)	0.250	0.050	µg/L	0.250		100	40-140	3.92	20	
2,4,5-TP (Silvex) [2C]	0.215	0.050	µg/L	0.250		86.2	40-140	9.83	20	
2,4,5-T	0.228	0.10	µg/L	0.250		91.2	40-140	12.5	20	
2,4,5-T [2C]	0.221	0.10	µg/L	0.250		88.4	40-140	11.6	20	
Dalapon	4.58	1.2	µg/L	6.25		73.2	40-140	7.36	20	
Dalapon [2C]	4.39	1.2	µg/L	6.25		70.3	40-140	8.45	20	
Dicamba	0.213	0.050	µg/L	0.250		85.3	40-140	5.29	20	
Dicamba [2C]	0.212	0.050	µg/L	0.250		84.9	40-140	9.53	20	
Dichloroprop	2.37	0.50	µg/L	2.50		95.0	40-140	9.87	20	
Dichloroprop [2C]	2.24	0.50	µg/L	2.50		89.5	40-140	10.7	20	
Dinoseb	1.03	0.25	µg/L	1.25		82.3	10-140	1.24	20	
Dinoseb [2C]	0.870	0.25	µg/L	1.25		69.6	10-140	7.01	20	V-06
MCPA	201	50	µg/L	250		80.4	40-140	16.9	20	
MCPA [2C]	203	50	µg/L	250		81.3	40-140	6.70	20	
MCPP	240	50	µg/L	250		95.9	40-140	7.06	20	
MCPP [2C]	207	50	µg/L	250		82.8	40-140	6.48	20	
Surrogate: 2,4-Dichlorophenylacetic acid	*1.80*		µg/L	2.00		90.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.81*		µg/L	2.00		90.6	30-150			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231628 - SW-846 7470A Prep										
Blank (B231628-BLK1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	ND	0.00010	mg/L							
LCS (B231628-BS1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	0.00395	0.00010	mg/L	0.00400		98.7	80-120			
LCS Dup (B231628-BSD1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	0.00395	0.00010	mg/L	0.00400		98.7	80-120	0.0962	20	
Batch B232189 - SW-846 3005A										
Blank (B232189-BLK1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	ND	0.010	mg/L							
Barium	ND	0.050	mg/L							
Chromium	ND	0.010	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
Zinc	ND	0.020	mg/L							
LCS (B232189-BS1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	0.499	0.010	mg/L	0.500		99.9	80-120			
Barium	0.504	0.050	mg/L	0.500		101	80-120			
Chromium	0.503	0.010	mg/L	0.500		101	80-120			
Iron	4.03	0.050	mg/L	4.00		101	80-120			
Lead	0.507	0.010	mg/L	0.500		101	80-120			
Zinc	1.04	0.020	mg/L	1.00		104	80-120			
LCS Dup (B232189-BSD1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	0.487	0.010	mg/L	0.500		97.4	80-120	2.54	20	
Barium	0.501	0.050	mg/L	0.500		100	80-120	0.455	20	
Chromium	0.501	0.010	mg/L	0.500		100	80-120	0.364	20	
Iron	4.00	0.050	mg/L	4.00		100	80-120	0.697	20	
Lead	0.501	0.010	mg/L	0.500		100	80-120	1.36	20	
Zinc	1.01	0.020	mg/L	1.00		101	80-120	3.34	20	
Batch B232424 - SW-846 3015A										
Blank (B232424-BLK1)				Prepared & Analyzed: 06/04/19						
Sodium	ND	2.2	mg/L							
LCS (B232424-BS1)				Prepared & Analyzed: 06/04/19						
Sodium	4.11	2.2	mg/L	4.44		92.4	80-120			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232424 - SW-846 3015A										
LCS Dup (B232424-BSD1)				Prepared & Analyzed: 06/04/19						
Sodium	4.07	2.2	mg/L	4.44		91.7	80-120	0.827	20	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231762 - SM 21-22 4500 P E										
Blank (B231762-BLK1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	ND	0.050	mg/L							
LCS (B231762-BS1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.20	0.050	mg/L	0.205		99.0	90-128			
LCS Dup (B231762-BSD1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.22	0.050	mg/L	0.205		106	90-128	6.41	16.2	
Duplicate (B231762-DUP1)	**Source: 19E1264-03**			Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.050	0.050	mg/L		ND			NC	44.2	
Matrix Spike (B231762-MS1)	**Source: 19E1264-03**			Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.32	0.050	mg/L	0.300	ND	108	26-170			
Batch B231851 - ASTM D516-11										
Blank (B231851-BLK1)				Prepared & Analyzed: 05/28/19						
Sulfate	ND	2.0	mg/L							
LCS (B231851-BS1)				Prepared & Analyzed: 05/28/19						
Sulfate	20	2.0	mg/L	20.0		98.4	83.1-111			
LCS Dup (B231851-BSD1)				Prepared & Analyzed: 05/28/19						
Sulfate	20	2.0	mg/L	20.0		98.0	83.1-111	0.458	10.9	
Batch B232034 - SM19-22 4500 NH3 C										
Blank (B232034-BLK1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B232034-BS1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110			
LCS Dup (B232034-BSD1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110	0.00	13.2	
Batch B232197 - SM21-22 2320B										
Blank (B232197-BLK1)				Prepared & Analyzed: 05/31/19						
Alkalinity	ND	1.0	mg/L							

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232197 - SM21-22 2320B										
LCS (B232197-BS1)				Prepared & Analyzed: 05/31/19						
Alkalinity	44	1.0	mg/L	44.4		98.4	85.8-110			
LCS Dup (B232197-BSD1)				Prepared & Analyzed: 05/31/19						
Alkalinity	44	1.0	mg/L	44.4		98.4	85.8-110	0.00	7.92	
Batch B232246 - SM 5310B										
Blank (B232246-BLK1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	ND	1.0	mg/L							
LCS (B232246-BS1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	10.1	1.0	mg/L	10.0		101	83.4-116			
LCS Dup (B232246-BSD1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	10.1	1.0	mg/L	10.0		101	83.4-116	0.683	9.95	
Batch B232285 - SM19-22 4500 NH3 C										
Blank (B232285-BLK1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B232285-BS1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	4.8	0.30	mg/L	5.00		95.8	85.2-110			
LCS Dup (B232285-BSD1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110	5.28	13.2	
Batch B232845 - SM21-22 4500 CL B										
Blank (B232845-BLK1)				Prepared & Analyzed: 06/07/19						
Chloride	ND	1.0	mg/L							
LCS (B232845-BS1)				Prepared & Analyzed: 06/07/19						
Chloride	10	1.0	mg/L	11.1		94.6	85.2-112			
LCS Dup (B232845-BSD1)				Prepared & Analyzed: 06/07/19						
Chloride	10	1.0	mg/L	11.1		94.6	85.2-112	0.00	8.24	
Duplicate (B232845-DUP1)	**Source: 19E1264-03**			Prepared & Analyzed: 06/07/19						
Chloride	50	5.0	mg/L		51			2.47	12.3	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232845 - SM21-22 4500 CL B										
Matrix Spike (B232845-MS1)	**Source: 19E1264-03**			Prepared & Analyzed: 06/07/19						
Chloride	100	5.0	mg/L	50.0	51	99.9	74.2-129			

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231560 - SM21-22 2540C										
Blank (B231560-BLK1)				Prepared & Analyzed: 05/23/19						
Total Dissolved Solids	ND	10	mg/L							
LCS (B231560-BS1)				Prepared & Analyzed: 05/23/19						
Total Dissolved Solids	280	10	mg/L	293		97.3	59.4-118			

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BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM1** **Analyzed:** **06/04/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	0.77
Endrin [1]	2.49

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	0.81
Endrin [2]	2.48

BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM2** **Analyzed:** **06/04/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.07
Endrin [1]	2.35

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	1.07
Endrin [2]	2.39

BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM3** **Analyzed:** **06/05/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.83
Endrin [1]	2.04

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BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM3	Analyzed:	06/05/2019

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	1.84
Endrin [2]	2.10

BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM4	Analyzed:	06/05/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.16
Endrin [1]	2.03

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.17
Endrin [2]	2.06

BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM5	Analyzed:	06/06/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.48
Endrin [1]	2.26

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.50
Endrin [2]	2.38

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS

Lab Sample ID: B231543-BS1 Date(s) Analyzed: 05/24/2019 05/24/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	14.703	0.000	0.000	0.258	
	2	14.771	0.000	0.000	0.248	4.7
2,4,5-TP (Silvex)	1	14.102	0.000	0.000	0.260	
	2	13.953	0.000	0.000	0.238	8.8
2,4-D	1	12.358	0.000	0.000	2.53	
	2	12.291	0.000	0.000	2.46	1.6
2,4-DB	1	15.863	0.000	0.000	2.93	
	2	15.862	0.000	0.000	2.73	6.0
Dalapon	1	4.067	0.000	0.000	4.93	
	2	3.725	0.000	0.000	4.78	2.5
Dicamba	1	10.389	0.000	0.000	0.225	
	2	10.226	0.000	0.000	0.234	1.7
Dichloroprop	1	11.881	0.000	0.000	2.62	
	2	11.653	0.000	0.000	2.49	4.3
Dinoseb	1	17.175	0.000	0.000	1.04	
	2	16.464	0.000	0.000	0.933	6.9
MCPA	1	11.157	0.000	0.000	238	
	2	11.014	0.000	0.000	217	10.1
MCPP	1	10.854	0.000	0.000	257	
	2	10.555	0.000	0.000	221	16.2

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS Dup

Lab Sample ID: B231543-BSD1 Date(s) Analyzed: 05/24/2019 05/24/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	14.704	0.000	0.000	0.228	
	2	14.771	0.000	0.000	0.221	4.0
2,4,5-TP (Silvex)	1	14.104	0.000	0.000	0.250	
	2	13.954	0.000	0.000	0.215	15.1
2,4-D	1	12.358	0.000	0.000	2.28	
	2	12.292	0.000	0.000	2.20	4.4
2,4-DB	1	15.865	0.000	0.000	2.58	
	2	15.863	0.000	0.000	2.43	6.8
Dalapon	1	4.066	0.000	0.000	4.58	
	2	3.725	0.000	0.000	4.39	4.7
Dicamba	1	10.390	0.000	0.000	0.213	
	2	10.226	0.000	0.000	0.212	0.9
Dichloroprop	1	11.881	0.000	0.000	2.37	
	2	11.653	0.000	0.000	2.24	6.9
Dinoseb	1	17.175	0.000	0.000	1.03	
	2	16.462	0.000	0.000	0.870	13.9
MCPA	1	11.155	0.000	0.000	201	
	2	11.012	0.000	0.000	203	1.5
MCPP	1	10.852	0.000	0.000	240	
	2	10.554	0.000	0.000	207	14.8

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B231811-BS1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.381	7.353	7.413	1.4	
	2	7.392	7.363	7.423	1.4	0.0
4,4'-DDE	1	6.934	6.906	6.966	1.4	
	2	6.955	6.927	6.987	1.4	0.0
4,4'-DDT	1	7.596	7.567	7.627	1.4	
	2	7.634	7.605	7.665	1.4	0.0
Alachlor	1	6.361	6.333	6.393	1.3	
	2	6.120	6.092	6.152	1.3	0.0
Aldrin	1	6.267	6.239	6.299	1.3	
	2	6.188	6.160	6.220	1.3	0.0
alpha-BHC	1	5.538	5.510	5.570	1.2	
	2	5.466	5.438	5.498	1.3	0.0
alpha-Chlordane	1	6.880	6.852	6.912	1.3	
	2	6.827	6.799	6.859	1.3	0.0
beta-BHC	1	5.798	5.770	5.830	1.3	
	2	5.741	5.712	5.772	1.3	0.0
delta-BHC	1	5.918	5.889	5.949	1.4	
	2	5.932	5.903	5.963	1.4	0.0
Dieldrin	1	7.158	7.130	7.190	1.4	
	2	7.070	7.041	7.101	1.3	7.4
Endosulfan I	1	6.981	6.953	7.013	1.3	
	2	6.867	6.840	6.900	1.3	0.0
Endosulfan II	1	7.503	7.475	7.535	1.3	
	2	7.460	7.432	7.492	1.3	0.0
Endosulfan Sulfate	1	8.145	8.117	8.177	1.5	
	2	7.937	7.910	7.970	1.3	14.3
Endrin	1	7.333	7.304	7.364	1.3	
	2	7.297	7.269	7.329	1.3	0.0
Endrin Aldehyde	1	7.826	7.798	7.858	1.2	
	2	7.723	7.695	7.755	1.3	8.0
Endrin Ketone	1	8.329	8.301	8.361	1.4	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B231811-BS1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	8.306	8.276	8.336	1.4	0.0
gamma-BHC (Lindane)	1	5.743	5.714	5.774	1.3	
	2	5.688	5.660	5.720	1.3	0.0
gamma-Chlordane	1	6.784	6.755	6.815	1.3	
	2	6.721	6.693	6.753	1.4	7.4
Heptachlor	1	6.060	6.032	6.092	1.2	
	2	5.973	5.944	6.004	1.3	8.0
Heptachlor Epoxide	1	6.694	6.666	6.726	1.3	
	2	6.586	6.558	6.618	1.3	0.0
Hexachlorobenzene	1	5.429	5.401	5.461	1.4	
	2	5.379	5.351	5.411	1.3	7.4
Methoxychlor	1	7.972	7.944	8.004	1.4	
	2	8.159	8.130	8.190	1.4	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B231811-BSD1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.382	7.353	7.413	1.5	
	2	7.393	7.363	7.423	1.5	0.0
4,4'-DDE	1	6.935	6.906	6.966	1.5	
	2	6.956	6.927	6.987	1.5	0.0
4,4'-DDT	1	7.597	7.567	7.627	1.4	
	2	7.635	7.605	7.665	1.4	0.0
Alachlor	1	6.361	6.333	6.393	1.4	
	2	6.121	6.092	6.152	1.3	7.4
Aldrin	1	6.268	6.239	6.299	1.4	
	2	6.190	6.160	6.220	1.3	7.4
alpha-BHC	1	5.539	5.510	5.570	1.3	
	2	5.468	5.438	5.498	1.4	7.4
alpha-Chlordane	1	6.881	6.852	6.912	1.4	
	2	6.829	6.799	6.859	1.4	0.0
beta-BHC	1	5.799	5.770	5.830	1.4	
	2	5.742	5.712	5.772	1.3	7.4
delta-BHC	1	5.918	5.889	5.949	1.5	
	2	5.933	5.903	5.963	1.4	6.9
Dieldrin	1	7.159	7.130	7.190	1.4	
	2	7.071	7.041	7.101	1.4	0.0
Endosulfan I	1	6.982	6.953	7.013	1.3	
	2	6.868	6.840	6.900	1.3	0.0
Endosulfan II	1	7.505	7.475	7.535	1.4	
	2	7.461	7.432	7.492	1.4	0.0
Endosulfan Sulfate	1	8.146	8.117	8.177	1.5	
	2	7.939	7.910	7.970	1.4	13.3
Endrin	1	7.333	7.304	7.364	1.4	
	2	7.299	7.269	7.329	1.4	0.0
Endrin Aldehyde	1	7.827	7.798	7.858	1.2	
	2	7.724	7.695	7.755	1.3	8.0
Endrin Ketone	1	8.330	8.301	8.361	1.5	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B231811-BSD1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	8.306	8.276	8.336	1.4	6.9
gamma-BHC (Lindane)	1	5.744	5.714	5.774	1.4	
	2	5.689	5.660	5.720	1.4	0.0
gamma-Chlordane	1	6.785	6.755	6.815	1.3	
	2	6.723	6.693	6.753	1.4	7.4
Heptachlor	1	6.061	6.032	6.092	1.3	
	2	5.973	5.944	6.004	1.3	0.0
Heptachlor Epoxide	1	6.695	6.666	6.726	1.4	
	2	6.588	6.558	6.618	1.3	7.4
Hexachlorobenzene	1	5.430	5.401	5.461	1.4	
	2	5.380	5.351	5.411	1.3	7.4
Methoxychlor	1	7.973	7.944	8.004	1.4	
	2	8.160	8.130	8.190	1.4	0.0

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-02	Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.
L-05	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the high side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.
V-36	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
ASTM D516-11 in Water	
Sulfate	NY,NH,MA,CT,RI,VA,NC
SM 21-22 4500 P E in Water	
Phosphorus, Total	CT,MA,NH,NY,RI,NC,ME,VA
SM 5310B in Water	
Total Organic Carbon	CT,NH,NY,RI,NC,MA,VA
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 2320B in Water	
Alkalinity	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 4500 CL B in Water	
Chloride	NH,CT,MA,NY,RI,NC,ME,VA
SW-846 6010 in Water	
Hardness	CT,MA,NH,NY
SW-846 6010D in Water	
Arsenic	CT,NH,NY,ME,VA,RI,NC
Barium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Sodium	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8081B in Water	
Alachlor	NC
Alachlor [2C]	NC
Aldrin	CT,NH,NY,ME,NC,VA
Aldrin [2C]	CT,NH,NY,ME,NC,VA
alpha-BHC	CT,NH,NY,ME,NC,VA
alpha-BHC [2C]	CT,NH,NY,ME,NC,VA
beta-BHC	CT,NH,NY,ME,NC,VA
beta-BHC [2C]	CT,NH,NY,ME,NC,VA
delta-BHC	CT,NH,NY,ME,NC,VA
delta-BHC [2C]	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane)	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane) [2C]	CT,NH,NY,ME,NC,VA
Chlordane	CT,NH,NY,ME,NC,VA
Chlordane [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDD	CT,NH,NY,ME,NC,VA
4,4'-DDD [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDE	CT,NH,NY,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Water	
4,4'-DDE [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDT	CT,NH,NY,ME,NC,VA
4,4'-DDT [2C]	CT,NH,NY,ME,NC,VA
Dieldrin	CT,NH,NY,ME,NC,VA
Dieldrin [2C]	CT,NH,NY,ME,NC,VA
Endosulfan I	CT,NH,NY,ME,NC,VA
Endosulfan I [2C]	CT,NH,NY,ME,NC,VA
Endosulfan II	CT,NH,NY,ME,NC,VA
Endosulfan II [2C]	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate [2C]	CT,NH,NY,ME,NC,VA
Endrin	CT,NH,NY,ME,NC,VA
Endrin [2C]	CT,NH,NY,ME,NC,VA
Endrin Aldehyde	CT,NH,NY,ME,NC,VA
Endrin Aldehyde [2C]	CT,NH,NY,ME,NC,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NH,NY,ME,NC,VA
Heptachlor [2C]	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide [2C]	CT,NH,NY,ME,NC,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NH,NY,ME,NC,VA
Methoxychlor [2C]	CT,NH,NY,ME,NC,VA
Toxaphene	CT,NH,NY,ME,NC,VA
Toxaphene [2C]	CT,NH,NY,ME,NC,VA
SW-846 8151A in Water	
2,4-D	ME,NC,NH,CT,NY,VA
2,4-D [2C]	ME,NC,NH,CT,NY,VA
2,4-DB	ME,NC,NH,CT,NY,VA
2,4-DB [2C]	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex)	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex) [2C]	ME,NC,NH,CT,NY,VA
2,4,5-T	ME,NC,NH,CT,NY,VA
2,4,5-T [2C]	ME,NC,NH,CT,NY,VA
Dalapon	ME,NC,NH,CT,NY,VA
Dalapon [2C]	ME,NC,NH,CT,NY,VA
Dicamba	ME,NC,NH,CT,NY,VA
Dicamba [2C]	ME,NC,NH,CT,NY,VA
Dichloroprop	ME,NC,NH,CT,NY,VA
Dichloroprop [2C]	ME,NC,NH,CT,NY,VA
Dinoseb	ME,NC,NH,CT,NY,VA
Dinoseb [2C]	ME,NC,NH,CT,NY,VA
MCPA	NC,CT
MCPA [2C]	NC,CT

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8151A in Water	
MCPP	NC,CT
MCPP [2C]	NC,CT
SW-846 8260C in Water	
Acetone	CT,ME,NH,VA,NY
Acrylonitrile	CT,ME,NH,VA,NY
tert-Amyl Methyl Ether (TAME)	ME,NH,VA,NY
Benzene	CT,ME,NH,VA,NY
Bromobenzene	NY
Bromochloromethane	ME,NH,VA,NY
Bromodichloromethane	CT,ME,NH,VA,NY
Bromoform	CT,ME,NH,VA,NY
Bromomethane	CT,ME,NH,VA,NY
2-Butanone (MEK)	CT,ME,NH,VA,NY
tert-Butyl Alcohol (TBA)	ME,NH,VA,NY
n-Butylbenzene	ME,VA,NY
sec-Butylbenzene	ME,VA,NY
tert-Butylbenzene	ME,VA,NY
tert-Butyl Ethyl Ether (TBEE)	ME,NH,VA,NY
Carbon Disulfide	CT,ME,NH,VA,NY
Carbon Tetrachloride	CT,ME,NH,VA,NY
Chlorobenzene	CT,ME,NH,VA,NY
Chlorodibromomethane	CT,ME,NH,VA,NY
Chloroethane	CT,ME,NH,VA,NY
Chloroform	CT,ME,NH,VA,NY
Chloromethane	CT,ME,NH,VA,NY
2-Chlorotoluene	ME,NH,VA,NY
4-Chlorotoluene	ME,NH,VA,NY
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	ME,NH,VA,NY
1,2-Dichlorobenzene	CT,ME,NH,VA,NY
1,3-Dichlorobenzene	CT,ME,NH,VA,NY
1,4-Dichlorobenzene	CT,ME,NH,VA,NY
trans-1,4-Dichloro-2-butene	ME,NH,VA,NY
Dichlorodifluoromethane (Freon 12)	ME,NH,VA,NY
1,1-Dichloroethane	CT,ME,NH,VA,NY
1,2-Dichloroethane	CT,ME,NH,VA,NY
1,1-Dichloroethylene	CT,ME,NH,VA,NY
cis-1,2-Dichloroethylene	ME,NY
trans-1,2-Dichloroethylene	CT,ME,NH,VA,NY
1,2-Dichloropropane	CT,ME,NH,VA,NY
1,3-Dichloropropane	ME,VA,NY
2,2-Dichloropropane	ME,NH,VA,NY
1,1-Dichloropropene	ME,NH,VA,NY
cis-1,3-Dichloropropene	CT,ME,NH,VA,NY
trans-1,3-Dichloropropene	CT,ME,NH,VA,NY

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8260C in Water	
Diethyl Ether	NY
Diisopropyl Ether (DIPE)	ME,NH,VA,NY
1,4-Dioxane	NY
Ethylbenzene	CT,ME,NH,VA,NY
Hexachlorobutadiene	CT,ME,NH,VA,NY
2-Hexanone (MBK)	CT,ME,NH,VA,NY
Isopropylbenzene (Cumene)	ME,VA,NY
p-Isopropyltoluene (p-Cymene)	CT,ME,NH,VA,NY
Methyl Acetate	NY
Methyl tert-Butyl Ether (MTBE)	CT,ME,NH,VA,NY
Methyl Cyclohexane	NY
Methylene Chloride	CT,ME,NH,VA,NY
4-Methyl-2-pentanone (MIBK)	CT,ME,NH,VA,NY
Naphthalene	ME,NH,VA,NY
n-Propylbenzene	CT,ME,NH,VA,NY
Styrene	CT,ME,NH,VA,NY
1,1,1,2-Tetrachloroethane	CT,ME,NH,VA,NY
1,1,2,2-Tetrachloroethane	CT,ME,NH,VA,NY
Tetrachloroethylene	CT,ME,NH,VA,NY
Toluene	CT,ME,NH,VA,NY
1,2,3-Trichlorobenzene	ME,NH,VA,NY
1,2,4-Trichlorobenzene	CT,ME,NH,VA,NY
1,3,5-Trichlorobenzene	ME
1,1,1-Trichloroethane	CT,ME,NH,VA,NY
1,1,2-Trichloroethane	CT,ME,NH,VA,NY
Trichloroethylene	CT,ME,NH,VA,NY
Trichlorofluoromethane (Freon 11)	CT,ME,NH,VA,NY
1,2,3-Trichloropropane	ME,NH,VA,NY
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	VA,NY
1,2,4-Trimethylbenzene	ME,VA,NY
1,3,5-Trimethylbenzene	ME,VA,NY
Vinyl Chloride	CT,ME,NH,VA,NY
m+p Xylene	CT,ME,NH,VA,NY
o-Xylene	CT,ME,NH,VA,NY
SW-846 8270D in Water	
Acenaphthene	CT,NY,NC,ME,NH,VA
Acenaphthylene	CT,NY,NC,ME,NH,VA
Acetophenone	NY,NC
Aniline	CT,NY,NC,ME,VA
Anthracene	CT,NY,NC,ME,NH,VA
Benzidine	CT,NY,NC,ME,NH,VA
Benzo(a)anthracene	CT,NY,NC,ME,NH,VA
Benzo(a)pyrene	CT,NY,NC,ME,NH,VA
Benzo(b)fluoranthene	CT,NY,NC,ME,NH,VA
Benzo(g,h,i)perylene	CT,NY,NC,ME,NH,VA
Benzo(k)fluoranthene	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

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Analyte	Certifications
SW-846 8270D in Water	
Benzoic Acid	NY,NC,ME,NH,VA
Bis(2-chloroethoxy)methane	CT,NY,NC,ME,NH,VA
Bis(2-chloroethyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-chloroisopropyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NC,ME,NH,VA
4-Bromophenylphenylether	CT,NY,NC,ME,NH,VA
Butylbenzylphthalate	CT,NY,NC,ME,NH,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NC,ME,NH,VA
4-Chloro-3-methylphenol	CT,NY,NC,ME,NH,VA
2-Chloronaphthalene	CT,NY,NC,ME,NH,VA
2-Chlorophenol	CT,NY,NC,ME,NH,VA
4-Chlorophenylphenylether	CT,NY,NC,ME,NH,VA
Chrysene	CT,NY,NC,ME,NH,VA
Dibenz(a,h)anthracene	CT,NY,NC,ME,NH,VA
Dibenzofuran	CT,NY,NC,ME,NH,VA
Di-n-butylphthalate	CT,NY,NC,ME,NH,VA
1,2-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,3-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,4-Dichlorobenzene	CT,NY,NC,ME,NH,VA
3,3-Dichlorobenzidine	CT,NY,NC,ME,NH,VA
2,4-Dichlorophenol	CT,NY,NC,ME,NH,VA
Diethylphthalate	CT,NY,NC,ME,NH,VA
2,4-Dimethylphenol	CT,NY,NC,ME,NH,VA
Dimethylphthalate	CT,NY,NC,ME,NH,VA
4,6-Dinitro-2-methylphenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrophenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrotoluene	CT,NY,NC,ME,NH,VA
2,6-Dinitrotoluene	CT,NY,NC,ME,NH,VA
Di-n-octylphthalate	CT,NY,NC,ME,NH,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NC
Fluoranthene	CT,NY,NC,ME,NH,VA
Fluorene	NY,NC,ME,NH,VA
Hexachlorobenzene	CT,NY,NC,ME,NH,VA
Hexachlorobutadiene	CT,NY,NC,ME,NH,VA
Hexachlorocyclopentadiene	CT,NY,NC,ME,NH,VA
Hexachloroethane	CT,NY,NC,ME,NH,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NC,ME,NH,VA
Isophorone	CT,NY,NC,ME,NH,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NC,ME,NH,VA
2-Methylphenol	CT,NY,NC,NH,VA
3/4-Methylphenol	CT,NY,NC,NH,VA
Naphthalene	CT,NY,NC,ME,NH,VA
2-Nitroaniline	CT,NY,NC,ME,NH,VA
3-Nitroaniline	CT,NY,NC,ME,NH,VA
4-Nitroaniline	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
Nitrobenzene	CT,NY,NC,ME,NH,VA
2-Nitrophenol	CT,NY,NC,ME,NH,VA
4-Nitrophenol	CT,NY,NC,ME,NH,VA
N-Nitrosodimethylamine	CT,NY,NC,ME,NH,VA
N-Nitrosodi-n-propylamine	CT,NY,NC,ME,NH,VA
Pentachloronitrobenzene	NC
Pentachlorophenol	CT,NY,NC,ME,NH,VA
Phenanthrene	CT,NY,NC,ME,NH,VA
Phenol	CT,NY,NC,ME,NH,VA
Pyrene	CT,NY,NC,ME,NH,VA
Pyridine	CT,NY,NC,ME,NH,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NC,ME,NH,VA
2,4,5-Trichlorophenol	CT,NY,NC,ME,NH,VA
2,4,6-Trichlorophenol	CT,NY,NC,ME,NH,VA
2-Fluorophenol	NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2020
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2020
RI	Rhode Island Department of Health	LAO00112	12/30/2019
NC	North Carolina Div. of Water Quality	652	12/31/2019
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2019
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2019
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2020
NC-DW	North Carolina Department of Health	25703	07/31/2019

KHF 14E1264

con-test ANALYTICAL LABORATORY

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http://www.contestlabs.com

Doc # 380 Rev 1_03242017

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2H Associates
Address: 179 River St, Troy, NY 12180
Phone:
Project Name: Cortlandville S&G
Project Location: Cortlandville, NY
Project Number:
Project Manager: John Gansfuss
Con-Test Quote Name/Number:
Invoice Recipient: John Gansfuss
Sampled By: William Oakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: jgansfuss@H2Hassociates.com
Fax To #:

								2	2	1	1	1	2	1	1	3	2	
										X		N		X		H	H	
								A	A	P	A	P	A	P	P	G	G	
Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/~~Time~~	~~Ending~~ ~~Date~~/Time	Composite	Grab	[1]Matrix Code	Conc Code	SVOCs	Herbicides	TOC	Alkalinity	Metals/Hardness	Pestacides	PAHs/NH3	TDS/Cl/SO4/NO3	VOCs	VOCs	
1	MW-01	5/21	1405		X	GW	U	X	X	X	X	X	X	X	X	X		
2	MW-3S	5/21	1045		X	GW	U	X	X	X	X	X	X	X	X	X		
3	MW-3D	5/21	1150		X	GW	U	X	X	X	X	X	X	X	X	X		
4	FB	5/21	1120		:	O	C									X		
5	TB					O	C										X	

ANALYSIS REQUESTED

# of Containers
[2] Preservation Code
[3] Container Code

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
☐ Lab to Filter

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) DI

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
William Oakes	5/22/19 0800
Received by: (signature)	Date/Time: 5-22-19 10:20 AM
Relinquished by: (signature)	Date/Time: 5-22-19 12:00 PM
Received by: (signature)	Date/Time: 5-22-19 12:00
Relinquished by: (signature)	Date/Time: 5-22-19 13:45
Received by: (signature) 5.4 5.6 5.5 5/22/19	Date/Time: 1345

Program & Regulatory Information
☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
☐ NY Restricted Use
☐ NY Unrestricted Use
☐ NY Part 375
Other:

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD
Other:

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client H2H

Received By SC Date 5/22/19 Time 1345

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____
Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.4, 5.8, 3.5
By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? _____
Are there Rushes? F Who was notified? _____
Are there Short Holds? F Who was notified? _____
Is there enough Volume? T
Is there Headspace where applicable? F MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? T
Were trip blanks received? T On COC? T
Do all samples have the proper pH? Acid T<2 Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	12	1 Liter Plastic		16 oz Amb.	
HCL-	14	500 mL Amb.		500 mL Plastic	6	8oz Amb/Clear	
Meoh-		250 mL Amb.	3	250 mL Plastic	6	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	6	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test ANALYTICAL LABORATORY

KMF 14E1264

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

Doc # 380 Rev 1_03242017

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2H Associates
Address: 179 River St, Troy, NY 12180
Phone:
Project Name: Cortlandville S&G
Project Location: Cortlandville, NY
Project Number:
Project Manager: John Gansfuss
Con-Test Quote Name/Number:
Invoice Recipient: John Gansfuss
Sampled By: William Oakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: jgansfuss@H2Hassociates.com
Fax To #:

								2	2	1	1	1	2	1	1	3	2	
										X		N		X		H	H	
								A	A	P	A	P	A	P	P	G	G	

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/~~Time~~	~~Ending~~ ~~Date~~/Time	Composite	Grab	[1]Matrix Code	Conc Code	SVOCs	Herbicides	TOC	Alkalinity	Metals/Hardness	Pesticides	Phos/NH3	TDS/Cl/SO4/NO3	VOCs	UOCs	
1	MW-01	5/21	1405		X	GW	U	X	X	X	X	X	X	X	X	X		
2	MW-3S	5/21	1045		X	GW	U	X	X	X	X	X	X	X	X	X		
3	MW-3D	5/21	1150		X	GW	U	X	X	X	X	X	X	X	X	X		
4	FB	5/21	1120			O	C									X		
5	TB					O	C										X	

# of Containers
[2] Preservation Code
[3] Container Code

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
☐ Lab to Filter

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) DI

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
William Oakes	5/22/19 0800
Received by: (signature)	Date/Time: 5-22-19 10:20 AM
Relinquished by: (signature)	Date/Time: 5-22-19 12:00 PM
Received by: (signature)	Date/Time: 5-22-19 12:00
Relinquished by: (signature)	Date/Time: 5-22-19 13:45
Received by: (signature) 5.4 5.8 5.5	Date/Time: 5/22/19 1345

Program & Regulatory Information
☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
☐ NY Restricted Use
☐ NY Unrestricted Use
☐ NY Part 375
Other:

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD
Other:

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client H2H

Received By SC Date 5/20/19 Time 1345

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.4, 5.8, 3.5

By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? T

Were trip blanks received? T On COC? T

Do all samples have the proper pH? Acid T<2 Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	12	1 Liter Plastic		16 oz Amb.	
HCL-	14	500 mL Amb.		500 mL Plastic	6	8oz Amb/Clear	
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Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	6 SL	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass	\	Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Appendix 1.F: 2020 Addendum to the Baseline Quarters 1&2 Hydrogeologic Investigation Report (H2H Geoscience Engineering, PLLC)

H2H GEOSCIENCE ENGINEERING
179 River Street, Troy, NY 12180
518.270.1620
www.h2hg-e.com

31 MARCH 2020

Joseph M Dlugolenski
Deputy Regional Permit Administrator
1285 Fisher Ave
Cortland, New York 13045-1090

Subject: **ADDENDUM TO THE BASELINE – QUARTERS 1 & 2 HYDROGEOLOGIC INVESTIGATION REPORT**
ROUTE 13 ROCKS, LLC
CORTLANDVILLE SAND & GRAVEL MINE
NYSDEC PERMIT #7-1122-00043/00008
NYSDEC MLF# 70436
TOWN OF CORTLANDVILLE, CORTLAND COUNTY, NEW YORK

Dear Mr. Dlugolenski

This letter report serves as an addendum to previously submitted reports for the one-year hydrogeologic assessment conducted in support of the Cortlandville Sand & Gravel mine permit modification application. This final addendum presents the final rounds of collected data, the new findings, and the overall conclusions. The report concludes that the proposed mine expansion will not have an adverse impact on the Town's Lime Hollow Road wells. H2H anticipates that the interim and final reports achieve all hydrogeologic assessment objectives and are sufficient to complete the application.

EXECUTIVE SUMMARY

This final addendum to the previously submitted reports for the Cortlandville Sand & Gravel hydrogeologic assessment presents the final rounds of collected data, the new findings, and the overall conclusions. Based on the existing conditions observed and measured during the one-year hydrogeologic assessment period, the available data indicate that the proposed mine pond would have minimal and inconsequential hydraulic interaction with, and effect on, the water quality and quantity at the Town's two Lime Hollow Road wells. The potential for significant adverse impacts to the municipal well would be negligible. This conclusion is based on multiple lines of evidence (analysis of surface water and groundwater levels, groundwater temperatures, analytical hydraulic models, U.S Geological Survey numeric modeling, landforms) summarized in the interim and final reports. All evidence indicates that groundwater flow at the proposed mine pond is northeasterly and away from the Town wells apparent capture zone and adequate recharge can be provided to the Town wells from its upgradient recharge area. This addendum includes recommendations for long-term monitoring.

1.0 INTRODUCTION

Route 13 Rocks, LLC (Applicant) has filed an application to New York State Department of Environmental Conservation to expand Applicant's permitted Cortlandville Sand & Gravel mine operation (Figure 1) laterally and vertically. H2H Geoscience Engineering, PLLC, Troy, NY (Formerly H2H Associates, LLC)has been retained to act on Applicant's behalf. A hydrogeologic investigation has been conducted to support the application by collecting baseline hydrogeological information to:

- Address NYSDEC's and SWCD's comments on the mine permit modification application;
- Confirm the Site's conceptual hydrogeologic model;
- Provide the data needed to assess potential impacts of deeper mining on the quality and quantity of groundwater in the vicinity of the Town's Lime Hollow public water supply wells;
- Support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells; and
- Complete the application.

The scope of work was developed to characterize baseline hydrogeologic conditions over a one-year, four-quarter period, sufficiently to meet project objectives. In July of 2019, H2H Submitted an interim report (Appendix 1), presenting the initial findings of quarters 1 and 2. In January of 2020, H2H submitted, as a response to the Cortland County Soil and Water Conservation District (CCSWCD) comments (Appendix 2) to that report, another report (Appendix 2a) that provided:

- More detailed data analyses in support of the original claim of no significant adverse impacts to the existing Lime Hollow public water supply wells, and;
- The conclusion of the water quality testing results with the Q3 and Q4 data sets.

1.1 PROJECT DESCRIPTION

The permitted Life of Mine currently comprises 66.8 acres and the permitted mine floor elevation is based on maintaining an 8-foot separation from the mean high-water table, which, according to this study, is approximately 1,172 feet above mean sea level (amsl). Cortlandville S&G is seeking a permit modification to mine an additional 11.9 acres laterally and to mine below the water table to the bottom of the sand and gravel outwash aquifer which may be as deep as elevation 1,070 feet amsl. The mine would be completed at a shallower elevation if the underlying lacustrine deposits are encountered at a shallower depth. The deepening requires a waiver of the current 8-foot separation distance requirement. The current pit bottom is at approximate elevation 1,185 feet amsl. In response to the initial application and a subsequent submittal, NYSDEC has indicated that additional hydrogeologic information must be submitted to support the application to deepen mining below the water table. Cortland County Soil and Water Conservation District (SWCD), acting on the Town of Cortland's behalf, has also submitted comments on the application.

1.2 PURPOSE

The purpose of this addendum is to summarize and conclude the hydrogeologic assessment conducted February 2019 through February 2020. H2H submitted the most recent interim report in July 2019. This addendum updates that report and summarizes the findings and conclusions to meet the assessment objectives.

2.0 FINAL DATA COLLECTION AND ANALYSIS

In addition to groundwater elevation data, H2H also analyzed groundwater temperature data to determine flow direction. While thermal tracing is not as conducive to quantitative analysis as groundwater elevation data, the calculations based on thermal plumes serve as another line of evidence for determining groundwater flow direction in the vicinity of the proposed mine pond location.

2.1 TEMPERATURE

The transducers that H2H installed in all monitoring wells measure water level and water temperature. Analogous to water level hydrographs, the groundwater thermographs reflect a graph of changing groundwater temperatures with time (Figure 2). Water temperatures vary with the monitoring well screen's position in the local flow system. Following is a summary of relevant findings for each well.

2.1.1 MW-1

Monitoring Well MW-1 is located the farthest from the town pumping wells and is upgradient of the ponds located adjacent to the mine area to the west (Figure 1). The well screen is also relatively deep with respect to the other monitoring wells and is, therefore, better insulated from air temperature variations. As a result, H2H expected to see a relatively stable groundwater temperature graph. The temperature in MW-1 fluctuated between 47.7° and 48.1° Fahrenheit with an average of 47.9 °F. This is in close agreement with a mean air temperature of 47.7 °F. This shows that the thermal conditions at MW-1 are stable and consistent with H2H's expectations and understanding of the site hydrogeology.

2.1.2 MW-2

Groundwater temperature in MW-2 ranged smoothly from 48.4° to 50.4° Fahrenheit. The highest groundwater temperatures were noted to occur in March when air temperatures were relatively low. High air temperatures occur in July. This apparent discrepancy indicates that groundwater and air temperatures are out of sync at this well, but can be easily explained. The relatively warmer water at MW-2 in March is the result of a thermal plume that is migrating along the prevailing hydraulic gradient from the upgradient mine excavation, where the water table is relatively shallow, toward the northeast. The warm water resulted from warm-weather precipitation recharge to the water table in the mine pit. H2H confirmed this by applying the site's estimated groundwater flow velocity of 6.7 feet per day, which was determined using the USGS derived hydraulic conductivity (K = 880 ft/day) porosity ($\Phi = 0.3$) (Appendix 3), and the mean hydraulic gradient ($i = 0.00229$) to the groundwater velocity equation ($Ki\Phi^{-1} = V$). Extrapolating groundwater flow upgradient for the eight months between March and July, yields a flow distance of 1,700 feet which coincides with the southern end of the mine pit. The apparent groundwater flow direction from the south end of the mine at MW-1 to MW-2 is north 12.5° to 30.6° east.

Although not as precise, this flow direction is consistent with the previously estimated north 21° east flow direction. This analysis provides additional evidence that groundwater flow at the mine is northeasterly and side-gradient to the Town wells. Groundwater from the mine will not interact with recharge to the town wells.

2.1.3 MW-3S

Similar data are observed at MW-3S as at MW-2 except that the thermal peak occurs on October 31, 2019, rather than in March. By applying the same groundwater flow principles described above, the calculated

flow distance during the period from the summer air temperature maximum is 845 feet. This distance correlates with the middle pond that is immediately adjacent to the mine area to the west.

The apparent groundwater flow direction in the northwest corner of the proposed mine pond is north 25° east, generally consistent with all other flow direction estimates at the mine site.

2.1.4 MW-3D

MW-3D is very similar to MW-3S, except the temperature fluctuations are lower which are to be expected because this well is screened in the bottom half of the aquifer where it is more insulated from surface effects. The seasonal high groundwater temperature occurs on November 18, 2020, which indicates a recharge water source approximately 1,000 feet distant, which is generally similar to MW-3S and falls with the anticipated range of variability. One possibility for the difference is that the average hydraulic conductivity in the deeper part of the aquifer may be slightly higher than in the shallow part, hence, a greater flow distance over similar time periods.

2.1.5 MW-4S

MW-4S has relatively high temperature fluctuations compared to the other wells because of its proximity to the hydraulically upgradient North Pond. H2H observed that as the pond's water storage lessened, ultimately to depletion, the water temperature at MW-4S became highly variable. Fluctuations of 15-20° Fahrenheit were seen during the spring and early summer months. These temperature swings likely represent variations in the source of water that is recharging groundwater at MW-4S. When the pond is full, the pond water serves as a source of recharge. When the pond is dry, the surface water recharge source depletes and groundwater becomes a more important source of water recharge to MW-4S. This local flow regime is complicated by precipitation events and by probable groundwater-surface water interactions at the west side of the pond which is probably controlled to some degree by town well pumping.

The temperature data are consistent with findings reported on previously for the water level data, namely, the prevailing northeasterly groundwater flow direction in this area, the flooded pond's role as a hydrologic buffer between the town wells and MW-4, and the pond's role as a part-time source of water recharge to the town wells.

2.2 GROUNDWATER ELEVATIONS

The hydrographs (Figure 6) show the relative water level variations with time for the five monitoring wells. The parallel alignments of the hydrographs for the different wells indicate that hydraulic gradients and flow directions are fairly stable with time. Hydraulic gradients ranged between 0.0013 and 0.0032 during high and low flow conditions. Prior reporting indicated a typical hydraulic gradient of 0.003. Lower gradients are associated with a slower groundwater flow rate.

2.2.1 MW-1

Monitoring Well MW-1 is located the farthest from the town pumping wells and is upgradient of the mine pit. It is also located outside of the USGS recharge zone for the Lime Hollow Road pumping wells and is, therefore, a good model for the background groundwater behavior for the Cortlandville Sand and Gravel operation. As anticipated, the data from MW-1 contains only seasonal ground water elevation fluctuations.

2.2.2 MW-2, MW-3S and MW-3D

These three wells show the same seasonal groundwater elevation trend as MW-1. There is also a secondary high-frequency wavy pattern superimposed on the hydrographs. The amplitude of these wavelets is extremely low, approximately 0.09 feet, which is at the instrumental resolution limit. The apparent period of these wavelets is between 16 and 48 hours. While the amplitudes of these wavelets are extremely low, all three wells have the same matching pattern which suggests that they are real. If the Lime Hollow wells were the source, we would expect measurably higher amplitudes at MW-3S, located 900 feet from the well field, than at MW-2S, located 1,080 feet from the well field. Furthermore, the 16-hour to 48-hour oscillation periods do not appear to mimic the known operating period of the two Town wells. These wavelets do not appear to be associated with any significant mass transport of groundwater.

2.2.3 MW-4S

The hydrograph for MW-4S has the same pattern as MW-2, MW-3S, and MW-3D, except the amplitude of the wavelets are larger, up to 0.35 feet in amplitude. Also, the peaks and troughs of the wavelets are sharper and more defined. MW-4S is 814 feet from the Town well, or 10%, closer than MW-3S. Such a large amplitude difference would not be expected over such a small change in distance. Perhaps the location of MW-4S northeast and downgradient of the Town wells is relevant, but regardless, these oscillations represent an extremely minor disturbance to the water table and the source of the oscillations remains unknown.

2.3 FLOW DIRECTION CALCULATIONS

To determine groundwater flow direction, the data from MW-2, MW-3S and MW-4S were utilized to model the orientation of the water table. The daily mean groundwater elevation for the monitoring period was used to estimate flow direction for every day during the hydrogeologic investigation period. During that time, flow directions were northeasterly with a prevailing flow direction of approximately north 21° east as reported previously. The latest transducer temperature data that was not available when the last interim report was submitted provides additional corroborating evidence of this northeasterly flow pattern (Figure 3).

The full year of data confirms a groundwater flow direction of approximately north 21° east which means that the proposed mine pond is side-gradient to the town well field. The groundwater at the proposed mine will not recharge the town wells.

3.0 CONCLUSIONS

The hydrogeologic data collected to date provide insight into the now well-characterized local hydrogeologic conditions. Based on the existing conditions observed and measured during the one-year hydrogeologic assessment period, the available data indicate that the proposed mine pond would have minimal and inconsequential hydraulic interaction with and effect on the water quality and quantity at the Town's two Lime Hollow Road wells. The potential for significant adverse impacts to the municipal well would be negligible. This conclusion is based on multiple lines of evidence indicating that groundwater flow at the proposed mine pond is northeasterly and away from the Town wells apparent capture zone.

4.0 LONG-TERM MONITORING PROGRAM

Recommended long-term monitoring (LTM) program:

- Maintain the existing monitoring well network, with transducers in each well.
- Develop annual water level hydrographs and thermographs.
- Assess changes in groundwater flow gradients and directions annually as the mine pond develops.
- Sample and analyze groundwater from MW-1, MW-3S and MW-3D quarterly beginning one quarter before the mine is deepened below the water table and annually thereafter, except as noted below. Analysis shall consist of the field parameters measured during the one-year hydrogeologic study (dissolved oxygen, specific conductivity, pH, turbidity, temperature, oxidation reduction potential, depth to water and total well depth).
- Implement a contingency plan under the following conditions - In the event that groundwater flow gradients and directions change from the baseline condition observed during the hydrogeologic assessment, and appear to be directed on a sustained basis toward the town well field, groundwater samples shall be collected from the three wells quarterly and analyzed for the same laboratory parameters monitored during the baseline period, plus gasoline range organics, diesel range organics, and bacteria to verify that water quality at the MW-3 location is not degraded. Mine pond water shall be sampled and analyzed for the same parameters. Apparent degradation of water quality that could impact the town wells to the degree that Department of Health water quality requirements for public water supplies may be compromised shall be brought to DEC's attention.
- Prepare annual reports that include the monitoring data, a copy of the town well pumping records, a review of the town's annual water quality reports, a summary of any spills or significant operational or site changes that could affect water quality and/or flow, updates to the Spill Prevention Plan, obvious changes to the adjacent ponds, and a hydrogeologic evaluation.

We would be happy to discuss this with you further. If you have any questions regarding this information, please contact me at 518.270.1620 ext. 114, or Rich Hisert at ext. 105.

Sincerely,
H2H Geoscience Engineering, PLLC

William J. Oakes III
Project Geologist

John E. Gansfuss, P.G.
Senior Project Engineering Geologist

H2H GEOSCIENCE ENGINEERING
179 River Street, Troy, NY 12180
518.270.1620
www.h2hg-e.com

Attachments

Figure 1 – Site Plan Map
Figure 2 – Groundwater Thermographs
Figure 3 – Thermal Tracing Flow Direction with Actual Flow Direction Data
Figure 4 –Modeled Groundwater Contribution Area for Town Wells from 2004 Report (App. 4)
Figure 5 – Groundwater Flow Direction Under Mean Flow Conditions
Figure 6 – Groundwater Flow Direction Rose Diagram
Figure 7 – Water Level Hydrographs
Table 1 – Groundwater Elevations and Flow Direction Calculations
Appendix 1 – H2H Interim Report Submitted July 2019
Appendix 2 – CCSWCD Response to July 2019 Report
Appendix 2a – H2H Report in Response to CCSWCD Comments
Appendix 3 – USGS WRI 96-4255
Appendix 4 - Hydrogeology and Simulation of Groundwater Flow in a Glacial Aquifer System at Cortland County, New York (USGS, 2004)

c. Chris Henry, Rt 13 Rocks LLC
Thomas Rigley, Region 7, NYSDEC
Amanda Barber, Cortland SWCD
John Proud, Town of Cortlandville
Dick Tupper, Town of Cortlandville Supervisor
Mike Polacco, H2H
Richard A. Hisert, PhD, P.G., H2H

Figures

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1	934,471.7	914,528.9
MW - 2	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- 2019 MONITORING WELL
- TEST PIT
- M.P. ## MARL PONDS
- PROPOSED MINE POND
- SCREENING AREA
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 6.0 ACRES
- AREA RECLAIMED; AWAITING REVIEW AND APPROVAL BY NYSDEC = 2.1 ACRES

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE CENTRAL, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

LIME HOLLOW ROAD
SCM WELLS 5-D & 5-S
MW - 4S
RESIDENTIAL RECEPTOR #1
LIME-HOLLOW PUMPING WELL #2 USGS #432, C-104
LIME-HOLLOW PUMPING WELL #7 USGS #320, 89-1
TAX PARCEL #95.00-06-05.000
TAX PARCEL #95.00-10-01.100
NORTH POND M.P. #1
TAX PARCEL #95.00-06-10.000
AREA TO BE REMOVED FROM EXISTING MINE PERMIT 0.4 ACRES
AREA OF LATERAL EXPANSION 2.5 ACRES
MW - 2(S)
MW - 3D
MW - 3S
TAX PARCEL #95.00-06-04.100
TAX PARCEL #95.00-10-11.200
M.P. #2 MID POND
TAX PARCEL #95.00-06-04.200
SOUTH POND M.P. #3
TAX PARCEL #105.00-03-02.000
TAX PARCEL #95.00-10-11.100
TAX PARCEL #105.00-03-04.000
TAX PARCEL #105.00-03-01.000
TAX PARCEL #105.00-03-03.000
MW - 1(S)
AREA OF LATERAL EXPANSION 9.4 ACRES
PROPOSED BERM
TAX PARCEL #105.00-03-0.6.100 7 ACRES
TAX PARCEL #105.00-03-25.000
TAX PARCEL #105.00-03-26.000
PROCESSING AREA
SCREEN
TAX PARCEL #105.00-03-27.000
SCALE HOUSE WELL
SCALE HOUSE
TRUCK SCALE
TAX PARCEL #105.00-03-28.000
VEHICLE/EQUIPMENT AREA
PROPOSED PAVED MAINTENANCE AREA 40'X40'
TAX PARCEL #105.00-03-29.000
TAX PARCEL #105.00-03-06.200 15 ACRES
NYS ROUTE 13
CR #1
B - 1
B - 2
B - 3
B - 6
G - 1
G - 2
G - 4
G - 5
G - 7
G - 8
G - 9

AFFECTED AREA SUMMARY:

- CURRENTLY PERITTED AFFECTED AREA = 66.8 ACRES
- AREA OF LATERAL EXPANSION = 11.9 ACRES
- AREA TO BE RECLAIMED AND REMOVED FROM AFFECTED AREA = 0.4 ACRES
- **TOTAL NEW AFFECTED AREA = 78.3 ACRES**

NOTES:

1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
	4	
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

SITE PLAN MAP

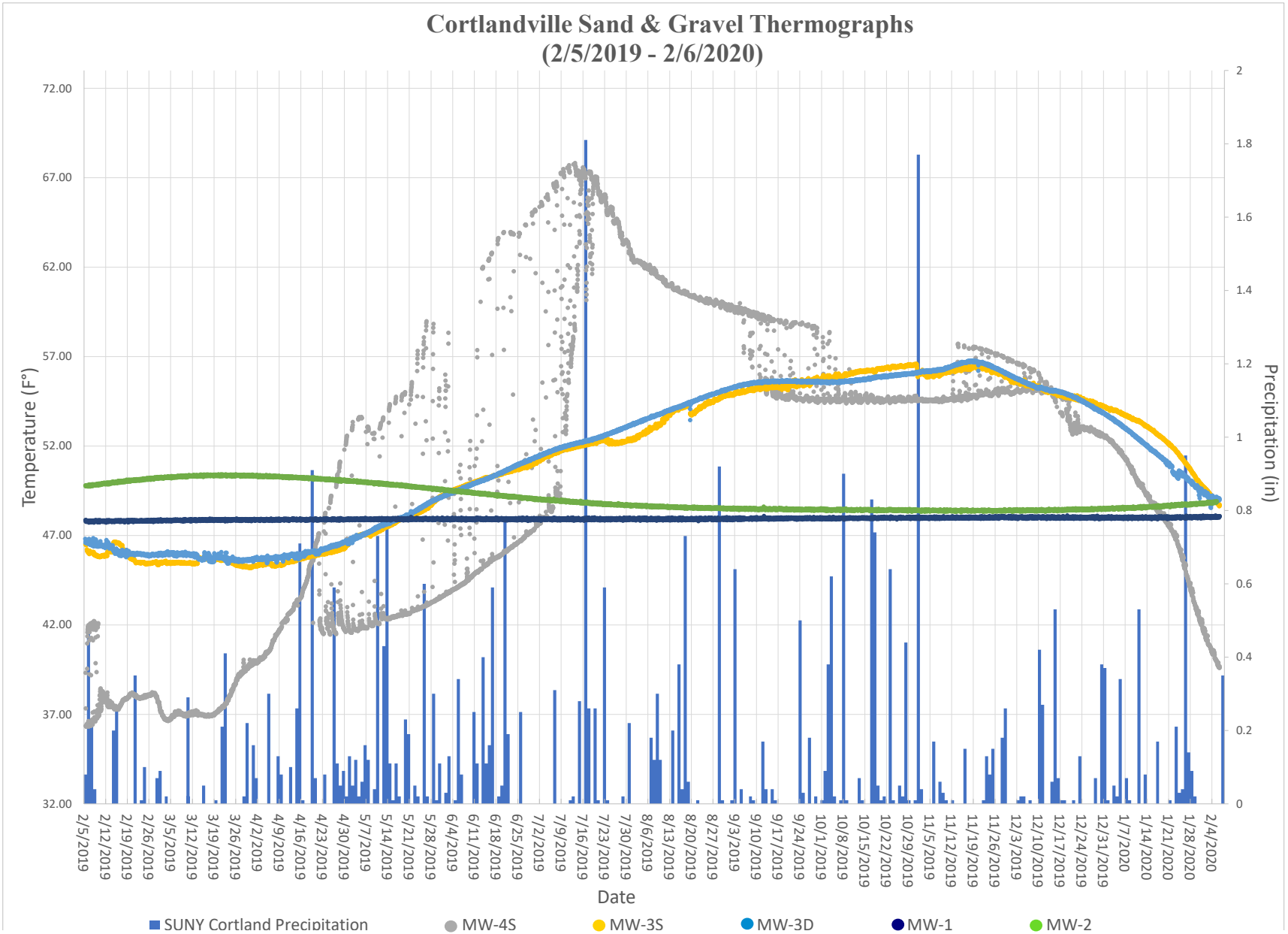
TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

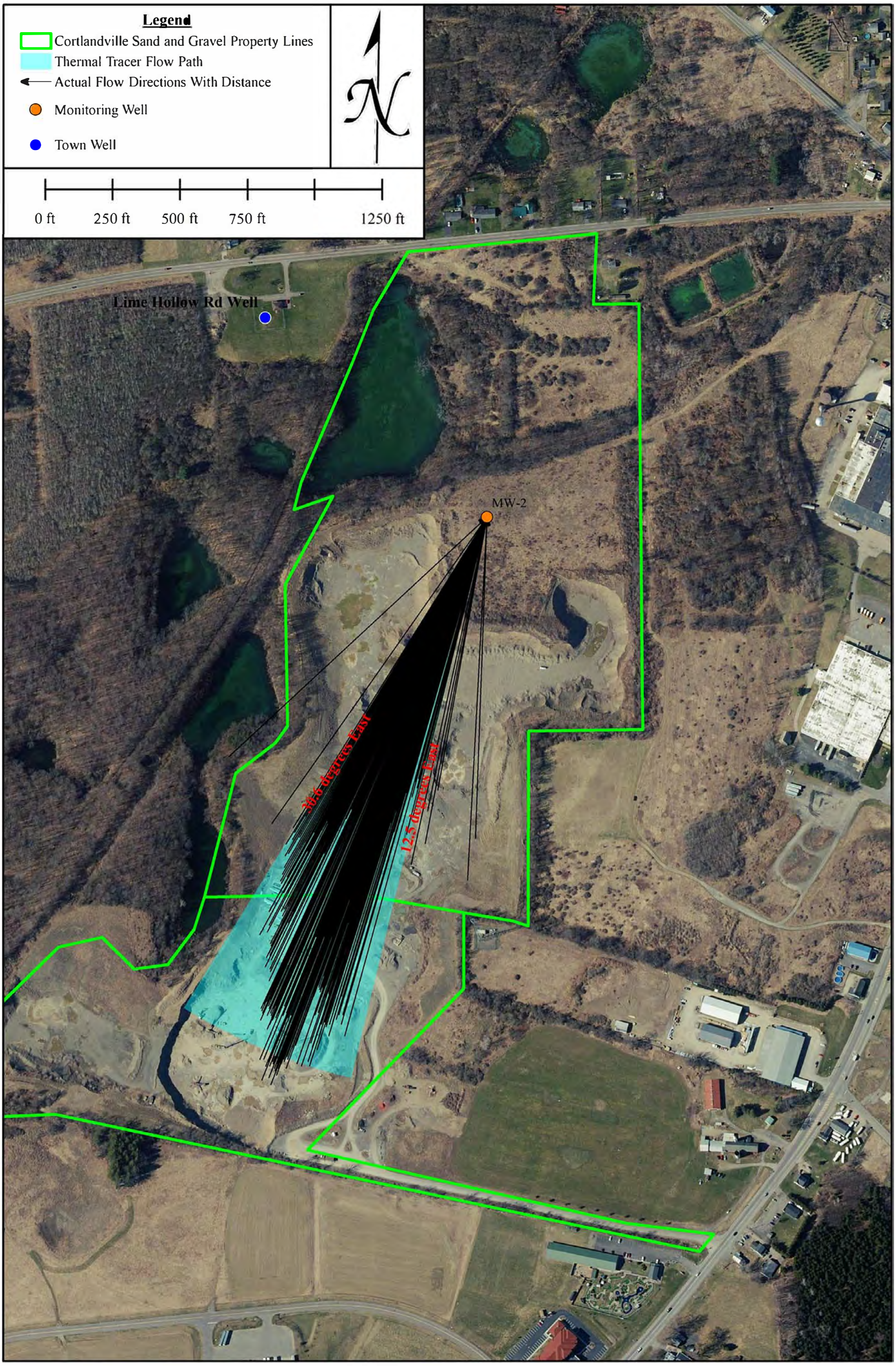
H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 1

SHEET 1 OF 1

FIGURE 2
GROUNDWATER THERMOGRAPHS





DATE	REVISIONS RECORD/DESCRIPTION	THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES	DRAWN BY:	WJO	THERMAL TRACING FLOW DIRECTION WITH ACTUAL FLOW DIRECTION DATA
			CHECKED BY:	JG	CORTLANDVILLE SAND AND GRAVEL
			DATE:	3/26/2020	TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY
					H2H Geoscience Engineering — TROY, NY WWW.H2HASSOCIATES.COM — Figure 3 — SHEET 1 OF 1

Figure 4 - Modeled Contribution Area for Town Wells from 2004 USGS Report (Figure 6)

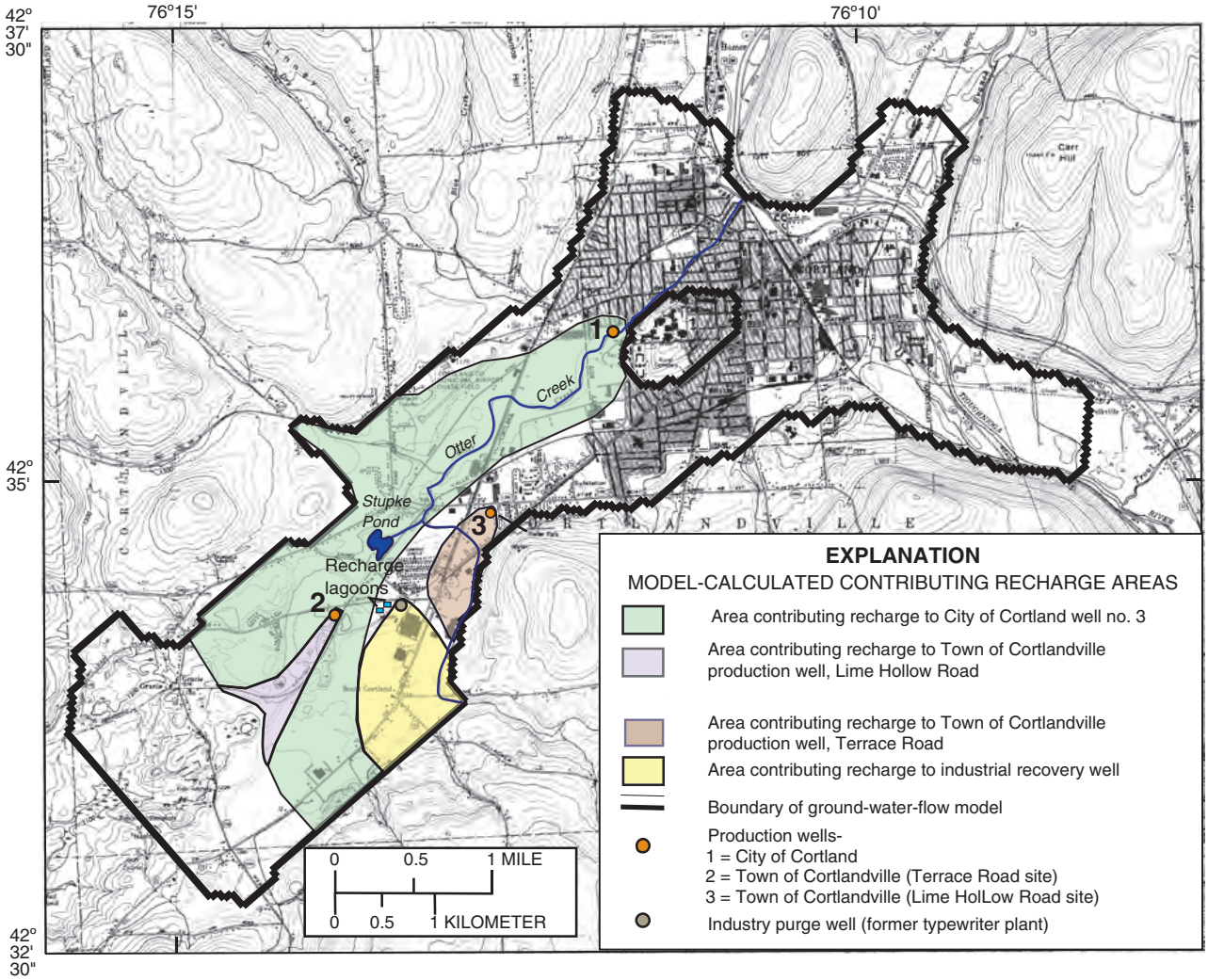
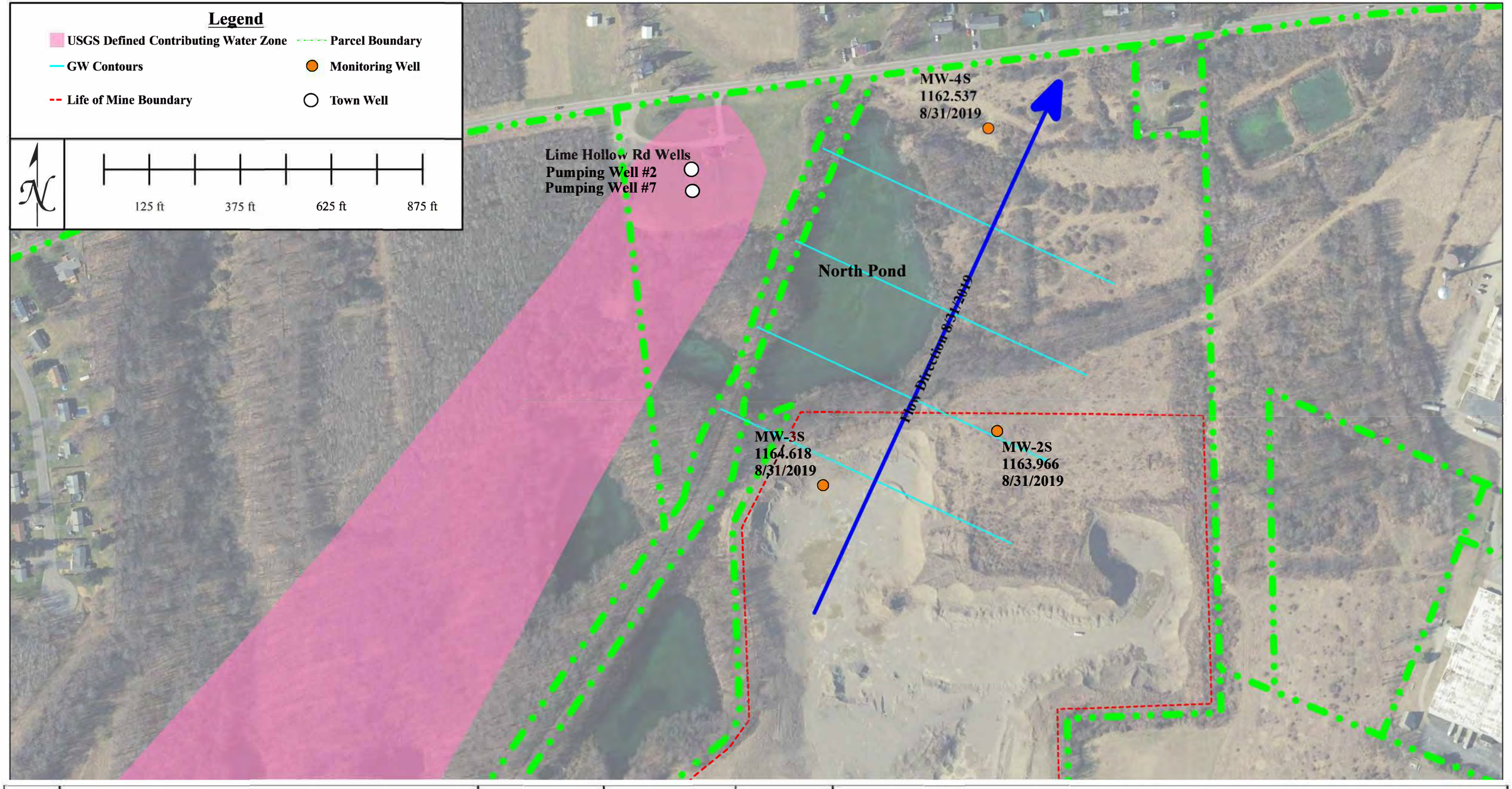


Figure 6. Model-calculated contributing recharge areas for major production wells during low-recharge conditions, in the unconfined aquifer, Cortland County, New York.



DATE	REVISIONS RECORD/DESCRIPTION	THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES	DRAWN BY:	WJO
			CHECKED BY:	JG
			DATE:	1/20/2020

Groundwater Flow Direction Under Mean Flow Conditions

Cortlandville Sand and Gravel

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

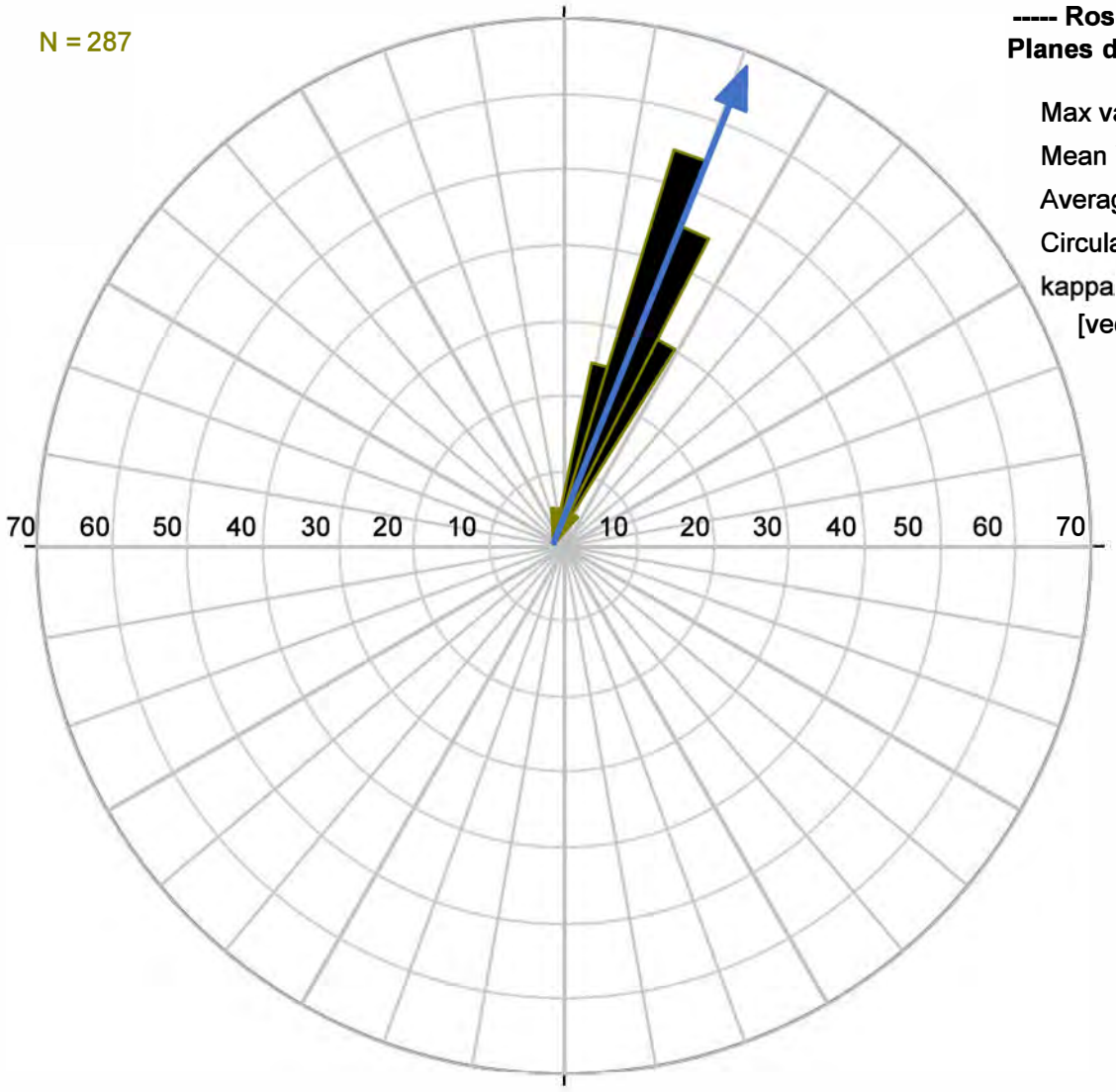
H2H Geoscience Engineering

TROY, NY WWW.H2HASSOCIATES.COM

Figure 5

SHEET 1 OF 1

Figure 6 - Groundwater Flow Direction Rose Diagram

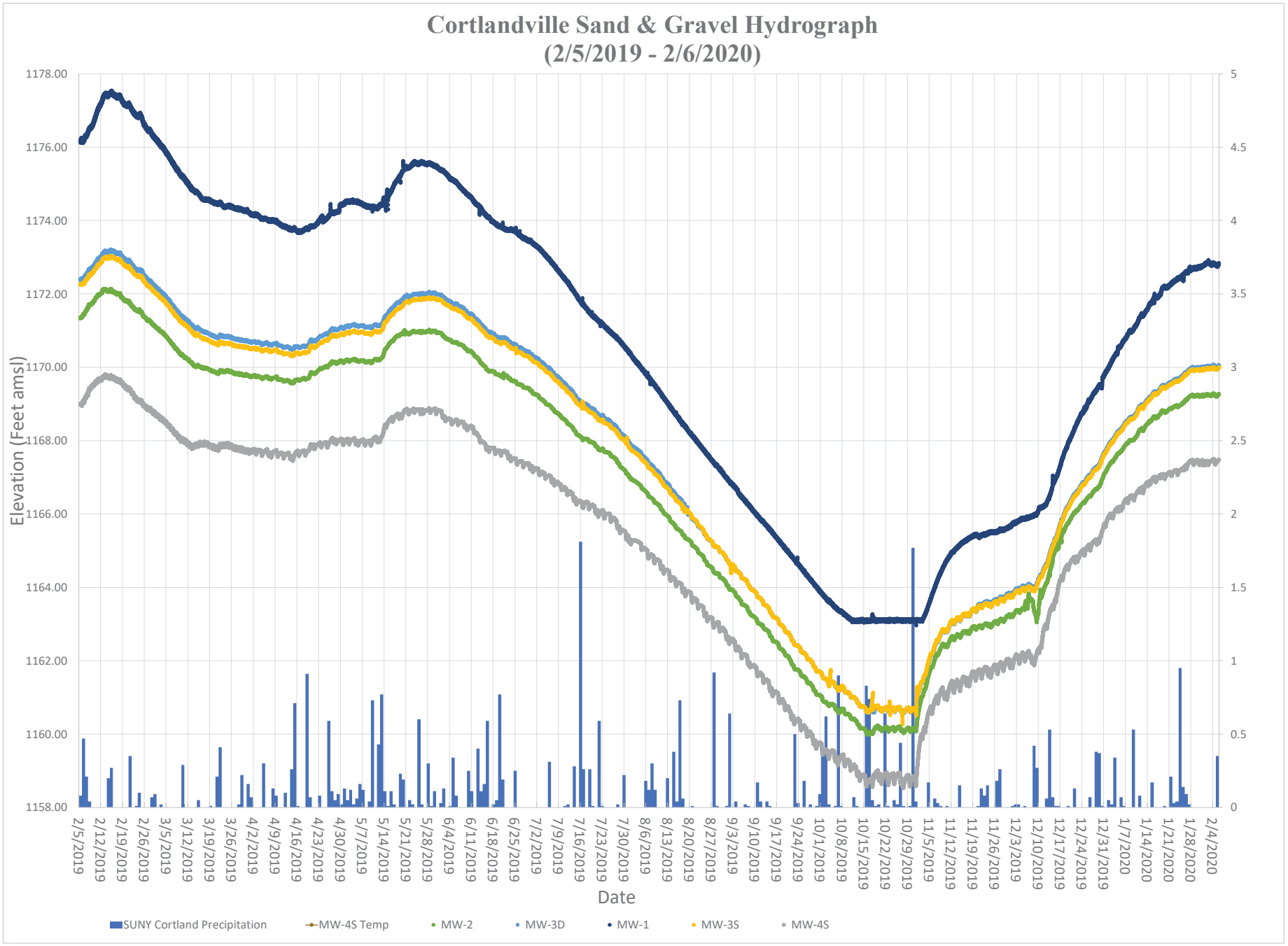


----- Rose diagram/Circular Histogram | 1/16/2020 -----
Planes data set (petals parallel Flow direction):
MW-3S, MW-4S, MW-2

Max value	= 37.6% between 016° and 020°
Mean Vector	= 021.9° ± 00.3°
Average Length	= 0.9971
Circular Variance	= 0.0029
kappa	= 100.

[vector mean; uncertainty is 1 standard error,
for 95% confidence level multiply by 1.96]

FIGURE 7
WATER LEVEL HYDROGRAPHS



Tables

Table 1
Groundwater Elevations and Flow Direction Calculations

Date	MW-2			MW-3S			MW-4S			Mean GW Point for Flow Direction Calculation			Mean GW Flow Direction	Comments
	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	*Easting, ft*	*Northing, ft*	*Elevation, ft*		
2/5/2019	916069.59	936677.78	1171.36	915590.78	936527.72	1172.26	916044.21	937509.77	1168.98	**915901.53**	**936905.09**	**1170.87**	**18.62**	
2/6/2019	916069.59	936677.78	1171.43	915590.78	936527.72	1172.29	916044.21	937509.77	1169.06	**915901.53**	**936905.09**	**1170.93**	**17.28**	
2/7/2019	916069.59	936677.78	1171.56	915590.78	936527.72	1172.4	916044.21	937509.77	1169.21	**915901.53**	**936905.09**	**1171.06**	**16.80**	
2/8/2019	916069.59	936677.78	1171.69	915590.78	936527.72	1172.51	916044.21	937509.77	1169.4	**915901.53**	**936905.09**	**1171.20**	**16.86**	
2/9/2019	916069.59	936677.78	1171.77	915590.78	936527.72	1172.59	916044.21	937509.77	1169.5	**915901.53**	**936905.09**	**1171.29**	**17.14**	
2/10/2019	916069.59	936677.78	1171.89	915590.78	936527.72	1172.7	916044.21	937509.77	1169.59	**915901.53**	**936905.09**	**1171.39**	**16.33**	
2/11/2019	916069.59	936677.78	1171.98	915590.78	936527.72	1172.81	916044.21	937509.77	1169.66	**915901.53**	**936905.09**	**1171.48**	**16.83**	
2/12/2019	916069.59	936677.78	1172.06	915590.78	936527.72	1172.9	916044.21	937509.77	1169.69	**915901.53**	**936905.09**	**1171.55**	**16.54**	
2/13/2019	916069.59	936677.78	1172.12	915590.78	936527.72	1172.99	916044.21	937509.77	1169.76	**915901.53**	**936905.09**	**1171.62**	**17.79**	
2/14/2019	916069.59	936677.78	1172.08	915590.78	936527.72	1172.98	916044.21	937509.77	1169.73	**915901.53**	**936905.09**	**1171.60**	**19.04**	
2/15/2019	916069.59	936677.78	1172.09	915590.78	936527.72	1173.01	916044.21	937509.77	1169.73	**915901.53**	**936905.09**	**1171.61**	**19.63**	
2/16/2019	916069.59	936677.78	1172.04	915590.78	936527.72	1172.98	916044.21	937509.77	1169.69	**915901.53**	**936905.09**	**1171.57**	**20.49**	
2/17/2019	916069.59	936677.78	1172	915590.78	936527.72	1172.93	916044.21	937509.77	1169.64	**915901.53**	**936905.09**	**1171.52**	**19.99**	
2/18/2019	916069.59	936677.78	1171.95	915590.78	936527.72	1172.9	916044.21	937509.77	1169.61	**915901.53**	**936905.09**	**1171.49**	**21.00**	
2/19/2019	916069.59	936677.78	1171.84	915590.78	936527.72	1172.8	916044.21	937509.77	1169.5	**915901.53**	**936905.09**	**1171.38**	**21.35**	
2/20/2019	916069.59	936677.78	1171.8	915590.78	936527.72	1172.74	916044.21	937509.77	1169.43	**915901.53**	**936905.09**	**1171.32**	**20.21**	
2/21/2019	916069.59	936677.78	1171.74	915590.78	936527.72	1172.69	916044.21	937509.77	1169.37	**915901.53**	**936905.09**	**1171.27**	**20.56**	
2/22/2019	916069.59	936677.78	1171.63	915590.78	936527.72	1172.58	916044.21	937509.77	1169.25	**915901.53**	**936905.09**	**1171.15**	**20.42**	
2/23/2019	916069.59	936677.78	1171.55	915590.78	936527.72	1172.5	916044.21	937509.77	1169.13	**915901.53**	**936905.09**	**1171.06**	**19.86**	
2/24/2019	916069.59	936677.78	1171.53	915590.78	936527.72	1172.48	916044.21	937509.77	1169.08	**915901.53**	**936905.09**	**1171.03**	**19.45**	
2/25/2019	916069.59	936677.78	1171.44	915590.78	936527.72	1172.41	916044.21	937509.77	1169.01	**915901.53**	**936905.09**	**1170.95**	**20.42**	
2/26/2019	916069.59	936677.78	1171.34	915590.78	936527.72	1172.29	916044.21	937509.77	1168.92	**915901.53**	**936905.09**	**1170.85**	**19.86**	
2/27/2019	916069.59	936677.78	1171.27	915590.78	936527.72	1172.2	916044.21	937509.77	1168.86	**915901.53**	**936905.09**	**1170.78**	**19.29**	
2/28/2019	916069.59	936677.78	1171.19	915590.78	936527.72	1172.12	916044.21	937509.77	1168.8	**915901.53**	**936905.09**	**1170.70**	**19.57**	
3/1/2019	916069.59	936677.78	1171.11	915590.78	936527.72	1172.04	916044.21	937509.77	1168.73	**915901.53**	**936905.09**	**1170.63**	**19.71**	
3/2/2019	916069.59	936677.78	1171.04	915590.78	936527.72	1171.96	916044.21	937509.77	1168.66	**915901.53**	**936905.09**	**1170.55**	**19.35**	
3/3/2019	916069.59	936677.78	1170.96	915590.78	936527.72	1171.88	916044.21	937509.77	1168.59	**915901.53**	**936905.09**	**1170.48**	**19.49**	
3/4/2019	916069.59	936677.78	1170.89	915590.78	936527.72	1171.8	916044.21	937509.77	1168.53	**915901.53**	**936905.09**	**1170.41**	**19.26**	
3/5/2019	916069.59	936677.78	1170.79	915590.78	936527.72	1171.7	916044.21	937509.77	1168.44	**915901.53**	**936905.09**	**1170.31**	**19.40**	
3/6/2019	916069.59	936677.78	1170.69	915590.78	936527.72	1171.59	916044.21	937509.77	1168.35	**915901.53**	**936905.09**	**1170.21**	**19.18**	
3/7/2019	916069.59	936677.78	1170.58	915590.78	936527.72	1171.48	916044.21	937509.77	1168.25	**915901.53**	**936905.09**	**1170.10**	**19.32**	
3/8/2019	916069.59	936677.78	1170.48	915590.78	936527.72	1171.37	916044.21	937509.77	1168.14	**915901.53**	**936905.09**	**1170.00**	**18.81**	
3/9/2019	916069.59	936677.78	1170.38	915590.78	936527.72	1171.27	916044.21	937509.77	1168.05	**915901.53**	**936905.09**	**1169.90**	**18.95**	
3/10/2019	916069.59	936677.78	1170.31	915590.78	936527.72	1171.2	916044.21	937509.77	1168.01	**915901.53**	**936905.09**	**1169.84**	**19.38**	
3/11/2019	916069.59	936677.78	1170.24	915590.78	936527.72	1171.13	916044.21	937509.77	1167.95	**915901.53**	**936905.09**	**1169.77**	**19.53**	
3/12/2019	916069.59	936677.78	1170.18	915590.78	936527.72	1171.05	916044.21	937509.77	1167.89	**915901.53**	**936905.09**	**1169.71**	**18.77**	
3/13/2019	916069.59	936677.78	1170.11	915590.78	936527.72	1170.97	916044.21	937509.77	1167.83	**915901.53**	**936905.09**	**1169.64**	**18.54**	
3/14/2019	916069.59	936677.78	1170.03	915590.78	936527.72	1170.88	916044.21	937509.77	1167.88	**915901.53**	**936905.09**	**1169.60**	**20.10**	
3/15/2019	916069.59	936677.78	1170.03	915590.78	936527.72	1170.87	916044.21	937509.77	1167.9	**915901.53**	**936905.09**	**1169.60**	**20.01**	
3/16/2019	916069.59	936677.78	1169.99	915590.78	936527.72	1170.8	916044.21	937509.77	1167.91	**915901.53**	**936905.09**	**1169.57**	**19.59**	
3/17/2019	916069.59	936677.78	1169.98	915590.78	936527.72	1170.77	916044.21	937509.77	1167.93	**915901.53**	**936905.09**	**1169.56**	**19.24**	
3/18/2019	916069.59	936677.78	1169.95	915590.78	936527.72	1170.74	916044.21	937509.77	1167.89	**915901.53**	**936905.09**	**1169.53**	**19.08**	
3/19/2019	916069.59	936677.78	1169.91	915590.78	936527.72	1170.69	916044.21	937509.77	1167.84	**915901.53**	**936905.09**	**1169.48**	**18.50**	
3/20/2019	916069.59	936677.78	1169.88	915590.78	936527.72	1170.66	916044.21	937509.77	1167.82	**915901.53**	**936905.09**	**1169.45**	**18.66**	
3/21/2019	916069.59	936677.78	1169.84	915590.78	936527.72	1170.62	916044.21	937509.77	1167.78	**915901.53**	**936905.09**	**1169.41**	**18.66**	
3/22/2019	916069.59	936677.78	1169.9	915590.78	936527.72	1170.68	916044.21	937509.77	1167.86	**915901.53**	**936905.09**	**1169.48**	**18.98**	
3/23/2019	916069.59	936677.78	1169.89	915590.78	936527.72	1170.66	916044.21	937509.77	1167.88	**915901.53**	**936905.09**	**1169.48**	**19.05**	
3/24/2019	916069.59	936677.78	1169.9	915590.78	936527.72	1170.65	916044.21	937509.77	1167.88	**915901.53**	**936905.09**	**1169.48**	**18.02**	
3/25/2019	916069.59	936677.78	1169.89	915590.78	936527.72	1170.65	916044.21	937509.77	1167.87	**915901.53**	**936905.09**	**1169.47**	**18.45**	
3/26/2019	916069.59	936677.78	1169.85	915590.78	936527.72	1170.61	916044.21	937509.77	1167.81	**915901.53**	**936905.09**	**1169.42**	**18.13**	
3/27/2019	916069.59	936677.78	1169.82	915590.78	936527.72	1170.58	916044.21	937509.77	1167.79	**915901.53**	**936905.09**	**1169.40**	**18.29**	
3/28/2019	916069.59	936677.78	1169.81	915590.78	936527.72	1170.57	916044.21	937509.77	1167.77	**915901.53**	**936905.09**	**1169.38**	**18.13**	
3/29/2019	916069.59	936677.78	1169.8	915590.78	936527.72	1170.56	916044.21	937509.77	1167.75	**915901.53**	**936905.09**	**1169.37**	**17.97**	
3/30/2019	916069.59	936677.78	1169.79	915590.78	936527.72	1170.55	916044.21	937509.77	1167.72	**915901.53**	**936905.09**	**1169.35**	**17.66**	
3/31/2019	916069.59	936677.78	1169.77	915590.78	936527.72	1170.52	916044.21	937509.77	1167.7	**915901.53**	**936905.09**	**1169.33**	**17.23**	
4/1/2019	916069.59	936677.78	1169.76	915590.78	936527.72	1170.51	916044.21	937509.77	1167.73	**915901.53**	**936905.09**	**1169.33**	**17.86**	
4/2/2019	916069.59	936677.78	1169.77	915590.78	936527.72	1170.51	916044.21	937509.77	1167.71	**915901.53**	**936905.09**	**1169.33**	**16.96**	
4/3/2019	916069.59	936677.78	1169.75	915590.78	936527.72	1170.5	916044.21	937509.77	1167.72	**915901.53**	**936905.09**	**1169.32**	**17.86**	
4/4/2019	916069.59	936677.78	1169.72	915590.78	936527.72	1170.47	916044.21	937509.77	1167.68	**915901.53**	**936905.09**	**1169.29**	**17.70**	
4/5/2019	916069.59	936677.78	1169.72	915590.78	936527.72	1170.46	916044.21	937509.77	1167.69	**915901.53**	**936905.09**	**1169.29**	**17.43**	
4/6/2019	916069.59	936677.78	1169.73	915590.78	936527.72	1170.48	916044.21	937509.77	1167.7	**915901.53**	**936905.09**	**1169.30**	**17.86**	
4/7/2019	916069.59	936677.78	1169.69	915590.78	936527.72	1170.43	916044.21	937509.77	1167.62	**915901.53**	**936905.09**	**1169.25**	**16.81**	
4/8/2019	916069.59	936677.78	1169.71	915590.78	936527.72	1170.45	916044.21	937509.77	1167.68	**915901.53**	**936905.09**	**1169.28**	**17.43**	
4/9/2019	916069.59	936677.78	1169.71	915590.78	936527.72	1170.45	916044.21	937509.77	1167.67	**915901.53**	**936905.09**	**1169.28**	**17.27**	
4/10/2019	916069.59	936677.78	1169.67	915590.78	936527.72	1170.41	916044.21	937509.77	1167.65	**915901.53**	**936905.09**	**1169.24**	**17.59**	
4/11/2019	916069.59	936677.78	1169.64	915590.78	936527.72	1170.38	916044.21	937509.77	1167.6	**915901.53**	**936905.09**	**1169.21**	**17.27**	
4/12/2019	916069.59	936677.78	1169.63	915590.78	936527.72	1170.37	916044.21	937509.77	1167.62	**915901.53**	**936905.09**	**1169.21**	**17.75**	
4/13/2019	916069.59	936677.78	1169.62	915590.78	936527.72	1170.36	916044.21	937509.77	1167.6	**915901.53**	**936905.09**	**1169.19**	**17.59**	
4/14/2019	916069.59	936677.78	1169.58	915590.78	936527.72	1170.32	916044.21	937509.77	1167.53	**915901.53**	**936905.09**	**1169.14**	**17.12**	
4/15/2019	916069.59	936677.78	1169.64	915590.78	936527.72	1170.38	916044.21	937509.77	1167.64	**915901.53**	**936905.09**	**1169.22**	**17.91**	
4/16/2019	916069.59	936677.78	1169.66	915590.78	936527.72	1170.38	916044.21	937509.77	1167.66	**915901.53**	**936905.09**	**1169.23**	**17.03**	
4/17/2019	916069.59	936677.78	1169.67	915590.78	936527.72	1170.38	916044.21	937509.77	1167.7	**915901.53**	**936905.09**	**1169.25**	**17.07**	
4/18/2019	916069.59	936677.78	1169.69	915590.78	936527.72	1170.4	916044.21	937509.77	1167.68	**915901.53**	**936905.09**	**1169.26**	**16.43**	
4/19/2019	916069.59	936677.78	1169.7	915590.78	936527.72	1170.42	916044.21	937509.77	1167.71	**915901.53**	**936905.09**	**1169.28**	**17.19**	
4/20/2019	916069.59	936677.78	1169.82	915590.78	936527.72	1170.56	916044.21	937509.77	1167.84	**915901.53**	**936905.09**	**1169.41**	**18.24**	
4/21/2019	916069.59	936677.78	1169.84	915590.78	936527.72	1170.55	916044.21	937509.77	1167.84	**915901.53**	**936905.09**	**1169.41**	**16.59**	
4/22/2019	916069.59	936677.78	1169.88	915590.78	936527.72	1170.59	916044.21	937509.77	1167.88	**915901.53**	**936905.09**	**1169.45**	**16.59**	
4/23/2019	916069.59	936677.78	1169.96	915590.78	936527.72	1170.66	916044.21	937509.77	1167.9	**915901.53**	**936905.09**	**1169.51**	**15.22**	
4/24/2019	916069.59	936677.78	1169.99	915590.78	936527.72	1170.7	916044.21	937509.77	1167.92	**915901.53**	**936905.09**	**1169.54**	**15.51**	
4/25/2019	916069.59	936677.78	1170.02	915590.78	936527.72	1170.73	916044.21	937509.77	1167.9	**915901.53**	**936905.09**	**1169.55**	**14.78**	
4/26/2019	916069.59	936677.78	1170.07	915590.78	936527.72	1170.79	916044.21	937509.77	1167.95	**915901.53**	**936905.09**	**1169.60**	**15.21**	
4/27/2019	916069.59	936677.78	1170.14	915590.78	936527.72	1170.87	916044.21	937509.77	1168.02	**915901.53**	**936905.09**	**1169.68**	**15.63**	
4/28/2019	916069.59	936677.78	1170.12	915590.78	936527.72	1170.85	916044.21	937509.77	1167.97	**915901.53**	**936905.09**	**1169.65**	**15.20**	
4/29/2019	916069.59	936677.78	1170.14	915590.78	936527.72	1170.88	916044.21	937509.77	1168.01	**915901.53**	**936905.09**	**1169.68**	**15.91**	
4/30/2019	916069.59	936677.78	1170.16	915590.78	936527.72	1170.9	916044.21	937509.77	1167.99	**915901.53**	**936905.09**	**1169.68**	**15.33**	
5/1/2019	916069.59	936677.78	1170.17	915590.78	936527.72	1170.92	916044.21	937509.77	1167.99	**915901.53**	**936905.09**	**1169.69**	**15.61**	
5/2/2019	916069.59	936677.78	1170.18	915590.78	936527.72	1170.94	916044.21	937509.77	1167.99	**915901.53**	**936905.09**	**1169.70**	**15.87**	
5/3/2019	916069.59	936677.78	1170.19	915590.78	936527.72	1170.96	916044.21	937509.77	1168.01	**915901.53**	**936905.09**	**1169.72**	**16.43**	
5/4/2019	916069.59	936677.78	1170.21	915590.78	936527.72	1170.98	916044.21	937509.77	1168.01	**915901.53**	**936905.09**	**1169.73**	**16.14**	
5/5/2019	916069.59	936677.78	1170.18	915590.78	936527.72	1170.95	916044.21	937509.77	1167.94	**915901.53**	**936905.09**	**1169.69**	**15.58**	
5/6/2019	916069.59	936677.78	1170.18	915590.78	936527.72	1170.96	916044.21	937509.77	1167.99	**915901.53**	**936905.09**	**1169.71**	**16.69**	
5/7/2019	916069.59	936677.78	1170.17	915590.78	936527.72	1170.95	916044.21	937509.77	1167.97	**915901.53**	**936905.09**	**1169.70**	**16.55**	
5/8/2019	916069.59	936677.78	1170.15	915590.78	936527.72	1170.92	916044.21	937509.77	1167.96	**915901.53**	**936905.09**	**1169.68**	**16.28**	
5/9/2019	916069.59	936677.78	1170.14	915590.78	936527.72	1170.91	916044.21	937509.77	1167.95	**915901.53**	**936905.09**	**1169.67**	**16.28**	
5/10/2019	916069.59	936677.78	1170.17	915590.78	936527.72	1170.95	916044.21	937509.77	1168.03	**915901.53**	**936905.09**	**1169.72**	**17.43**	
5/11/2019	916069.59	936677.78	1170.21	915590.78	936527.72	1170.98	916044.21	937509.77	1168.05	**915901.53**	**936905.09**	**1169.75**	**16.72**	
5/12/2019	916069.59	936677.78	1170.21	915590.78	936527.72	1170.97	916044.21	937509.77	1168.02	**915901.53**	**936905.09**	**1169.73**	**15.87**	
5/13/2019	916069.59	936677.78	1170.29	915590.78	936527.72	1171.05	916044.21	937509.77	1168.17	**915901.53**	**936905.09**	**1169.84**	**16.90**	
5/14/2019	916069.59	936677.78	1170.49	915590.78	936527.72	1171.23	916044.21	937509.77	1168.39	**915901.53**	**936905.09**	**1170.04**	**16.35**	
5/15/2019	916069.59	936677.78	1170.62	915590.78	936527.72	1171.34	916044.21	937509.77	1168.53	**915901.53**	**936905.09**	**1170.16**	**15.65**	
5/16/2019	916069.59	936677.78	1170.71	915590.78	936527.72	1171.43	916044.21	937509.77	1168.59	**915901.53**	**936905.09**	**1170.24**	**15.21**	
5/17/2019	916069.59	936677.78	1170.8	915590.78	936527.72	1171.52	916044.21	937509.77	1168.65	**915901.53**	**936905.09**	**1170.32**	**14.78**	
5/18/2019	916069.59	936677.78	1170.86	915590.78	936527.72	1171.59	916044.21	937509.77	1168.67	**915901.53**	**936905.09**	**1170.37**	**14.64**	
5/19/2019	916069.59	936677.78	1170.91	915590.78	936527.72	1171.64	916044.21	937509.77	1168.67	**915901.53**	**936905.09**	**1170.41**	**13.96**	
5/20/2019	916069.59	936677.78	1170.95	915590.78	936527.72	1171.74	916044.21	937509.77	1168.8	**915901.53**	**936905.09**	**1170.50**	**17.69**	
5/21/2019	916069.59	936677.78	1170.92	915590.78	936527.72	1171.78	916044.21	937509.77	1168.81	**915901.53**	**936905.09**	**1170.50**	**21.13**	
5/22/2019	916069.59	936677.78	1170.94	915590.78	936527.72	1171.8	916044.21	937509.77	1168.8	**915901.53**	**936905.09**	**1170.51**	**20.65**	
5/23/2019	916069.59	936677.78	1170.98	915590.78	936527.72	1171.84	916044.21	937509.77	1168.82	**915901.53**	**936905.09**	**1170.55**	**20.34**	
5/24/2019	916069.59	936677.78	1170.96	915590.78	936527.72	1171.85	916044.21	937509.77	1168.84	**915901.53**	**936905.09**	**1170.55**	**22.15**	
5/25/2019	916069.59	936677.78	1170.96	915590.78	936527.72	1171.85	916044.21	937509.77	1168.8	**915901.53**	**936905.09**	**1170.54**	**21.50**	
5/26/2019	916069.59	936677.78	1170.96	915590.78	936527.72	1171.86	916044.21	937509.77	1168.8	**915901.53**	**936905.09**	**1170.54**	**21.89**	
5/27/2019	916069.59	936677.78	1170.97	915590.78	936527.72	1171.87	916044.21	937509.77	1168.82	**915901.53**	**936905.09**	**1170.55**	**22.05**	
5/28/2019	916069.59	936677.78	1170.99	915590.78	936527.72	1171.89	916044.21	937509.77	1168.83	**915901.53**	**936905.09**	**1170.57**	**21.89**	
5/29/2019	916069.59	936677.78	1170.98	915590.78	936527.72	1171.88	916044.21	937509.77	1168.84	**915901.53**	**936905.09**	**1170.57**	**22.21**	
5/30/2019	916069.59	936677.78	1170.97	915590.78	936527.72	1171.87	916044.21	937509.77	1168.82	**915901.53**	**936905.09**	**1170.55**	**22.05**	
5/31/2019	916069.59	936677.78	1170.94	915590.78	936527.72	1171.84	916044.21	937509.77	1168.81	**915901.53**	**936905.09**	**1170.53**	**22.37**	
6/1/2019	916069.59	936677.78	1170.91	915590.78	936527.72	1171.81	916044.21	937509.77	1168.74	**915901.53**	**936905.09**	**1170.49**	**21.73**	
6/2/2019	916069.59	936677.78	1170.82	915590.78	936527.72	1171.74	916044.21	937509.77	1168.61	**915901.53**	**936905.09**	**1170.39**	**21.86**	
6/3/2019	916069.59	936677.78	1170.76	915590.78	936527.72	1171.69	916044.21	937509.77	1168.59	**915901.53**	**936905.09**	**1170.35**	**22.87**	
6/4/2019	916069.59	936677.78	1170.72	915590.78	936527.72	1171.63	916044.21	937509.77	1168.53	**915901.53**	**936905.09**	**1170.29**	**21.79**	
6/5/2019	916069.59	936677.78	1170.68	915590.78	936527.72	1171.59	916044.21	937509.77	1168.53	**915901.53**	**936905.09**	**1170.27**	**22.43**	
6/6/2019	916069.59	936677.78	1170.66	915590.78	936527.72	1171.57	916044.21	937509.77	1168.51	**915901.53**	**936905.09**	**1170.25**	**22.43**	
6/7/2019	916069.59	936677.78	1170.62	915590.78	936527.72	1171.52	916044.21	937509.77	1168.5	**915901.53**	**936905.09**	**1170.21**	**22.54**	
6/8/2019	916069.59	936677.78	1170.57	915590.78	936527.72	1171.47	916044.21	937509.77	1168.46	**915901.53**	**936905.09**	**1170.17**	**22.70**	

Table 1
Groundwater Elevations and Flow Direction Calculations

Date	MW-2			MW-3S			MW-4S			Mean GW Point for Flow Direction Calculation			Mean GW Flow Direction	Comments
	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	*Easting, ft*	*Northing, ft*	*Elevation, ft*		
6/9/2019	916069.59	936677.78	1170.48	915590.78	936527.72	1171.38	916044.21	937509.77	1168.36	**915901.53**	**936905.09**	**1170.07**	**22.54**	
6/10/2019	916069.59	936677.78	1170.44	915590.78	936527.72	1171.33	916044.21	937509.77	1168.38	**915901.53**	**936905.09**	**1170.05**	**23.15**	
6/11/2019	916069.59	936677.78	1170.38	915590.78	936527.72	1171.27	916044.21	937509.77	1168.32	**915901.53**	**936905.09**	**1169.99**	**23.15**	
6/12/2019	916069.59	936677.78	1170.29	915590.78	936527.72	1171.18	916044.21	937509.77	1168.21	**915901.53**	**936905.09**	**1169.89**	**22.81**	
6/13/2019	916069.59	936677.78	1170.2	915590.78	936527.72	1171.1	916044.21	937509.77	1168.07	**915901.53**	**936905.09**	**1169.79**	**22.37**	
6/14/2019	916069.59	936677.78	1170.09	915590.78	936527.72	1171.01	916044.21	937509.77	1167.97	**915901.53**	**936905.09**	**1169.69**	**23.30**	
6/15/2019	916069.59	936677.78	1170	915590.78	936527.72	1170.92	916044.21	937509.77	1167.87	**915901.53**	**936905.09**	**1169.60**	**23.14**	
6/16/2019	916069.59	936677.78	1169.91	915590.78	936527.72	1170.83	916044.21	937509.77	1167.77	**915901.53**	**936905.09**	**1169.50**	**22.97**	
6/17/2019	916069.59	936677.78	1169.9	915590.78	936527.72	1170.81	916044.21	937509.77	1167.8	**915901.53**	**936905.09**	**1169.50**	**23.25**	
6/18/2019	916069.59	936677.78	1169.86	915590.78	936527.72	1170.75	916044.21	937509.77	1167.74	**915901.53**	**936905.09**	**1169.45**	**22.15**	
6/19/2019	916069.59	936677.78	1169.8	915590.78	936527.72	1170.69	916044.21	937509.77	1167.72	**915901.53**	**936905.09**	**1169.40**	**22.81**	
6/20/2019	916069.59	936677.78	1169.77	915590.78	936527.72	1170.67	916044.21	937509.77	1167.68	**915901.53**	**936905.09**	**1169.37**	**23.03**	
6/21/2019	916069.59	936677.78	1169.79	915590.78	936527.72	1170.68	916044.21	937509.77	1167.71	**915901.53**	**936905.09**	**1169.39**	**22.81**	
6/22/2019	916069.59	936677.78	1169.75	915590.78	936527.72	1170.63	916044.21	937509.77	1167.64	**915901.53**	**936905.09**	**1169.34**	**21.92**	
6/23/2019	916069.59	936677.78	1169.67	915590.78	936527.72	1170.54	916044.21	937509.77	1167.52	**915901.53**	**936905.09**	**1169.24**	**20.88**	
6/24/2019	916069.59	936677.78	1169.63	915590.78	936527.72	1170.5	916044.21	937509.77	1167.51	**915901.53**	**936905.09**	**1169.21**	**21.36**	
6/25/2019	916069.59	936677.78	1169.58	915590.78	936527.72	1170.46	916044.21	937509.77	1167.44	**915901.53**	**936905.09**	**1169.16**	**21.43**	
6/26/2019	916069.59	936677.78	1169.53	915590.78	936527.72	1170.41	916044.21	937509.77	1167.43	**915901.53**	**936905.09**	**1169.12**	**22.08**	
6/27/2019	916069.59	936677.78	1169.49	915590.78	936527.72	1170.36	916044.21	937509.77	1167.37	**915901.53**	**936905.09**	**1169.07**	**21.36**	
6/28/2019	916069.59	936677.78	1169.44	915590.78	936527.72	1170.31	916044.21	937509.77	1167.37	**915901.53**	**936905.09**	**1169.04**	**22.19**	
6/29/2019	916069.59	936677.78	1169.41	915590.78	936527.72	1170.28	916044.21	937509.77	1167.32	**915901.53**	**936905.09**	**1169.00**	**21.85**	
6/30/2019	916069.59	936677.78	1169.33	915590.78	936527.72	1170.2	916044.21	937509.77	1167.24	**915901.53**	**936905.09**	**1168.92**	**21.85**	
7/1/2019	916069.59	936677.78	1169.27	915590.78	936527.72	1170.14	916044.21	937509.77	1167.24	**915901.53**	**936905.09**	**1168.88**	**22.87**	
7/2/2019	916069.59	936677.78	1169.21	915590.78	936527.72	1170.09	916044.21	937509.77	1167.17	**915901.53**	**936905.09**	**1168.82**	**23.09**	
7/3/2019	916069.59	936677.78	1169.13	915590.78	936527.72	1170.01	916044.21	937509.77	1167.13	**915901.53**	**936905.09**	**1168.76**	**23.79**	
7/4/2019	916069.59	936677.78	1169.06	915590.78	936527.72	1169.94	916044.21	937509.77	1167.06	**915901.53**	**936905.09**	**1168.69**	**23.79**	
7/5/2019	916069.59	936677.78	1168.98	915590.78	936527.72	1169.86	916044.21	937509.77	1167.04	**915901.53**	**936905.09**	**1168.63**	**24.87**	
7/6/2019	916069.59	936677.78	1168.93	915590.78	936527.72	1169.8	916044.21	937509.77	1166.98	**915901.53**	**936905.09**	**1168.57**	**24.28**	
7/7/2019	916069.59	936677.78	1168.83	915590.78	936527.72	1169.7	916044.21	937509.77	1166.87	**915901.53**	**936905.09**	**1168.47**	**24.10**	
7/8/2019	916069.59	936677.78	1168.76	915590.78	936527.72	1169.63	916044.21	937509.77	1166.86	**915901.53**	**936905.09**	**1168.42**	**25.21**	
7/9/2019	916069.59	936677.78	1168.69	915590.78	936527.72	1169.55	916044.21	937509.77	1166.78	**915901.53**	**936905.09**	**1168.34**	**24.61**	
7/10/2019	916069.59	936677.78	1168.6	915590.78	936527.72	1169.46	916044.21	937509.77	1166.72	**915901.53**	**936905.09**	**1168.26**	**25.18**	
7/11/2019	916069.59	936677.78	1168.52	915590.78	936527.72	1169.38	916044.21	937509.77	1166.63	**915901.53**	**936905.09**	**1168.18**	**24.99**	
7/12/2019	916069.59	936677.78	1168.44	915590.78	936527.72	1169.29	916044.21	937509.77	1166.6	**915901.53**	**936905.09**	**1168.11**	**25.53**	
7/13/2019	916069.59	936677.78	1168.35	915590.78	936527.72	1169.2	916044.21	937509.77	1166.5	**915901.53**	**936905.09**	**1168.02**	**25.33**	
7/14/2019	916069.59	936677.78	1168.23	915590.78	936527.72	1169.08	916044.21	937509.77	1166.36	**915901.53**	**936905.09**	**1167.89**	**24.95**	
7/15/2019	916069.59	936677.78	1168.14	915590.78	936527.72	1168.99	916044.21	937509.77	1166.35	**915901.53**	**936905.09**	**1167.83**	**26.53**	
7/16/2019	916069.59	936677.78	1168.07	915590.78	936527.72	1168.94	916044.21	937509.77	1166.27	**915901.53**	**936905.09**	**1167.76**	**27.17**	
7/17/2019	916069.59	936677.78	1168.05	915590.78	936527.72	1168.89	916044.21	937509.77	1166.29	**915901.53**	**936905.09**	**1167.74**	**26.71**	
7/18/2019	916069.59	936677.78	1168.01	915590.78	936527.72	1168.82	916044.21	937509.77	1166.25	**915901.53**	**936905.09**	**1167.69**	**25.39**	
7/19/2019	916069.59	936677.78	1167.96	915590.78	936527.72	1168.76	916044.21	937509.77	1166.23	**915901.53**	**936905.09**	**1167.65**	**25.57**	
7/20/2019	916069.59	936677.78	1167.91	915590.78	936527.72	1168.71	916044.21	937509.77	1166.16	**915901.53**	**936905.09**	**1167.59**	**25.15**	
7/21/2019	916069.59	936677.78	1167.81	915590.78	936527.72	1168.6	916044.21	937509.77	1166.03	**915901.53**	**936905.09**	**1167.48**	**24.10**	
7/22/2019	916069.59	936677.78	1167.75	915590.78	936527.72	1168.55	916044.21	937509.77	1166.05	**915901.53**	**936905.09**	**1167.45**	**26.20**	
7/23/2019	916069.59	936677.78	1167.73	915590.78	936527.72	1168.52	916044.21	937509.77	1165.99	**915901.53**	**936905.09**	**1167.41**	**24.91**	
7/24/2019	916069.59	936677.78	1167.68	915590.78	936527.72	1168.46	916044.21	937509.77	1166	**915901.53**	**936905.09**	**1167.38**	**25.71**	
7/25/2019	916069.59	936677.78	1167.63	915590.78	936527.72	1168.4	916044.21	937509.77	1165.93	**915901.53**	**936905.09**	**1167.32**	**24.82**	
7/26/2019	916069.59	936677.78	1167.55	915590.78	936527.72	1168.33	916044.21	937509.77	1165.88	**915901.53**	**936905.09**	**1167.25**	**25.93**	
7/27/2019	916069.59	936677.78	1167.48	915590.78	936527.72	1168.25	916044.21	937509.77	1165.77	**915901.53**	**936905.09**	**1167.17**	**24.61**	
7/28/2019	916069.59	936677.78	1167.34	915590.78	936527.72	1168.13	916044.21	937509.77	1165.59	**915901.53**	**936905.09**	**1167.02**	**24.70**	
7/29/2019	916069.59	936677.78	1167.25	915590.78	936527.72	1168.04	916044.21	937509.77	1165.56	**915901.53**	**936905.09**	**1166.95**	**25.96**	
7/30/2019	916069.59	936677.78	1167.15	915590.78	936527.72	1167.98	916044.21	937509.77	1165.45	**915901.53**	**936905.09**	**1166.86**	**27.54**	
7/31/2019	916069.59	936677.78	1167.05	915590.78	936527.72	1167.85	916044.21	937509.77	1165.33	**915901.53**	**936905.09**	**1166.74**	**25.78**	
8/1/2019	916069.59	936677.78	1166.95	915590.78	936527.72	1167.74	916044.21	937509.77	1165.25	**915901.53**	**936905.09**	**1166.65**	**25.74**	
8/2/2019	916069.59	936677.78	1166.9	915590.78	936527.72	1167.68	916044.21	937509.77	1165.28	**915901.53**	**936905.09**	**1166.62**	**27.03**	
8/3/2019	916069.59	936677.78	1166.84	915590.78	936527.72	1167.62	916044.21	937509.77	1165.24	**915901.53**	**936905.09**	**1166.57**	**27.49**	
8/4/2019	916069.59	936677.78	1166.75	915590.78	936527.72	1167.53	916044.21	937509.77	1165.13	**915901.53**	**936905.09**	**1166.47**	**27.03**	
8/5/2019	916069.59	936677.78	1166.65	915590.78	936527.72	1167.43	916044.21	937509.77	1165.07	**915901.53**	**936905.09**	**1166.38**	**27.95**	
8/6/2019	916069.59	936677.78	1166.56	915590.78	936527.72	1167.33	916044.21	937509.77	1164.94	**915901.53**	**936905.09**	**1166.28**	**26.56**	
8/7/2019	916069.59	936677.78	1166.45	915590.78	936527.72	1167.23	916044.21	937509.77	1164.88	**915901.53**	**936905.09**	**1166.19**	**28.18**	
8/8/2019	916069.59	936677.78	1166.37	915590.78	936527.72	1167.15	916044.21	937509.77	1164.79	**915901.53**	**936905.09**	**1166.10**	**27.95**	
8/9/2019	916069.59	936677.78	1166.29	915590.78	936527.72	1167.06	916044.21	937509.77	1164.75	**915901.53**	**936905.09**	**1166.03**	**28.42**	
8/10/2019	916069.59	936677.78	1166.21	915590.78	936527.72	1166.97	916044.21	937509.77	1164.66	**915901.53**	**936905.09**	**1165.95**	**27.70**	
8/11/2019	916069.59	936677.78	1166.07	915590.78	936527.72	1166.83	916044.21	937509.77	1164.49	**915901.53**	**936905.09**	**1165.80**	**27.00**	
8/12/2019	916069.59	936677.78	1165.98	915590.78	936527.72	1166.74	916044.21	937509.77	1164.47	**915901.53**	**936905.09**	**1165.73**	**28.66**	
8/13/2019	916069.59	936677.78	1165.89	915590.78	936527.72	1166.65	916044.21	937509.77	1164.37	**915901.53**	**936905.09**	**1165.64**	**28.42**	
8/14/2019	916069.59	936677.78	1165.77	915590.78	936527.72	1166.52	916044.21	937509.77	1164.26	**915901.53**	**936905.09**	**1165.52**	**28.17**	
8/15/2019	916069.59	936677.78	1165.67	915590.78	936527.72	1166.42	916044.21	937509.77	1164.15	**915901.53**	**936905.09**	**1165.41**	**27.93**	
8/16/2019	916069.59	936677.78	1165.58	915590.78	936527.72	1166.33	916044.21	937509.77	1164.12	**915901.53**	**936905.09**	**1165.34**	**29.42**	
8/17/2019	916069.59	936677.78	1165.5	915590.78	936527.72	1166.24	916044.21	937509.77	1164.02	**915901.53**	**936905.09**	**1165.25**	**28.42**	
8/18/2019	916069.59	936677.78	1165.38	915590.78	936527.72	1166.13	916044.21	937509.77	1163.87	**915901.53**	**936905.09**	**1165.13**	**28.17**	
8/19/2019	916069.59	936677.78	1165.31	915590.78	936527.72	1166.05	916044.21	937509.77	1163.87	**915901.53**	**936905.09**	**1165.08**	**29.43**	
8/20/2019	916069.59	936677.78	1165.23	915590.78	936527.72	1165.97	916044.21	937509.77	1163.78	**915901.53**	**936905.09**	**1164.99**	**29.17**	
8/21/2019	916069.59	936677.78	1165.12	915590.78	936527.72	1165.86	916044.21	937509.77	1163.67	**915901.53**	**936905.09**	**1164.88**	**29.17**	
8/22/2019	916069.59	936677.78	1165.03	915590.78	936527.72	1165.76	916044.21	937509.77	1163.58	**915901.53**	**936905.09**	**1164.79**	**28.67**	
8/23/2019	916069.59	936677.78	1164.91	915590.78	936527.72	1165.65	916044.21	937509.77	1163.5	**915901.53**	**936905.09**	**1164.69**	**30.21**	
8/24/2019	916069.59	936677.78	1164.82	915590.78	936527.72	1165.55	916044.21	937509.77	1163.39	**915901.53**	**936905.09**	**1164.59**	**29.18**	
8/25/2019	916069.59	936677.78	1164.67	915590.78	936527.72	1165.4	916044.21	937509.77	1163.2	**915901.53**	**936905.09**	**1164.42**	**28.16**	
8/26/2019	916069.59	936677.78	1164.58	915590.78	936527.72	1165.3	916044.21	937509.77	1163.18	**915901.53**	**936905.09**	**1164.35**	**29.46**	
8/27/2019	916069.59	936677.78	1164.49	915590.78	936527.72	1165.2	916044.21	937509.77	1163.06	**915901.53**	**936905.09**	**1164.25**	**28.16**	
8/28/2019	916069.59	936677.78	1164.39	915590.78	936527.72	1165.11	916044.21	937509.77	1163	**915901.53**	**936905.09**	**1164.17**	**29.73**	
8/29/2019	916069.59	936677.78	1164.34	915590.78	936527.72	1165.04	916044.21	937509.77	1162.94	**915901.53**	**936905.09**	**1164.11**	**28.42**	
8/30/2019	916069.59	936677.78	1164.25	915590.78	936527.72	1164.95	916044.21	937509.77	1162.88	**915901.53**	**936905.09**	**1164.03**	**29.22**	
8/31/2019	916069.59	936677.78	1164.16	915590.78	936527.72	1164.85	916044.21	937509.77	1162.76	**915901.53**	**936905.09**	**1163.92**	**27.89**	
9/1/2019	916069.59	936677.78	1164.01	915590.78	936527.72	1164.7	916044.21	937509.77	1162.57	**915901.53**	**936905.09**	**1163.76**	**26.86**	
9/2/2019	916069.59	936677.78	1163.94	915590.78	936527.72	1164.58	916044.21	937509.77	1162.57	**915901.53**	**936905.09**	**1163.70**	**25.93**	
9/3/2019	916069.59	936677.78	1163.86	915590.78	936527.72	1164.55	916044.21	937509.77	1162.47	**915901.53**	**936905.09**	**1163.63**	**28.15**	
9/4/2019	916069.59	936677.78	1163.73	915590.78	936527.72	1164.43	916044.21	937509.77	1162.35	**915901.53**	**936905.09**	**1163.50**	**28.95**	
9/5/2019	916069.59	936677.78	1163.62	915590.78	936527.72	1164.33	916044.21	937509.77	1162.21	**915901.53**	**936905.09**	**1163.39**	**28.68**	
9/6/2019	916069.59	936677.78	1163.52	915590.78	936527.72	1164.23	916044.21	937509.77	1162.16	**915901.53**	**936905.09**	**1163.30**	**30.02**	
9/7/2019	916069.59	936677.78	1163.44	915590.78	936527.72	1164.15	916044.21	937509.77	1162.06	**915901.53**	**936905.09**	**1163.22**	**29.47**	
9/8/2019	916069.59	936677.78	1163.29	915590.78	936527.72	1164	916044.21	937509.77	1161.88	**915901.53**	**936905.09**	**1163.06**	**28.68**	
9/9/2019	916069.59	936677.78	1163.21	915590.78	936527.72	1163.92	916044.21	937509.77	1161.87	**915901.53**	**936905.09**	**1163.00**	**30.57**	
9/10/2019	916069.59	936677.78	1163.12	915590.78	936527.72	1163.83	916044.21	937509.77	1161.74	**915901.53**	**936905.09**	**1162.90**	**29.47**	
9/11/2019	916069.59	936677.78	1163.01	915590.78	936527.72	1163.71	916044.21	937509.77	1161.65	**915901.53**	**936905.09**	**1162.79**	**29.49**	
9/12/2019	916069.59	936677.78	1162.94	915590.78	936527.72	1163.62	916044.21	937509.77	1161.53	**915901.53**	**936905.09**	**1162.70**	**27.09**	
9/13/2019	916069.59	936677.78	1162.85	915590.78	936527.72	1163.51	916044.21	937509.77	1161.47	**915901.53**	**936905.09**	**1162.61**	**26.79**	
9/14/2019	916069.59	936677.78	1162.77	915590.78	936527.72	1163.42	916044.21	937509.77	1161.35	**915901.53**	**936905.09**	**1162.51**	**25.20**	
9/15/2019	916069.59	936677.78	1162.61	915590.78	936527.72	1163.26	916044.21	937509.77	1161.16	**915901.53**	**936905.09**	**1162.34**	**24.45**	
9/16/2019	916069.59	936677.78	1162.52	915590.78	936527.72	1163.18	916044.21	937509.77	1161.14	**915901.53**	**936905.09**	**1162.28**	**26.79**	
9/17/2019	916069.59	936677.78	1162.44	915590.78	936527.72	1163.09	916044.21	937509.77	1161.03	**915901.53**	**936905.09**	**1162.19**	**25.45**	
9/18/2019	916069.59	936677.78	1162.32	915590.78	936527.72	1162.97	916044.21	937509.77	1160.93	**915901.53**	**936905.09**	**1162.07**	**25.97**	
9/19/2019	916069.59	936677.78	1162.21	915590.78	936527.72	1162.86	916044.21	937509.77	1160.78	**915901.53**	**936905.09**	**1161.95**	**24.95**	
9/20/2019	916069.59	936677.78	1162.12	915590.78	936527.72	1162.77	916044.21	937509.77	1160.74	**915901.53**	**936905.09**	**1161.88**	**26.23**	
9/21/2019	916069.59	936677.78	1161.99	915590.78	936527.72	1162.65	916044.21	937509.77	1160.54	**915901.53**	**936905.09**	**1161.73**	**25.00**	
9/22/2019	916069.59	936677.78	1161.83	915590.78	936527.72	1162.49	916044.21	937509.77	1160.39	**915901.53**	**936905.09**	**1161.57**	**25.25**	
9/23/2019	916069.59	936677.78	1161.76	915590.78	936527.72	1162.42	916044.21	937509.77	1160.4	**915901.53**	**936905.09**	**1161.53**	**27.32**	
9/24/2019	916069.59	936677.78	1161.68	915590.78	936527.72	1162.33	916044.21	937509.77	1160.27	**915901.53**	**936905.09**	**1161.43**	**25.45**	
9/25/2019	916069.59	936677.78	1161.57	915590.78	936527.72	1162.23	916044.21	937509.77	1160.21	**915901.53**	**936905.09**	**1161.34**	**27.32**	
9/26/2019	916069.59	936677.78	1161.49	915590.78	936527.72	1162.13	916044.21	937509.77	1160.08	**915901.53**	**936905.09**	**1161.23**	**24.90**	
9/27/2019	916069.59	936677.78	1161.39	915590.78	936527.72	1162.03	916044.21	937509.77	1160.04	**915901.53**	**936905.09**	**1161.15**	**26.47**	
9/28/2019	916069.59	936677.78	1161.29	915590.78	936527.72	1161.93	916044.21	937509.77	1159.89	**915901.53**	**936905.09**	**1161.04**	**25.15**	
9/29/2019	916069.59	936677.78	1161.14	915590.78	936527.72	1161.78	916044.21	937509.77	1159.72	**915901.53**	**936905.09**	**1160.88**	**24.65**	
9/30/2019	916069.59	936677.78	1161.07	915590.78	936527.72	1161.71	916044.21	937509.77	1159.74	**915901.53**	**936905.09**	**1160.84**	**27.01**	
10/1/2019	916069.59	936677.78	1160.99	915590.78	936527.72	1161.63	916044.21	937509.77	1159.62	**915901.53**	**936905.09**	**1160.75**	**25.93**	
10/2/2019	916069.59	936677.78	1160.88	915590.78	936527.72	1161.52	916044.21	937509.77	1159.55	**915901.53**	**936905.09**	**1160.65**	**27.01**	
10/3/2019	916069.59	936677.78	1160.81	915590.78	936527.72	1161.41	916044.21	937509.77	1159.46	**915901.53**	**936905.09**	**1160.56**	**24.15**	
10/4/2019	916069.59	936677.78	1160.81	915590.78	936527.72	1161.48	916044.21	937509.77	1159.52	**915901.53**	**936905.09**	**1160.60**	**29.83**	
10/5/2019	916069.59	936677.78	1160.76	915590.78	936527.72	1161.38	916044.21	937509.77	1159.44	**915901.53**	**936905.09**	**1160.53**	**26.13**	
10/6/2019	916069.59	936677.78	1160.63	915590.78	936527.72	1161.24	916044.21	937509.77	1159.27	**915901.53**	**936905.09**	**1160.38**	**24.47**	
10/7/2019	916069.59	936677.78	1160.63	915590.78	936527.72	1161.25	916044.21	937509.77	1159.35	**915901.53**	**936905.09**	**1160.41**	**27.25**	
10/8/2019	916069.59	936677.78	1160.65	915590.78	936527.72	1161.25	916044.21	937509.77	1159.33	**915901.53**	**936905.09**	**1160.41**	**24.95**	
10/9/2019	916069.59	936677.78	1160.55	915590.78	936527.72	1161.14	916044.21	937509.77	1159.26	**915901.53**	**936905.09**	**1160.32**	**25.17**	
10/10/2019	916069.59	936677.78	1160.49	915590.78	936527.72	1161.08	916044.21	937509.77	1159.16	**915901.53**	**936905.09**	**1160.24**	**24.08**	

Table 1
Groundwater Elevations and Flow Direction Calculations

Date	MW-2			MW-3S			MW-4S			Mean GW Point for Flow Direction Calculation			Mean GW Flow Direction	Comments
	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	Easting, ft	Northing, ft	Elevation, ft	*Easting, ft*	*Northing, ft*	*Elevation, ft*		
10/11/2019	916069.59	936677.78	1160.42	915590.78	936527.72	1161.01	916044.21	937509.77	1159.14	**915901.53**	**936905.09**	**1160.19**	**25.45**	
10/12/2019	916069.59	936677.78	1160.35	915590.78	936527.72	1160.94	916044.21	937509.77	1159.02	**915901.53**	**936905.09**	**1160.10**	**24.08**	
10/13/2019	916069.59	936677.78	1160.22	915590.78	936527.72	1160.81	916044.21	937509.77	1158.86	**915901.53**	**936905.09**	**1159.96**	**23.29**	
10/14/2019	916069.59	936677.78	1160.16	915590.78	936527.72	1160.75	916044.21	937509.77	1158.87	**915901.53**	**936905.09**	**1159.93**	**25.17**	
10/15/2019	916069.59	936677.78	1160.1	915590.78	936527.72	1160.69	916044.21	937509.77	1158.76	**915901.53**	**936905.09**	**1159.85**	**23.82**	
10/16/2019	916069.59	936677.78	1160.01	915590.78	936527.72	1160.61	916044.21	937509.77	1158.7	**915901.53**	**936905.09**	**1159.77**	**25.22**	
10/17/2019	916069.59	936677.78	1160.04	915590.78	936527.72	1160.8	916044.21	937509.77	1158.72	**915901.53**	**936905.09**	**1159.85**	**33.69**	
10/18/2019	916069.59	936677.78	1160.14	915590.78	936527.72	1160.74	916044.21	937509.77	1158.88	**915901.53**	**936905.09**	**1159.92**	**26.63**	
10/19/2019	916069.59	936677.78	1160.2	915590.78	936527.72	1160.74	916044.21	937509.77	1158.9	**915901.53**	**936905.09**	**1159.95**	**21.78**	
10/20/2019	916069.59	936677.78	1160.13	915590.78	936527.72	1160.67	916044.21	937509.77	1158.78	**915901.53**	**936905.09**	**1159.86**	**20.49**	
10/21/2019	916069.59	936677.78	1160.15	915590.78	936527.72	1160.69	916044.21	937509.77	1158.87	**915901.53**	**936905.09**	**1159.90**	**22.32**	
10/22/2019	916069.59	936677.78	1160.15	915590.78	936527.72	1160.7	916044.21	937509.77	1158.81	**915901.53**	**936905.09**	**1159.89**	**21.37**	
10/23/2019	916069.59	936677.78	1160.13	915590.78	936527.72	1160.7	916044.21	937509.77	1158.83	**915901.53**	**936905.09**	**1159.89**	**23.67**	
10/24/2019	916069.59	936677.78	1160.14	915590.78	936527.72	1160.68	916044.21	937509.77	1158.81	**915901.53**	**936905.09**	**1159.88**	**21.00**	
10/25/2019	916069.59	936677.78	1160.15	915590.78	936527.72	1160.69	916044.21	937509.77	1158.86	**915901.53**	**936905.09**	**1159.90**	**22.05**	
10/26/2019	916069.59	936677.78	1160.17	915590.78	936527.72	1160.71	916044.21	937509.77	1158.82	**915901.53**	**936905.09**	**1159.90**	**20.49**	
10/27/2019	916069.59	936677.78	1160.08	915590.78	936527.72	1160.59	916044.21	937509.77	1158.66	**915901.53**	**936905.09**	**1159.78**	**16.95**	
10/28/2019	916069.59	936677.78	1160.11	915590.78	936527.72	1160.67	916044.21	937509.77	1158.8	**915901.53**	**936905.09**	**1159.86**	**22.78**	
10/29/2019	916069.59	936677.78	1160.14	915590.78	936527.72	1160.68	916044.21	937509.77	1158.76	**915901.53**	**936905.09**	**1159.86**	**19.75**	
10/30/2019	916069.59	936677.78	1160.11	915590.78	936527.72	1160.66	916044.21	937509.77	1158.77	**915901.53**	**936905.09**	**1159.85**	**21.37**	
10/31/2019	916069.59	936677.78	1160.14	915590.78	936527.72	1160.69	916044.21	937509.77	1158.77	**915901.53**	**936905.09**	**1159.87**	**20.62**	
11/1/2019	916069.59	936677.78	1160.56	915590.78	936527.72	1161.15	916044.21	937509.77	1159.38	**915901.53**	**936905.09**	**1160.36**	**28.42**	
11/2/2019	916069.59	936677.78	1160.96	915590.78	936527.72	1161.4	916044.21	937509.77	1159.9	**915901.53**	**936905.09**	**1160.75**	**21.76**	
11/3/2019	916069.59	936677.78	1161.2	915590.78	936527.72	1161.59	916044.21	937509.77	1160.12	**915901.53**	**936905.09**	**1160.97**	**17.13**	
11/4/2019	916069.59	936677.78	1161.5	915590.78	936527.72	1161.88	916044.21	937509.77	1160.47	**915901.53**	**936905.09**	**1161.28**	**17.82**	
11/5/2019	916069.59	936677.78	1161.78	915590.78	936527.72	1162.14	916044.21	937509.77	1160.65	**915901.53**	**936905.09**	**1161.52**	**13.29**	
11/6/2019	916069.59	936677.78	1161.96	915590.78	936527.72	1162.33	916044.21	937509.77	1160.82	**915901.53**	**936905.09**	**1161.70**	**13.84**	
11/7/2019	916069.59	936677.78	1162.15	915590.78	936527.72	1162.54	916044.21	937509.77	1160.94	**915901.53**	**936905.09**	**1161.88**	**13.63**	
11/8/2019	916069.59	936677.78	1162.3	915590.78	936527.72	1162.7	916044.21	937509.77	1161.11	**915901.53**	**936905.09**	**1162.04**	**14.89**	
11/9/2019	916069.59	936677.78	1162.43	915590.78	936527.72	1162.83	916044.21	937509.77	1161.14	**915901.53**	**936905.09**	**1162.13**	**12.50**	
11/10/2019	916069.59	936677.78	1162.4	915590.78	936527.72	1162.83	916044.21	937509.77	1161.03	**915901.53**	**936905.09**	**1162.09**	**12.85**	
11/11/2019	916069.59	936677.78	1162.53	915590.78	936527.72	1162.96	916044.21	937509.77	1161.27	**915901.53**	**936905.09**	**1162.25**	**15.36**	
11/12/2019	916069.59	936677.78	1162.63	915590.78	936527.72	1163.07	916044.21	937509.77	1161.31	**915901.53**	**936905.09**	**1162.34**	**14.64**	
11/13/2019	916069.59	936677.78	1162.64	915590.78	936527.72	1163.1	916044.21	937509.77	1161.35	**915901.53**	**936905.09**	**1162.36**	**16.73**	
11/14/2019	916069.59	936677.78	1162.68	915590.78	936527.72	1163.14	916044.21	937509.77	1161.32	**915901.53**	**936905.09**	**1162.38**	**15.08**	
11/15/2019	916069.59	936677.78	1162.73	915590.78	936527.72	1163.2	916044.21	937509.77	1161.44	**915901.53**	**936905.09**	**1162.46**	**17.41**	
11/16/2019	916069.59	936677.78	1162.78	915590.78	936527.72	1163.26	916044.21	937509.77	1161.45	**915901.53**	**936905.09**	**1162.50**	**17.11**	
11/17/2019	916069.59	936677.78	1162.77	915590.78	936527.72	1163.25	916044.21	937509.77	1161.41	**915901.53**	**936905.09**	**1162.48**	**16.40**	
11/18/2019	916069.59	936677.78	1162.85	915590.78	936527.72	1163.34	916044.21	937509.77	1161.59	**915901.53**	**936905.09**	**1162.59**	**19.55**	
11/19/2019	916069.59	936677.78	1162.91	915590.78	936527.72	1163.4	916044.21	937509.77	1161.6	**915901.53**	**936905.09**	**1162.64**	**18.26**	
11/20/2019	916069.59	936677.78	1162.9	915590.78	936527.72	1163.43	916044.21	937509.77	1161.65	**915901.53**	**936905.09**	**1162.66**	**22.49**	
11/21/2019	916069.59	936677.78	1162.93	915590.78	936527.72	1163.47	916044.21	937509.77	1161.64	**915901.53**	**936905.09**	**1162.68**	**22.05**	
11/22/2019	916069.59	936677.78	1162.96	915590.78	936527.72	1163.52	916044.21	937509.77	1161.74	**915901.53**	**936905.09**	**1162.74**	**25.30**	
11/23/2019	916069.59	936677.78	1162.99	915590.78	936527.72	1163.54	916044.21	937509.77	1161.73	**915901.53**	**936905.09**	**1162.75**	**23.51**	
11/24/2019	916069.59	936677.78	1162.96	915590.78	936527.72	1163.51	916044.21	937509.77	1161.65	**915901.53**	**936905.09**	**1162.71**	**22.15**	
11/25/2019	916069.59	936677.78	1163	915590.78	936527.72	1163.56	916044.21	937509.77	1161.8	**915901.53**	**936905.09**	**1162.79**	**25.90**	
11/26/2019	916069.59	936677.78	1163.05	915590.78	936527.72	1163.59	916044.21	937509.77	1161.79	**915901.53**	**936905.09**	**1162.81**	**22.87**	
11/27/2019	916069.59	936677.78	1163.08	915590.78	936527.72	1163.63	916044.21	937509.77	1161.85	**915901.53**	**936905.09**	**1162.85**	**24.36**	
11/28/2019	916069.59	936677.78	1163.11	915590.78	936527.72	1163.65	916044.21	937509.77	1161.84	**915901.53**	**936905.09**	**1162.87**	**22.59**	
11/29/2019	916069.59	936677.78	1163.15	915590.78	936527.72	1163.7	916044.21	937509.77	1161.95	**915901.53**	**936905.09**	**1162.93**	**25.25**	
11/30/2019	916069.59	936677.78	1163.22	915590.78	936527.72	1163.76	916044.21	937509.77	1161.95	**915901.53**	**936905.09**	**1162.98**	**22.59**	
12/1/2019	916069.59	936677.78	1163.22	915590.78	936527.72	1163.75	916044.21	937509.77	1161.9	**915901.53**	**936905.09**	**1162.96**	**20.62**	
12/2/2019	916069.59	936677.78	1163.31	915590.78	936527.72	1163.84	916044.21	937509.77	1162.08	**915901.53**	**936905.09**	**1163.08**	**23.05**	
12/3/2019	916069.59	936677.78	1163.35	915590.78	936527.72	1163.89	916044.21	937509.77	1162.05	**915901.53**	**936905.09**	**1163.10**	**21.78**	
12/4/2019	916069.59	936677.78	1163.38	915590.78	936527.72	1163.92	916044.21	937509.77	1162.12	**915901.53**	**936905.09**	**1163.14**	**22.87**	
12/5/2019	916069.59	936677.78	1163.46	915590.78	936527.72	1163.94	916044.21	937509.77	1162.1	**915901.53**	**936905.09**	**1163.17**	**16.40**	
12/6/2019	916069.59	936677.78	1163.6	915590.78	936527.72	1163.99	916044.21	937509.77	1162.19	**915901.53**	**936905.09**	**1163.26**	**9.36**	**Possible Partial Westward Flow**
12/7/2019	916069.59	936677.78	1163.67	915590.78	936527.72	1163.98	916044.21	937509.77	1162.1	**915901.53**	**936905.09**	**1163.25**	**1.68**	**Possible Partial Westward Flow**
12/8/2019	916069.59	936677.78	1163.48	915590.78	936527.72	1163.92	916044.21	937509.77	1161.98	**915901.53**	**936905.09**	**1163.13**	**10.94**	
12/9/2019	916069.59	936677.78	1163.21	915590.78	936527.72	1164.03	916044.21	937509.77	1162.18	**915901.53**	**936905.09**	**1163.14**	**45.75**	
12/10/2019	916069.59	936677.78	1163.62	915590.78	936527.72	1164.24	916044.21	937509.77	1162.31	**915901.53**	**936905.09**	**1163.39**	**26.41**	
12/11/2019	916069.59	936677.78	1163.85	915590.78	936527.72	1164.38	916044.21	937509.77	1162.69	**915901.53**	**936905.09**	**1163.64**	**25.13**	
12/12/2019	916069.59	936677.78	1164.09	915590.78	936527.72	1164.56	916044.21	937509.77	1162.93	**915901.53**	**936905.09**	**1163.86**	**20.93**	
12/13/2019	916069.59	936677.78	1164.34	915590.78	936527.72	1164.8	916044.21	937509.77	1163.24	**915901.53**	**936905.09**	**1164.13**	**22.01**	
12/14/2019	916069.59	936677.78	1164.71	915590.78	936527.72	1165.07	916044.21	937509.77	1163.44	**915901.53**	**936905.09**	**1164.41**	**10.01**	
12/15/2019	916069.59	936677.78	1165.02	915590.78	936527.72	1165.28	916044.21	937509.77	1163.63	**915901.53**	**936905.09**	**1164.64**	**0.66**	**Possible Partial Westward Flow**
12/16/2019	916069.59	936677.78	1165.2	915590.78	936527.72	1165.52	916044.21	937509.77	1164.02	**915901.53**	**936905.09**	**1164.91**	**8.84**	**Possible Partial Westward Flow**
12/17/2019	916069.59	936677.78	1165.41	915590.78	936527.72	1165.78	916044.21	937509.77	1164.24	**915901.53**	**936905.09**	**1165.14**	**13.07**	
12/18/2019	916069.59	936677.78	1165.59	915590.78	936527.72	1165.99	916044.21	937509.77	1164.45	**915901.53**	**936905.09**	**1165.34**	**16.22**	
12/19/2019	916069.59	936677.78	1165.74	915590.78	936527.72	1166.16	916044.21	937509.77	1164.56	**915901.53**	**936905.09**	**1165.49**	**16.67**	
12/20/2019	916069.59	936677.78	1165.89	915590.78	936527.72	1166.31	916044.21	937509.77	1164.71	**915901.53**	**936905.09**	**1165.64**	**16.67**	
12/21/2019	916069.59	936677.78	1166.02	915590.78	936527.72	1166.46	916044.21	937509.77	1164.75	**915901.53**	**936905.09**	**1165.74**	**15.82**	
12/22/2019	916069.59	936677.78	1166.1	915590.78	936527.72	1166.56	916044.21	937509.77	1164.78	**915901.53**	**936905.09**	**1165.81**	**16.00**	
12/23/2019	916069.59	936677.78	1166.21	915590.78	936527.72	1166.69	916044.21	937509.77	1164.91	**915901.53**	**936905.09**	**1165.94**	**17.84**	
12/24/2019	916069.59	936677.78	1166.3	915590.78	936527.72	1166.8	916044.21	937509.77	1164.97	**915901.53**	**936905.09**	**1166.02**	**18.43**	
12/25/2019	916069.59	936677.78	1166.4	915590.78	936527.72	1166.9	916044.21	937509.77	1165.06	**915901.53**	**936905.09**	**1166.12**	**18.18**	
12/26/2019	916069.59	936677.78	1166.48	915590.78	936527.72	1167	916044.21	937509.77	1165.1	**915901.53**	**936905.09**	**1166.19**	**18.50**	
12/27/2019	916069.59	936677.78	1166.58	915590.78	936527.72	1167.12	916044.21	937509.77	1165.21	**915901.53**	**936905.09**	**1166.30**	**20.00**	
12/28/2019	916069.59	936677.78	1166.67	915590.78	936527.72	1167.21	916044.21	937509.77	1165.24	**915901.53**	**936905.09**	**1166.37**	**18.57**	
12/29/2019	916069.59	936677.78	1166.75	915590.78	936527.72	1167.29	916044.21	937509.77	1165.29	**915901.53**	**936905.09**	**1166.44**	**17.90**	
12/30/2019	916069.59	936677.78	1166.94	915590.78	936527.72	1167.49	916044.21	937509.77	1165.52	**915901.53**	**936905.09**	**1166.65**	**19.41**	
12/31/2019	916069.59	936677.78	1167.13	915590.78	936527.72	1167.66	916044.21	937509.77	1165.71	**915901.53**	**936905.09**	**1166.83**	**18.19**	
1/1/2020	916069.59	936677.78	1167.28	915590.78	936527.72	1167.81	916044.21	937509.77	1165.91	**915901.53**	**936905.09**	**1167.00**	**19.37**	
1/2/2020	916069.59	936677.78	1167.41	915590.78	936527.72	1167.93	916044.21	937509.77	1165.95	**915901.53**	**936905.09**	**1167.10**	**16.69**	
1/3/2020	916069.59	936677.78	1167.5	915590.78	936527.72	1168.04	916044.21	937509.77	1166.05	**915901.53**	**936905.09**	**1167.20**	**18.12**	
1/4/2020	916069.59	936677.78	1167.63	915590.78	936527.72	1168.17	916044.21	937509.77	1166.12	**915901.53**	**936905.09**	**1167.31**	**16.82**	
1/5/2020	916069.59	936677.78	1167.7	915590.78	936527.72	1168.26	916044.21	937509.77	1166.16	**915901.53**	**936905.09**	**1167.37**	**17.35**	
1/6/2020	916069.59	936677.78	1167.82	915590.78	936527.72	1168.38	916044.21	937509.77	1166.3	**915901.53**	**936905.09**	**1167.50**	**17.77**	
1/7/2020	916069.59	936677.78	1167.92	915590.78	936527.72	1168.48	916044.21	937509.77	1166.36	**915901.53**	**936905.09**	**1167.59**	**16.94**	
1/8/2020	916069.59	936677.78	1168	915590.78	936527.72	1168.58	916044.21	937509.77	1166.47	**915901.53**	**936905.09**	**1167.68**	**18.70**	
1/9/2020	916069.59	936677.78	1168.02	915590.78	936527.72	1168.61	916044.21	937509.77	1166.44	**915901.53**	**936905.09**	**1167.69**	**18.21**	
1/10/2020	916069.59	936677.78	1168.11	915590.78	936527.72	1168.71	916044.21	937509.77	1166.56	**915901.53**	**936905.09**	**1167.79**	**19.39**	
1/11/2020	916069.59	936677.78	1168.27	915590.78	936527.72	1168.87	916044.21	937509.77	1166.63	**915901.53**	**936905.09**	**1167.92**	**17.55**	
1/12/2020	916069.59	936677.78	1168.3	915590.78	936527.72	1168.9	916044.21	937509.77	1166.66	**915901.53**	**936905.09**	**1167.95**	**17.55**	
1/13/2020	916069.59	936677.78	1168.4	915590.78	936527.72	1169.01	916044.21	937509.77	1166.8	**915901.53**	**936905.09**	**1168.07**	**18.89**	
1/14/2020	916069.59	936677.78	1168.5	915590.78	936527.72	1169.1	916044.21	937509.77	1166.83	**915901.53**	**936905.09**	**1168.14**	**16.97**	
1/15/2020	916069.59	936677.78	1168.57	915590.78	936527.72	1169.19	916044.21	937509.77	1166.92	**915901.53**	**936905.09**	**1168.23**	**18.41**	
1/16/2020	916069.59	936677.78	1168.64	915590.78	936527.72	1169.27	916044.21	937509.77	1166.95	**915901.53**	**936905.09**	**1168.29**	**18.15**	
1/17/2020	916069.59	936677.78	1168.66	915590.78	936527.72	1169.3	916044.21	937509.77	1167	**915901.53**	**936905.09**	**1168.32**	**19.26**	
1/18/2020	916069.59	936677.78	1168.77	915590.78	936527.72	1169.41	916044.21	937509.77	1167.02	**915901.53**	**936905.09**	**1168.40**	**17.53**	
1/19/2020	916069.59	936677.78	1168.79	915590.78	936527.72	1169.44	916044.21	937509.77	1167.03	**915901.53**	**936905.09**	**1168.42**	**17.85**	
1/20/2020	916069.59	936677.78	1168.81	915590.78	936527.72	1169.48	916044.21	937509.77	1167.09	**915901.53**	**936905.09**	**1168.46**	**19.60**	
1/21/2020	916069.59	936677.78	1168.87	915590.78	936527.72	1169.53	916044.21	937509.77	1167.1	**915901.53**	**936905.09**	**1168.50**	**18.16**	
1/22/2020	916069.59	936677.78	1168.92	915590.78	936527.72	1169.59	916044.21	937509.77	1167.15	**915901.53**	**936905.09**	**1168.55**	**18.65**	
1/23/2020	916069.59	936677.78	1168.94	915590.78	936527.72	1169.62	916044.21	937509.77	1167.14	**915901.53**	**936905.09**	**1168.57**	**18.59**	
1/24/2020	916069.59	936677.78	1168.96	915590.78	936527.72	1169.65	916044.21	937509.77	1167.19	**915901.53**	**936905.09**	**1168.60**	**19.63**	
1/25/2020	916069.59	936677.78	1169.03	915590.78	936527.72	1169.73	916044.21	937509.77	1167.22	**915901.53**	**936905.09**	**1168.66**	**19.36**	
1/26/2020	916069.59	936677.78	1169.11	915590.78	936527.72	1169.81	916044.21	937509.77	1167.29	**915901.53**	**936905.09**	**1168.74**	**19.18**	
1/27/2020	916069.59	936677.78	1169.19	915590.78	936527.72	1169.88	916044.21	937509.77	1167.41	**915901.53**	**936905.09**	**1168.83**	**19.44**	
1/28/2020	916069.59	936677.78	1169.23	915590.78	936527.72	1169.92	916044.21	937509.77	1167.42	**915901.53**	**936905.09**	**1168.86**	**18.89**	
1/29/2020	916069.59	936677.78	1169.22	915590.78	936527.72	1169.92	916044.21	937509.77	1167.43	**915901.53**	**936905.09**	**1168.86**	**19.73**	
1/30/2020	916069.59	936677.78	1169.22	915590.78	936527.72	1169.92	916044.21	937509.77	1167.41	**915901.53**	**936905.09**	**1168.85**	**19.36**	
1/31/2020	916069.59	936677.78	1169.22	915590.78	936527.72	1169.93	916044.21	937509.77	1167.41	**915901.53**	**936905.09**	**1168.85**	**19.83**	
2/1/2020	916069.59	936677.78	1169.24	915590.78	936527.72	1169.95	916044.21	937509.77	1167.39	**915901.53**	**936905.09**	**1168.86**	**19.11**	
2/2/2020	916069.59	936677.78	1169.25	915590.78	936527.72	1169.96	916044.21	937509.77	1167.4	**915901.53**	**936905.09**	**1168.87**	**19.11**	
2/3/2020	916069.59	936677.78	1169.24	915590.78	936527.72	1169.96	916044.21	937509.77	1167.45	**915901.53**	**936905.09**	**1168.88**	**20.68**	
2/4/2020	916069.59	936677.78	1169.25	915590.78	936527.72	1169.98	916044.21	937509.77	1167.44	**915901.53**	**936905.09**	**1168.89**	**20.77**	
2/5/2020	916069.59	936677.78	1169.23	915590.78	936527.72	1169.96	916044.21	937509.77	1167.44	**915901.53**	**936905.09**	**1168.88**	**21.15**	
2/6/2020	916069.59	936677.78	1169.29	915590.78	936527.72	1170.01	916044.21	937509.77	1167.49	**915901.53**	**936905.09**	**1168.93**	**20.49**	

Minimum Flow Direction	**0.7**
Average Flow Direction	**21.2**
Maximum Flow Direction	**45.8**

Appendices

Appendix 1 - H2H Interim Report Submitted July 2019

BASELINE - QUARTERS 1 & 2
HYDROGEOLOGIC INVESTIGATION REPORT
Cortlandville Sand and Gravel Mine

In Support of NOIA for NYSDEC Mine Permit Modification
NYSDEC Mine Permit #7-1122-00043/00008
MLR Mine #70436

July 2019

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TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1-1
1.1 PROJECT BACKGROUND 1-1
1.2 PURPOSE 1-1
1.3 SCOPE 1-1

2.0 INVESTIGATION METHODS 2-1
2.1 USGS TOPOGRAPHIC MAP REVIEW 2-1
2.2 NEARBY FORMER SCM SITE REMEDIATION REVIEW 2-1
2.3 RESEARCH OF PUBLISHED HYDROGEOLOGIC INFORMATION 2-1
2.4 EXISTING ONSITE MONITORING WELL EVALUATION 2-2
2.5 SOIL DRILLING AND WELL INSTALLATIONS 2-2
2.6 GRAIN SIZE ANALYSIS 2-3
2.7 POND STAFF GAUGE INSTALLATION 2-4
2.8 SURVEYING 2-4
2.9 WATER LEVEL MEASUREMENTS 2-4
2.10 GROUNDWATER SAMPLING AND ANALYSIS 2-5

3.0 RESULTS 3-1
3.1 AQUIFER LITHOLOGY AND GRAIN SIZE ANALYSES 3-1
3.2 GROUND WATER AND POND LEVELS 3-1
3.3 GROUNDWATER ANALYSES 3-1

4.0 FINDINGS 4-1
4.1 HYDROGEOLOGY 4-1
4.1.1 Aquifer Type and Thickness 4-1
4.1.2 Groundwater Levels, Hydraulic Gradients and Flow Direction 4-1
4.1.3 Groundwater Flow Velocity and Travel Time 4-3
4.1.4 Groundwater Temperature 4-3
4.1.5 Groundwater – Pond Water Interaction 4-4
4.1.6 Water Withdrawal Rates and Recharge at Lime Hollow Road Well Field 4-5
4.1.7 Hydrogeologic Relationship of Site and Well Field 4-6
4.2 GROUNDWATER QUALITY 4-6

5.0 CONTINUING INVESTIGATION AND LONG-TERM MONITORING 5-1
5.1 QUARTER 3 SITE VISIT 5-1
5.2 LONG-TERM MONITORING 5-1

LIST OF TABLES

Table 1 Well Construction Details
Table 2 Grain Size Analyses
Table 3 Monitoring Well Data – Manual Measurements
Table 4 Pond Water Elevations
Table 5 Water Quality Data
Table 6 Relative Percent Differences
Table 7 Well Construction Details for Lime Hollow Road Wells
Table 8 Water Production at Lime Hollow Road Well Field

LIST OF FIGURES

Figure 1 Site Plan Map
Figure 2 North End Plan Map
Figure 3 Topographic Quadrangle Map
Figure 3a Topo Quad – 1200-ft Contour Line
Figure 4 Water Level Hydrographs
Figure 5 Groundwater Thermographs
Figure 6 Water Table Contour Maps
Figure 7 Aerial Photograph May 2013 – High Water Table
Figure 7a Aerial Photograph September 2016 – Low Water Table

LIST OF APPENDICES

Appendix A Work Plan
Appendix B Drilling Logs
Appendix C Well Construction Logs
Appendix D Grain Size Analyses
Appendix E Laboratory Analysis Reports

EXECUTIVE SUMMARY

Route 13 Rocks LLC (Applicant) has filed an application to New York State Department of Environmental Conservation to expand Applicant's permitted Cortlandville Sand & Gravel mine operation laterally and vertically. H2H Associates LLC, Troy, NY, has been retained to act on Applicant's behalf. A hydrogeologic investigation is being conducted to support the application by collecting baseline hydrogeological information to address NYSDEC's and SWCD's comments on the mine permit modification application; confirm the Site's conceptual hydrogeologic model; provide the data needed to assess potential impacts of deeper mining on the quality and quantity of groundwater in the vicinity of the Town's Lime Hollow public water supply wells; support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells; and complete the application. The scope of work was developed to characterize baseline hydrogeologic conditions over a one-year, four-quarter period, sufficiently to meet project objectives. This report presents the initial findings of Quarters 1 and 2.

The available data suggests that the proposed mine pond would have minimal hydraulic interaction with and impact to the Town's wells. This contention is based on the following lines of evidence:

- Topographic contours, USGS hydrogeologic modeling, Site monitoring well water levels, SCM-Cortlandville hydrogeologic data, and groundwater temperature data all indicate that groundwater at the proposed mine pond area flows in a northeasterly direction along flow paths located east of and parallel to flow paths at the well field;
- USGS hydrogeologic simulations for average and low recharge conditions indicate that the area of contribution to the Lime Hollow wells is west to southwest of the Pond-wetland complex and does not involve the Site;
- Hydraulic calculations indicate the water withdrawn from the well field can be made-up completely from groundwater flowing on the west side of the Pond-wetland complex, especially under average to high-recharge conditions;
- The USGS model suggests that the Pond-wetland complex separates flow regimes on the west (including Town well field) from the east (including the Site) and may mitigate their hydraulic interconnection; and
- The continually operating pressure transducers did not detect definitive evidence of pump cycling from the Town's wells located approximately 730 feet to the west although another source of pump cycling was detected, most likely from a location across Lime Hollow Road to the north of MW-4S. Water levels in the deep well screened within the same depth interval as the Town's wells, did not appear significantly different than the shallow well.

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Route 13 Rocks LLC (Applicant) has filed an application to New York State Department of Environmental Conservation (NYSDEC) to expand Applicant's permitted Cortlandville Sand & Gravel mine operation (Site) laterally and vertically (Figure 1). H2H Associates LLC, Troy, NY, has been retained to act on Applicant's behalf.

The permitted Life of Mine currently comprises 66.8 acres and the permitted mine floor elevation is based on maintaining an 8-foot separation from the mean high-water table. Cortlandville S&G is seeking a permit modification to mine an additional 11.9 acres laterally and to mine below the water table to the bottom of the sand and gravel outwash aquifer which may be as deep as elevation 1,070 feet above mean sea level (amsl). The mine would be completed at a shallower elevation if the underlying lacustrine deposits are encountered at a shallower depth. The deepening requires a waiver of the current 8-foot separation distance requirement. The current pit bottom is at approximate elevation 1,185 ft amsl. In response to the initial application and a subsequent submittal, NYSDEC has indicated that additional hydrogeologic information must be submitted to support the application to deepen mining below the water table. Cortland County Soil and Water Conservation District (SWCD), acting on the Town of Cortland's behalf, has also submitted comments on the application.

1.2 PURPOSE

The purpose of this hydrogeologic assessment or investigation is to collect baseline hydrogeological information that would be used to meet the following specific objectives:

- Address NYSDEC's and SWCD's comments on the mine permit modification application;
- Confirm the Site's conceptual hydrogeologic model;
- Provide the data needed to assess potential impacts of deeper mining on the quality and quantity of groundwater in the vicinity of the Town's Lime Hollow public water supply wells;
- Support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells; and
- Complete the application.

1.3 SCOPE

The scope of work was developed to characterize baseline hydrogeologic conditions at the facility over a one-year, four-quarter period, sufficiently to meet project objectives. The scope of work has been modified slightly from the original Work Plan[1] (Appendix A) and consisted of the following tasks:

1. Inspect the two existing aquifer groundwater monitoring wells, MW-1 and MW-2, to confirm that they are suitable for future use;
2. Install permanent aquifer monitoring wells at two additional strategic locations, MW-3 (a shallow and deep well) and MW-4 (shallow well), to enable sampling of the aquifer materials, monitoring of groundwater levels, and sampling and analysis of groundwater;

[1] Changes from original Work Plan are documented in the report text.

3. Collect soil samples from the deepest drill hole nearest the Town's well field and develop borehole logs;
4. Perform grain size analyses for soil samples collected throughout the aquifer and evaluate if petrographic analysis is warranted to characterize aquifer materials;
5. Install pressure transducer-data logger instrumentation in wells to enable continual monitoring of groundwater levels which would enable determination of flow gradients, flow directions, and varying groundwater temperatures during the baseline monitoring period;
6. Measure surface water levels and assess bottom conditions in the north pond between the north end of the Site and the Town's well field to assess surface water - groundwater interactions;
7. Survey the locations and elevations of monitoring points;
8. Collect an initial and quarterly rounds of groundwater samples for analysis to determine baseline spatial and temporal variations of water quality; and
9. Prepare a hydrogeologic assessment report that includes a discussion of groundwater flow directions and rates, potential impacts of deeper mining on the Lime Hollow Road wells, and long-term operational monitoring.

2.0 INVESTIGATION METHODS

Hydrogeologic investigation methods consisted of review of maps and site-relevant publications, evaluation of existing monitoring wells, installation of new monitoring wells, collection of soil samples for gran size analyses, surveying of data collection points, water level measurements, groundwater sampling and analyses, and data analysis and reporting. The following discussion describes what was done, why and how.

2.1 USGS TOPOGRAPHIC MAP REVIEW

H2H reviewed the Cortland, NY 7.5-minute topographic quadrangle map (Figure 3). This map contains geomorphic and elevation information that are relevant to the hydrogeologic study. Tracing of the 1,200-foot topographic contour line in the Site vicinity reveals a low-lying area that pinches closed just west of the south end of the mine and broadens in a northeasterly direction toward the city of Cortland (Figure 3a). The Lime Hollow Road well field is on a slight mound that is part of a low northeast-southwest trending topographic divide that rises to elevations of approximately 1,200 to 1,220 ft amsl within the low-lying area. The divide extends for short distance north of Lime Hollow Road. The area below elevation 1,200 feet amsl east of the divide is occupied by a series of depressions that have developed as wetlands (National Wetlands Inventory) and shallow ponds that are designated in this report as the North, Middle and South Ponds.

The mine is located on a broad low undissected northeasterly-sloping terrace just east of the low-lying area. Ground surface elevations at the Site range from 1,240 ft amsl in the southwest to 1,170 ft amsl in the northeast. The terrace deposits originated as glacial outwash. The divide described above is likely an erosional remnant of the terrace that has been incised by post-glacial northeasterly drainage toward the Tioughnioga River about 3.5 miles to the northeast. Otter Creek flows at the far eastern edge of the terrace. Other than Otter Creek, several small streams draining the eastern uplands terminate upon reaching the permeable terrace deposits as the flow totally infiltrates into the permeable deposit as a source of groundwater recharge. The overall southwest to northeast drainage pattern with easterly bend farther north is readily apparent.

2.2 NEARBY FORMER SCM SITE REMEDIATION REVIEW

The SCM-Cortlandville State Superfund Site No. 712006 is located along Lime Hollow Road northeast of the Site and on the same 10 to 30-foot high glacial outwash terrace above the eroded low-lying areas. The remedial investigation there provides detailed hydrogeologic information for the local area. The sand and gravel aquifer at that location is 80 to 110 feet thick overlying fine-grained glaciolacustrine deposits. Water table depth is 35 to 45-feet. Groundwater flow direction is northeasterly. Recharge basins constructed as part of the remedy can be seen in the northeast corner of Figure 2. H2H infers that the basins are far enough downgradient that they do not impact the Site.

2.3 RESEARCH OF PUBLISHED HYDROGEOLOGIC INFORMATION

H2H reviewed selected publications to supplement the hydrogeologic investigation. A few of the publications provide detailed hydrogeologic information that would not be otherwise available without costly investment of time and resources. Of particular value was a U.S Geological Survey (USGS) Water

Resources Investigations Report 96-4255, published in 1998, *Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York,* by Todd S. Miller, Donald A. Sutherland, Peter M. Jeffers, and Nancy Mueller. This report summarizes aquifer characteristics and includes several plates that depict simulated groundwater contours in the regional area including the Site. Scenarios are presented for low-recharge, average-recharge, and high-recharge conditions. Hydraulic gradients and flow directions can be readily estimated from the contours. This report was supplemented by USGS Fact Sheet FS 054-03, published in April 2004, *Hydrogeology and Simulation of Ground-Water Flow in a Glacial-Aquifer System at Cortland Cunty, New York* that was published in cooperation with the Cortland County Soil and Water Conservation District.

Hydrogeologic information from these reports that H2H used include:

- Major Valley Heads drainage divide is approximately one mile southwest of the Site (FS figure 2);
- Northeast-directed meltwater flow through the site area deposited the sand and gravel outwash plain / terrace (FS figure 3);
- An average aquifer hydraulic conductivity of 880 ft/day was estimated at the Line Hollow Road wells based on an aquifer pumping test performed on 7/16/1991 in Town of Cortlandville well #2, also designated as USGS well 432 (C-#104) (table 2, p.20) which is the northwesternmost well at the Town's well field;
- An effective porosity of 0.30 was estimated for the outwash aquifer (p.29, 58, 59);
- Horizontal hydraulic conductivity was estimated to be 10 times the vertical hydraulic conductivity (p.48);
- For simulated average- and low-recharge conditions the area contributing recharge to the Lime Hollow wells is located west of the ponds and extends southwesterly to the groundwater divide (p.58, plates 3 & 4); and
- Groundwater flow is simulated as northeasterly (plates 2,3,4) based on potentiometric contour maps developed for high-, average, and low recharge conditions.

2.4 EXISTING ONSITE MONITORING WELL EVALUATION

H2H reviewed available information for the two existing monitoring wells at the Site, MW-1 and MW-2[2], that were installed in 1989 (Figures 1 and 2). H2H assessed their usability for the hydrogeologic investigation and future monitoring. H2H determined that they are shallow 2-inch diameter screened wells that are approximately 12 feet to 22 feet shallower than the two new shallow wells. Historically, these wells are designated as USGS ID #348 (MW-1) and USGS ID #349 (MW-2). They are useful for monitoring the water table and shallow groundwater. Well construction details are summarized in Table 1.

2.5 SOIL DRILLING AND WELL INSTALLATIONS

The Work Plan describes the hydrogeologic investigation activities and rationale (Appendix A). New monitoring wells were installed at two locations at the north end of the proposed mine pond in the general vicinity of the Town wells to complement the existing wells. At the location nearest the Town's well field, MW-3, shallow and deep wells were installed to assess possible vertical hydraulic gradients related to the relatively deep Town wells and identify shallow and deep water-quality variations.

[2] Now sometimes referred to as MW-1S and MW-2S to describe their construction.

H2H constructed three groundwater monitoring wells, MW-3S, MW-3D, MW-4S, during the week of December 3, 2018. H2H anticipated potentially difficult drilling conditions owing to the presence of coarse gravel and cobbles and therefore used the Symmetrix drilling system which accommodates such difficulty.

Two-inch diameter PVC well screens with riser pipe were placed in each drill hole. Screen length varied depending upon well objective. MW-3S used a 30-foot long screen for the upper part of the aquifer, MW-3D used a 42-foot screen for the lower part of the aquifer that coincided with the inlet areas for the town's wells. The combined screen lengths for MW-3S and MW-3D cover the full thickness of the aquifer. MW-4S used a 32-foot screen comparable to MW-3S. Well screen design took into account the potential for low groundwater levels such as those that occurred during the summer of 2016 when MW-1 and MW-2 went dry from July through September. Seasonal low groundwater levels that year were nearly 8 feet deeper than usual.

Screen slot size for all wells was 0.20-inch to facilitate well development. Gravel pack was placed adjacent to and extended 2.0 to 2.5 feet above the top of the screen. The wells were sealed with a 1.0 to 2.0-foot thick layer of bentonite and the remainder of the holes grouted. A steel protective casing and locking cap completed the installation. The wells were developed by surge pumping with a 10 gallon per minute pump. All of the wells cleared up nicely which is reflected by the very low turbidities observed later in the new wells during sampling.

Following a period of equilibration to allow the wells to recovery from the effects of drilling, H2H returned to the Site on February 5, 2019. H2H surveyed the wells and installed pressure transducers / data loggers for continuous water level and temperature monitoring. Survey data and well construction details are summarized in Table 1.

The wells were drilled and installed with full-time oversight from an H2H geologist who prepared drilling logs (Appendix B) and well construction diagrams (Appendix C).

2.6 GRAIN SIZE ANALYSIS

The lateral extent and thickness of the coarse -grained, sand and gravel glacial outwash deposit aquifer are well documented. H2H took advantage of the opportunity afforded by drilling new monitoring wells to characterize the nature of the sand and gravel resource at the Site. During drilling H2H collected 10 soil samples from 7 feet to 91 feet (elevation 1,090 ft amsl) deep in MW-3D using a 3-inch diameter split-spoon sampler. Sample locations are indicated on the drilling logs (Appendix B). The sampling interval ranged from 2 feet to 10 feet (mostly). Nine samples, S-1 through S-9, were collected from aquifer material below the water table for grain size analysis adjacent to the screened intervals in MW-3S and MW-3D. H2H examined the cuttings between the sampled intervals to confirm consistency and to identify a need for additional sampling such as at the bottom of the drill hole. H2H sent the samples to a local testing laboratory, SJB Services Inc. in Cortland, NY, for grain size analyses in accordance with ASTM D422. Based on sample examination in the field, the petrographic analyses that were originally proposed in the Work Plan were considered unnecessary for project purposes and were waived.

Soil at the other new well location, MW-4S, was not sampled as proposed in the Work Plan for several reasons. MW-4S is located 1115 feet northeast of MW-3S/3D and east-northeast of the Town's well field. Because MW-4S is a shallow well, is well beyond the limits of mining, and is not potentially hydraulically upgradient of the well field, it was H2H's judgement that sampling it would not provide cost-effective supplemental data. MW-3S soil was not sampled because of its proximity to MW-3D which was sampled.

2.7 POND STAFF GAUGE INSTALLATION

An important element of the hydrogeologic investigation was characterizing the interaction between groundwater and the North, Mid and South Ponds along the western side of the Site (Figures 1 and 2). The North Pond is located between the Site and the Town's well field (Figure 6). The Work Plan originally proposed that temporary staff gauges would be installed at the three ponds to evaluate the interactions, but the staff gauges were not installed. Temporary staff gauges are often not reliable because of subsequent damage and frost heave that could alter their surveyed elevations and lead to misleading data. As an alternative, H2H is measuring pond water levels periodically during the quarterly site visits using a GPS unit which eliminates the potential problems with a staff gauge. Whether a staff gauge was installed or measurements are made with GPS unit, the measurement frequency would be the same.

Based on aerial survey information the bottom elevations of the ponds are approximately as follows: North Pond (1,164 ft amsl), Mid Pond (1,167 ft amsl), South Pond (1,168 ft amsl).

2.8 SURVEYING

Locations of all monitoring wells and the town wells were surveyed using GPS equipment. Horizontal coordinates were based on the State Plane Coordinate System, NAD83, New York Central zone, Horizontal and vertical accuracy was approximately three hundredths of a foot. Vertical elevations were surveyed using the NAVD 88 datum.

All wells were surveyed on February 5, 2019. The re-surveyed measuring point elevations for MW-1 and MW-2 differed slightly from the 1989 survey data. MW-1 was 1,237.37 ft amsl in 1989 and 1,237.28 ft amsl or 0.09 feet lower in February 2019. MW-2 was 1,225.64 ft amsl in 1989 and 1,224.96 ft amsl or 0.68 feet lower in February 2019. After the February 2019 survey well MW-1 was struck by a vehicle and partially bent over. It was straightened and the measuring point re-surveyed on May 20, 2019, at 1,237.60 ft amsl.

2.9 WATER LEVEL MEASUREMENTS

Water levels are measured using two methods – by dedicated instruments deployed within the wells and manually using electronic water level indicators. Transducer instruments measure water pressure converted to water depth and incorporate integrated data loggers to allow continuous water level monitoring. Short-term changes and trends are documented. The manual water level indicators provide "snapshot" water depths and are used to calibrate and set up the transducers.

Decontaminated dedicated transducers and cable assemblies (In Situ Inc.'s Model Level Troll™ 500's with vented cables) were installed in all wells. Transducers were deployed approximately 20 feet below the water table which provided adequate factor of safety below the lowest anticipated water level. The top of each transducer was secured at the top of the well casing. These basic transducers measure temperature as well as water level.

H2H has returned to the Site twice to download and re-program the transducers. This was done on March 13, 2019 and May 20, 2019, to coincide with quarterly groundwater sampling, H2H measured water levels in the wells manually to verify that the transducer data are accurate. The transducers were originally

programmed to collect one measurement per minute and later changed in March to one measurement per 10 minutes to streamline data collection. The transducers have remained at that setting since then.

2.10 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater quality is determined in two ways – by a field instrument (Horiba U-52 Multi-parameter Water Meter) to measure selected water quality parameters real-time and by samples collected for laboratory analysis. The field water quality parameters are: temperature, pH, dissolved oxygen, oxidation-reduction potential, turbidity and specific conductance. The field parameters provide useful hydrogeologic data.

- Temperature – can provide an indication of recharge, flow zones and groundwater age.
- pH – provides an indication of groundwater corrosivity and reactions with aquifer materials and water constituents.
- Dissolved oxygen – related to water temperature, can provide an indication of recharge, flow zones, groundwater age and history, and ability to oxidize certain minerals and support aerobic bacteria.
- Oxidation–reduction potential – can indicate tendencies for certain chemical reactions.
- Turbidity – can provide an indication of how representative the groundwater sample is and help interpret analytical results for metals.
- Specific conductance – provides an indication of water purity and source, as well as an estimate of total dissolved solids content.

H2H collected water samples for Quarters 1 and 2 using the low-flow sampling method. The intent of the first sampling event on March 13, 2019 was to collect water samples from MW-1, MW-3S, MW-3D and MW-4S to provide an indication of the spatial variability of water quality. However, well MW-1 could not be sampled because it had recently been damaged by a vehicle that bent the casing to a degree that sampling equipment could not enter the well. Well MW-2 was sampled instead.

H2H collected samples for the 2nd Quarter on May 20, 2019. At that time the casing for well MW-1 had been straightened out and the well could be sampled. As described in the Work Plan, samples were also collected this Quarter from the shallow and deep wells, MW-3S and MW-3D. These two wells will be sampled again in Quarters 3 and 4 to identify water quality changes with time.

The water samples were collected in laboratory-supplied bottles that contained preservatives as necessary. Trip blank, field blank, and blind duplicate samples were collected for quality control. The samples were stored on ice and delivered to the NYSDOH ELAP-certified laboratory, Con-Test Inc., under chain-of-custody protocol for analyses per the Work Plan.

3.0 RESULTS

3.1 AQUIFER LITHOLOGY AND GRAIN SIZE ANALYSES

Grain size analyses are summarized in Table 2 and the testing reports are included in Appendix D. The visual observations of drill cuttings and grain size analyses for samples from MW-3D confirmed the presence of stratified, well-graded, rounded to sub-rounded coarse sand and gravel throughout the aquifer. Field examination of the gravel identified the expected lithologies, i.e. mostly sub-rounded greywacke, sandstone, and mudstone with some quartzitic and granitic gravels. Angular rock fragments indicated that cobbles were present that were broken during the drilling process. Some isolated thin lenses of clayey silt were observed in the sample from 77-79 feet deep, but sand and gravel extended down to at least the 91-foot (1,090 ft amsl) elevation at the bottom of the drill hole. These observations confirm the presence of a thick highly permeable aquifer free of any significant confining layers. The aquifer likely extends a short distance below the drilled depth.

3.2 GROUND WATER AND POND LEVELS

Groundwater levels have been measured monthly at the Site since October 2010. Recent manual measurements since January 2018 are summarized in Table 3. Based on historical monitoring over a 5-year period, the water table at the mine ranges from approximately 1,173 ft amsl in the southwest to 1,167 ft amsl in the northeast. Exceptionally low groundwater levels were observed July through September 2016 when MW-1 (<1,161.57 ft amsl) and MW-2 (<1,157.44 ft amsl) were dry (Table 1, Figure 7a). The average water table elevation is approximately 1,170 ft amsl. H2H developed groundwater level contour maps for two dates when manual water level data were available for all wells (Figure 6). The contour maps were used to estimate hydraulic gradients and flow directions. Pond water levels (Table 4) were compared with the groundwater levels to discern how the water levels are related and to interpolate expected pond water levels.

Continuous-recording transducers have been operating in the five monitoring wells since February 2019. Water level hydrographs (Figure 4) and water temperature thermographs (Figure 5) indicating variations with time at each well have been developed from the transducer data.

3.3 GROUNDWATER ANALYSES

The field parameter and laboratory analytical water quality data for the Quarter 1 and Quarter 2 samples are summarized in Table 5. Relative percent differences (RPD) for the duplicate quality control samples sent to the lab are summarized in Table 6. The RPDs indicate close correlation between analyses suggesting that the laboratory water quality data are reliable. Laboratory analytical reports are included in Appendix E.

4.0 FINDINGS

Hydrogeologic investigation findings are subdivided into two broad categories – hydrogeology and water quality.

4.1 HYDROGEOLOGY

This section addresses aquifer type; groundwater levels, hydraulic gradients, and flow direction; flow velocity and travel time; groundwater temperatures, groundwater-pond interaction; water withdrawal and recharge at the Town's well field, and hydrogeologic relationship of site and well field.

4.1.1 Aquifer Type and Thickness

The published regional hydrogeologic data, site-specific stratigraphic data, pond level data, and water temperature data all consistently indicate that the aquifer at the Site is unconfined. No confining layers have been identified. The aquifer's potentiometric surface is the water table. It follows that the proposed future mine pond water surface level would coincide with the water table.

Aquifer average thickness is approximately 80 feet based on the difference between the average water table elevation (1,170 ft amsl) and the bottom elevation of the aquifer from drill hole MW-3D (1,090 ft amsl). Aquifer thickness would be greater during high water table conditions and lower during low water table conditions. The typical annual water table fluctuation is 4 to 8 feet. The elevation of the bottom of the outwash deposit may be slightly lower than elevation 1,090 ft amsl which would add to aquifer thickness. USGS cross-section B-B' in WRI Report 96-4255 showed the bottom of the outwash deposit at elevation at 1,085 ft amsl.

No data have been generated that indicate that the Site hydrogeology is inconsistent with the aquifer-wide model, aquifer boundary conditions, recharge and discharge areas, and water budgets documented in the published literature, including the US Geological Survey Water Resources Investigation Report 96—4255 cited above.

4.1.2 Groundwater Levels, Hydraulic Gradients and Flow Direction

Water Levels

The hydrographs (Figure 4) show the relative water level variations with time for the five monitoring wells. The parallel alignments suggest that hydraulic gradients and flow directions are fairly stable with time. During the February through May 2019 monitoring period, water levels were highest in mid-February, lowest in mid-April, and quickly rising in mid-May. Water levels are typically lowest in October but considerable variation occurs year to year based on the historical record.

Close inspection reveals that sinusoidal groundwater level oscillations are observable in the transducer data (Figure 4). The oscillation amplitude is highest in MW-4S where it was estimated as 0.1 to 0.2 feet. MW-4S is located 814 feet from the well field. The amplitudes are approximately the same and much lower in MW-2S and MW-3S. MW-3S is located 900 feet from the well field and MW-2S is located 1,080 feet from the well field. On or about April 2, 2019, the oscillation period changed abruptly from 16 hours to three times as long. The cause for the oscillations and the changed period is unknown. Regardless of source, the

low magnitude 0.1-foot to 0.2-foot oscillations would average out over time and are not expected to have a significant impact on hydraulic gradients or flow directions in this area.

The oscillations do not appear to be caused by the Town's wells based on the following reasoning:

- The maximum amplitude observed at MW-4S and the similar smaller amplitudes at MW-2S and MW-3S suggest that the source is located closer to MW-4S and roughly equidistant from MW-2S and MW-3S. The most likely source area would thus be north of MW-4S and Lime Hollow Road. A search of the NYSDEC's water wells database, which includes wells installed after April 2000, did not reveal the presence of any wells in this area. The database however does not include all operating wells.
- MW-4S is only 86 feet, or 10% closer to the Town wells than MW-3S. Such a large amplitude difference would not be expected over such a small distance difference.
- If the Lime Hollow wells were the source, we would expect measurable higher amplitudes at MW-3S, located 900 feet from the well field, than at MW-2S, located 1,080 feet from the well field.
- The 16-hour to 48-hour oscillation periods do not appear to mimic known operating characteristics of the Town's wells.

Hydraulic Gradients

Horizontal hydraulic gradients can be estimated from the groundwater level contour maps for February 5, 2019 and May 20, 2019 (Figure 6) for the north area of the Site closest to the Town's wells. The scaled hydraulic gradients in this area are 0.0030 for February 5 and 0.0027 for May 20, which gives an average of 0.00285. The contour maps do not include monitoring well MW-1 because of its distance from the north area. However, extrapolating MW-1 data to the north area indicates hydraulic gradients of 0.0018 on both February 5 and May 20.

Potentiometric surface (water table) contour maps are also available for different simulated recharge scenarios developed over a large area of the aquifer and published by the USGS (USGS WRI Report 96-4255). The magnitudes and directions of horizontal gradients scaled in the vicinity of the Town's well field are:

- High recharge conditions (Plate 2): 0.0037, toward approximately north 66º east.
- Average recharge conditions (Plate 3): 0.0030, toward approximately north 67º east.
- Low recharge conditions (Plate 4): 0.0022, toward approximately north 50º east.
- The average hydraulic gradient is 0.0030, which is consistent with the site data.

Vertical hydraulic gradients can be assessed by comparing water levels in the MW-3 well pair. The similarity of water levels for MW-3S and MW-3D confirms that vertical components of flow are minor and groundwater flow is predominantly horizontal in this area (Figure 4, Table 3). The 0.15-foot to 0.19-foot slightly higher water level in MW-3D as compared with MW-3S suggests a very slight upward hydraulic gradient at this location. If this location were affected by pumping from the deep well screen intakes at the Town's wells, one would expect a slight downward hydraulic gradient rather than upward.

Flow Direction

Groundwater flow direction can be estimated from the groundwater contour maps. The inferred flow direction in the north area of the Site is indicated by arrows on Figure 6. The flow direction is to the northeast at north 19º east on February 5 and north 23º east on May 20. These flow directions are subparallel to the railroad track right of way west of the North Pond and are expected to vary only slightly with time. The flow direction from MW-1 to the north area was north 14º east for both February 5 and May 20.

These flow directions are consistent with the USGS model. For the USGS model, the flow direction is also to the northeast as indicated above, but more easterly in the vicinity of the Town's well field and less

easterly in the Site area because of the curved contour lines. The USGS model takes into account a much broader area that conforms with the regional topography and drainage pattern. It also takes into account the City of Cortland's pumping centers far downgradient. Based on the USGS model the southwest-northeast line of ponds and wetlands west of the Site represent a transition zone in the regional flow regime whereby groundwater to the west flows in a more east-northeasterly direction and groundwater to the east flows in a more north-northeasterly direction. This is consistent with the lower more northerly hydraulic gradient in the south part of the Site. Groundwater flow apparently gradually curves northeasterly in a southwest to northeast direction.

The proposed mine pond is located southeast and side-gradient of the Town's well field. Site groundwater is not expected to be significantly involved in the well field's local flow regime.

4.1.3 Groundwater Flow Velocity and Travel Time

Groundwater flow velocity can be estimated form the Darcy relation: velocity equals hydraulic conductivity times hydraulic gradient, divided by effective porosity. The hydraulic conductivity (880 ft/day) and porosity (0.30) are estimated from the USGS WRI Report 96-4255. The hydraulic gradient is estimated from the groundwater contour maps developed from site data and USGS simulations reported in the WRI Report 96-4255. Based on the 0.0030 horizontal gradient, the estimated average groundwater flow velocity is 8.8 ft/day toward the northeast. This velocity is not necessarily the transport velocity of elemental-, chemical-, micro-organism-groundwater constituents because of retardation effects which will slow down transport. Constituent concentrations would be further affected by lateral and vertical dispersion which would be enhanced by the high flow velocity.

At this average flow rate groundwater would course over a 900-foot distance in 102.3 days or 3.4 months. Some water molecules would travel faster and some slower. Most groundwater constituents would typically travel slower. A notable exception is chloride which generally travels at the same rate as groundwater.

The estimated travel time does not apply to constituent migration from the proposed mine pond to the Town's wells because a completed flow path does not exist between these two locations. The well field is not located directly downgradient of the proposed mine pond. Most groundwater flow from the proposed mine pond would flow east of the well field. The mine pond is not expected to have a significant impact on groundwater recharge to the Town's well field.

The higher groundwater levels that would result from the mine pond at the north part of the Site would increase hydraulic gradients and flow velocities away from the mine pond, but it does not appear that there would be a significant effect on recharge to the Town's well field because of the predominantly northeasterly flow direction.

4.1.4 Groundwater Temperature

Groundwater thermographs reflect changing groundwater temperatures with time. (Figure 5). Water temperatures vary with the monitoring well's position in the local flow system. Wells MW-1 and MW-2 are relatively shallow and should reflect seasonal effects, but their data do not show these effects. H2H suspects that there may be a problem with the data and will investigate this in Quarter 3.

The most representative groundwater temperature data is provided by MW-3S and MW-3D. Their temperatures ranged between 46 and 48 F, consistent with the annual average air temperature of 46º to 47º F. The groundwater temperature at this location was rising in late May as air temperatures warmed. The

similarity of groundwater temperatures in the shallow and deep wells suggests an absence of thermal stratification in the aquifer and groundwater that would recharge the proposed mine pond.

A distinct groundwater temperature contrast is observed in MW-4S as compared with the other wells. Its temperature was on the order of 8º to 10º F colder from February through March 20 as seen in both the transducer and field data. MW-4S's temperature gradually rose after March 20 to approximately 55º F in mid-late May. MW-4S's well construction is similar to MW-3S but its temperature is strikingly different. H2H interprets these observations as the result of the well's proximity to the North Pond which serves as a "flow-through" pond as described in the next section. The Pond chills downgradient water in winter, and warms it in summer. The location of MW-4S, only 290 feet northeast of the North Pond, provides independent evidence of a northeasterly groundwater flow direction in this area. The high dissolved oxygen content at MW-4S (Table 5) further suggests a surface water source for some of the groundwater at MW-4S.

Based on these data H2H expects that the temperature of the proposed mine pond water will be relatively cool in summer and relatively warm in winter and will moderate between ambient groundwater and air temperature.

4.1.5 Groundwater – Pond Water Interaction

Surface water in the North Pond generally represents the water table. This is based on the coincidence of the surface water and water table elevations (Table 4), the absence of a surficial confining layer, the observation that the pond rarely freezes over in winter (Figure 6), and the apparently pond-related downgradient water temperatures. When groundwater levels are high the pond level will be high. When groundwater levels are low and below the pond bottom the pond will essentially dry-up except for some residual surface water that may remain perched on the lower permeability organic silty pond bottom deposits. Google Earth aerial photographs reflect pond water levels when groundwater levels were relatively high in May 2013 and low in September 2016 (Figures 7 and 7a).

Seasonal groundwater level fluctuations, which are typically 4 to 8 feet based on the historical MW-1 and MW-2 water level data, would likely be the primary driver for pond level fluctuation. The Pond would dry up when the water table is below the level of the Pond bottom. When groundwater levels are high enough the 800-foot long North Pond may act as a flow-through pond. Higher ambient groundwater levels at the southwest end would drive surface water flow toward the northeast where ambient groundwater levels are lower. Groundwater would up-well into the pond primarily at the southeast end and infiltrate out at the northeast end. Pond water level would equilibrate at a level intermediate between groundwater levels at the two ends of the Pond (Table 4). Pond water level may also be affected to a lesser degree by the balance between direct precipitation recharge, local evapotranspiration discharge and the permeability of the pond bottom.

The water level in the proposed mine pond may act in the same manner, without the potential for drying up. Comparison of the ambient groundwater levels at the two ends of the proposed mine pond (Figure 6) indicates a difference of approximately 6 feet. The mine pond level at the southwest end would thus be approximately 3 feet lower than ambient groundwater level and the northeast end would be approximately 3 feet higher than ambient groundwater. The higher groundwater elevations at the northeast end of the proposed mine pond would increase local hydraulic gradients away from the mine pond and presumably primarily in a northeasterly direction.

The proposed mine pond and North Pond would be hydraulically interconnected. Elevated groundwater at the north end of the mine pond would potentially recharge the southwest end of the North Pond and slightly

raise its level. The North Pond would dry up less frequently. On the other hand, the water level in North Pond would not be affected by a local increase in groundwater levels if the regional water table is low.

The latest pond level data for the Mid and South Ponds indicate higher surface water levels than anticipated based on the ambient groundwater levels (Table 4). The high levels, 1,194 ft amsl, do not seem plausible. Additional pond level data will be collected in Quarters 3 and 4.

4.1.6 Water Withdrawal Rates and Recharge at Lime Hollow Road Well Field

Well construction details for the two Lime Hollow Road wells are summarized in Table 7. Average daily water withdrawal production rates at the Lime Hollow Well Field averaged 496 gpm for the first three months of 2019, with a range of 259 gpm to 800 gpm (Table 8).

Simulated areas of recharge contribution to the Lime Hollow Road wells are presented on maps in USGS WRI Report 86-2955.

The volumetric rate of groundwater flow toward the well field from the southwest can be estimated for different scenarios using the modified Darcy formula: Flow (Q) equals horizontal hydraulic conductivity of aquifer (K) times saturated thickness of aquifer (M) times hydraulic gradient (I) times width of flow path (L). Site specific parameter values are:

- K – 880 ft/day per USGS aquifer pumping test in Lime Hollow well;
- M – 80 feet based on difference between the average water table elevation (1,170 ft amsl) and the bottom elevation of the aquifer from drill hole MW-3D (1,090 ft amsl);
- I – 0.003 scaled from USGS groundwater contour maps and from the site-specific groundwater contour map (Figure 6); and
- L – 729 feet solved for the scenario whereby flow rate is 800 gpm which was the maximum recorded[3] for the first three months of 2019. This equates to a flow path width of 365 feet (L/2) on each side of the wells perpendicular to the ambient groundwater flow direction.

Based on a constant maximum 800 gpm production rate, the eastern terminus of this estimated 365-foot half-width of the flow zone to the Town wells would be located a maximum of 25 feet beyond the western edge of the North Pond. This implies that the North Pond would represent the approximate eastern limit of the contributing area to the well field. This is consistent with USGS simulations for average recharge conditions (Plate 3, USGS WRI Report 96-4255) which show the well field's contributing area west of the North Pond. The proposed mine pond would be located approximately 350 farther east well beyond the apparent area of influence.

The degree to which the Town's well field would induce infiltration from the North Pond under high water table conditions or expand its radius of influence beneath the North Pond toward the proposed mine pond during low groundwater conditions are unknown. In either case, if any induced infiltration occurs it would likely be minor.

During much of the year, it is likely that the flow width necessary to provide the 800 gpm to the well field would be less than 729 feet wide. Under high recharge conditions, the water table would be higher, the

[3] The maximum 800 gpm was reported for well #2 which was where the USGS aquifer pumping test was performed in 1991.

aquifer saturated thickness (M) would be greater, and the hydraulic gradient (I) would be greater. The net result would be a narrower flow width required to produce the 800 gpm.

4.1.7 Hydrogeologic Relationship of Site and Well Field

The available data suggests that the proposed mine pond would have minimal hydraulic interaction with and impact to the Town's wells. This contention is based on the following lines of evidence:

- Topographic contours, USGS hydrogeologic modeling, Site monitoring well water levels, SCM-Cortlandville hydrogeologic data, and groundwater temperature data all indicate that groundwater at the proposed mine pond area flows in a northeasterly direction along flow paths located east of and parallel to the well field;
- USGS hydrogeologic simulations for average and low recharge conditions (Plates 3 and 4 in USGS WRI Report 96-4255) indicate that the area of contribution to the Lime Hollow wells is west to southwest of the Pond-wetland complex and does not involve the Site;
- Hydraulic calculations indicate the water withdrawn from the well field can be made-up completely from groundwater flowing on the west side of the Pond-wetland complex;
- The USGS model suggests that the Pond-wetland complex separates flow regimes on the west (including Town well field) from the east (including the Site) and may mitigate their hydraulic interconnection; and
- The continually operating pressure transducers did not detect definitive evidence of pump cycling from the Town's wells located approximately 815 feet to the west although another source of pump cycling was detected, most likely from a location across Lime Hollow Road to the north of MW-4S. Water levels in deep well MW-3D, screened within the same depth interval as the Town's wells, did not appear significantly different than MW3S.

4.2 GROUNDWATER QUALITY

Groundwater quality data was collected to provide baseline conditions prior to development of the mine pond. Groundwater quality is generally consistent with data available from the Town's Annual Water Quality Reports for the years 2017 and 2018 and with the ranges reported in the USGS's local aquifer Water Resource Investigation Report 96-4255. With the exception of sodium in two wells and iron in one well, all analytes are within NYSDEC standards and guidance values (Table 5). Sodium was slightly elevated in two shallow wells MW-2S and MW-3S and was at the 20 mg/L standard in MW-4S. The deep well, MW-3D, had lower sodium levels that are more consistent with the Town's (A) well water quality. MW-3D was the only monitoring well where iron was detected. The May 21 sample from that well had a concentration of 1.9 mg/L which is well above the 0.3 mg/L standard. MW-3S and MW-3D will be sampled again in Quarter 3.

Other water quality findings:

- The two existing wells, MW-1 and MW-2 had turbidities much higher than the new wells installed by H2H suggesting that these two older wells could benefit from re-development.
- Slight differences are observed between the shallow and deep groundwater at MW-3 but after only two rounds of sampling, it remains to be determined if there is any meaningful water quality variability. These wells will be sampled again in Quarters 3 and 4. Based on the two rounds, the deeper groundwater appears to have lower dissolved oxygen, oxidation-reduction potential, specific conductance, sodium, hardness and alkalinity. The deeper water has higher pH, and barium and iron concentrations.

- Chloride levels in all monitoring wells were slightly above the concentrations reported in the Town's (A) well, but still well below the 250 mg/L standard.
- Volatile organic compounds (VOCs) were detected in shallow groundwater north of the mine, but not in deeper groundwater. The concentrations detected were at trace levels well below drinking water standards. Chloroform was detected in MW-4S. Chloroform is a member of the Trihalomethane family of chemicals that was detected at an order-of-magnitude higher concentration in the Town's drinking water. This chemical may exist as a by-product of drinking water chlorination to kill harmful organisms. The source of the Chloroform in the shallow groundwater is unknown. The other VOC, 1,1,1-Trichloroethane, is a common solvent. It was detected at similar concentrations in both the March and May samples from MW-3S. This well will be re-sampled in Quarters 3 and 4.
- Trace levels of Arsenic, Phosphorus and Ammonia were detected in the shallow groundwater at MW-3S at concentrations well within regulatory limits. Trace level of Arsenic was also detected in shallow groundwater at MW-4S. These elements and compound may be residuals left over from prior land use.

5.0 CONTINUING INVESTIGATION AND LONG-TERM MONITORING

5.1 QUARTER 3 SITE VISIT

Key action items for the Quarter 3 site visit are as follows:

1. Measure and record the groundwater levels and total depths of all wells manually to verify transducer data and assess continued well integrity; download the transducer data; verify that manual and transducer water levels are consistent; verify by repeated measurements the apparent 0.15-foot to 0.19-foot higher water level in MW-3D as compared with MW-3S;

2. Check the transducer temperature sensor sensitivity and programming in MW-1 and MW-2 which appear anomalous in the existing data set;

3. Collect field water quality parameters and groundwater water samples from MW-3S and MW-3D for analysis per the Work Plan;

4. Measure the elevations of the North, Mid, and South Ponds and assess the potential cause for the excessively high pond surface elevations recorded at the Mid Pond and South Pond during Quarter 2; determine if there is a culvert connecting the North Pond with the small pond to the southwest and if so, its invert elevation;

5. Inspect the bottom of the south and north ends of the North Pond to see if the consistency and nature of bottom sediment are different at the two ends, e.g. softer and less silt at southeast end and more compact and thicker organic silt at southeast end;

6. Re-measure and record the measuring point elevations of original monitoring wells MW-1 and MW-2;

7. Inspect monitoring well MW-1 that was previously damaged to determine is the transducer or the well itself has been compromised. Inspection activities include measuring the well's total depth and comparing it with historical data, attempting to sample debris accumulating at the well bottom, pulling the transducer and assessing if the pressure transducer and thermistor are functioning, slug testing the well to assess its responsiveness, using compressed air to re-develop it, and re-checking its measuring point elevation.

5.2 LONG-TERM MONITORING

Based on findings as of the end of Quarter 2, the long-term monitoring (LTM) program will consist of the following:

- Maintain the existing monitoring well network.
- Develop a hydrograph for all reliable water level data for all wells.
- Continue the ongoing monthly groundwater level measurement program and assess changes in groundwater flow gradients and directions as the mine pond develops.
- Sample and analyze groundwater from MW-1, MW-3S and MW-3D quarterly beginning one quarter before the mine is deepened below the water table; analysis shall consist of the field

parameters and gasoline range organics, diesel range organics, sodium, chloride, arsenic, and enterococcus bacteria or as recommended otherwise by the Health Department.

- Sample and analyze mine pond water for the same parameters as groundwater.
- Request Town to track static water levels and drawdown at the Line Hollow Road well field to identify trends as the proposed mine pond develops.
- Develop and submit annual reports, or provide sooner notification if a potentially significant anomaly is detected.

TABLES

TABLE 1
Well Construction Details
Cortlandville Sand Gravel

Monitoring Well	Easting, ft	Northing, ft	Date Installed	Measuring Point Elevation, ft amsl	Grade Elevation, ft amsl	Top of Well Screen		Bottom of Well Screen		Bottom of Well		Bottom of Original Well Bore	
						Depth, ft	Elevation, ft	Depth, ft	Elevation, ft	Depth, ft	Elevation, ft	Depth, ft	Elevation, ft
MW-1	914,504.08	934,452.71	1989	1237.60	1234.57					75.8	1161.57	na	
MW-2	916,069.59	936,677.78	1989	1224.96	1222.69					68.2	1157.44	na	
MW-3S	915,590.78	936,527.72	12/7/2018	1183.60	1181.09	4	**1177.09**	34	**1147.09**			35.5	**1145.59**
MW-3D	915,568.76	936,527.61	12/6/2018	1183.81	1181.39	34	**1147.39**	76	**1071.39**			91	**1090.39**
MW-4S	916,044.21	937,509.77	12/10/2018	1177.81	1175.58	3	**1172.58**	35	**1137.58**			36	**1139.58**

All depths measured from ground surface.
State Plane Coordinate system: horizontal datum - NAD83, zone - New York Central (FIPS 3102); vertical datum - NAVD88
Original measuring point elevations in 1989 were 1237.37 in MW-1 and 1225.64 ft in MW-2. Well bottom elevations are based on these measuring points.
Elevations re-surveyed by H2H on Feb. 5, 2019 are shown above, except for MW-1 which was damaged and re-surveyed on May 20, 2019.

TABLE 2
Grain Size Analyses
Cortlandvile Sand Gravel Mine

Gradation Sample	Sample Depth (ft., bgs)		Sample Length, ft	%Cobbles	% Gravel	% Sand	% Silt / Clay	C_u (Coefficient of Uniformity)	Notes
	from	to							
S-1	17.0	19.0	2.0	0.0	64.6	29.2	5.5	30.4	3" Split Spoon Sample
S-2	27.0	29.0	2.0	0.0	72.3	24.7	3.0	24.1	3" Split Spoon Sample
S-3	29.0	39.0	10.0	0.0	51.3	47.1	1.6	13.4	37.0-39.0' 3" Split Spoon, Cutting Samples 29.0-37.0' same.
S-4	39.0	49.0	10.0	0.0	41.1	52.6	6.3	32.5	47.0 - 49.0' 3" Split Spoon, Cutting Samples 39.0-47.0' same.
S-5	49.0	59.0	10.0	0.0	47.1	51.5	1.4	17.7	57.0-59.0' 3" Split Spoon, Cutting Samples 49.0-57.0' same.
S-6	59.0	69.0	10.0	0.0	45.8	51.2	3.0	17.6	67.0 - 69.0' 3" Split Spoon, Cutting Samples 59.0 - 67.0'.
S-7	69.0	79.0	10.0	0.0	40.3	55.7	4.0	17.5	77.0 - 79.0' 3" Split Spoon, Cutting Samples 69.0 - 77.0'.
S-8	79.0	89.0	10.0	0.0	35.3	58.3	6.4	27.9	87.0 - 89.0' 3" Split Spoon. Cutting Samples 79.0 - 87.0'.
S-9	89.0	91.0	2.0	0.0	54.9	40.4	4.7	49.8	3" Split Spoon.

Notes:
1. MW-3D screened from 34.0' BGS - 76.0 'BGS
2. MW-3S screened from 4' BGS - 34.0' BGS
3. Samples collected from MW-3D
4. MW-3D ground surface elv. 1181.4' amsl / MW-3S ground surface elv. 1181.1'

TABLE 3
Monitoring Well Data - Manual Measurements
Cortlandville Sand Gravel

Well:	MW-1		MW-2		MW-3S		MW-3D		MW-4S	
Ground Surface El., ft amsl		1234.57		1222.69		1181.09		1181.39		1175.58
Measuring Point El., ft amsl		1237.28		1224.96		1183.60		1183.81		1177.81
		1237.60								
Date	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
1/4/2018	65.4	1171.88	56.9	1168.06						
2/7/2018	63.2	1174.08	56.5	1168.46						
3/13/2018	61.4	1175.88	54.6	1170.36						
4/11/2018	60.3	1176.98	53.5	1171.46						
5/15/2018	61.5	1175.78	54.1	1170.86						
6/12/2018	67.7	1169.58	58.7	1166.26						
7/17/2018	68.2	1169.08	59.2	1165.76						
8/14/2018	68.5	1168.78	59.4	1165.56						
9/12/2018	69.2	1168.08	59.9	1165.06						
2/5/2019	61.1	1176.18	53.62	1171.34	11.35	1172.25	11.41	1172.40	8.84	1168.97
3/13/2019	62.73	1174.55	54.89	1170.07	12.69	1170.91	12.71	1171.10	9.98	1167.83
5/20/2019	61.84	1175.76	54.06	1170.90	11.8	1171.80	11.85	1171.96	8.98	1168.83

Elevations above are from H2H re-survey on Feb. 5, 2019.

Original 1989 measuring point elevations were: 1237.37 for MW-1 and 1224.64 for MW-2.

Well MW-1 was damaged, repaired and resurveyed as 1237.60 May 20, 2019

TABLE 4
Pond Water Elevations
Cortlandville Sand Gravel

Pond	Measuring Point	Data Source	Water Elevations, ft amsl			
			2/5/2019	5/20/2019		
North	Pond (1):	Measured	1170.31	1170.06		
	GW MW-4S:	Measured	1168.97	1169.01		
	Interpolated Pond:	Estimated (2)	1170.61	1170.40		
	GW MW-3S:	Measured	1172.25	1171.76		
Mid	Pond (1):	-	-	1194.92		
	GW MW-3S:	Measured	1172.25	1171.80		
	Interpolated Pond:	Estimated (3)	1173.40	1172.40		
	GW MW-1:	Measured	1176.18	1175.16		
South	Pond (1):	-	-	1195.81		
	GW MW-3S	Measured	1172.25	1171.80		
	Interpolated Pond:	Estimated (4)	1174.60	1174.10		
	GW MW-1:	Measured	1176.18	1175.76		

NOTES

1. Pond elevations are measured by GPS.

2. North Pond level is estimated from groundwater level midway between MW-4S and MW-S. Estimate is close to the surveyed level. The interpolated pond level and groundwater level match exactly at a point 60% of the distance from MW-3S to MW-4S.

3. Mid Pond level is estimated from groundwater level at a point 70% of the distance from MW-1 to MW-3S.

4. South Pond level is estimated from groundwater level at a point 41% of the distance from MW-1 to MW-3S.

TABLE 5
Water Quality Data -
Quarters 1 and 2
Cortlandville Sand Gravel

1st & 2nd Quarters 2019			MW-1	MW-2	MW-3S		MW-3D		MW-4S	BLIND DUP - MW-3D	Field Blank		Trip Blank	
Analyte	**Units**	**Ambient Groundwater Standard - Class GA**	**5/21/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**3/13/2019**	**5/21/2019**
FIELD PARAMETERS														
Temperature, ºC	ºC	none	13.9	9.6	7.2	9.8	8.4	10.3	3.0	8.4	na	na	na	na
Temperature, ºF	ºF	none	57.0	49.3	45.0	49.7	47.1	50.5	37.4	47.1	na	na	na	na
pH	s.u.	6.5-8.5	8.14	7.48	7.20	7.53	7.25	8.06	7.54	7.25	na	na	na	na
Dissolved Oxygen (DO)	% Saturation	none	27.4	90.1	67.5	26	45.2	0	91.5	45.2	na	na	na	na
Oxidation-Reduction Potential (ORP)	mV	none	136	58	95	153	89	126	93	89	na	na	na	na
Turbidity (field / lab)	NTU	no adverse	90.2	18.8	5.4	0.0	0.0	0.0	2.0	0.0	na	na	na	na
Estimated Total Dissolved Solids (Field)	mg/L	500	305	335	361	355	292	298	326	292	na	na	na	na
Specific Conductance	uS/cm, 25º C	none	469	523	654	555	450	458	509	450	na	na	na	na
VOCs														
Chloroform	µg/L	7	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0.34 J	<0.17	<0.17	<0.17	<0.17	<0.17
1,1,1-Trichloroethane	µg/L	5	<0.20	<0.20	0.32 J	0.27 J	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
METALS														
Arsenic	mg/L	0.025	<0.0080	<0.0080	0.0084	<0.0080	<0.0080	<0.0080	0.0088	<0.0080	na	na	na	na
Barium	mg/L	1	0.053	0.040	0.045	0.041	0.054	0.048	0.029	0.054	na	na	na	na
Chromium	mg/L	0.05	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	na	na	na	na
Iron	mg/L	0.3	<0.040	<0.040	<0.040	<0.040	<0.040	**1.9**	<0.040	<0.040	na	na	na	na
Lead	mg/L	0.025	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	na	na	na	na
Mercury	mg/L	0.0007	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	na	na	na	na
Sodium	mg/L	20	14	**28**	**21**	**22**	13	18	**20**	13	na	na	na	na
Zinc	mg/L	2	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	0.0069	<0.0052	<0.0052	na	na	na	na
Hardness	mg/L	None	220	240	260	250	230	230	250	230	na	na	na	na
GENERAL ANALYTES														
Alkalinity	mg/L	None	170	220	230	210	160	160	180	180	na	na	na	na
Ammonia as N	mg/L	2	<0.30	<0.30	0.081	<0.030	<0.30	<0.30	<0.30	<0.30	na	na	na	na
Chloride	mg/L	250	42	48	52	51	40	51	54	40	na	na	na	na
Nitrate as N	mg/L	10	1.64	2.9	2.7	1.92	1.8	2.78	1.8	2.1	na	na	na	na
Phosphorus, Total	mg/L	None	<0.049	<0.061	0.081	<0.049	<0.061	<0.049	<0.061	0.074	na	na	na	na
Sulfate	mg/L	250	19	10	9.8	10	17	9.5	8.8	19	na	na	na	na
Total Dissolved Solids	mg/L	500	270	250	232*	330	230	280	242*	224*	na	na	na	na
Total Organic Carbon	mg/L	None	<0.73	<0.73	<0.073	<0.073	<0.73	<0.73	<0.73	<0.73	na	na	na	na

Values in bold font exceed the NYSDEC standard or guidance value; ref. T.O.G.S. 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998

MW-1 was not sampled 3/13/2019 because well damage prevented insertion of sampling equipment. It was sampled on 5/21/2019 after repairs.

For VOCs, SVOCs, Pesticides and Herbicides - only detected analytes are listed

* Samples re-analyzed because the initial results were obviously not representative of acutal water quality.

TABLE 6
Relative Percent Difference
Laboratory Analyses - March 13, 2019 Samples
Cortlandville Sand Gravel

Sampling Event -3/13/2019

Analyte	Units	MW-3D	Dup.	Relative % Difference
FIELD				
Temperature, ºC	ºC	8.4	8.4	**0.0**
pH	s.u.	7.25	7.25	**0.0**
Dissolved Oxygen (DO)	%	45.2	45.2	**0.0**
Oxidation-Reduction Potential (ORP)	mV	89	89	**0.0**
Turbidity (field / lab)	NTU	0.0	0.0	**0.0**
Total Dissolved Solids (Field)	mg/L	292	292	**0.0**
Color	c.u.			**0.0**
Specific Conductance	uS/cm, 25º C	450	450	**0.0**
LAB				
Chloroform	µg/L	<0.17	<0.17	**0.0%**
1,1,1-Trichloroethane	µg/L	<0.20	<0.20	**0.0%**
Arsenic	mg/L	<0.0080	<0.0080	**0.0%**
Barium	mg/L	0.054	0.054	**0.0%**
Iron	mg/L	<0.040	<0.040	**0.0%**
Sodium	mg/L	13	13	**0.0%**
Hardness	mg/L	230	230	**0.0%**
Alkalinity	mg/L	160	180	**11.8%**
Chloride	mg/L	40	40	**0.0%**
Nitrate as N	mg/L	1.8	2.1	**15.4%**
Phosphorus, Total	mg/L	<0.061	0.074	**19.3%**
Sulfate	mg/L	17	19	**11.1%**
Total Dissolved Solids	mg/L	230	224	**2.6%**

TABLE 7
Well Construction Details for Lime Hollow Road Wells
Cortlandville Sand Gravel

Well	Latitude / Longitude	Date Drilled	Elevation of Ground Surface, ft amsl	Diameter of Well, inches	Depth of Well, ft	Depth Drilled, ft	Elevation of Bottom of Well, ft amsl	Elevation Top of Casing, ft amsl	Elevation Top of Screen, ft amsl	Elevation Bottom of Screen, ft amsl	Depth to Ground-water, ft	Elevation of Ground-water, ft amsl	Date	Minimum Aquifer Thickness, ft	Comment
Well No.2 USGS 432 C-104	42 33 51 076 13 52	2/16/1988	1197	12	90	?	1107	1198.11	1130.47	1108.47	31	1167.11	5/18/1988	59	Screen lenth 22 ft; S&G to at least 90 feet, aquifer pumping test by USGS 7/16/1991; aquifer thickness would be about 82 feet
Well No. 7 USGS 320 89-1	42 33 50 076 13 51	11/22/1989	1196	16	90	100	1106	1198.43	1140.63	1114.88	28.87	1169.56	12/29/1989	71	Screen length 25. 75 ft; S&G to 100 feet; cross-section B-B, p.12, shows bottom of S&G at elevation 1085 ft amsl so aquifer thickness would be 84.6 ft

References - Appendix 1, Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York, USGS Water Resources Investigation Report 96-4255, 1998, by Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller. Also files from Town of Cortland, NY.

TABLE 8
Water Production at Lime Hollow Well Field
Q1 - 2019
Cortlandville SG

	Withdrawal Amount, gallons				Water Levels, ft amsl			
Date Reported	Well 2	Well 7	Total	Daily Rate, gpm	Well 2	Well 7	Difference Well 2 - Well 7, ft	Average
1/1/2019	420,000	-	420,000	292	1172.00	1173.00	-1.00	1172.50
1/2/2019	-	870,000	870,000	604	1171.00	1165.00	6.00	1168.00
1/3/2019	-	482,000	482,000	335	1172.00	1173.00	-1.00	1172.50
1/4/2019	848,000	-	848,000	589	1170.00	1172.00	-2.00	1171.00
1/5/2019	420,000	221,000	641,000	445	1172.00	1173.00	-1.00	1172.50
1/6/2019	-	458,000	458,000	318	1172.00	1173.00	-1.00	1172.50
1/7/2019	897,000	-	897,000	623	1170.00	1172.00	-2.00	1171.00
1/8/2019	517,000	-	517,000	359	1171.00	1173.00	-2.00	1172.00
1/9/2019	-	753,000	753,000	523	1171.00	1164.00	7.00	1167.50
1/10/2019	-	562,000	562,000	390	1172.00	1173.00	-1.00	1172.50
1/11/2019	725,000	-	725,000	503	1170.00	1172.00	-2.00	1171.00
1/12/2019	373,000	-	373,000	259	1171.00	1173.00	-2.00	1172.00
1/13/2019	-	769,000	769,000	534	1172.00	1173.00	-1.00	1172.50
1/14/2019	962,000	-	962,000	668	1170.00	1172.00	-2.00	1171.00
1/15/2019	478,000	-	478,000	332	1170.00	1165.00	5.00	1167.50
1/16/2019	-	981,000	981,000	681	1171.00	1173.00	-2.00	1172.00
1/17/2019	132,000	448,000	580,000	403	1170.00	1172.00	-2.00	1171.00
1/18/2019	863,000	-	863,000	599	1171.00	1172.00	-1.00	1171.50
1/19/2019	458,000	-	458,000	318	1170.00	1174.00	-4.00	1172.00
1/20/2019	-	440,000	440,000	306	1169.00	1171.00	-2.00	1170.00
1/21/2019	613,000	-	613,000	426	1170.00	1172.00	-2.00	1171.00
1/22/2019	488,000	-	488,000	339	1171.00	1172.00	-1.00	1171.50
1/23/2019	-	989,000	989,000	687	1171.00	1172.00	-1.00	1171.50
1/24/2019	-	497,000	497,000	345	1171.00	1172.00	-1.00	1171.50
1/25/2019	988,000	-	988,000	686	1169.00	1171.00	-2.00	1170.00
1/26/2019	590,000	-	590,000	410	1171.00	1172.00	-1.00	1171.50
1/27/2019	-	564,000	564,000	392	1169.00	1171.00	-2.00	1170.00
1/28/2019	1,152,000	-	1,152,000	800	1171.00	1171.00	0.00	1171.00
1/29/2019	500,000	-	500,000	347	1171.00	1172.00	-1.00	1171.50
1/30/2019	-	869,000	869,000	603	1171.00	1172.00	-1.00	1171.50
1/31/2019	11,000	469,000	480,000	333	1169.00	1171.00	-2.00	1170.00
2/1/2019	955,000	-	955,000	663	1169.00	1171.00	-2.00	1170.00
2/2/2019	504,000	174,000	678,000	471	1171.00	1172.00	-1.00	1171.50
2/3/2019	57,000	496,000	553,000	384	1169.00	1171.00	-2.00	1170.00
2/4/2019	1,024,000	-	1,024,000	711	1170.00	1172.00	-2.00	1171.00
2/5/2019	546,000	-	546,000	379	1171.00	1172.00	-1.00	1171.50
2/6/2019	-	883,000	883,000	613	1170.00	1166.00	4.00	1168.00
2/7/2019	-	475,000	475,000	330	1171.00	1172.00	-1.00	1171.50
2/8/2019	965,000	-	965,000	670	1171.00	1172.00	-1.00	1171.50
2/9/2019	446,000	-	446,000	310	1171.00	1173.00	-2.00	1172.00
2/10/2019	-	504,000	504,000	350	1170.00	1172.00	-2.00	1171.00
2/11/2019	561,000	-	561,000	390	1171.00	1172.00	-1.00	1171.50
2/12/2019	525,000	-	525,000	365	1172.00	1173.00	-1.00	1172.50
2/13/2019	-	889,000	889,000	617	1171.00	1173.00	-2.00	1172.00
2/14/2019	-	474,000	474,000	329	1170.00	1172.00	-2.00	1171.00
2/15/2019	1,114,000	-	1,114,000	774	1171.00	1172.00	-1.00	1171.50
2/16/2019	499,000	-	499,000	347	1171.00	1165.00	6.00	1168.00
2/17/2019	-	526,000	526,000	365	1169.00	1172.00	-3.00	1170.50
2/18/2019	1,066,000	-	1,066,000	740	1171.00	1172.00	-1.00	1171.50
2/19/2019	521,000	-	521,000	362	1171.00	1172.00	-1.00	1171.50
2/20/2019	-	893,000	893,000	620	1170.00	1165.00	5.00	1167.50
2/21/2019	-	605,000	605,000	420	1171.00	1172.00	-1.00	1171.50
2/22/2019	1,014,000	-	1,014,000	704	1169.00	1171.00	-2.00	1170.00
2/23/2019	528,000	-	528,000	367	1171.00	1172.00	-1.00	1171.50
2/24/2019	-	946,000	946,000	657	1169.00	1171.00	-2.00	1170.00
2/25/2019	1,077,000	-	1,077,000	748	1171.00	1172.00	-1.00	1171.50
2/26/2019	537,000	-	537,000	373	1171.00	1172.00	-1.00	1171.50
2/27/2019	-	889,000	889,000	617	1170.00	1172.00	-2.00	1171.00
2/28/2019	26,000	486,000	512,000	356	1169.00	1171.00	-2.00	1170.00
3/1/2019	902,000	-	902,000	626	1169.00	1170.00	-1.00	1169.50
3/2/2019	674,000	-	674,000	468	1170.00	1172.00	-2.00	1171.00
3/3/2019	357,000	498,000	855,000	594	1168.00	1171.00	-3.00	1169.50

TABLE 8
Water Production at Lime Hollow Well Field
Q1 - 2019
Cortlandville SG

	Withdrawal Amount, gallons				Water Levels, ft amsl			
Date Reported	Well 2	Well 7	Total	Daily Rate, gpm	Well 2	Well 7	Difference Well 2 - Well 7, ft	Average
3/4/2019	613,000	-	**613,000**	**426**	1169.00	1169.00	**0.00**	**1169.00**
3/5/2019	697,000	126,000	**823,000**	**572**	1169.00	1164.00	**5.00**	**1166.50**
3/6/2019	-	814,000	**814,000**	**565**	1169.00	1164.00	**5.00**	**1166.50**
3/7/2019	-	791,000	**791,000**	**549**	1170.00	1171.00	**-1.00**	**1170.50**
3/8/2019	850,000	-	**850,000**	**590**	1168.00	1170.00	**-2.00**	**1169.00**
3/9/2019	619,000	-	**619,000**	**430**	1169.00	1164.00	**5.00**	**1166.50**
3/10/2019	-	848,000	**848,000**	**589**	1170.00	1171.00	**-1.00**	**1170.50**
3/11/2019	712,000	-	**712,000**	**494**	1168.00	1170.00	**-2.00**	**1169.00**
3/12/2019	488,000	-	**488,000**	**339**	1168.00	1163.00	**5.00**	**1165.50**
3/13/2019	-	1,060,000	**1,060,000**	**736**	1170.00	1171.00	**-1.00**	**1170.50**
3/14/2019	-	597,000	**597,000**	**415**	1168.00	1170.00	**-2.00**	**1169.00**
3/15/2019	1,086,000	-	**1,086,000**	**754**	1169.00	1171.00	**-2.00**	**1170.00**
3/16/2019	508,000	-	**508,000**	**353**	1170.00	1171.00	**-1.00**	**1170.50**
3/17/2019	-	641,000	**641,000**	**445**	1170.00	1171.00	**-1.00**	**1170.50**
3/18/2019	1,029,000	-	**1,029,000**	**715**	1168.00	1170.00	**-2.00**	**1169.00**
3/19/2019	547,000	-	**547,000**	**380**	1170.00	1171.00	**-1.00**	**1170.50**
3/20/2019	-	971,000	**971,000**	**674**	1169.00	1170.00	**-1.00**	**1169.50**
3/21/2019	35,000	470,000	**505,000**	**351**	1168.00	1170.00	**-2.00**	**1169.00**
3/22/2019	1,019,000	-	**1,019,000**	**708**	1169.00	1170.00	**-1.00**	**1169.50**
3/23/2019	480,000	-	**480,000**	**333**	1170.00	1171.00	**-1.00**	**1170.50**
3/24/2019	-	511,000	**511,000**	**355**	1168.00	1170.00	**-2.00**	**1169.00**
3/25/2019	1,147,000	-	**1,147,000**	**797**	1167.00	1170.00	**-3.00**	**1168.50**
3/26/2019	525,000	-	**525,000**	**365**	1169.00	1171.00	**-2.00**	**1170.00**
3/27/2019	-	940,000	**940,000**	**653**	1168.00	1163.00	**5.00**	**1165.50**
3/28/2019	-	461,000	**461,000**	**320**	1169.00	1171.00	**-2.00**	**1170.00**
3/29/2019	969,000	-	**969,000**	**673**	1167.00	1170.00	**-3.00**	**1168.50**
3/30/2019	628,000	55,000	**683,000**	**474**	1169.00	1171.00	**-2.00**	**1170.00**
3/31/2019	183,000	481,000	**664,000**	**461**	1167.00	1170.00	**-3.00**	**1168.50**
Totals	**37,468,000**	**26,876,000**	**64,344,000**					
Average	**646,000**	**625,023**	**714,933**	**496**	**1169.9**	**1170.7**	**-0.74**	**1170.3**
Maximum	**1,152,000**	**1,060,000**	**1,152,000**	**800**	**1172**	**1174**		**1172.5**
Minimum	**11,000**	**55,000**	**373,000**	**259**	**1167**	**1163**		**1165.5**
Difference, ft					**5**	**11**		**7.0**

Yellow highlight - days on which both wells produced water part-time.
Red highlight - daily production greater than 700 gpm

FIGURES

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1	934,471.7	914,528.9
MW - 2	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2

LIME HOLLOW ROAD

SCM WELLS 5-D & 5-S

MW - 4S

RESIDENTIAL RECEPTOR #1

LIME-HOLLOW PUMPING WELL #2 USGS #432, C-104

LIME-HOLLOW PUMPING WELL #7 USGS #320, 89-1

TAX PARCEL #95.00-06-05.000

TAX PARCEL #95.00-10-01.100

NORTH POND M.P. #1

TAX PARCEL #95.00-06-10.000

AREA TO BE REMOVED FROM EXISTING MINE PERMIT 0.4 ACRES

AREA OF LATERAL EXPANSION 2.5 ACRES

MW - 2(S)

MW - 3D

MW - 3S

TAX PARCEL #95.00-06-04.100

TAX PARCEL #95.00-10-11.200

M.P. #2 MID POND

TAX PARCEL #95.00-06-04.200

TAX PARCEL #95.00-10-11.100

SOUTH POND M.P. #3

TAX PARCEL #105.00-03-02.000

TAX PARCEL #105.00-03-04.000

TAX PARCEL #105.00-03-01.000

TAX PARCEL #105.00-03-03.000

MW - 1(S)

AREA OF LATERAL EXPANSION 9.4 ACRES

PROPOSED BERM

TAX PARCEL #105.00-03-0.6.100 7 ACRES

TAX PARCEL #105.00-03-25.000

TAX PARCEL #105.00-03-26.000

PROCESSING AREA

SCREEN

TAX PARCEL #105.00-03-27.000

SCALE HOUSE WELL

SCALE HOUSE

TRUCK SCALE

TAX PARCEL #105.00-03-28.000

VEHICLE/EQUIPMENT AREA

PROPOSED PAVED MAINTENANCE AREA 40'X40'

TAX PARCEL #105.00-03-29.000

TAX PARCEL #105.00-03-06.200 15 ACRES

NYS ROUTE 13

CR #1

G - 1 G - 2 G - 3 G - 4 G - 5 G - 6 G - 7 G - 8 G - 9

B - 1 B - 2 B - 3 B - 4 B - 5 B - 6

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- 2019 MONITORING WELL
- TEST PIT
- M.P. ## MARL PONDS
- PROPOSED MINE POND
- SCREENING AREA
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 6.0 ACRES
- AREA RECLAIMED; AWAITING REVIEW AND APPROVAL BY NYSDEC = 2.1 ACRES

AFFECTED AREA SUMMARY:

- CURRENTLY PERITTED AFFECTED AREA = 66.8 ACRES
- AREA OF LATERAL EXPANSION = 11.9 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- **TOTAL NEW AFFECTED AREA = 78.3 ACRES**

NOTES:
1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

MAP NOTES:
1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE CENTRAL, FEET
VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
	4	
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

SITE PLAN MAP

TOWN OF CORTLANDVILLE **CORTLANDVILLE SAND & GRAVEL** CORTLAND COUNTY, NY

H2H ASSOCIATES TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 1

SHEET 1 OF 1

LIME HOLLOW ROAD

LIME-HOLLOW
PUMPING WELL #2
USGS #432, C-104

LIME-HOLLOW
PUMPING WELL #7
USGS #320, 89-1

TAX PARCEL
#95.00-06-05.000

MW - 4S

RESIDENTIAL
RECEPTOR #1

NORTH
POND

M.P. #1

TAX PARCEL
#95.00-06-10.000

AREA TO BE REMOVED
FROM EXISTING
MINE PERMIT
0.4 ACRES

AREA OF LATERAL EXPANSION
2.5 ACRES

MW - 2(S)

MW - 3D

MW - 3S

G - 6

G - 7

G - 8

G - 9

1170
1180
1190
1200
1210
1220

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
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7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

SCALE IN FEET
0 37.5 75 150

N

MONITORING WELLS COORDINATES

WELL #	NORTHING (FT)	EASTING (FT)
MW - 1	934,471.7	914,528.9
MW - 2	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2

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NYSDEC MLF# 70436

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
5/21/19	3	SCALE BAR UPDATED
6/27/19	4	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

SITE PLAN MAP

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 2

SHEET 1 OF 1

FIGURE 3
USGS Topographic Quadrangle Map – Cortland, NY

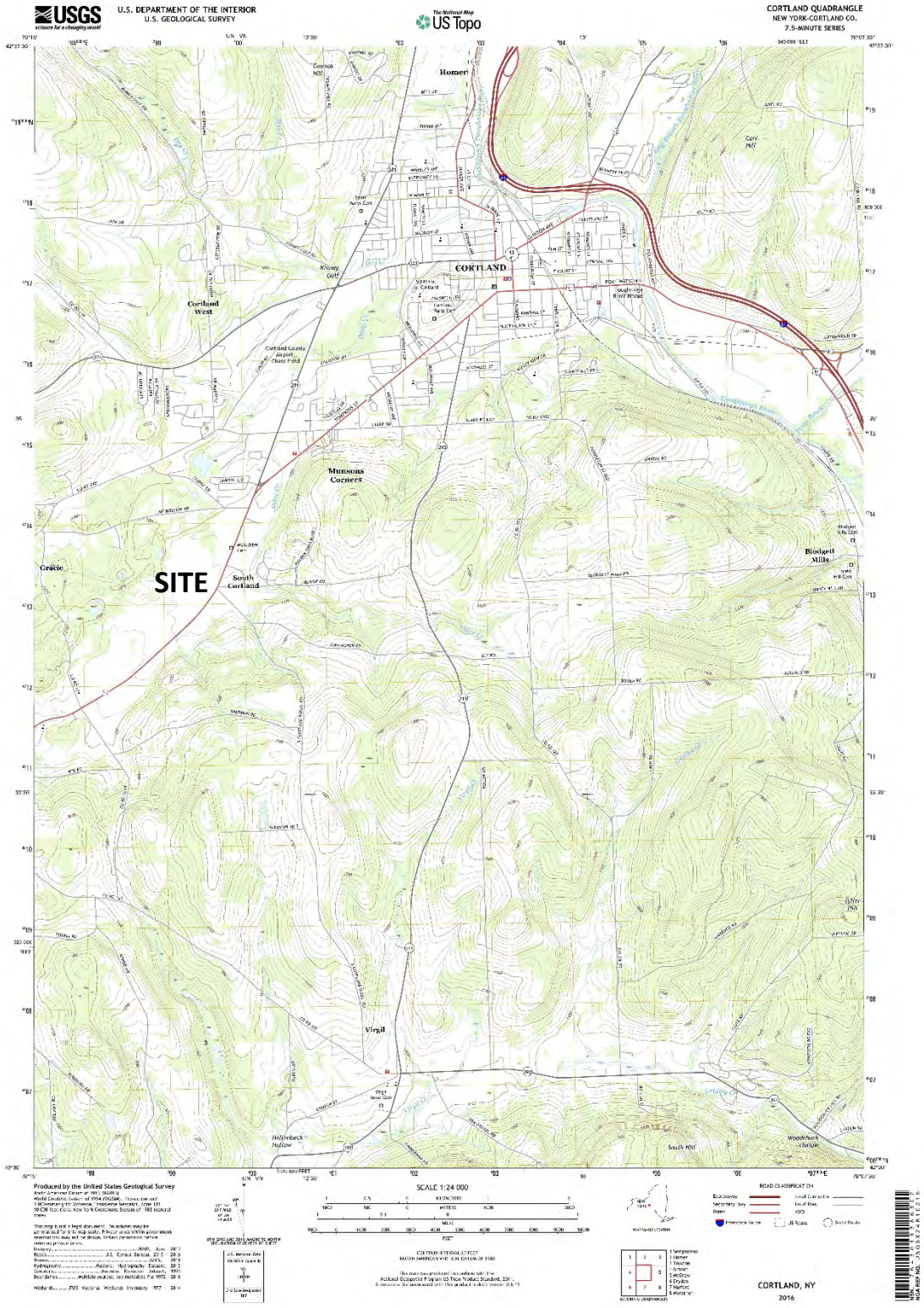


FIGURE 3a

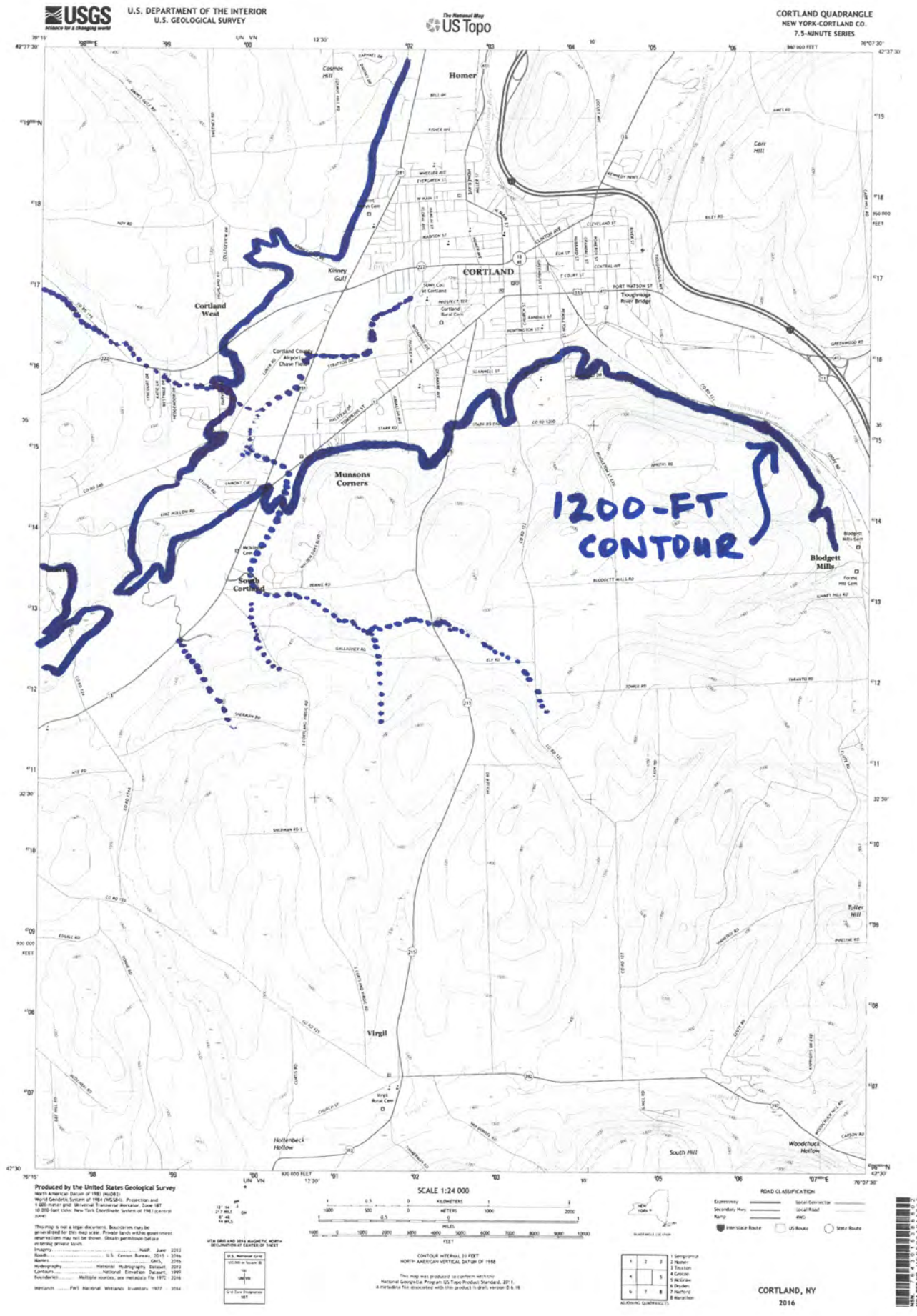

USGS
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
CORTLAND QUADRANGLE
NEW YORK-CORTLAND CO.
7.5-MINUTE SERIES
Homer
Cosmos Hill
Corr Hill
Kinney Gulf
CORTLAND
Cortland West
Cortland County Chase Field Airport
Tioughnioga River Bridge
Munsons Corners
1200-FT CONTOUR
Blodgett Mills
South Cortland
Virgil
Tuller Hill
Hollenbeck Hollow
South Hill
Woodchuck Hollow
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
ROAD CLASSIFICATION
CORTLAND, NY
2016

FIGURE 4
WATER LEVEL HYDROGRAPHS

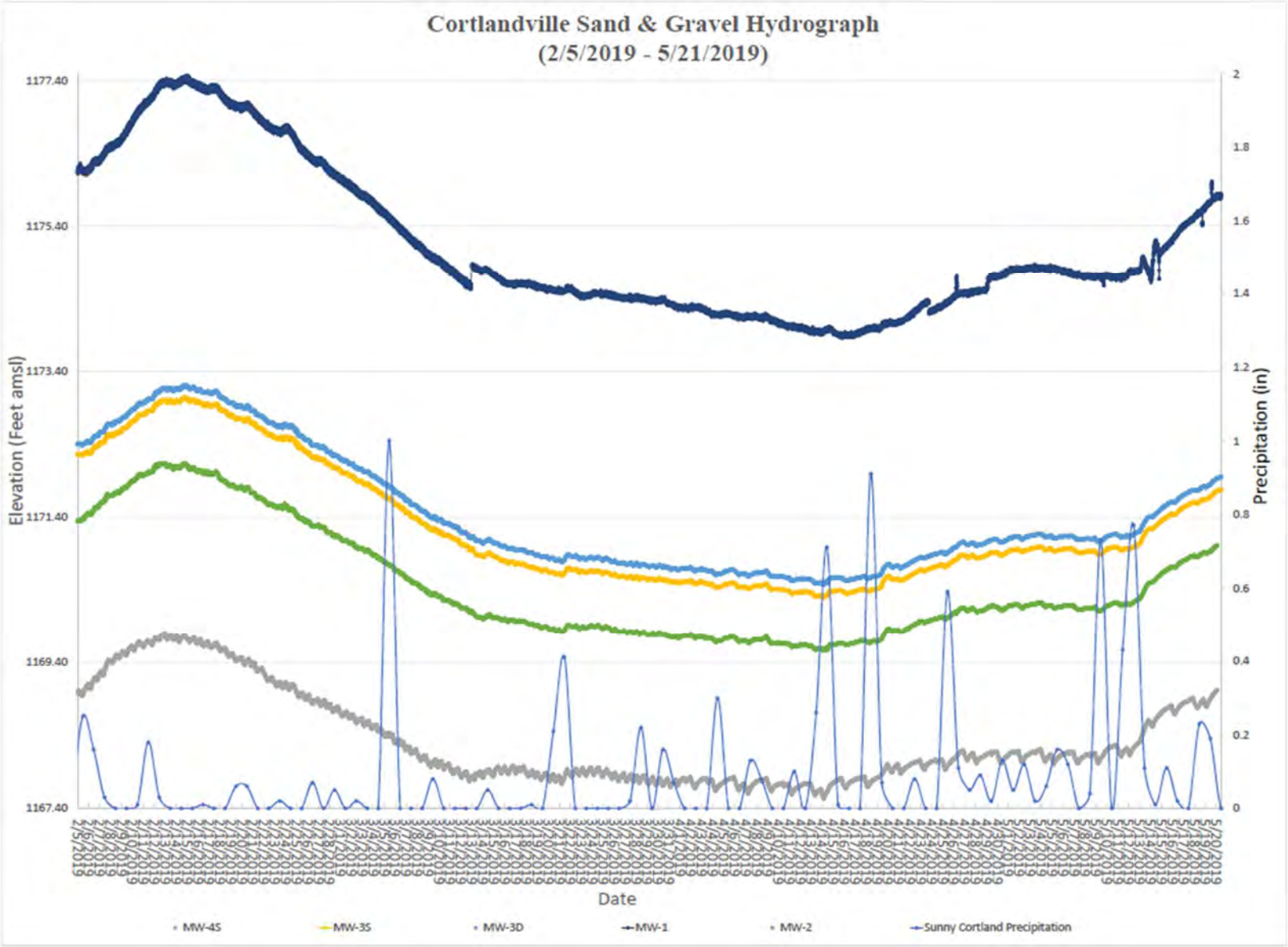


FIGURE 5
GROUNDWATER THERMOGRAPHS

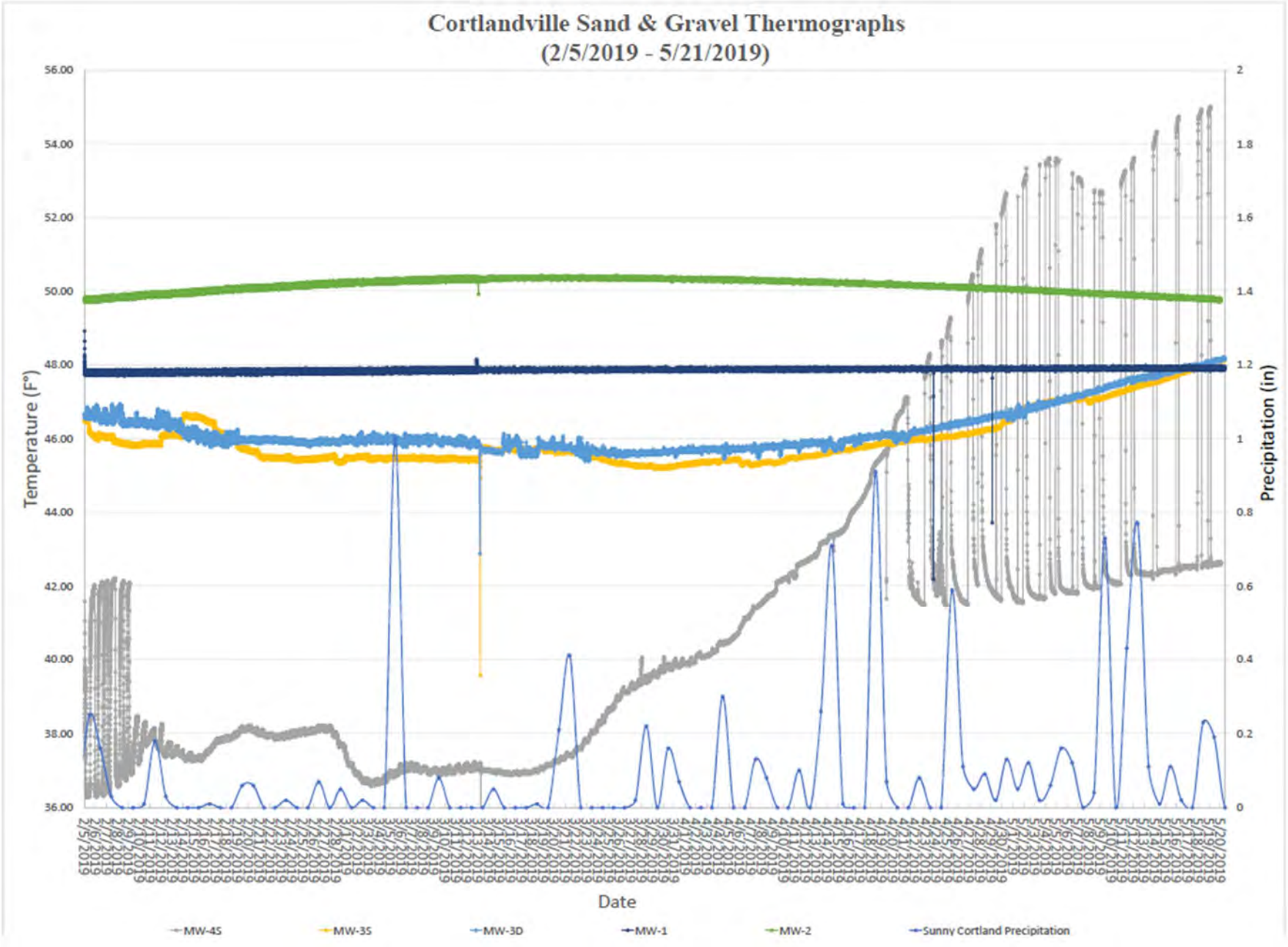
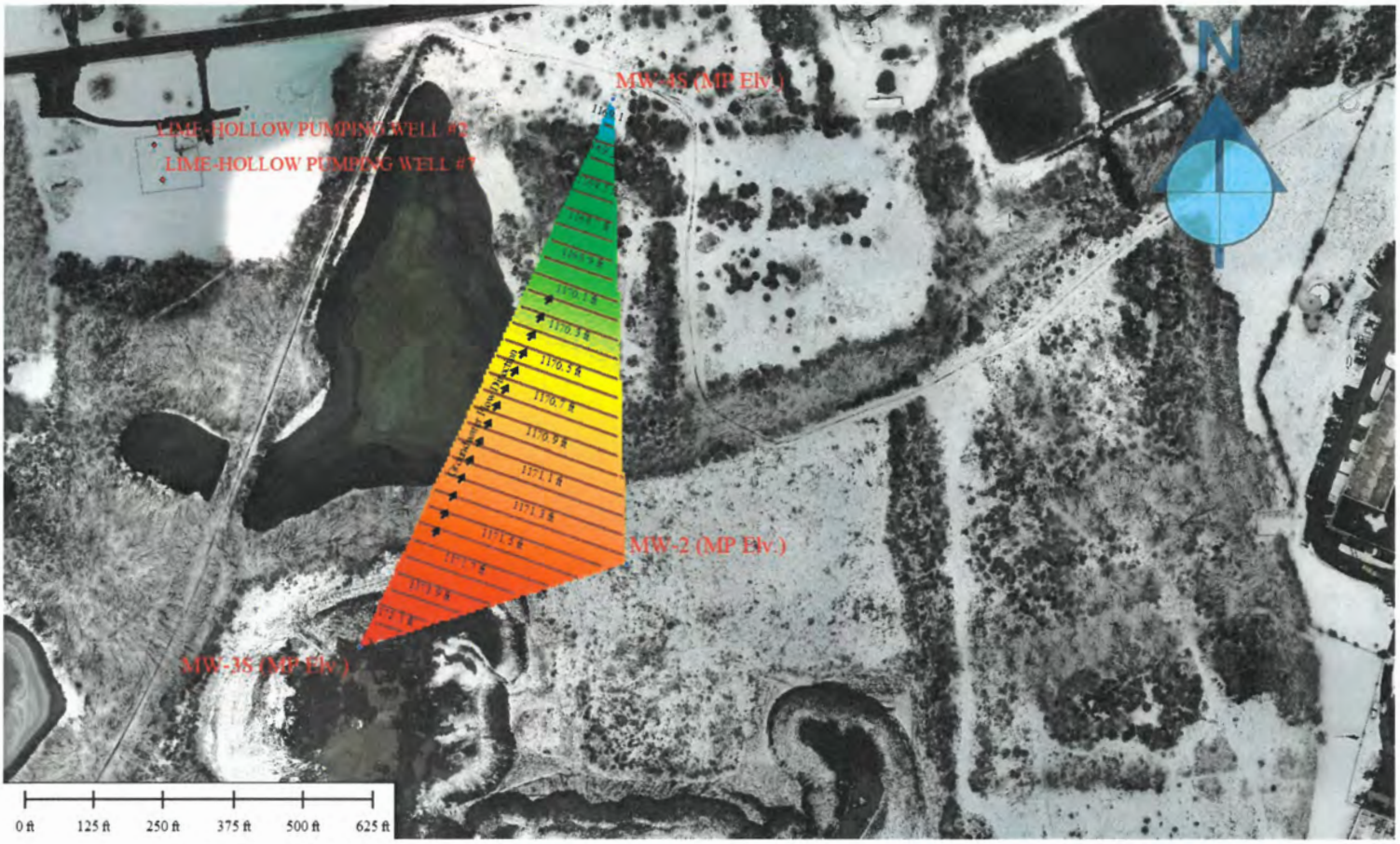
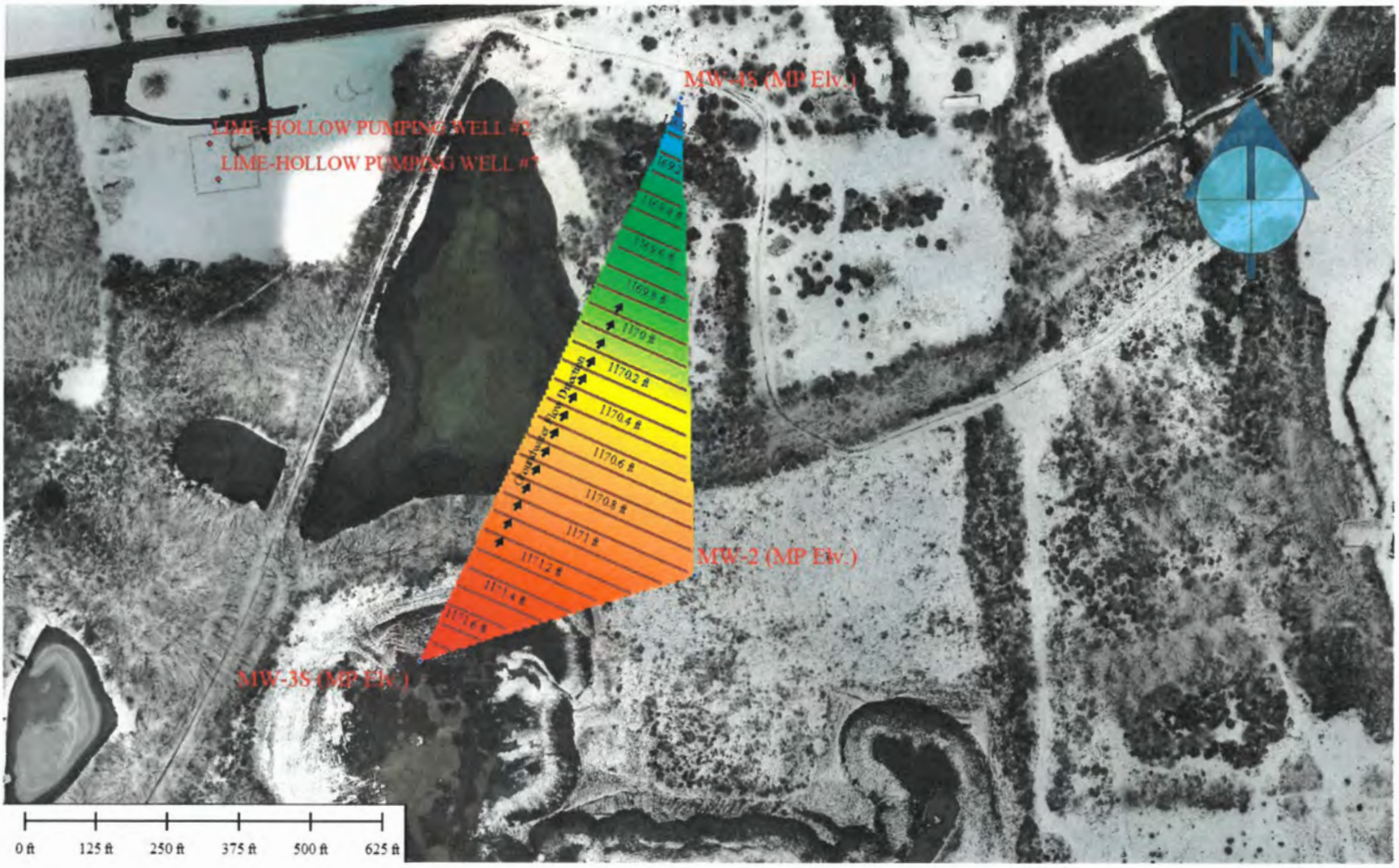


FIGURE 6 – WATER TABLE CONTOUR MAP (2/5/2019)



1. Water Levels based on manual measurements taken on 2/5/2019
2. Aerial Photo from 01-26-2017 Flight by H2H Associates, LLC

FIGURE 6 – WATER TABLE CONTOUR MAP (5/20/2019)



1. Water Levels based on manual measurements taken on 5/20/2019
2. Aerial Photo from 01-26-2017 Flight by H2H Associates, LLC


FIGURE 7 - May 2013
Google Earth
N
800 ft


FIGURE 7a - September 2016
Google Earth
N
800 ft

APPENDICES

APPENDIX A
Work Plan

H2H Associates, LLC
179 River Street, Troy, NY 12180
Geologic Consultants
Environmental Professionals
Construction Services
(518) 270-1620/Fax (518) 270-1672

PROPOSED SCOPE OF WORK – HYDROGEOLOGIC INVESTIGATION
Revised in response to NYSDEC and SWCD comments

Route 13 Rocks LLC (Applicant) has filed an application to NYSDEC to expand its permitted Cortlandville Sand & Gravel mine operation (Site) laterally and vertically (Figure 1). The permitted Life of Mine currently comprises 66.8 acres and the permitted mine floor elevation is based on maintaining an 8-foot separation from the mean high-water table. Cortlandville S&G is seeking a permit modification to mine an additional 11.9 acres laterally and to mine below the water table to the bottom of the sand and gravel outwash aquifer which may be as deep as elevation 1070 feet above mean sea level (amsl). The mine would be completed at a shallower elevation if the underlying lacustrine deposits are encountered at a shallower depth. The deepening requires a waiver of the current 8-foot separation distance requirement. The current pit bottom is at approximate elevation 1185 feet amsl.

In response to the initial application and a subsequent submittal, NYSDEC has indicated that additional hydrogeologic information must be submitted to support the application to deepen mining below the water table. Cortlandville S&G desires to obtain information sufficient to address the NYSDEC's comments, confirm the site's conceptual hydrogeologic model, provide the data needed to assess potential impacts to groundwater quality and quantity, and assess how the modification could potentially affect the Town's Lime-Hollow public water supply wells.

General Scope of Work

This document outlines the proposed work to be completed by H2H to characterize hydrogeologic conditions at the facility. The proposed scope of work, along with the Spill Prevention and Response Plan, is designed to complete the application and to provide sufficient baseline hydrogeologic information to support a SEQRA determination of no significant adverse impacts to the existing Lime Hollow public water supply wells. The proposed scope of work consists of the following subtask activities:

1. Inspect the two existing aquifer groundwater monitoring wells, MW-1 and MW-2, to confirm that they are suitable for future use;
2. Install permanent aquifer monitoring wells at two additional strategic locations, MW-3 (a shallow and deep well) and MW-4 (shallow well), to enable sampling of the aquifer materials, monitoring of groundwater levels, and sampling and analysis of groundwater;
3. Collect soil samples within each new well bore and develop borehole logs;
4. Test "representative" soil samples from the planned screened zone of one shallow and one deep well for grain size and petrographic analysis to characterize aquifer materials;
5. Install pressure transducer-data logger instrumentation in wells to enable continual monitoring of groundwater levels, flow gradients, flow directions, and temperature during the baseline monitoring period;
6. Install staff gauges and assess the relative water levels, bottom conditions and probable groundwater-surface water interactions at the marl ponds adjacent to the mine;
7. Survey the locations and elevations of monitoring points;
8. Collect an initial and quarterly rounds of groundwater samples for analysis to determine baseline spatial and temporal variations of water quality; and
9. Prepare a hydrogeologic assessment report with recommendations for the long-term operational monitoring and groundwater management program.

Following is a detailed description of these subtasks.

Detailed Description of Work Scope

1 - Inspect MW-1 / MW-2 (existing monitoring wells onsite)

Two groundwater monitoring wells are currently located on site (Figure 1). H2H will evaluate the condition and integrity of the well components, and measure the exposed infrastructure and well depths for comparability with the new wells. This will include estimation of the likely well screen elevation (well construction details are unavailable) for comparability with the new wells. Based on this data H2H will document findings and draw conclusions regarding the suitability of the wells for transducer water level measurements and future sampling.

2 - New Monitoring Well Installation

H2H proposes to install new permanent groundwater monitoring wells at two locations (MW-3 & MW-4) in the northern portion of the site (Figures 1 and 2). At the MW-3 location, one well (MW-3S) will be shallow and installed at the water table and the other well (MW-3D) will be deep and installed at the bottom of the aquifer which is the ultimate target horizon for the proposed mine pond. This may be as deep as approximately 100 feet below the water table to approximate elevation 1070 feet amsl. The actual depth will be different depending upon the depth of the bottom of the aquifer. This combination of wells will enable three-dimensional characterization of groundwater in this area and assessment of potential impacts of the proposed mine pond on groundwater quality. Each well will be drilled and installed using appropriate techniques for the anticipated site conditions.

The wells with be constructed of three-inch diameter PVC casing with factory-pre-slotted well screen (nominal 0.020-inch slots) with bottom caps. This casing diameter will facilitate well development and future groundwater sampling. Screen will be provided in 10-foot lengths. The shallow well screen at MW-3S will extend down from approximately 3 feet above the estimated high groundwater level which is nominally 30 feet below grade and varies seasonally. The intent is for the water table to be located within the well screen. Estimated shallow screen length is 30 feet. The deep well will be screened from the bottom of the proposed final pit elevation of 1070’ feet amsl to approximately the horizon of the top of the Lime-Hollow public water supply well screens. Estimated deep screen length is 30 feet.

The lower part of the annular space between the well screen and aquifer will be backfilled with a suitably graded filter pack, nominally two-inches thick. The top of the filter pack will be completed two to three feet above the top of the well screen as confirmed by a weighted tag line. Special attention will be directed during well installation to pull back the temporary casing gradually to insure the filter pack remains intact. The annular space above the top of the filter pack will be filled with an approximately two- to three-foot thick bentonite seal. The reminder of the hole will be backfilled with cement-bentonite grout up toward the ground surface. An approximately four-foot thick frost-proof concrete cap will be constructed at the ground surface. The cap will serve as a support base for the permanent surface steel casing with locking cap to protect the PVC well. Precautions will be taken during well construction to prevent unclean or foreign materials from entering the well. This includes cleaning the drilling and other intrusive equipment onsite before well installation commences.

The well will be developed by an appropriate method (e.g. overpumping, surge and bail) to remove drilling residues, improve the interconnection between the screened interval and the adjacent aquifer, and yield relatively clear water for samples. Fluids removed from the well will be monitored visibly for sediment and instrumentally for pH, temperature, specific conductance, and turbidity. The goal is to develop the well until the measured parameters stabilize and the turbidity is reduced to 25 NTUs or lower.

Well drilling, construction and development will be conducted under full-time oversight by an H2H geologist. The new wells will complement the existing monitoring wells located on the downgradient (north) and upgradient (south) ends of the mine.

3 – Soil Samples

The drill cuttings from each proposed well will be monitored and logged to confirm the anticipated sand and gravel stratigraphy in the general area between the proposed mine pond and the municipal wells. Aquifer materials in this general area are well documented in reports published by the United States Geological Survey (USGS). The material is described as an approximately 100-foot thick, coarse grained sand and gravel outwash deposit.

In addition to observing the drill cuttings, H2H will collect split-spoon soil samples (3-inch diameter) at 10-foot intervals below the water table to the bottom of the drill hole at MW-3D for classification and logging. MW-3D will be in close proximity to MW-3S therefore obviating the need for split-spoon samples at MW-3S. Split-spoon sampling is not proposed for MW-4S. Grain size and petrographic analyses will also be completed as described below.

4 – Grain Size and Petrographic Analysis

After soil classification and field logging, H2H will select representative samples from below the water table at MW-3D for grain size and petrographic analyses. The samples should be generally representative of materials in the shallow and deep parts of the aquifer at the north end of the mine. The sample classifications and grain size analyses will be used to characterize changes in aquifer gradation with depth, confirm the adequacy of the monitoring wells' filter pack sand screen designs, and assess resource quality. Petrographic analysis will indicate sand and gravel lithologic composition and provenance.

5 - Install Pressure Transducers

Use of the transducers will provide accurate and well-documented automated water level measurements over the duration of the baseline monitoring period. H2H proposes to install dedicated pressure transducers to measure water levels in all five wells initially. The transducers will be capable of providing a continuous temporal record of the groundwater level in each well. The measurement interval will be set to 30 minutes initially. The intent is to install the transducers to allow data collection during a baseline period of one complete hydrologic cycle, that is, one year. The data will be periodically downloaded to a data collector used to interface with the pressure transducers. The data will be used for the following purposes:

- Provide an indication of the amount of groundwater stored in the aquifer, i.e. water quantity;
- Provide an indication of temporal and spatial variations;
- Reveal if the wells are located within the Town wells' cone of depression;
- Assess the Town wells' radius of influence;
- Assess the Town wells' potential future interaction with mine pond water;
- Develop groundwater contour maps;
- Confirm local groundwater flow directions and horizontal and vertical hydraulic gradients;
- Integrate the new data with data and analyses previously collected by USGS to estimate groundwater flow velocities and travel times; and
- Assess potential vertical components of flow near the Town's wells.

Based on the findings, transducers will be left in place in four wells after one year of monitoring to eliminate the need for manual monthly water level measurements. The logging interval would be adjusted as considered appropriate at that time.

The transducers that would be installed would also have the capability of measuring water temperature at the same time interval as the water levels. This accessory data will be useful for identifying temperature variations, general flow patterns and natural seasonal changes in groundwater recharge.

6 - Surveying

Using its Trimble GPS equipment, H2H will survey the locations of all existing and new wells and staff gauges and determine elevations. Measurements will be reported to the nearest 0.01 feet. Other features relevant to the proposed mine expansion and hydrogeologic assessment will also be surveyed at that time.

7 - Surface Water Feature Inspection & Characterization

H2H proposes to inspect the existing marl ponds located north and west of the proposed mine pond to assess how they might be affected by the proposed mine deepening as a result of surface water-groundwater interaction. H2H will measure pond water levels and their estimated variations using the GPS unit. To the degree practicable, H2H will also assess the pond bottom conditions (e.g. sediment type) as may be pertinent to pond water infiltration/exfiltration. Pond levels will be compared to estimated ground water levels to determine if the ponds are perched, or to what degree they may be directly continuous to the water table and the proposed future mine pond. Perched ponds would not be expected to interact directly with the water table.

One staff gauge will be installed at each of the three ponds. The gauges will consist of a discrete steel fencepost driven approximately four feet into the ground and the top surveyed. Future water level measurements would be made by measuring down from the top of the post to determine water elevations.

8 – Baseline Groundwater Sampling and Analysis

As requested by SWCD, H2H proposes to collect groundwater samples during the one-year baseline period to evaluate spatial and temporal variability of water quality. The sampling and analytical protocol may be revised based on the findings of the MW-1 and W-2 well evaluations.

Spatial Variability
H2H will collect field water quality parameters (temperature, pH, specific conductance, turbidity, dissolved oxygen, redox potential) for all five wells. H2H will also collect one round of four groundwater samples from MW-1, MW-3S, MW-3D, and MW-4S for laboratory chemical analysis. The results will provide an indication of the spatial variability of water quality upgradient and downgradient of the proposed mine pond.

Samples will be extracted from adjacent to the well screens using an appropriate method designed for consistency and efficiency (e.g. via a Redi-Flo 2 or bladder pump). Field water quality parameters will be monitored to determine when sufficient water has been purged from the well prior to sampling. The groundwater samples from each well will be collected in laboratory-provided containers, with preservatives, as appropriate, for analysis in a NYSDOH-approved analytical laboratory. These samples will be kept on ice and transported to the laboratory within standard holding times and under chain of custody protocols.

The samples will be analyzed for total dissolved solids, total organic carbon, alkalinity, hardness, chloride, sulfate, nitrate, phosphorus, ammonia, volatile organic compounds (includes TCE), semi-volatile organic compounds, herbicides/pesticides and metals (including arsenic, barium, chromium, iron, lead, mercury, sodium, zinc). This suite of analytes selected for analysis is derived from several sources: draft comments from NYSDEC, metals reported in the Town's Annual Water Report, metals typically analyzed under the NYSDEC MSGP Sector J Requirements for sand and gravel mines, analyses typically completed to evaluate impacts for other surface mines and associated ponds in NYS, and potential agricultural and atmospheric contaminants.

Temporal Variability
H2H will collect three additional rounds of groundwater samples from MW-3S and MW-3D. These samples will be collected on a quarterly basis intended to characterize the seasonal variability of groundwater quality in the shallow and deep groundwater between the proposed mine pond and the public supply wells.

Baseline Water Quality at Town Wells
H2H will attempt to obtain and review the comprehensive NYSDOH Part 5, Subpart 5-1water quality analyses for the Lime Hollow Road wells prior to finalizing the analyte list. Should any of the spatial or temporal rounds of analysis at the mine identify contaminants during the baseline period, H2H may request permission from the Town to sample its Lime Hollow wells and analyze the water for these parameters.

9 - Hydrogeologic Assessment Report

H2H will prepare a preliminary data summary following completion of the primary field components of the hydrogeologic assessment. The results may suggest how subsequent subtasks should be conducted. The results may also suggest the presence of interim data gaps that may need to be addressed by additional investigatory components.

H2H will prepare a final Hydrogeologic Assessment Report, which will include the following:

- Methodology of individual subtasks;
- Bore hole logs:
- Well construction forms;
- Well development logs;
- Groundwater and surface water feature elevation table;
- Surveyed location and elevation of key monitoring points;
- Maps of groundwater and surface water level elevations;
- Evaluation of all data collected from the site investigation;
- Updated site conceptual model relevant to the mine pond and public water supply wells;
- Conclusions relative to potential water quantity or quality impacts of mine deepening; and
- A proposed long-term groundwater monitoring and management program.

APPENDIX B
Drilling Logs

H2H Associates, LLC 179 River Street Troy, New York 12180 Tel: 518.270-1620 Fax: 518.270-1672	Test Boring Log	Boring No. MW-3D
PROJECT: Hydrogeologic Assessment		Sheet 1 of 5
CLIENT: Cortlandville Sand & Gravel		Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling		Meas. Pt Elev: 1181.39
PURPOSE: Installation of Groundwater Monitoring Wells		Ground Elev: 1181.39
DRILLING METHOD: Symmetrix	SAMPLE / CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE: Cuttings / 2' Split Spoon / Symmetrix	Date Started: 12/03/18
GROUNDWATER DEPTH: 8.2' BGS	DIAM.: 3" / 5"	Date Finished: 12/6/18
MEASURING POINT: Ground Surface	WEIGHT: -	Driller: Steven Laeamee
LOCATION: Cortlandville S&G Mine	FALL: -	Geologist: Michael Polacco

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
5	No Sample					(0.0-7.0') Cuttings, same as 7.0'.	
		30	14	20	50	(7.0-9.0') Very Dark Gray (3/1), Fine to Coarse Sub Rounded Sandy Gravel, Dry, NP.	7.0 - 9.0' Split Spoon sample, cutting samples 0.0-7.0' same.
10						(9.0 - 17.0') Cuttings same 17.0'.	
15							
	S1 17.0-19.0	12	15	22	15	(17.0 - 19.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	17.0 - 19.0' Split Spoon, cutting samples 7.0-17.0' same.
20							

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
25						(19.0 - 27.0') Cuttings same as 27.0'.	
	S2 27.0 - 29.0	35	50	22	18	(27.0 - 29.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	27.0 - 29.0' Split Spoon, Cutting samples 17.0-27.0' same.
30							
						(29.0-37.0') Cuttings same as 37.0'.	
35							
	S3 37.0 - 39.0'	40	31	20	22	(37.0 - 39.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Medium to Coarse Sub Rounded to Rounded Gravel and Sand, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	37.0-39.0' Split Spoon, Cutting Samples 27.0-37.0' same.
40							

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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
45						(39.0 - 47.0') Cuttings same as 47.0'.	
	S4 47.0-49.0'					(47.0-49.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Sandy Coarse Gravel, Trace Silt Large Angular Fragments of Rock From Cobbles, Wet, NP.	47.0 - 49.0 Split Spoon, Cutting Samples 37.0-47.0' same.
50						(49.0 - 57.0') Cuttings same as 57.0'.	
55							
	S5 57.0-59.0					(57.0-59.0) Very Dark Gray (3/1), Rounded to Sub Rounded Fine to Course Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	57.0-59.0' Split Spoon, Cutting Samples 47.0-57.0' same.
60						(59.0 - 67.0') Cuttings same as 67.0'.	

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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
	S6 67.0-69.0	14	23	55	50	(67.0 - 69.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Sandy Gravel, Trace Silt, Increase in Large Angular Fragments of Rock From Cobbles, Wet, NP.	67.0 - 69.0' Split Spoon, Cutting Samples 57.0 - 67.0'.
70							
75							
	S7 77.0 -79.0	58	40	23	26	(77.0 - 79.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Gravely Sand,Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP. Lenses of Light Tan, Clayey Silt W,P.	77.0 - 79.0' Split Spoon, Cutting Samples 67.0 - 77.0'.
80							
85							
	S8 87.0-89.0	40	58	26	53	(87.0 - 88.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Coarse Sandy Gravel, Trace Silt, Wet, NP. (88.0 - 89.0') Very Dark Gray (3/1), Rounded to Sub Rounded Gravely Sand, Trace Silt, Wet, NP.	87.0 - 89.0' Split Spoon. Cutting Samples 77.0 - 87.0'.

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Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 5 of 5

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
90	S9 89.0-91.0	40	37	35	28	(89.0 - 90.0') Very Dark Gray (3/1), Fine to Course Rounded to Sub rounded Gravely Sand, Trace Silt, Wet, NP. (90.0 - 91.0) Dark Gray (3/1), Fine to Coarse Gravely Sand Rounded to Sub rounded, Trace Silt.	89.0 - 91.0' Split Spoon,
91						**Total Depth - 91.0 Feet Below Ground Surface**	

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Test Boring Log

Boring No. MW-3S

PROJECT: Hydrogeologic Assessment				Sheet 1 of 2
CLIENT: Cortlandville Sand & Gravel				Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling				Meas. Pt Elev: 1181.09
PURPOSE: Installation of Groundwater Monitoring Wells				Ground Elev: 1181.09
DRILLING METHOD: Symmetrix		SAMPLE	CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE	Cuttings	Symmetrix	Date Started: 12/06/18
GROUNDWATER DEPTH: 8.1' BGS	DIAM.	3"	5"	Date Finished: 12/06/18
MEASURING POINT: Ground Surface	WEIGHT	-		Driller: Steven Laeamee
Location: Courtlandville S&G Mine	FALL	-		Geologist: Michael Polacco

Depth (feet)	Sample Number	Geologic Description	Remarks
5	No Sample	(0-12') Olive Gray (5/2), Fine Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Moist, NP.	Log based on cuttings
10			
15		(12 - 22') Gray (5/5), Fine to Coarse Gravely Sand, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
20			

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Test Boring Log

Boring No. MW-3S

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 2 of 2

Job No. 360.00

Depth (feet)	Geologic Description	Remarks
25	(22 - 27') Gray (5/5), Fine to Coarse Gravely Sand, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
30	(27 - 32') Dark Gray (4/1), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
35	(32 - 35.5') Dark Gray (4/1), Fine to Coarse Gravely Sand, Rounded to Sub rounded, Wet, NP.	Log based on cuttings

35.5 **Total Depth - 35.5 Feet Below Ground Surface**

H2H Associates, LLC 179 River Street Troy, New York 12180 Tel: 518.270-1620 Fax: 518.270-1672	Test Boring Log	Boring No. MW-4S
PROJECT: Hydrogeologic Assessment		Sheet 1 of 2
CLIENT: Cortlandville Sand & Gravel		Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling		Meas. Pt Elev: 1175.58
PURPOSE: Installation of Groundwater Monitoring Wells		Ground Elev: 1175.58

DRILLING METHOD: Symmetrix		SAMPLE	CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE	Cuttings	Symmetrix	Date Started: 12/07/18
GROUNDWATER DEPTH: 5.8' BGS	DIAM.	3"	5"	Date Finished: 12/07/18
MEASURING POINT: Ground Surface	WEIGHT	-		Driller: Steven Laeamee
	FALL	-		Geologist: Michael Polacco

Depth (feet)	Geologic Description	Remarks
	Fill From Site	
5	(0 - 8') Brown (5/2), Fine Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Moist, NP.	Log based on cuttings.
10	(8 - 13') Brown (5/2), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings.
15	(13 - 18') Dark Brown (3/2), Fine to Coarse Sandy Gravel, Trace Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings.
20		

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Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-4S

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 2 of 2

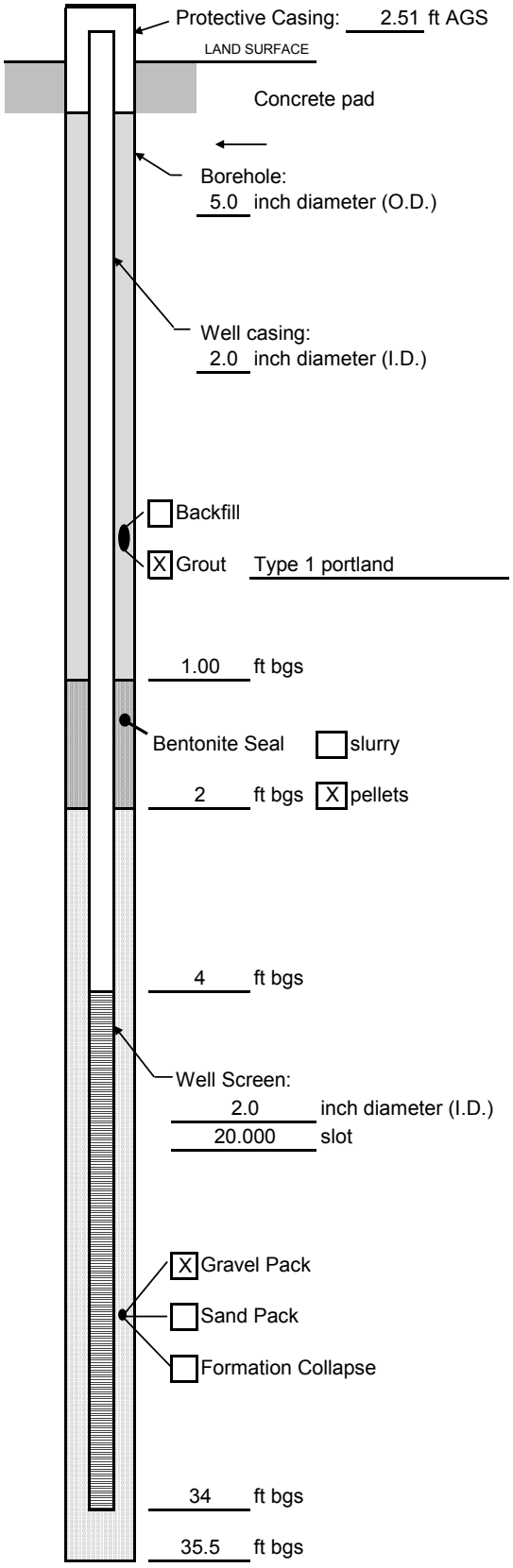
Job No. 360.00

Depth (feet)	Geologic Description	Remarks
	(18 - 23') Dark Brown (3/2), Fine to Coarse Sandy Gravel, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
25	(23 - 28') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
30	(28 - 33') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
35	(33 - 36') Dark Gray (4/1), Fine to Coarse Gravley Sand, Little to No Silt (Fines can be rolled, but breaks up), Rounded to Sub rounded, Large Angular Fragments of Rock From Cobbles, Wet, NP.	Log based on cuttings
36	**Total Depth - 36.0 Feet Below Ground Surface**	

APPENDIX C
Well Construction Logs

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-3S

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1181.09 feet [X] Surveyed

Measuring Point Elevation: 1183.60 feet [ ] Estimated

Installation Date(s): 12/7/2018

Drilled Date(s): 12/6/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/11/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

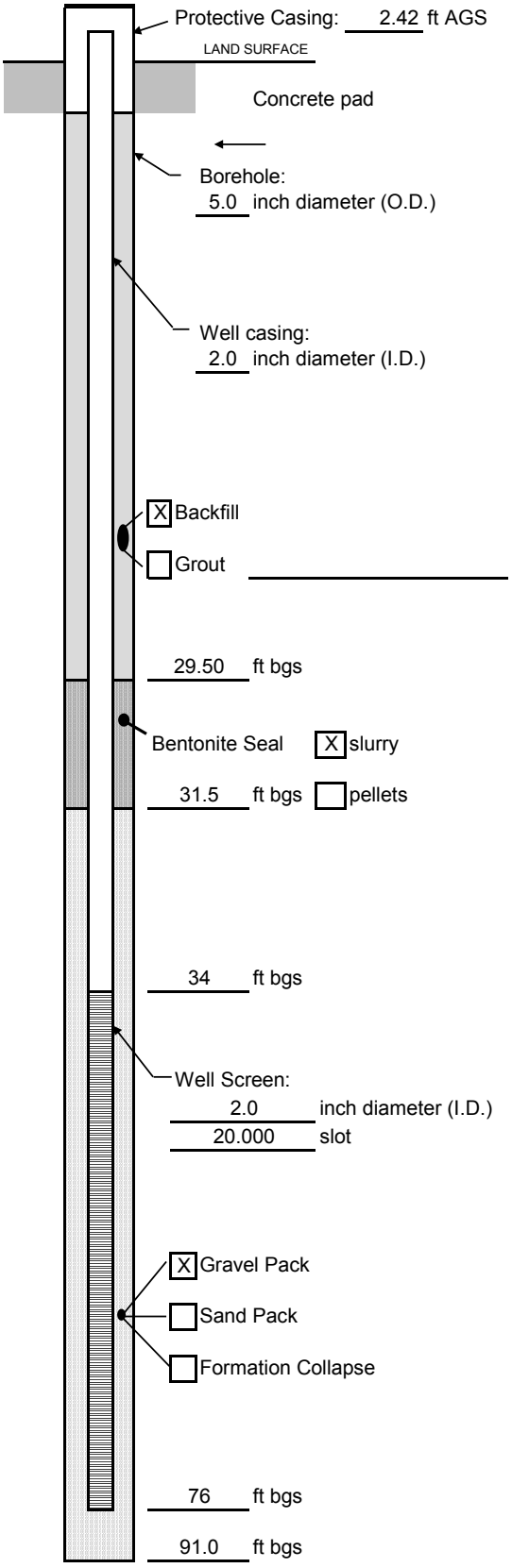
Remarks:

Prepared by:

Michael Polacco

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-3D

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1181.388 feet [X] Surveyed

Measuring Point Elevation: 1183.81 feet [ ] Estimated

Installation Date(s): 12/6/2018

Drilled Date(s): 12/03/2018 - 12/06/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/10/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

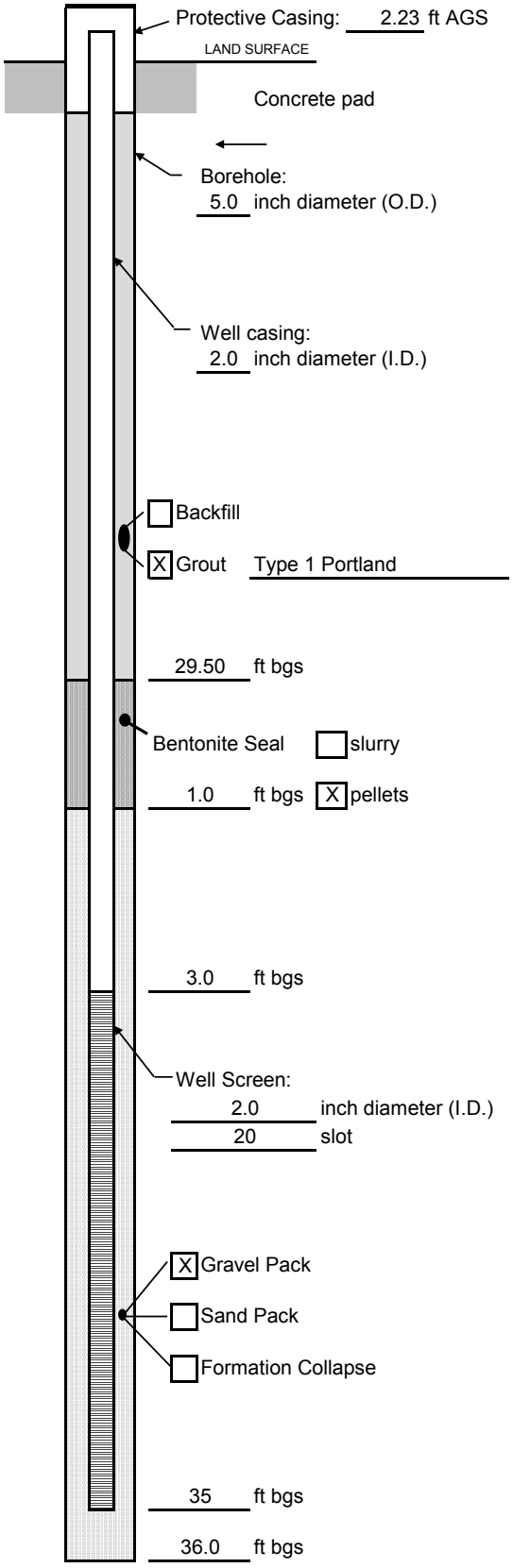
Remarks:

Prepared by:

Michael Polacco

Well Construction Log

H2H Associates



Project: Hydrogeologic Assessment Well ID: MW-4S

Town/City: Courtlandville

County: Cortland State: N.Y.

Client: Cortlandville Sand & Gravel

Land-Surface Elevation: 1175.58 feet [X] Surveyed

Measuring Point Elevation: 1177.81 feet [ ] Estimated

Installation Date(s): 12/10/2018

Drilled Date(s): 12/7/2018

Drilling Method: Symmetrix

Drilling Contractor: North Star Drilling

Drilling Fluid: N/A

Development Technique(s) and Date(s)

10 G.P.M Pump - 12/10/18

Static Depth to Water: 10.8 feet below M.P.

Well Purpose: NYSDEC MLR Permit Modification

Remarks:

Prepared by:

Michael Polacco

APPENDIX D
Grain Size Analyses

Cortlandvile Sand Gravel Mine
Mining Permit Modification
Gradation Analysis

Gradation Sample	Sample Depth (Ft. BGS)		%Cobbles	% Gravel	% Sand	% Silt / Clay	Notes
	from	to					
S-1	17.0	19.0	0.0	64.6	29.2	5.5	3" Split Spoon Sample
S-2	27.0	29.0	0.0	72.3	24.7	3.0	3" Split Spoon Sample
S-3	29.0	39.0	0.0	51.3	47.1	1.6	37.0-39.0' 3" Split Spoon, Cutting Samples 29.0-37.0' same.
S-4	39.0	49.0	0.0	41.1	52.6	6.3	47.0 - 49.0' 3" Split Spoon, Cutting Samples 39.0-47.0' same.
S-5	49.0	59.0	0.0	47.1	51.5	1.4	57.0-59.0' 3" Split Spoon, Cutting Samples 49.0-57.0' same.
S-6	59.0	69.0	0.0	45.8	51.2	3.0	67.0 - 69.0' 3" Split Spoon, Cutting Samples 59.0 - 67.0'.
S-7	69.0	79.0	0.0	40.3	55.7	4.0	77.0 - 79.0' 3" Split Spoon, Cutting Samples 69.0 - 77.0'.
S-8	79.0	89.0	0.0	35.3	58.3	6.4	87.0 - 89.0' 3" Split Spoon. Cutting Samples 79.0 - 87.0'.
S-9	89.0	91.0	0.0	54.9	40.4	4.7	3" Split Spoon.

Notes:
1. MW-3D screened from 34.0' BGS - 76.0 'BGS
2. MW-3S screened from 4' BGS - 34.0' BGS
3. Samples collected from MW-3D
4. MW-3D ground surface elv. 1181.4' amsl / MW-3S ground surface elv. 1181.1'

APPENDIX E
Laboratory Analysis Reports

APPENDIX E-1
Quarter 1
Laboratory Analysis Reports

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

April 3, 2019

Mike Polacco
H2H Associates, LLC
179 River Street
Troy, NY 12180

Project Location: Cortlandville, NY
Client Job Number:
Project Number: 10009
Laboratory Work Order Number: 19C0662

Enclosed are results of analyses for samples received by the laboratory on March 14, 2019. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Aaron L. Benoit
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 7

Sample Results 10

19C0662-01 10

19C0662-02 19

19C0662-03 28

19C0662-04 37

19C0662-05 46

19C0662-06 55

19C0662-07 57

Sample Preparation Information 59

QC Data 62

Volatile Organic Compounds by GC/MS 62

B225949 62

Semivolatile Organic Compounds by GC/MS 67

B226147 67

Organochloride Pesticides by GC/ECD 72

B226044 72

Herbicides by GC/ECD 75

B226019 75

Metals Analyses (Total) 77

B225878 77

B226176 77

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 79

B225801 79

Table of Contents (continued)

B225891 79

B225927 79

B225953 79

B225995 80

B226138 80

B226174 80

B226260 81

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) 82

B225822 82

B227340 82

Pesticides Degradation Report 83

Dual Column RPD Report 85

Flag/Qualifier Summary 91

Certifications 92

Chain of Custody/Sample Receipt 100

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-2	19C0662-01	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-3D	19C0662-02	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-3S	19C0662-03	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-4S	19C0662-04	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: Mike Polacco

REPORT DATE: 4/3/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19C0662

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
DUP	19C0662-05	Ground Water		ASTM D516-11	
				EPA 300.0	
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
Field Blank	19C0662-06	Field Blank		SW-846 8260C	
Trip Blank	19C0662-07	Trip Blank Water		SW-846 8260C	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

REVISED REPORT 04/01/2019: Report revised to verify TDS results for 19C0662-03 through 19C0662-05 per client 3/29/19 e-mail request.

For method 8151, samples were derivatized on 03/19/19.

For method 8151, sample analysis bracketed by LCS to monitor esterification. All recoveries in the bracketing LCS met method criteria.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ASTM D516-11

Qualifications:

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Sulfate
B226138-BSD1

EPA 300.0

Qualifications:

MS-07

Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Chloride
19C0662-02[MW-3D], B226260-MS1

SM21-22 2540C

Qualifications:

H-02

Gross violation of holding time. Analysis performed after 2X the allowable holding time.

Analyte & Samples(s) Qualified:

Total Dissolved Solids
19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP]

SW-846 8081B

Qualifications:

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Hexachlorobenzene
B226044-BS1, B226044-BSD1

SW-846 8260C

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Methyl Acetate
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Methyl Acetate
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1, S033642-CCV1

Tetrahydrofuran
19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], 19C0662-06[Field Blank], 19C0662-07[Trip Blank], B225949-BLK1, B225949-BS1, B225949-BSD1, S033642-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
B225949-BS1, B225949-BSD1, S033642-CCV1

Dichlorodifluoromethane (Freon 12
B225949-BS1, B225949-BSD1, S033642-CCV1

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V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Methyl Acetate

B225949-BS1, B225949-BSD1, S033642-CCV1

V-36

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Carbon Disulfide

B225949-BS1, B225949-BSD1, S033642-CCV1

SW-846 8270D

Qualifications:

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Benzidine

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

3,3-Dichlorobenzidine

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

3-Nitroaniline

B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

4-Chloroaniline

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

Aniline

19C0662-01[MW-2], 19C0662-02[MW-3D], 19C0662-03[MW-3S], 19C0662-04[MW-4S], 19C0662-05[DUP], B226147-BLK1, B226147-BS1, B226147-BSD1, S033811-CCV1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Project Manager

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:01	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 15:01
Toluene-d8	102	70-130		3/18/19 15:01
4-Bromofluorobenzene	102	70-130		3/18/19 15:01

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:31	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.6	15-110		3/22/19 17:31
Phenol-d6	23.7	15-110		3/22/19 17:31
Nitrobenzene-d5	82.8	30-130		3/22/19 17:31
2-Fluorobiphenyl	89.0	30-130		3/22/19 17:31
2,4,6-Tribromophenol	101	15-110		3/22/19 17:31
p-Terphenyl-d14	114	30-130		3/22/19 17:31

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.20	0.025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Aldrin [1]	ND	0.050	0.017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
alpha-BHC [1]	ND	0.050	0.0032	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
beta-BHC [1]	ND	0.050	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
delta-BHC [1]	ND	0.050	0.030	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
gamma-BHC (Lindane) [1]	ND	0.030	0.014	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Chlordane [1]	ND	0.20	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDD [1]	ND	0.040	0.0018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDE [1]	ND	0.040	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
4,4'-DDT [1]	ND	0.040	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Dieldrin [1]	ND	0.0020	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan I [1]	ND	0.050	0.0021	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan II [1]	ND	0.080	0.0029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endosulfan sulfate [1]	ND	0.080	0.0025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin [1]	ND	0.080	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin aldehyde [1]	ND	0.080	0.063	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Endrin ketone [1]	ND	0.080	0.0050	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Heptachlor [1]	ND	0.050	0.0046	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Heptachlor epoxide [1]	ND	0.050	0.0040	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Hexachlorobenzene [2]	ND	0.050	0.039	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Methoxychlor [1]	ND	0.50	0.0097	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG
Toxaphene [1]	ND	1.0	0.66	µg/L	1		SW-846 8081B	3/19/19	3/23/19 18:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.3	30-150		3/23/19 18:55
Decachlorobiphenyl [2]	84.0	30-150		3/23/19 18:55
Tetrachloro-m-xylene [1]	68.2	30-150		3/23/19 18:55
Tetrachloro-m-xylene [2]	66.9	30-150		3/23/19 18:55

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	3/19/19	3/19/19 23:45	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	94.7	30-150		3/19/19 23:45
2,4-Dichlorophenylacetic acid [2]	92.8	30-150		3/19/19 23:45

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Barium	0.040	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:55	TBC
Sodium	28	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:39	EJB
Hardness	240			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:39	EJB

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	220	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	48	1.0	0.30	mg/L	1		EPA 300.0	3/22/19	3/22/19 10:40	IS
Nitrate as N	2.9	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 0:10	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/17/19	3/17/19 13:20	AIA
Sulfate	10	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:27	KMV

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-2 | Sampled: 3/13/2019 14:25

Sample ID: 19C0662-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	250	10	5.9	mg/L	1		SM21-22 2540C	3/15/19	3/15/19 11:55	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 15:31	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 15:31
Toluene-d8	101	70-130		3/18/19 15:31
4-Bromofluorobenzene	99.7	70-130		3/18/19 15:31

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 17:53	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	36.9	15-110		3/22/19 17:53
Phenol-d6	23.3	15-110		3/22/19 17:53
Nitrobenzene-d5	84.8	30-130		3/22/19 17:53
2-Fluorobiphenyl	90.1	30-130		3/22/19 17:53
2,4,6-Tribromophenol	104	15-110		3/22/19 17:53
p-Terphenyl-d14	121	30-130		3/22/19 17:53

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Aldrin [1]	ND	0.048	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
alpha-BHC [1]	ND	0.048	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
beta-BHC [1]	ND	0.048	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
delta-BHC [1]	ND	0.048	0.029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
gamma-BHC (Lindane) [1]	ND	0.029	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDE [1]	ND	0.038	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan I [1]	ND	0.048	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan II [1]	ND	0.077	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endosulfan sulfate [1]	ND	0.077	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin [1]	ND	0.077	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin aldehyde [1]	ND	0.077	0.060	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Endrin ketone [1]	ND	0.077	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Heptachlor [1]	ND	0.048	0.0044	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Heptachlor epoxide [1]	ND	0.048	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Hexachlorobenzene [2]	ND	0.048	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Methoxychlor [1]	ND	0.48	0.0093	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG
Toxaphene [1]	ND	0.96	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:22	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	68.3	30-150		3/23/19 19:22
Decachlorobiphenyl [2]	86.1	30-150		3/23/19 19:22
Tetrachloro-m-xylene [1]	71.9	30-150		3/23/19 19:22
Tetrachloro-m-xylene [2]	70.5	30-150		3/23/19 19:22

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 0:24	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	91.8	30-150		3/20/19 0:24
2,4-Dichlorophenylacetic acid [2]	90.7	30-150		3/20/19 0:24

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D
Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Barium	0.054	0.050	0.0053	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:56	TBC
Sodium	13	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:45	EJB
Hardness	230			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:45	EJB

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	160	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	40	1.0	0.30	mg/L	1	MS-07	EPA 300.0	3/22/19	3/22/19 10:54	IS
Nitrate as N	1.8	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 0:39	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/17/19	3/17/19 13:20	AIA
Sulfate	17	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:43	KMV

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3D | Sampled: 3/13/2019 17:10

Sample ID: 19C0662-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	230	10	5.9	mg/L	1		SM21-22 2540C	3/15/19	3/15/19 11:55	LL

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,1-Trichloroethane	0.32	1.0	0.20	µg/L	1	J	SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:02	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 16:02
Toluene-d8	101	70-130		3/18/19 16:02
4-Bromofluorobenzene	99.4	70-130		3/18/19 16:02

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Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:16	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	38.2	15-110		3/22/19 18:16
Phenol-d6	24.4	15-110		3/22/19 18:16
Nitrobenzene-d5	87.3	30-130		3/22/19 18:16
2-Fluorobiphenyl	91.5	30-130		3/22/19 18:16
2,4,6-Tribromophenol	104	15-110		3/22/19 18:16
p-Terphenyl-d14	119	30-130		3/22/19 18:16

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.21	0.026	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Aldrin [1]	ND	0.052	0.018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
alpha-BHC [1]	ND	0.052	0.0033	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
beta-BHC [1]	ND	0.052	0.025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
delta-BHC [1]	ND	0.052	0.031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
gamma-BHC (Lindane) [1]	ND	0.031	0.014	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Chlordane [1]	ND	0.21	0.13	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDD [1]	ND	0.041	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDE [1]	ND	0.041	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
4,4'-DDT [1]	ND	0.041	0.0025	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Dieldrin [1]	ND	0.0021	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan I [1]	ND	0.052	0.0022	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan II [1]	ND	0.082	0.0030	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endosulfan sulfate [1]	ND	0.082	0.0026	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin [1]	ND	0.082	0.0018	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin aldehyde [1]	ND	0.082	0.065	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Endrin ketone [1]	ND	0.082	0.0051	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Heptachlor [1]	ND	0.052	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Heptachlor epoxide [1]	ND	0.052	0.0041	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Hexachlorobenzene [2]	ND	0.052	0.040	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Methoxychlor [1]	ND	0.52	0.010	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG
Toxaphene [1]	ND	1.0	0.68	µg/L	1		SW-846 8081B	3/19/19	3/23/19 19:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.0	30-150		3/23/19 19:48
Decachlorobiphenyl [2]	76.8	30-150		3/23/19 19:48
Tetrachloro-m-xylene [1]	61.8	30-150		3/23/19 19:48
Tetrachloro-m-xylene [2]	60.9	30-150		3/23/19 19:48

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:03	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	95.2	30-150		3/20/19 1:03
2,4-Dichlorophenylacetic acid [2]	94.0	30-150		3/20/19 1:03

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	0.0084	0.010	0.0080	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Barium	0.045	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:58	TBC
Sodium	21	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 10:51	EJB
Hardness	260			mg/L	1		SW-846 6010	3/20/19	3/21/19 10:51	EJB

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	230	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	52	5.0	1.5	mg/L	5		EPA 300.0	3/22/19	3/22/19 12:06	IS
Nitrate as N	2.7	0.10	0.028	mg/L	1		EPA 300.0	3/14/19	3/14/19 23:42	IS
Phosphorus, Total	0.081	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	9.8	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 11:59	KMV

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-3S | Sampled: 3/13/2019 18:40

Sample ID: 19C0662-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	230	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloroform	0.34	2.0	0.17	µg/L	1	J	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 16:33	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 16:33
Toluene-d8	102	70-130		3/18/19 16:33
4-Bromofluorobenzene	101	70-130		3/18/19 16:33

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 18:38	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.6	15-110		3/22/19 18:38
Phenol-d6	24.3	15-110		3/22/19 18:38
Nitrobenzene-d5	83.6	30-130		3/22/19 18:38
2-Fluorobiphenyl	88.2	30-130		3/22/19 18:38
2,4,6-Tribromophenol	102	15-110		3/22/19 18:38
p-Terphenyl-d14	119	30-130		3/22/19 18:38

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Aldrin [1]	ND	0.047	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
alpha-BHC [1]	ND	0.047	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
beta-BHC [1]	ND	0.047	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
delta-BHC [1]	ND	0.047	0.028	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
gamma-BHC (Lindane) [1]	ND	0.028	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDE [1]	ND	0.038	0.0015	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan I [1]	ND	0.047	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan II [1]	ND	0.076	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endosulfan sulfate [1]	ND	0.076	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin [1]	ND	0.076	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin aldehyde [1]	ND	0.076	0.059	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Endrin ketone [1]	ND	0.076	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Heptachlor [1]	ND	0.047	0.0043	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Heptachlor epoxide [1]	ND	0.047	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Hexachlorobenzene [2]	ND	0.047	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Methoxychlor [1]	ND	0.47	0.0092	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG
Toxaphene [1]	ND	0.95	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.6	30-150		3/23/19 20:15
Decachlorobiphenyl [2]	84.8	30-150		3/23/19 20:15
Tetrachloro-m-xylene [1]	67.0	30-150		3/23/19 20:15
Tetrachloro-m-xylene [2]	65.5	30-150		3/23/19 20:15

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 1:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	81.7	30-150		3/20/19 1:43	
2,4-Dichlorophenylacetic acid [2]	81.3	30-150		3/20/19 1:43	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S
Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	0.0088	0.010	0.0080	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Barium	0.029	0.050	0.0053	mg/L	1	J	SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 8:59	TBC
Sodium	20	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:08	EJB
Hardness	250			mg/L	1		SW-846 6010	3/20/19	3/21/19 11:08	EJB

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	180	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	54	5.0	1.5	mg/L	5		EPA 300.0	3/22/19	3/22/19 12:21	IS
Nitrate as N	1.8	0.10	0.028	mg/L	1		EPA 300.0	3/15/19	3/15/19 1:37	IS
Phosphorus, Total	ND	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	8.8	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 12:15	KMV

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: MW-4S | Sampled: 3/13/2019 20:10

Sample ID: 19C0662-04

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	240	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 17:03	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 17:03
Toluene-d8	101	70-130		3/18/19 17:03
4-Bromofluorobenzene	97.2	70-130		3/18/19 17:03

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Aniline	ND	5.0	3.7	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzidine	ND	20	12	µg/L	1	V-05	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Benzoic Acid	ND	10	8.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	3/20/19	3/22/19 19:01	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	36.1	15-110		3/22/19 19:01
Phenol-d6	23.0	15-110		3/22/19 19:01
Nitrobenzene-d5	81.2	30-130		3/22/19 19:01
2-Fluorobiphenyl	86.3	30-130		3/22/19 19:01
2,4,6-Tribromophenol	98.5	15-110		3/22/19 19:01
p-Terphenyl-d14	115	30-130		3/22/19 19:01

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.19	0.024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Aldrin [1]	ND	0.048	0.016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
alpha-BHC [1]	ND	0.048	0.0031	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
beta-BHC [1]	ND	0.048	0.023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
delta-BHC [1]	ND	0.048	0.029	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
gamma-BHC (Lindane) [1]	ND	0.029	0.013	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Chlordane [1]	ND	0.19	0.12	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDD [1]	ND	0.038	0.0017	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDE [1]	ND	0.038	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
4,4'-DDT [1]	ND	0.038	0.0023	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Dieldrin [1]	ND	0.0019	0.0019	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan I [1]	ND	0.048	0.0020	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan II [1]	ND	0.077	0.0027	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endosulfan sulfate [1]	ND	0.077	0.0024	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin [1]	ND	0.077	0.0016	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin aldehyde [1]	ND	0.077	0.060	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Endrin ketone [1]	ND	0.077	0.0047	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Heptachlor [1]	ND	0.048	0.0044	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Heptachlor epoxide [1]	ND	0.048	0.0038	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Hexachlorobenzene [2]	ND	0.048	0.037	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Methoxychlor [1]	ND	0.48	0.0093	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG
Toxaphene [1]	ND	0.96	0.63	µg/L	1		SW-846 8081B	3/19/19	3/23/19 20:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.3	30-150		3/23/19 20:42
Decachlorobiphenyl [2]	84.7	30-150		3/23/19 20:42
Tetrachloro-m-xylene [1]	59.7	30-150		3/23/19 20:42
Tetrachloro-m-xylene [2]	58.8	30-150		3/23/19 20:42

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.10	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0097	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
2,4,5-T [1]	ND	0.096	0.023	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dicamba [1]	ND	0.048	0.015	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
Dinoseb [1]	ND	0.24	0.045	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
MCPA [1]	ND	48	9.1	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG
MCPP [1]	ND	48	9.4	µg/L	1		SW-846 8151A	3/19/19	3/20/19 2:22	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	92.6	30-150		3/20/19	2:22
2,4-Dichlorophenylacetic acid [2]	91.3	30-150		3/20/19	2:22

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Barium	0.054	0.050	0.0053	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	3/18/19	3/19/19 9:01	TBC
Sodium	13	2.0	0.28	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	3/20/19	3/21/19 11:14	EJB
Hardness	230			mg/L	1		SW-846 6010	3/20/19	3/21/19 11:14	EJB

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	180	1.0	0.069	mg/L	1		SM21-22 2320B	3/15/19	3/15/19 19:45	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	3/18/19	3/19/19 8:00	EC
Chloride	40	1.0	0.30	mg/L	1		EPA 300.0	3/22/19	3/22/19 12:35	IS
Nitrate as N	2.1	0.10	0.028	mg/L	1		EPA 300.0	3/14/19	3/14/19 23:13	IS
Phosphorus, Total	0.074	0.062	0.061	mg/L	1.25		SM 21-22 4500 P E	3/19/19	3/19/19 18:27	AIA
Sulfate	19	2.0	0.92	mg/L	1		ASTM D516-11	3/20/19	3/20/19 8:30	EC
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	3/20/19	3/21/19 12:31	KMV

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: DUP | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-05

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	220	10	5.9	mg/L	1	H-02	SM21-22 2540C	4/1/19	4/1/19 13:35	LL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Field Blank | Sampled: 3/13/2019 19:20

Sample ID: 19C0662-06

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Field Blank | Sampled: 3/13/2019 19:20

Sample ID: 19C0662-06

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:26	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		3/18/19 11:26
Toluene-d8	101	70-130		3/18/19 11:26
4-Bromofluorobenzene	100	70-130		3/18/19 11:26

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Trip Blank | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-07

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19C0662

Date Received: 3/14/2019

Field Sample #: Trip Blank | Sampled: 3/13/2019 00:00

Sample ID: 19C0662-07

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Hexachlorobutadiene	ND	1.0	0.47	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1	L-04, V-05	SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Naphthalene	ND	5.0	0.31	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1	V-05	SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	3/18/19	3/18/19 11:56	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		3/18/19 11:56
Toluene-d8	103	70-130		3/18/19 11:56
4-Bromofluorobenzene	100	70-130		3/18/19 11:56

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

ASTM D516-11

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226138	100	100	03/20/19
19C0662-02 [MW-3D]	B226138	100	100	03/20/19
19C0662-03 [MW-3S]	B226138	100	100	03/20/19
19C0662-04 [MW-4S]	B226138	100	100	03/20/19
19C0662-05 [DUP]	B226138	100	100	03/20/19

Prep Method: EPA 300.0-EPA 300.0

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225801	10.0	10.0	03/15/19
19C0662-02 [MW-3D]	B225801	10.0	10.0	03/15/19
19C0662-03 [MW-3S]	B225801	10.0	10.0	03/14/19
19C0662-04 [MW-4S]	B225801	10.0	10.0	03/15/19
19C0662-05 [DUP]	B225801	10.0	10.0	03/14/19

Prep Method: EPA 300.0-EPA 300.0

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226260	10.0	10.0	03/22/19
19C0662-02 [MW-3D]	B226260	10.0	10.0	03/22/19
19C0662-03 [MW-3S]	B226260	10.0	10.0	03/22/19
19C0662-04 [MW-4S]	B226260	10.0	10.0	03/22/19
19C0662-05 [DUP]	B226260	10.0	10.0	03/22/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225927	50.0	50.0	03/17/19
19C0662-02 [MW-3D]	B225927	50.0	50.0	03/17/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-03 [MW-3S]	B225995	50.0	50.0	03/19/19
19C0662-04 [MW-4S]	B225995	50.0	50.0	03/19/19
19C0662-05 [DUP]	B225995	50.0	50.0	03/19/19

SM 5310B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226174	50.0	50.0	03/20/19
19C0662-02 [MW-3D]	B226174	50.0	50.0	03/20/19
19C0662-03 [MW-3S]	B226174	50.0	50.0	03/20/19
19C0662-04 [MW-4S]	B226174	50.0	50.0	03/20/19
19C0662-05 [DUP]	B226174	50.0	50.0	03/20/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225953	100	100	03/18/19
19C0662-02 [MW-3D]	B225953	100	100	03/18/19
19C0662-03 [MW-3S]	B225953	100	100	03/18/19
19C0662-04 [MW-4S]	B225953	100	100	03/18/19
19C0662-05 [DUP]	B225953	100	100	03/18/19

SM21-22 2320B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225891	100	100	03/15/19
19C0662-02 [MW-3D]	B225891	100	100	03/15/19
19C0662-03 [MW-3S]	B225891	100	100	03/15/19
19C0662-04 [MW-4S]	B225891	100	100	03/15/19
19C0662-05 [DUP]	B225891	100	100	03/15/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-01 [MW-2]	B225822	50.0	03/15/19
19C0662-02 [MW-3D]	B225822	50.0	03/15/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-03 [MW-3S]	B227340	50.0	04/01/19
19C0662-04 [MW-4S]	B227340	50.0	04/01/19
19C0662-05 [DUP]	B227340	50.0	04/01/19

Prep Method: SW-846 3005A-SW-846 6010

Lab Number [Field ID]	Batch	Initial [mL]	Date
19C0662-01 [MW-2]	B226176	50.0	03/20/19
19C0662-02 [MW-3D]	B226176	50.0	03/20/19
19C0662-03 [MW-3S]	B226176	50.0	03/20/19
19C0662-04 [MW-4S]	B226176	50.0	03/20/19
19C0662-05 [DUP]	B226176	50.0	03/20/19

Prep Method: SW-846 3005A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226176	50.0	50.0	03/20/19
19C0662-02 [MW-3D]	B226176	50.0	50.0	03/20/19
19C0662-03 [MW-3S]	B226176	50.0	50.0	03/20/19
19C0662-04 [MW-4S]	B226176	50.0	50.0	03/20/19
19C0662-05 [DUP]	B226176	50.0	50.0	03/20/19

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 7470A Prep-SW-846 7470A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225878	6.00	6.00	03/18/19
19C0662-02 [MW-3D]	B225878	6.00	6.00	03/18/19
19C0662-03 [MW-3S]	B225878	6.00	6.00	03/18/19
19C0662-04 [MW-4S]	B225878	6.00	6.00	03/18/19
19C0662-05 [DUP]	B225878	6.00	6.00	03/18/19

Prep Method: SW-846 3510C-SW-846 8081B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226044	1000	10.0	03/19/19
19C0662-02 [MW-3D]	B226044	1040	10.0	03/19/19
19C0662-03 [MW-3S]	B226044	970	10.0	03/19/19
19C0662-04 [MW-4S]	B226044	1060	10.0	03/19/19
19C0662-05 [DUP]	B226044	1040	10.0	03/19/19

Prep Method: SW-846 3510C-SW-846 8151A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226019	1020	5.00	03/19/19
19C0662-02 [MW-3D]	B226019	1040	5.00	03/19/19
19C0662-03 [MW-3S]	B226019	1020	5.00	03/19/19
19C0662-04 [MW-4S]	B226019	1040	5.00	03/19/19
19C0662-05 [DUP]	B226019	1040	5.00	03/19/19

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B225949	5	5.00	03/18/19
19C0662-02 [MW-3D]	B225949	5	5.00	03/18/19
19C0662-03 [MW-3S]	B225949	5	5.00	03/18/19
19C0662-04 [MW-4S]	B225949	5	5.00	03/18/19
19C0662-05 [DUP]	B225949	5	5.00	03/18/19
19C0662-06 [Field Blank]	B225949	5	5.00	03/18/19
19C0662-07 [Trip Blank]	B225949	5	5.00	03/18/19

Prep Method: SW-846 3510C-SW-846 8270D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19C0662-01 [MW-2]	B226147	1000	1.00	03/20/19
19C0662-02 [MW-3D]	B226147	1000	1.00	03/20/19
19C0662-03 [MW-3S]	B226147	1000	1.00	03/20/19
19C0662-04 [MW-4S]	B226147	1000	1.00	03/20/19
19C0662-05 [DUP]	B226147	1000	1.00	03/20/19

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225949 - SW-846 5030B										
Blank (B225949-BLK1)				Prepared & Analyzed: 03/18/19						
Acetone	ND	50	µg/L							
Acrylonitrile	ND	5.0	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	0.50	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							L-04, V-05

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B											
Blank (B225949-BLK1)				Prepared & Analyzed: 03/18/19							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L								
Methyl Cyclohexane	ND	1.0	µg/L								
Methylene Chloride	ND	5.0	µg/L								
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L								
Naphthalene	ND	2.0	µg/L								
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L							V-05	
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*25.6*		µg/L	25.0		102	70-130				
Surrogate: Toluene-d8	*25.4*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100	70-130				
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19							
Acetone	118	50	µg/L	100		118	70-160				†
Acrylonitrile	9.53	5.0	µg/L	10.0		95.3	70-130				
tert-Amyl Methyl Ether (TAME)	10.8	0.50	µg/L	10.0		108	70-130				
Benzene	10.5	1.0	µg/L	10.0		105	70-130				
Bromobenzene	11.0	1.0	µg/L	10.0		110	70-130				
Bromochloromethane	11.8	1.0	µg/L	10.0		118	70-130				
Bromodichloromethane	11.4	0.50	µg/L	10.0		114	70-130				
Bromoform	10.1	1.0	µg/L	10.0		101	70-130				
Bromomethane	7.53	2.0	µg/L	10.0		75.3	40-160				†
2-Butanone (MEK)	96.6	20	µg/L	100		96.6	40-160				†
tert-Butyl Alcohol (TBA)	99.8	20	µg/L	100		99.8	40-160				†
n-Butylbenzene	10.5	1.0	µg/L	10.0		105	70-130				
sec-Butylbenzene	10.6	1.0	µg/L	10.0		106	70-130				
tert-Butylbenzene	10.1	1.0	µg/L	10.0		101	70-130				
tert-Butyl Ethyl Ether (TBEE)	10.6	0.50	µg/L	10.0		106	70-130				
Carbon Disulfide	11.1	5.0	µg/L	10.0		111	70-130			V-36	
Carbon Tetrachloride	11.1	5.0	µg/L	10.0		111	70-130				
Chlorobenzene	10.8	1.0	µg/L	10.0		108	70-130				
Chlorodibromomethane	11.0	0.50	µg/L	10.0		110	70-130				
Chloroethane	11.0	2.0	µg/L	10.0		110	70-130				
Chloroform	10.6	2.0	µg/L	10.0		106	70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B												
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19								
Chloromethane	9.03	2.0	µg/L	10.0		90.3		40-160				†
2-Chlorotoluene	11.1	1.0	µg/L	10.0		111		70-130				
4-Chlorotoluene	11.3	1.0	µg/L	10.0		113		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	9.98	5.0	µg/L	10.0		99.8		70-130				
1,2-Dibromoethane (EDB)	10.9	0.50	µg/L	10.0		109		70-130				
Dibromomethane	11.6	1.0	µg/L	10.0		116		70-130				
1,2-Dichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130				
1,3-Dichlorobenzene	10.9	1.0	µg/L	10.0		109		70-130				
1,4-Dichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130				
trans-1,4-Dichloro-2-butene	11.1	2.0	µg/L	10.0		111		70-130				
Dichlorodifluoromethane (Freon 12)	10.3	2.0	µg/L	10.0		103		40-160			V-20	†
1,1-Dichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
1,2-Dichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,1-Dichloroethylene	12.0	1.0	µg/L	10.0		120		70-130				
cis-1,2-Dichloroethylene	11.0	1.0	µg/L	10.0		110		70-130				
trans-1,2-Dichloroethylene	11.5	1.0	µg/L	10.0		115		70-130				
1,2-Dichloropropane	10.7	1.0	µg/L	10.0		107		70-130				
1,3-Dichloropropane	10.8	0.50	µg/L	10.0		108		70-130				
2,2-Dichloropropane	12.4	1.0	µg/L	10.0		124		40-130			V-20	†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107		70-130				
cis-1,3-Dichloropropene	10.9	0.50	µg/L	10.0		109		70-130				
trans-1,3-Dichloropropene	11.0	0.50	µg/L	10.0		110		70-130				
Diethyl Ether	11.3	2.0	µg/L	10.0		113		70-130				
Diisopropyl Ether (DIPE)	10.0	0.50	µg/L	10.0		100		70-130				
1,4-Dioxane	99.6	50	µg/L	100		99.6		40-130				†
Ethylbenzene	10.7	1.0	µg/L	10.0		107		70-130				
Hexachlorobutadiene	10.1	0.60	µg/L	10.0		101		70-130				
2-Hexanone (MBK)	99.4	10	µg/L	100		99.4		70-160				†
Isopropylbenzene (Cumene)	11.1	1.0	µg/L	10.0		111		70-130				
p-Isopropyltoluene (p-Cymene)	10.3	1.0	µg/L	10.0		103		70-130				
Methyl Acetate	5.83	1.0	µg/L	10.0		**58.3**	*	70-130			L-04, V-05, V-34	
Methyl tert-Butyl Ether (MTBE)	10.8	1.0	µg/L	10.0		108		70-130				
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107		70-130				
Methylene Chloride	9.90	5.0	µg/L	10.0		99.0		70-130				
4-Methyl-2-pentanone (MIBK)	92.9	10	µg/L	100		92.9		70-160				†
Naphthalene	11.3	2.0	µg/L	10.0		113		40-130				†
n-Propylbenzene	11.0	1.0	µg/L	10.0		110		70-130				
Styrene	10.9	1.0	µg/L	10.0		109		70-130				
1,1,1,2-Tetrachloroethane	10.9	1.0	µg/L	10.0		109		70-130				
1,1,2,2-Tetrachloroethane	11.7	0.50	µg/L	10.0		117		70-130				
Tetrachloroethylene	11.5	1.0	µg/L	10.0		115		70-130				
Tetrahydrofuran	8.53	10	µg/L	10.0		85.3		70-130			V-05, J	
Toluene	10.8	1.0	µg/L	10.0		108		70-130				
1,2,3-Trichlorobenzene	11.6	5.0	µg/L	10.0		116		70-130				
1,2,4-Trichlorobenzene	11.2	1.0	µg/L	10.0		112		70-130				
1,3,5-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130				
1,1,1-Trichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,1,2-Trichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
Trichloroethylene	10.6	1.0	µg/L	10.0		106		70-130				
Trichlorofluoromethane (Freon 11)	10.0	2.0	µg/L	10.0		100		70-130				
1,2,3-Trichloropropane	10.3	2.0	µg/L	10.0		103		70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B											
LCS (B225949-BS1)				Prepared & Analyzed: 03/18/19							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.7	1.0	µg/L	10.0		107	70-130				
1,2,4-Trimethylbenzene	10.1	1.0	µg/L	10.0		101	70-130				
1,3,5-Trimethylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
Vinyl Chloride	9.91	2.0	µg/L	10.0		99.1	40-160				†
m+p Xylene	21.7	2.0	µg/L	20.0		108	70-130				
o-Xylene	10.8	1.0	µg/L	10.0		108	70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.4*		µg/L	25.0		102	70-130				
Surrogate: Toluene-d8	*25.2*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.4	70-130				
LCS Dup (B225949-BSD1)				Prepared & Analyzed: 03/18/19							
Acetone	119	50	µg/L	100		119	70-160	0.641	25		†
Acrylonitrile	9.65	5.0	µg/L	10.0		96.5	70-130	1.25	25		
tert-Amyl Methyl Ether (TAME)	10.7	0.50	µg/L	10.0		107	70-130	0.466	25		
Benzene	10.4	1.0	µg/L	10.0		104	70-130	0.957	25		
Bromobenzene	11.0	1.0	µg/L	10.0		110	70-130	0.818	25		
Bromochloromethane	11.8	1.0	µg/L	10.0		118	70-130	0.338	25		
Bromodichloromethane	11.3	0.50	µg/L	10.0		113	70-130	0.883	25		
Bromoform	10.1	1.0	µg/L	10.0		101	70-130	0.0988	25		
Bromomethane	8.73	2.0	µg/L	10.0		87.3	40-160	14.8	25		†
2-Butanone (MEK)	94.1	20	µg/L	100		94.1	40-160	2.60	25		†
tert-Butyl Alcohol (TBA)	96.1	20	µg/L	100		96.1	40-160	3.85	25		†
n-Butylbenzene	10.3	1.0	µg/L	10.0		103	70-130	1.73	25		
sec-Butylbenzene	10.4	1.0	µg/L	10.0		104	70-130	2.09	25		
tert-Butylbenzene	10.0	1.0	µg/L	10.0		100	70-130	1.29	25		
tert-Butyl Ethyl Ether (TBEE)	10.2	0.50	µg/L	10.0		102	70-130	3.17	25		
Carbon Disulfide	10.8	5.0	µg/L	10.0		108	70-130	2.74	25	V-36	
Carbon Tetrachloride	10.6	5.0	µg/L	10.0		106	70-130	4.33	25		
Chlorobenzene	11.0	1.0	µg/L	10.0		110	70-130	2.01	25		
Chlorodibromomethane	10.8	0.50	µg/L	10.0		108	70-130	1.29	25		
Chloroethane	10.7	2.0	µg/L	10.0		107	70-130	3.03	25		
Chloroform	10.5	2.0	µg/L	10.0		105	70-130	0.662	25		
Chloromethane	8.93	2.0	µg/L	10.0		89.3	40-160	1.11	25		†
2-Chlorotoluene	11.1	1.0	µg/L	10.0		111	70-130	0.0904	25		
4-Chlorotoluene	11.1	1.0	µg/L	10.0		111	70-130	1.88	25		
1,2-Dibromo-3-chloropropane (DBCP)	10.1	5.0	µg/L	10.0		101	70-130	1.29	25		
1,2-Dibromoethane (EDB)	10.5	0.50	µg/L	10.0		105	70-130	3.27	25		
Dibromomethane	11.3	1.0	µg/L	10.0		113	70-130	2.62	25		
1,2-Dichlorobenzene	10.7	1.0	µg/L	10.0		107	70-130	0.650	25		
1,3-Dichlorobenzene	10.9	1.0	µg/L	10.0		109	70-130	0.459	25		
1,4-Dichlorobenzene	10.6	1.0	µg/L	10.0		106	70-130	0.377	25		
trans-1,4-Dichloro-2-butene	10.8	2.0	µg/L	10.0		108	70-130	2.01	25		
Dichlorodifluoromethane (Freon 12)	9.76	2.0	µg/L	10.0		97.6	40-160	5.58	25	V-20	†
1,1-Dichloroethane	10.8	1.0	µg/L	10.0		108	70-130	3.17	25		
1,2-Dichloroethane	10.7	1.0	µg/L	10.0		107	70-130	2.59	25		
1,1-Dichloroethylene	11.4	1.0	µg/L	10.0		114	70-130	4.79	25		
cis-1,2-Dichloroethylene	10.9	1.0	µg/L	10.0		109	70-130	1.37	25		
trans-1,2-Dichloroethylene	11.2	1.0	µg/L	10.0		112	70-130	2.47	25		
1,2-Dichloropropane	10.6	1.0	µg/L	10.0		106	70-130	0.563	25		
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104	70-130	3.49	25		
2,2-Dichloropropane	12.1	1.0	µg/L	10.0		121	40-130	2.70	25	V-20	†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107	70-130	0.654	25		

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B225949 - SW-846 5030B												
LCS Dup (B225949-BSD1)				Prepared & Analyzed: 03/18/19								
cis-1,3-Dichloropropene	10.9	0.50	µg/L	10.0		109		70-130	0.275	25		
trans-1,3-Dichloropropene	10.5	0.50	µg/L	10.0		105		70-130	4.66	25		
Diethyl Ether	11.4	2.0	µg/L	10.0		114		70-130	0.264	25		
Diisopropyl Ether (DIPE)	9.83	0.50	µg/L	10.0		98.3		70-130	1.91	25		
1,4-Dioxane	94.4	50	µg/L	100		94.4		40-130	5.41	50		† ‡
Ethylbenzene	10.5	1.0	µg/L	10.0		105		70-130	2.07	25		
Hexachlorobutadiene	10.2	0.60	µg/L	10.0		102		70-130	0.492	25		
2-Hexanone (MBK)	94.4	10	µg/L	100		94.4		70-160	5.18	25		†
Isopropylbenzene (Cumene)	10.7	1.0	µg/L	10.0		107		70-130	3.03	25		
p-Isopropyltoluene (p-Cymene)	10.2	1.0	µg/L	10.0		102		70-130	0.878	25		
Methyl Acetate	5.84	1.0	µg/L	10.0		**58.4**	*	70-130	0.171	25	L-04, V-05, V-34	
Methyl tert-Butyl Ether (MTBE)	11.0	1.0	µg/L	10.0		110		70-130	1.55	25		
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107		70-130	0.0932	25		
Methylene Chloride	9.91	5.0	µg/L	10.0		99.1		70-130	0.101	25		
4-Methyl-2-pentanone (MIBK)	90.2	10	µg/L	100		90.2		70-160	2.94	25		†
Naphthalene	11.3	2.0	µg/L	10.0		113		40-130	0.354	25		†
n-Propylbenzene	10.9	1.0	µg/L	10.0		109		70-130	0.547	25		
Styrene	11.1	1.0	µg/L	10.0		111		70-130	1.54	25		
1,1,1,2-Tetrachloroethane	10.9	1.0	µg/L	10.0		109		70-130	0.458	25		
1,1,2,2-Tetrachloroethane	11.4	0.50	µg/L	10.0		114		70-130	2.69	25		
Tetrachloroethylene	11.0	1.0	µg/L	10.0		110		70-130	4.17	25		
Tetrahydrofuran	8.61	10	µg/L	10.0		86.1		70-130	0.933	25	V-05, J	
Toluene	10.5	1.0	µg/L	10.0		105		70-130	2.92	25		
1,2,3-Trichlorobenzene	11.6	5.0	µg/L	10.0		116		70-130	0.431	25		
1,2,4-Trichlorobenzene	11.4	1.0	µg/L	10.0		114		70-130	2.22	25		
1,3,5-Trichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130	1.65	25		
1,1,1-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130	0.729	25		
1,1,2-Trichloroethane	11.0	1.0	µg/L	10.0		110		70-130	1.35	25		
Trichloroethylene	10.2	1.0	µg/L	10.0		102		70-130	3.65	25		
Trichlorofluoromethane (Freon 11)	9.75	2.0	µg/L	10.0		97.5		70-130	2.83	25		
1,2,3-Trichloropropane	10.8	2.0	µg/L	10.0		108		70-130	4.36	25		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.8	1.0	µg/L	10.0		108		70-130	0.743	25		
1,2,4-Trimethylbenzene	10.1	1.0	µg/L	10.0		101		70-130	0.198	25		
1,3,5-Trimethylbenzene	10.7	1.0	µg/L	10.0		107		70-130	1.95	25		
Vinyl Chloride	9.85	2.0	µg/L	10.0		98.5		40-160	0.607	25		†
m+p Xylene	21.4	2.0	µg/L	20.0		107		70-130	1.35	25		
o-Xylene	10.9	1.0	µg/L	10.0		109		70-130	0.276	25		
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100		70-130				
Surrogate: Toluene-d8	*25.0*		µg/L	25.0		100		70-130				
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		100		70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226147 - SW-846 3510C										
Blank (B226147-BLK1)				Prepared: 03/20/19 Analyzed: 03/22/19						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	5.0	µg/L							V-34
Anthracene	ND	5.0	µg/L							
Benzidine	ND	20	µg/L							V-05
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Benzoic Acid	ND	10	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
Carbazole	ND	10	µg/L							
4-Chloroaniline	ND	10	µg/L							V-34
4-Chloro-3-methylphenol	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							V-34
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							
Hexachloroethane	ND	10	µg/L							
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
1-Methylnaphthalene	ND	5.0	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226147 - SW-846 3510C										
Blank (B226147-BLK1)				Prepared: 03/20/19 Analyzed: 03/22/19						
2-Methylphenol	ND	10	µg/L							
3/4-Methylphenol	ND	10	µg/L							
Naphthalene	ND	5.0	µg/L							
2-Nitroaniline	ND	10	µg/L							
3-Nitroaniline	ND	10	µg/L							V-34
4-Nitroaniline	ND	10	µg/L							
Nitrobenzene	ND	10	µg/L							
2-Nitrophenol	ND	10	µg/L							
4-Nitrophenol	ND	10	µg/L							
N-Nitrosodimethylamine	ND	10	µg/L							
N-Nitrosodiphenylamine/Diphenylamine	ND	10	µg/L							
N-Nitrosodi-n-propylamine	ND	10	µg/L							
Pentachloronitrobenzene	ND	10	µg/L							
Pentachlorophenol	ND	10	µg/L							
Phenanthrene	ND	5.0	µg/L							
Phenol	ND	10	µg/L							
Pyrene	ND	5.0	µg/L							
Pyridine	ND	5.0	µg/L							
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L							
1,2,4-Trichlorobenzene	ND	5.0	µg/L							
2,4,5-Trichlorophenol	ND	10	µg/L							
2,4,6-Trichlorophenol	ND	10	µg/L							
Surrogate: 2-Fluorophenol	*90.7*		µg/L	200		45.4	15-110			
Surrogate: Phenol-d6	*64.1*		µg/L	200		32.0	15-110			
Surrogate: Nitrobenzene-d5	*82.7*		µg/L	100		82.7	30-130			
Surrogate: 2-Fluorobiphenyl	*84.3*		µg/L	100		84.3	30-130			
Surrogate: 2,4,6-Tribromophenol	*199*		µg/L	200		99.4	15-110			
Surrogate: p-Terphenyl-d14	*105*		µg/L	100		105	30-130			
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19						
Acenaphthene	40.0	5.0	µg/L	50.0		80.0	40-140			
Acenaphthylene	39.0	5.0	µg/L	50.0		78.0	40-140			
Acetophenone	40.3	10	µg/L	50.0		80.5	40-140			
Aniline	30.8	5.0	µg/L	50.0		61.6	40-140			V-34
Anthracene	41.7	5.0	µg/L	50.0		83.3	40-140			
Benzidine	36.3	20	µg/L	50.0		72.6	40-140			V-05
Benzo(a)anthracene	41.0	5.0	µg/L	50.0		82.0	40-140			
Benzo(a)pyrene	44.2	5.0	µg/L	50.0		88.3	40-140			
Benzo(b)fluoranthene	41.9	5.0	µg/L	50.0		83.9	40-140			
Benzo(g,h,i)perylene	49.6	5.0	µg/L	50.0		99.2	40-140			
Benzo(k)fluoranthene	43.2	5.0	µg/L	50.0		86.4	40-140			
Benzoic Acid	18.2	10	µg/L	50.0		36.3	10-130			†
Bis(2-chloroethoxy)methane	47.1	10	µg/L	50.0		94.2	40-140			
Bis(2-chloroethyl)ether	42.2	10	µg/L	50.0		84.4	40-140			
Bis(2-chloroisopropyl)ether	46.3	10	µg/L	50.0		92.6	40-140			
Bis(2-Ethylhexyl)phthalate	46.7	10	µg/L	50.0		93.4	40-140			
4-Bromophenylphenylether	42.6	10	µg/L	50.0		85.2	40-140			
Butylbenzylphthalate	45.8	10	µg/L	50.0		91.6	40-140			
Carbazole	41.0	10	µg/L	50.0		82.0	40-140			
4-Chloroaniline	39.0	10	µg/L	50.0		78.1	40-140			V-34
4-Chloro-3-methylphenol	41.3	10	µg/L	50.0		82.6	30-130			
2-Chloronaphthalene	36.3	10	µg/L	50.0		72.5	40-140			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19							
2-Chlorophenol	37.0	10	µg/L	50.0		74.0	30-130				
4-Chlorophenylphenylether	43.6	10	µg/L	50.0		87.3	40-140				
Chrysene	42.4	5.0	µg/L	50.0		84.7	40-140				
Dibenz(a,h)anthracene	45.3	5.0	µg/L	50.0		90.5	40-140				
Dibenzofuran	40.9	5.0	µg/L	50.0		81.9	40-140				
Di-n-butylphthalate	44.8	10	µg/L	50.0		89.5	40-140				
1,2-Dichlorobenzene	35.0	5.0	µg/L	50.0		70.0	40-140				
1,3-Dichlorobenzene	33.5	5.0	µg/L	50.0		67.0	40-140				
1,4-Dichlorobenzene	34.0	5.0	µg/L	50.0		68.0	40-140				
3,3-Dichlorobenzidine	47.3	10	µg/L	50.0		94.6	40-140			V-34	
2,4-Dichlorophenol	38.3	10	µg/L	50.0		76.5	30-130				
Diethylphthalate	44.8	10	µg/L	50.0		89.5	40-140				
2,4-Dimethylphenol	38.1	10	µg/L	50.0		76.3	30-130				
Dimethylphthalate	43.9	10	µg/L	50.0		87.8	40-140				
4,6-Dinitro-2-methylphenol	41.0	10	µg/L	50.0		81.9	30-130				
2,4-Dinitrophenol	45.7	10	µg/L	50.0		91.4	30-130				
2,4-Dinitrotoluene	42.7	10	µg/L	50.0		85.4	40-140				
2,6-Dinitrotoluene	43.6	10	µg/L	50.0		87.2	40-140				
Di-n-octylphthalate	45.2	10	µg/L	50.0		90.4	40-140				
1,2-Diphenylhydrazine/Azobenzene	41.4	10	µg/L	50.0		82.7	40-140				
Fluoranthene	42.4	5.0	µg/L	50.0		84.8	40-140				
Fluorene	42.0	5.0	µg/L	50.0		84.1	40-140				
Hexachlorobenzene	40.4	10	µg/L	50.0		80.8	40-140				
Hexachlorobutadiene	37.6	10	µg/L	50.0		75.2	40-140				
Hexachlorocyclopentadiene	36.8	10	µg/L	50.0		73.5	30-140				†
Hexachloroethane	35.9	10	µg/L	50.0		71.7	40-140				
Indeno(1,2,3-cd)pyrene	46.2	5.0	µg/L	50.0		92.5	40-140				
Isophorone	42.5	10	µg/L	50.0		85.0	40-140				
1-Methylnaphthalene	36.2	5.0	µg/L	50.0		72.5	40-140				
2-Methylnaphthalene	40.8	5.0	µg/L	50.0		81.7	40-140				
2-Methylphenol	27.5	10	µg/L	50.0		54.9	30-130				
3/4-Methylphenol	30.0	10	µg/L	50.0		60.1	30-130				
Naphthalene	38.5	5.0	µg/L	50.0		77.0	40-140				
2-Nitroaniline	48.8	10	µg/L	50.0		97.6	40-140				
3-Nitroaniline	41.7	10	µg/L	50.0		83.4	40-140			V-34	
4-Nitroaniline	42.8	10	µg/L	50.0		85.5	40-140				
Nitrobenzene	38.0	10	µg/L	50.0		75.9	40-140				
2-Nitrophenol	40.6	10	µg/L	50.0		81.2	30-130				
4-Nitrophenol	22.3	10	µg/L	50.0		44.6	10-130				†
N-Nitrosodimethylamine	23.4	10	µg/L	50.0		46.7	40-140				
N-Nitrosodiphenylamine/Diphenylamine	43.7	10	µg/L	50.0		87.4	40-140				
N-Nitrosodi-n-propylamine	41.4	10	µg/L	50.0		82.8	40-140				
Pentachloronitrobenzene	40.5	10	µg/L	50.0		81.1	40-140				
Pentachlorophenol	43.6	10	µg/L	50.0		87.1	30-130				
Phenanthrene	41.5	5.0	µg/L	50.0		83.0	40-140				
Phenol	16.9	10	µg/L	50.0		33.8	20-130				†
Pyrene	42.8	5.0	µg/L	50.0		85.5	40-140				
Pyridine	16.1	5.0	µg/L	50.0		32.2	10-140				†
1,2,4,5-Tetrachlorobenzene	39.3	10	µg/L	50.0		78.6	40-140				
1,2,4-Trichlorobenzene	38.1	5.0	µg/L	50.0		76.3	40-140				
2,4,5-Trichlorophenol	40.8	10	µg/L	50.0		81.6	30-130				
2,4,6-Trichlorophenol	43.3	10	µg/L	50.0		86.6	30-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS (B226147-BS1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Surrogate: 2-Fluorophenol	*92.5*		µg/L	200		46.2	15-110				
Surrogate: Phenol-d6	*66.6*		µg/L	200		33.3	15-110				
Surrogate: Nitrobenzene-d5	*80.6*		µg/L	100		80.6	30-130				
Surrogate: 2-Fluorobiphenyl	*85.0*		µg/L	100		85.0	30-130				
Surrogate: 2,4,6-Tribromophenol	*190*		µg/L	200		94.8	15-110				
Surrogate: p-Terphenyl-d14	*95.1*		µg/L	100		95.1	30-130				
LCS Dup (B226147-BSD1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Acenaphthene	38.7	5.0	µg/L	50.0		77.5	40-140	3.23	20		
Acenaphthylene	38.7	5.0	µg/L	50.0		77.4	40-140	0.772	20		
Acetophenone	39.4	10	µg/L	50.0		78.7	40-140	2.24	20		
Aniline	31.2	5.0	µg/L	50.0		62.5	40-140	1.45	50	V-34	‡
Anthracene	41.4	5.0	µg/L	50.0		82.8	40-140	0.650	20		
Benzidine	40.0	20	µg/L	50.0		80.0	40-140	9.78	20	V-05	
Benzo(a)anthracene	39.3	5.0	µg/L	50.0		78.5	40-140	4.29	20		
Benzo(a)pyrene	42.6	5.0	µg/L	50.0		85.2	40-140	3.64	20		
Benzo(b)fluoranthene	40.6	5.0	µg/L	50.0		81.1	40-140	3.37	20		
Benzo(g,h,i)perylene	47.7	5.0	µg/L	50.0		95.4	40-140	3.99	20		
Benzo(k)fluoranthene	42.2	5.0	µg/L	50.0		84.4	40-140	2.29	20		
Benzoic Acid	19.1	10	µg/L	50.0		38.2	10-130	5.00	50		† ‡
Bis(2-chloroethoxy)methane	47.2	10	µg/L	50.0		94.4	40-140	0.191	20		
Bis(2-chloroethyl)ether	42.0	10	µg/L	50.0		84.0	40-140	0.404	20		
Bis(2-chloroisopropyl)ether	45.9	10	µg/L	50.0		91.8	40-140	0.867	20		
Bis(2-Ethylhexyl)phthalate	44.6	10	µg/L	50.0		89.3	40-140	4.53	20		
4-Bromophenylphenylether	42.0	10	µg/L	50.0		84.0	40-140	1.35	20		
Butylbenzylphthalate	43.7	10	µg/L	50.0		87.4	40-140	4.72	20		
Carbazole	40.0	10	µg/L	50.0		79.9	40-140	2.52	20		
4-Chloroaniline	39.0	10	µg/L	50.0		78.0	40-140	0.128	20	V-34	
4-Chloro-3-methylphenol	41.4	10	µg/L	50.0		82.8	30-130	0.169	20		
2-Chloronaphthalene	36.0	10	µg/L	50.0		72.0	40-140	0.775	20		
2-Chlorophenol	37.2	10	µg/L	50.0		74.5	30-130	0.593	20		
4-Chlorophenylphenylether	43.4	10	µg/L	50.0		86.8	40-140	0.505	20		
Chrysene	40.3	5.0	µg/L	50.0		80.6	40-140	4.93	20		
Dibenz(a,h)anthracene	43.6	5.0	µg/L	50.0		87.3	40-140	3.67	20		
Dibenzofuran	40.2	5.0	µg/L	50.0		80.3	40-140	1.92	20		
Di-n-butylphthalate	43.5	10	µg/L	50.0		87.0	40-140	2.83	20		
1,2-Dichlorobenzene	35.3	5.0	µg/L	50.0		70.5	40-140	0.797	20		
1,3-Dichlorobenzene	33.9	5.0	µg/L	50.0		67.8	40-140	1.25	20		
1,4-Dichlorobenzene	34.0	5.0	µg/L	50.0		68.0	40-140	0.00	20		
3,3-Dichlorobenzidine	45.8	10	µg/L	50.0		91.7	40-140	3.18	20	V-34	
2,4-Dichlorophenol	38.4	10	µg/L	50.0		76.7	30-130	0.235	20		
Diethylphthalate	43.3	10	µg/L	50.0		86.7	40-140	3.22	20		
2,4-Dimethylphenol	39.0	10	µg/L	50.0		78.0	30-130	2.18	20		
Dimethylphthalate	42.2	10	µg/L	50.0		84.4	40-140	4.04	50		‡
4,6-Dinitro-2-methylphenol	41.3	10	µg/L	50.0		82.5	30-130	0.705	50		‡
2,4-Dinitrophenol	43.8	10	µg/L	50.0		87.7	30-130	4.11	50		‡
2,4-Dinitrotoluene	40.7	10	µg/L	50.0		81.4	40-140	4.82	20		
2,6-Dinitrotoluene	42.3	10	µg/L	50.0		84.6	40-140	3.00	20		
Di-n-octylphthalate	43.7	10	µg/L	50.0		87.5	40-140	3.26	20		
1,2-Diphenylhydrazine/Azobenzene	41.0	10	µg/L	50.0		82.0	40-140	0.825	20		
Fluoranthene	41.2	5.0	µg/L	50.0		82.5	40-140	2.73	20		
Fluorene	41.0	5.0	µg/L	50.0		81.9	40-140	2.60	20		

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B226147 - SW-846 3510C											
LCS Dup (B226147-BSD1)				Prepared: 03/20/19 Analyzed: 03/22/19							
Hexachlorobenzene	41.0	10	µg/L	50.0		82.1	40-140	1.62	20		
Hexachlorobutadiene	38.4	10	µg/L	50.0		76.8	40-140	2.08	20		
Hexachlorocyclopentadiene	36.9	10	µg/L	50.0		73.7	30-140	0.299	50		† ‡
Hexachloroethane	36.8	10	µg/L	50.0		73.7	40-140	2.70	50		‡
Indeno(1,2,3-cd)pyrene	45.0	5.0	µg/L	50.0		89.9	40-140	2.83	50		‡
Isophorone	42.0	10	µg/L	50.0		84.1	40-140	1.09	20		
1-Methylnaphthalene	35.7	5.0	µg/L	50.0		71.4	40-140	1.58	20		
2-Methylnaphthalene	41.0	5.0	µg/L	50.0		82.0	40-140	0.440	20		
2-Methylphenol	28.2	10	µg/L	50.0		56.3	30-130	2.55	20		
3/4-Methylphenol	30.8	10	µg/L	50.0		61.6	30-130	2.50	20		
Naphthalene	38.3	5.0	µg/L	50.0		76.6	40-140	0.443	20		
2-Nitroaniline	47.0	10	µg/L	50.0		94.0	40-140	3.74	20		
3-Nitroaniline	40.3	10	µg/L	50.0		80.6	40-140	3.51	20	V-34	
4-Nitroaniline	41.4	10	µg/L	50.0		82.8	40-140	3.21	20		
Nitrobenzene	37.5	10	µg/L	50.0		75.0	40-140	1.25	20		
2-Nitrophenol	40.5	10	µg/L	50.0		80.9	30-130	0.345	20		
4-Nitrophenol	22.8	10	µg/L	50.0		45.6	10-130	2.35	50		† ‡
N-Nitrosodimethylamine	24.1	10	µg/L	50.0		48.1	40-140	2.95	20		
N-Nitrosodiphenylamine/Diphenylamine	43.4	10	µg/L	50.0		86.9	40-140	0.620	20		
N-Nitrosodi-n-propylamine	41.8	10	µg/L	50.0		83.6	40-140	0.865	20		
Pentachloronitrobenzene	40.2	10	µg/L	50.0		80.3	40-140	0.942	20		
Pentachlorophenol	43.1	10	µg/L	50.0		86.1	30-130	1.18	50		‡
Phenanthrene	41.2	5.0	µg/L	50.0		82.4	40-140	0.822	20		
Phenol	17.9	10	µg/L	50.0		35.8	20-130	5.68	20		†
Pyrene	40.9	5.0	µg/L	50.0		81.9	40-140	4.35	20		
Pyridine	17.0	5.0	µg/L	50.0		33.9	10-140	5.14	50		† ‡
1,2,4,5-Tetrachlorobenzene	38.8	10	µg/L	50.0		77.7	40-140	1.15	20		
1,2,4-Trichlorobenzene	37.1	5.0	µg/L	50.0		74.2	40-140	2.71	20		
2,4,5-Trichlorophenol	40.4	10	µg/L	50.0		80.9	30-130	0.862	20		
2,4,6-Trichlorophenol	42.3	10	µg/L	50.0		84.7	30-130	2.27	50		‡
Surrogate: 2-Fluorophenol	*95.7*		µg/L	200		47.8	15-110				
Surrogate: Phenol-d6	*68.5*		µg/L	200		34.3	15-110				
Surrogate: Nitrobenzene-d5	*78.9*		µg/L	100		78.9	30-130				
Surrogate: 2-Fluorobiphenyl	*82.4*		µg/L	100		82.4	30-130				
Surrogate: 2,4,6-Tribromophenol	*183*		µg/L	200		91.4	15-110				
Surrogate: p-Terphenyl-d14	*90.4*		µg/L	100		90.4	30-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
Blank (B226044-BLK1)				Prepared: 03/19/19 Analyzed: 03/20/19						
Alachlor	ND	0.20	µg/L							
Alachlor [2C]	ND	0.20	µg/L							
Aldrin	ND	0.050	µg/L							
Aldrin [2C]	ND	0.050	µg/L							
alpha-BHC	ND	0.050	µg/L							
alpha-BHC [2C]	ND	0.050	µg/L							
beta-BHC	ND	0.050	µg/L							
beta-BHC [2C]	ND	0.050	µg/L							
delta-BHC	ND	0.050	µg/L							
delta-BHC [2C]	ND	0.050	µg/L							
gamma-BHC (Lindane)	ND	0.030	µg/L							
gamma-BHC (Lindane) [2C]	ND	0.030	µg/L							
Chlordane	ND	0.20	µg/L							
Chlordane [2C]	ND	0.20	µg/L							
4,4'-DDD	ND	0.040	µg/L							
4,4'-DDD [2C]	ND	0.040	µg/L							
4,4'-DDE	ND	0.040	µg/L							
4,4'-DDE [2C]	ND	0.040	µg/L							
4,4'-DDT	ND	0.040	µg/L							
4,4'-DDT [2C]	ND	0.040	µg/L							
Dieldrin	ND	0.0020	µg/L							
Dieldrin [2C]	ND	0.0020	µg/L							
Endosulfan I	ND	0.050	µg/L							
Endosulfan I [2C]	ND	0.050	µg/L							
Endosulfan II	ND	0.080	µg/L							
Endosulfan II [2C]	ND	0.080	µg/L							
Endosulfan Sulfate	ND	0.080	µg/L							
Endosulfan Sulfate [2C]	ND	0.080	µg/L							
Endrin	ND	0.080	µg/L							
Endrin [2C]	ND	0.080	µg/L							
Endrin Aldehyde	ND	0.080	µg/L							
Endrin Aldehyde [2C]	ND	0.080	µg/L							
Endrin Ketone	ND	0.080	µg/L							
Endrin Ketone [2C]	ND	0.080	µg/L							
Heptachlor	ND	0.050	µg/L							
Heptachlor [2C]	ND	0.050	µg/L							
Heptachlor Epoxide	ND	0.050	µg/L							
Heptachlor Epoxide [2C]	ND	0.050	µg/L							
Hexachlorobenzene	ND	0.050	µg/L							
Hexachlorobenzene [2C]	ND	0.050	µg/L							
Methoxychlor	ND	0.50	µg/L							
Methoxychlor [2C]	ND	0.50	µg/L							
Toxaphene	ND	1.0	µg/L							
Toxaphene [2C]	ND	1.0	µg/L							
Surrogate: Decachlorobiphenyl	*1.75*		µg/L	2.00		87.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.95*		µg/L	2.00		97.7	30-150			
Surrogate: Tetrachloro-m-xylene	*1.72*		µg/L	2.00		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.68*		µg/L	2.00		83.9	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
LCS (B226044-BS1)				Prepared: 03/19/19 Analyzed: 03/20/19						
alpha-Chlordane	0.94	0.050	µg/L	1.00		94.2	0-200			
alpha-Chlordane [2C]	0.94	0.050	µg/L	1.00		93.8	0-200			
gamma-Chlordane	0.94	0.050	µg/L	1.00		94.0	0-200			
gamma-Chlordane [2C]	0.95	0.050	µg/L	1.00		94.7	0-200			
Alachlor	0.90	0.20	µg/L	1.00		90.1	40-140			
Alachlor [2C]	0.92	0.20	µg/L	1.00		91.6	40-140			
Aldrin	0.94	0.050	µg/L	1.00		94.4	40-140			
Aldrin [2C]	0.90	0.050	µg/L	1.00		89.9	40-140			
alpha-BHC	0.82	0.050	µg/L	1.00		81.9	40-140			
alpha-BHC [2C]	0.85	0.050	µg/L	1.00		84.8	40-140			
beta-BHC	0.88	0.050	µg/L	1.00		88.5	40-140			
beta-BHC [2C]	0.89	0.050	µg/L	1.00		88.9	40-140			
delta-BHC	0.93	0.050	µg/L	1.00		92.6	40-140			
delta-BHC [2C]	0.89	0.050	µg/L	1.00		89.1	40-140			
gamma-BHC (Lindane)	0.88	0.030	µg/L	1.00		88.2	40-140			
gamma-BHC (Lindane) [2C]	0.85	0.030	µg/L	1.00		85.1	40-140			
4,4'-DDD	1.0	0.040	µg/L	1.00		103	40-140			
4,4'-DDD [2C]	0.98	0.040	µg/L	1.00		97.6	40-140			
4,4'-DDE	1.0	0.040	µg/L	1.00		104	40-140			
4,4'-DDE [2C]	0.98	0.040	µg/L	1.00		97.5	40-140			
4,4'-DDT	1.0	0.040	µg/L	1.00		103	40-140			
4,4'-DDT [2C]	1.0	0.040	µg/L	1.00		102	40-140			
Dieldrin	0.94	0.0020	µg/L	1.00		93.6	40-140			
Dieldrin [2C]	0.89	0.0020	µg/L	1.00		89.4	40-140			
Endosulfan I	0.94	0.050	µg/L	1.00		94.2	40-140			
Endosulfan I [2C]	0.94	0.050	µg/L	1.00		93.8	40-140			
Endosulfan II	0.98	0.080	µg/L	1.00		97.8	40-140			
Endosulfan II [2C]	0.96	0.080	µg/L	1.00		96.2	40-140			
Endosulfan Sulfate	1.0	0.080	µg/L	1.00		101	40-140			
Endosulfan Sulfate [2C]	0.98	0.080	µg/L	1.00		97.7	40-140			
Endrin	0.97	0.080	µg/L	1.00		97.5	40-140			
Endrin [2C]	0.96	0.080	µg/L	1.00		96.2	40-140			
Endrin Aldehyde	0.93	0.080	µg/L	1.00		93.4	40-140			
Endrin Aldehyde [2C]	0.93	0.080	µg/L	1.00		93.3	40-140			
Endrin Ketone	1.0	0.080	µg/L	1.00		102	40-140			
Endrin Ketone [2C]	1.0	0.080	µg/L	1.00		99.6	40-140			
Heptachlor	0.90	0.050	µg/L	1.00		89.7	40-140			
Heptachlor [2C]	0.87	0.050	µg/L	1.00		87.3	40-140			
Heptachlor Epoxide	0.93	0.050	µg/L	1.00		93.4	40-140			
Heptachlor Epoxide [2C]	0.91	0.050	µg/L	1.00		90.9	40-140			
Hexachlorobenzene	1.1	0.050	µg/L	1.00		113	40-140			V-06
Hexachlorobenzene [2C]	1.1	0.050	µg/L	1.00		106	40-140			
Methoxychlor	1.0	0.50	µg/L	1.00		105	40-140			
Methoxychlor [2C]	1.0	0.50	µg/L	1.00		104	40-140			
Surrogate: Decachlorobiphenyl	*1.81*		µg/L	2.00		90.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.02*		µg/L	2.00		101	30-150			
Surrogate: Tetrachloro-m-xylene	*1.72*		µg/L	2.00		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.67*		µg/L	2.00		83.6	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226044 - SW-846 3510C										
LCS Dup (B226044-BSD1)				Prepared: 03/19/19 Analyzed: 03/20/19						
alpha-Chlordane	0.93	0.050	µg/L	1.00		92.7	0-200	1.64		
alpha-Chlordane [2C]	0.93	0.050	µg/L	1.00		92.8	0-200	1.06		
gamma-Chlordane	0.92	0.050	µg/L	1.00		92.5	0-200	1.68		
gamma-Chlordane [2C]	0.93	0.050	µg/L	1.00		93.4	0-200	1.32		
Alachlor	0.89	0.20	µg/L	1.00		89.1	40-140	1.06	20	
Alachlor [2C]	0.93	0.20	µg/L	1.00		92.6	40-140	1.07	20	
Aldrin	0.91	0.050	µg/L	1.00		91.1	40-140	3.63	20	
Aldrin [2C]	0.87	0.050	µg/L	1.00		87.2	40-140	3.08	20	
alpha-BHC	0.80	0.050	µg/L	1.00		80.1	40-140	2.19	20	
alpha-BHC [2C]	0.82	0.050	µg/L	1.00		82.3	40-140	3.05	20	
beta-BHC	0.87	0.050	µg/L	1.00		87.4	40-140	1.29	20	
beta-BHC [2C]	0.88	0.050	µg/L	1.00		88.0	40-140	1.05	20	
delta-BHC	0.92	0.050	µg/L	1.00		92.1	40-140	0.623	20	
delta-BHC [2C]	0.89	0.050	µg/L	1.00		88.8	40-140	0.317	20	
gamma-BHC (Lindane)	0.86	0.030	µg/L	1.00		85.7	40-140	2.93	20	
gamma-BHC (Lindane) [2C]	0.83	0.030	µg/L	1.00		83.4	40-140	1.98	20	
4,4'-DDD	1.0	0.040	µg/L	1.00		102	40-140	1.07	20	
4,4'-DDD [2C]	0.97	0.040	µg/L	1.00		97.1	40-140	0.525	20	
4,4'-DDE	1.0	0.040	µg/L	1.00		102	40-140	1.53	20	
4,4'-DDE [2C]	0.95	0.040	µg/L	1.00		95.4	40-140	2.19	20	
4,4'-DDT	1.0	0.040	µg/L	1.00		103	40-140	0.410	20	
4,4'-DDT [2C]	1.0	0.040	µg/L	1.00		101	40-140	0.692	20	
Dieldrin	0.92	0.0020	µg/L	1.00		91.9	40-140	1.81	20	
Dieldrin [2C]	0.89	0.0020	µg/L	1.00		88.7	40-140	0.762	20	
Endosulfan I	0.93	0.050	µg/L	1.00		93.0	40-140	1.24	20	
Endosulfan I [2C]	0.93	0.050	µg/L	1.00		92.8	40-140	1.01	20	
Endosulfan II	0.97	0.080	µg/L	1.00		97.0	40-140	0.878	20	
Endosulfan II [2C]	0.95	0.080	µg/L	1.00		95.4	40-140	0.908	20	
Endosulfan Sulfate	1.0	0.080	µg/L	1.00		100	40-140	0.460	20	
Endosulfan Sulfate [2C]	0.97	0.080	µg/L	1.00		96.8	40-140	0.963	20	
Endrin	0.97	0.080	µg/L	1.00		97.1	40-140	0.401	20	
Endrin [2C]	0.96	0.080	µg/L	1.00		95.8	40-140	0.481	20	
Endrin Aldehyde	0.94	0.080	µg/L	1.00		94.1	40-140	0.753	20	
Endrin Aldehyde [2C]	0.94	0.080	µg/L	1.00		93.9	40-140	0.625	20	
Endrin Ketone	1.0	0.080	µg/L	1.00		101	40-140	0.767	20	
Endrin Ketone [2C]	0.99	0.080	µg/L	1.00		98.6	40-140	0.961	20	
Heptachlor	0.87	0.050	µg/L	1.00		87.1	40-140	2.95	20	
Heptachlor [2C]	0.85	0.050	µg/L	1.00		85.1	40-140	2.50	20	
Heptachlor Epoxide	0.92	0.050	µg/L	1.00		92.1	40-140	1.39	20	
Heptachlor Epoxide [2C]	0.90	0.050	µg/L	1.00		89.7	40-140	1.38	20	
Hexachlorobenzene	1.1	0.050	µg/L	1.00		109	40-140	4.21	20	V-06
Hexachlorobenzene [2C]	1.0	0.050	µg/L	1.00		102	40-140	4.32	20	
Methoxychlor	1.0	0.50	µg/L	1.00		104	40-140	0.0727	20	
Methoxychlor [2C]	1.0	0.50	µg/L	1.00		104	40-140	0.200	20	
Surrogate: Decachlorobiphenyl	*1.75*		µg/L	2.00		87.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.96*		µg/L	2.00		98.1	30-150			
Surrogate: Tetrachloro-m-xylene	*1.61*		µg/L	2.00		80.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.56*		µg/L	2.00		78.2	30-150			

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226019 - SW-846 3510C										
Blank (B226019-BLK1)				Prepared & Analyzed: 03/19/19						
2,4-D	ND	0.50	µg/L							
2,4-D [2C]	ND	0.50	µg/L							
2,4-DB	ND	0.50	µg/L							
2,4-DB [2C]	ND	0.50	µg/L							
2,4,5-TP (Silvex)	ND	0.050	µg/L							
2,4,5-TP (Silvex) [2C]	ND	0.050	µg/L							
2,4,5-T	ND	0.10	µg/L							
2,4,5-T [2C]	ND	0.10	µg/L							
Dalapon	ND	1.2	µg/L							
Dalapon [2C]	ND	1.2	µg/L							
Dicamba	ND	0.050	µg/L							
Dicamba [2C]	ND	0.050	µg/L							
Dichloroprop	ND	0.50	µg/L							
Dichloroprop [2C]	ND	0.50	µg/L							
Dinoseb	ND	0.25	µg/L							
Dinoseb [2C]	ND	0.25	µg/L							
MCPA	ND	50	µg/L							
MCPA [2C]	ND	50	µg/L							
MCPP	ND	50	µg/L							
MCPP [2C]	ND	50	µg/L							
Surrogate: 2,4-Dichlorophenylacetic acid	*1.76*		µg/L	2.00		88.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.73*		µg/L	2.00		86.6	30-150			
LCS (B226019-BS1)				Prepared & Analyzed: 03/19/19						
2,4-D	2.45	0.50	µg/L	2.50		98.1	40-140			
2,4-D [2C]	2.51	0.50	µg/L	2.50		100	40-140			
2,4-DB	2.37	0.50	µg/L	2.50		94.9	40-140			
2,4-DB [2C]	2.39	0.50	µg/L	2.50		95.6	40-140			
2,4,5-TP (Silvex)	0.247	0.050	µg/L	0.250		99.0	40-140			
2,4,5-TP (Silvex) [2C]	0.247	0.050	µg/L	0.250		98.8	40-140			
2,4,5-T	0.248	0.10	µg/L	0.250		99.2	40-140			
2,4,5-T [2C]	0.247	0.10	µg/L	0.250		98.7	40-140			
Dalapon	4.81	1.2	µg/L	6.25		76.9	40-140			
Dalapon [2C]	4.79	1.2	µg/L	6.25		76.6	40-140			
Dicamba	0.242	0.050	µg/L	0.250		97.0	40-140			
Dicamba [2C]	0.244	0.050	µg/L	0.250		97.6	40-140			
Dichloroprop	2.54	0.50	µg/L	2.50		102	40-140			
Dichloroprop [2C]	2.54	0.50	µg/L	2.50		102	40-140			
Dinoseb	0.800	0.25	µg/L	1.25		64.0	10-140			
Dinoseb [2C]	0.745	0.25	µg/L	1.25		59.6	10-140			
MCPA	222	50	µg/L	250		89.0	40-140			
MCPA [2C]	218	50	µg/L	250		87.0	40-140			
MCPP	240	50	µg/L	250		96.0	40-140			
MCPP [2C]	227	50	µg/L	250		90.8	40-140			
Surrogate: 2,4-Dichlorophenylacetic acid	*1.86*		µg/L	2.00		93.2	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.89*		µg/L	2.00		94.6	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226019 - SW-846 3510C										
LCS Dup (B226019-BSD1)				Prepared & Analyzed: 03/19/19						
2,4-D	2.40	0.50	µg/L	2.50		96.0	40-140	2.17	20	
2,4-D [2C]	2.46	0.50	µg/L	2.50		98.2	40-140	2.20	20	
2,4-DB	2.25	0.50	µg/L	2.50		90.1	40-140	5.26	20	
2,4-DB [2C]	2.36	0.50	µg/L	2.50		94.4	40-140	1.31	20	
2,4,5-TP (Silvex)	0.242	0.050	µg/L	0.250		96.6	40-140	2.39	20	
2,4,5-TP (Silvex) [2C]	0.240	0.050	µg/L	0.250		96.2	40-140	2.64	20	
2,4,5-T	0.247	0.10	µg/L	0.250		98.7	40-140	0.538	20	
2,4,5-T [2C]	0.239	0.10	µg/L	0.250		95.7	40-140	3.11	20	
Dalapon	4.71	1.2	µg/L	6.25		75.4	40-140	2.05	20	
Dalapon [2C]	4.68	1.2	µg/L	6.25		75.0	40-140	2.23	20	
Dicamba	0.235	0.050	µg/L	0.250		94.1	40-140	2.99	20	
Dicamba [2C]	0.238	0.050	µg/L	0.250		95.0	40-140	2.71	20	
Dichloroprop	2.48	0.50	µg/L	2.50		99.1	40-140	2.52	20	
Dichloroprop [2C]	2.48	0.50	µg/L	2.50		99.1	40-140	2.58	20	
Dinoseb	0.940	0.25	µg/L	1.25		75.2	10-140	16.1	20	
Dinoseb [2C]	0.881	0.25	µg/L	1.25		70.5	10-140	16.7	20	
MCPA	218	50	µg/L	250		87.1	40-140	2.15	20	
MCPA [2C]	212	50	µg/L	250		84.9	40-140	2.44	20	
MCPP	233	50	µg/L	250		93.4	40-140	2.76	20	
MCPP [2C]	222	50	µg/L	250		88.7	40-140	2.35	20	
Surrogate: 2,4-Dichlorophenylacetic acid	*1.87*		µg/L	2.00		93.6	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.93*		µg/L	2.00		96.5	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225878 - SW-846 7470A Prep										
Blank (B225878-BLK1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	ND	0.00010	mg/L							
LCS (B225878-BS1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	0.00393	0.00010	mg/L	0.00400		98.2	80-120			
LCS Dup (B225878-BSD1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Mercury	0.00382	0.00010	mg/L	0.00400		95.4	80-120	2.87	20	
Batch B226176 - SW-846 3005A										
Blank (B226176-BLK1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	ND	0.010	mg/L							
Barium	ND	0.050	mg/L							
Chromium	ND	0.010	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
Sodium	ND	2.0	mg/L							
Zinc	ND	0.020	mg/L							
LCS (B226176-BS1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.462	0.010	mg/L	0.500		92.5	80-120			
Barium	0.503	0.050	mg/L	0.500		101	80-120			
Chromium	0.490	0.010	mg/L	0.500		98.1	80-120			
Iron	4.01	0.050	mg/L	4.00		100	80-120			
Lead	0.488	0.010	mg/L	0.500		97.7	80-120			
Sodium	3.75	2.0	mg/L	4.00		93.6	80-120			
Zinc	0.982	0.020	mg/L	1.00		98.2	80-120			
LCS Dup (B226176-BSD1)				Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.472	0.010	mg/L	0.500		94.3	80-120	1.98	20	
Barium	0.516	0.050	mg/L	0.500		103	80-120	2.60	20	
Chromium	0.504	0.010	mg/L	0.500		101	80-120	2.75	20	
Iron	3.99	0.050	mg/L	4.00		99.8	80-120	0.457	20	
Lead	0.500	0.010	mg/L	0.500		100	80-120	2.42	20	
Sodium	3.70	2.0	mg/L	4.00		92.6	80-120	1.16	20	
Zinc	1.01	0.020	mg/L	1.00		101	80-120	2.30	20	
Duplicate (B226176-DUP1)	**Source: 19C0662-01**			Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.00853	0.010	mg/L		ND			NC	20	J
Barium	0.0393	0.050	mg/L		0.0396			0.626	20	J
Chromium	ND	0.010	mg/L		ND			NC	20	
Iron	ND	0.050	mg/L		ND			NC	20	
Lead	ND	0.010	mg/L		ND			NC	20	
Sodium	26.6	2.0	mg/L		27.8			4.26	20	
Zinc	ND	0.020	mg/L		ND			NC	20	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B226176 - SW-846 3005A										
Matrix Spike (B226176-MS1)		**Source: 19C0662-01**		Prepared: 03/20/19 Analyzed: 03/21/19						
Arsenic	0.493	0.010	mg/L	0.500	ND	98.6	75-125			
Barium	0.551	0.050	mg/L	0.500	0.0396	102	75-125			
Chromium	0.504	0.010	mg/L	0.500	ND	101	75-125			
Iron	4.16	0.050	mg/L	4.00	ND	104	75-125			
Lead	0.493	0.010	mg/L	0.500	ND	98.6	75-125			
Sodium	32.5	2.0	mg/L	4.00	27.8	119	75-125			
Zinc	1.01	0.020	mg/L	1.00	ND	101	75-125			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B225801 - EPA 300.0										
Blank (B225801-BLK1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	ND	0.10	mg/L							
LCS (B225801-BS1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	0.99	0.10	mg/L	1.00		99.3	90-110			
LCS Dup (B225801-BSD1)				Prepared & Analyzed: 03/14/19						
Nitrate as N	0.99	0.10	mg/L	1.00		99.4	90-110	0.131	20	
Batch B225891 - SM21-22 2320B										
Blank (B225891-BLK1)				Prepared & Analyzed: 03/15/19						
Alkalinity	ND	1.0	mg/L							
LCS (B225891-BS1)				Prepared & Analyzed: 03/15/19						
Alkalinity	190	1.0	mg/L	194		96.9	86.2-110			
LCS Dup (B225891-BSD1)				Prepared & Analyzed: 03/15/19						
Alkalinity	200	1.0	mg/L	194		101	86.2-110	4.17	5.57	
Batch B225927 - SM 21-22 4500 P E										
Blank (B225927-BLK1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	ND	0.050	mg/L							
LCS (B225927-BS1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	0.21	0.050	mg/L	0.205		102	86.5-124			
LCS Dup (B225927-BSD1)				Prepared & Analyzed: 03/19/19						
Phosphorus, Total	0.22	0.050	mg/L	0.205		109	86.5-124	5.79	11	
Batch B225953 - SM19-22 4500 NH3 C										
Blank (B225953-BLK1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B225953-BS1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	4.9	0.30	mg/L	5.00		98.0	81.5-113			
LCS Dup (B225953-BSD1)				Prepared: 03/18/19 Analyzed: 03/19/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	81.5-113	2.82	11.4	

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B225995 - SM 21-22 4500 P E											
Blank (B225995-BLK1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	ND	0.050	mg/L								
LCS (B225995-BS1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	0.22	0.050	mg/L	0.205		108	86.5-124				
LCS Dup (B225995-BSD1)				Prepared & Analyzed: 03/19/19							
Phosphorus, Total	0.22	0.050	mg/L	0.205		107	86.5-124	0.848		11	
Batch B226138 - ASTM D516-11											
Blank (B226138-BLK1)				Prepared & Analyzed: 03/20/19							
Sulfate	ND	2.0	mg/L								
LCS (B226138-BS1)				Prepared & Analyzed: 03/20/19							
Sulfate	18	2.0	mg/L	20.0		92.4	85.6-110				
LCS Dup (B226138-BSD1)				Prepared & Analyzed: 03/20/19							
Sulfate	20	2.0	mg/L	20.0		99.1	85.6-110	**6.94**	*	5.55	R-05
Duplicate (B226138-DUP1)	**Source: 19C0662-01**			Prepared & Analyzed: 03/20/19							
Sulfate	8.7	2.0	mg/L		10			16.0		16	
Matrix Spike (B226138-MS1)	**Source: 19C0662-01**			Prepared & Analyzed: 03/20/19							
Sulfate	27	2.0	mg/L	20.0	10	81.7	45.6-127				
Batch B226174 - SM 5310B											
Blank (B226174-BLK1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	ND	1.0	mg/L								
LCS (B226174-BS1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	10.8	1.0	mg/L	10.0		108	85.1-116				
LCS Dup (B226174-BSD1)				Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	10.9	1.0	mg/L	10.0		109	85.1-116	0.561		7.86	
Duplicate (B226174-DUP1)	**Source: 19C0662-05**			Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	ND	1.0	mg/L		ND			NC		23.4	
Matrix Spike (B226174-MS1)	**Source: 19C0662-05**			Prepared: 03/20/19 Analyzed: 03/21/19							
Total Organic Carbon	5.86	1.0	mg/L	5.00	ND	117	49.1-151				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B226260 - EPA 300.0											
Blank (B226260-BLK1)				Prepared & Analyzed: 03/22/19							
Chloride	ND	1.0	mg/L								
LCS (B226260-BS1)				Prepared & Analyzed: 03/22/19							
Chloride	4.8	1.0	mg/L	5.00		96.7		90-110			
LCS Dup (B226260-BSD1)				Prepared & Analyzed: 03/22/19							
Chloride	5.0	1.0	mg/L	5.00		100		90-110	3.57	20	
Duplicate (B226260-DUP1)	**Source: 19C0662-02**			Prepared & Analyzed: 03/22/19							
Chloride	40	1.0	mg/L		40				0.0190	20	
Matrix Spike (B226260-MS1)	**Source: 19C0662-02**			Prepared & Analyzed: 03/22/19							
Chloride	41	1.0	mg/L	5.00	40	**24.7**	*	80-120			MS-07

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B225822 - SM21-22 2540C											
Blank (B225822-BLK1)				Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	ND	10	mg/L								
LCS (B225822-BS1)				Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	230	10	mg/L	293		78.2	61.4-114				
Duplicate (B225822-DUP1)	**Source: 19C0662-04**			Prepared & Analyzed: 03/15/19							
Total Dissolved Solids	82	10	mg/L		240			**98.8**	*	5	
Batch B227340 - SM21-22 2540C											
Blank (B227340-BLK1)				Prepared & Analyzed: 04/01/19							
Total Dissolved Solids	ND	10	mg/L								
LCS (B227340-BS1)				Prepared & Analyzed: 04/01/19							
Total Dissolved Solids	230	10	mg/L	293		79.2	61.4-114				

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BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM1** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.69
Endrin [1]	3.58

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	2.13
Endrin [2]	3.82

BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM2** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	2.00
Endrin [1]	4.09

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	2.48
Endrin [2]	4.33

BREAKDOWN REPORT

Lab Sample ID: **S033722-PEM3** **Analyzed:** **03/20/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.86
Endrin [1]	4.16

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BREAKDOWN REPORT

Lab Sample ID:	S033722-PEM3	Analyzed:	03/20/2019

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.30
Endrin [2]	3.73

BREAKDOWN REPORT

Lab Sample ID:	S033857-PEM1	Analyzed:	03/23/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.84
Endrin [1]	4.11

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	3.57
Endrin [2]	4.48

BREAKDOWN REPORT

Lab Sample ID:	S033857-PEM2	Analyzed:	03/23/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	3.12
Endrin [1]	4.63

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	3.77
Endrin [2]	4.55

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS

Lab Sample ID: B226019-BS1 Date(s) Analyzed: 03/19/2019 03/19/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	16.717	0.000	0.000	0.248	
	2	16.662	0.000	0.000	0.247	1.2
2,4,5-TP (Silvex)	1	16.170	0.000	0.000	0.247	
	2	15.854	0.000	0.000	0.247	1.2
2,4-D	1	14.281	0.000	0.000	2.45	
	2	14.066	0.000	0.000	2.51	0.4
2,4-DB	1	17.212	0.000	0.000	2.37	
	2	17.138	0.000	0.000	2.39	0.4
Dalapon	1	4.822	0.000	0.000	4.81	
	2	4.425	0.000	0.000	4.79	0.2
Dicamba	1	12.100	0.000	0.000	0.242	
	2	11.797	0.000	0.000	0.244	1.7
Dichloroprop	1	13.760	0.000	0.000	2.54	
	2	13.372	0.000	0.000	2.54	1.6
Dinoseb	1	17.809	0.000	0.000	0.800	
	2	17.334	0.000	0.000	0.745	7.1
MCPA	1	12.946	0.000	0.000	222	
	2	12.657	0.000	0.000	218	0.9
MCPP	1	12.605	0.000	0.000	240	
	2	12.143	0.000	0.000	227	5.6

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS Dup

Lab Sample ID: B226019-BSD1 Date(s) Analyzed: 03/19/2019 03/19/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	16.717	0.000	0.000	0.247	
	2	16.660	0.000	0.000	0.239	4.5
2,4,5-TP (Silvex)	1	16.170	0.000	0.000	0.242	
	2	15.853	0.000	0.000	0.240	0.0
2,4-D	1	14.281	0.000	0.000	2.40	
	2	14.067	0.000	0.000	2.46	2.5
2,4-DB	1	17.210	0.000	0.000	2.25	
	2	17.138	0.000	0.000	2.36	2.6
Dalapon	1	4.823	0.000	0.000	4.71	
	2	4.426	0.000	0.000	4.68	0.4
Dicamba	1	12.102	0.000	0.000	0.235	
	2	11.797	0.000	0.000	0.238	0.8
Dichloroprop	1	13.760	0.000	0.000	2.48	
	2	13.371	0.000	0.000	2.48	0.8
Dinoseb	1	17.807	0.000	0.000	0.940	
	2	17.334	0.000	0.000	0.881	6.5
MCPA	1	12.946	0.000	0.000	218	
	2	12.655	0.000	0.000	212	3.7
MCPP	1	12.605	0.000	0.000	233	
	2	12.142	0.000	0.000	222	3.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B226044-BS1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.086	7.055	7.115	1.0	
	2	6.999	6.969	7.029	0.98	2.0
4,4'-DDE	1	6.652	6.622	6.682	1.0	
	2	6.584	6.553	6.613	0.98	2.0
4,4'-DDT	1	7.296	7.264	7.324	1.0	
	2	7.231	7.201	7.261	1.0	0.0
Alachlor	1	6.102	6.071	6.131	0.90	
	2	5.808	5.778	5.838	0.92	2.2
Aldrin	1	6.003	5.971	6.031	0.94	
	2	5.858	5.828	5.888	0.90	4.4
alpha-BHC	1	5.318	5.288	5.348	0.82	
	2	5.207	5.177	5.237	0.85	3.6
alpha-Chlordane	1	6.592	6.561	6.621	0.94	
	2	6.453	6.423	6.483	0.94	0.0
beta-BHC	1	5.564	5.533	5.593	0.88	
	2	5.456	5.427	5.487	0.89	0.0
delta-BHC	1	5.674	5.644	5.704	0.93	
	2	5.626	5.596	5.656	0.89	4.4
Dieldrin	1	6.858	6.827	6.887	0.94	
	2	6.677	6.647	6.707	0.89	5.5
Endosulfan I	1	6.686	6.656	6.716	0.94	
	2	6.487	6.456	6.516	0.94	0.0
Endosulfan II	1	7.192	7.161	7.221	0.98	
	2	7.046	7.016	7.076	0.96	2.1
Endosulfan Sulfate	1	7.846	7.814	7.874	1.0	
	2	7.513	7.482	7.542	0.98	2.0
Endrin	1	7.026	6.995	7.055	0.97	
	2	6.889	6.859	6.919	0.96	2.1
Endrin Aldehyde	1	7.510	7.478	7.538	0.93	
	2	7.299	7.269	7.329	0.93	0.0
Endrin Ketone	1	8.048	8.017	8.077	1.0	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B226044-BS1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	7.911	7.880	7.940	1.0	0.0
gamma-BHC (Lindane)	1	5.510	5.479	5.539	0.88	
	2	5.405	5.375	5.435	0.85	3.5
gamma-Chlordane	1	6.499	6.469	6.529	0.94	
	2	6.354	6.324	6.384	0.95	1.1
Heptachlor	1	5.807	5.777	5.837	0.90	
	2	5.663	5.632	5.692	0.87	3.4
Heptachlor Epoxide	1	6.412	6.380	6.440	0.93	
	2	6.225	6.195	6.255	0.91	2.2
Hexachlorobenzene	1	5.217	5.186	5.246	1.1	
	2	5.130	5.100	5.160	1.1	0.0
Methoxychlor	1	7.680	7.649	7.709	1.0	
	2	7.775	7.744	7.804	1.0	9.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B226044-BSD1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.086	7.055	7.115	1.0	
	2	7.000	6.969	7.029	0.97	3.1
4,4'-DDE	1	6.653	6.622	6.682	1.0	
	2	6.584	6.553	6.613	0.95	5.1
4,4'-DDT	1	7.296	7.264	7.324	1.0	
	2	7.232	7.201	7.261	1.0	0.0
Alachlor	1	6.102	6.071	6.131	0.89	
	2	5.808	5.778	5.838	0.93	4.4
Aldrin	1	6.003	5.971	6.031	0.91	
	2	5.858	5.828	5.888	0.87	4.5
alpha-BHC	1	5.319	5.288	5.348	0.80	
	2	5.208	5.177	5.237	0.82	2.5
alpha-Chlordane	1	6.592	6.561	6.621	0.93	
	2	6.454	6.423	6.483	0.93	0.0
beta-BHC	1	5.564	5.533	5.593	0.87	
	2	5.456	5.427	5.487	0.88	1.1
delta-BHC	1	5.674	5.644	5.704	0.92	
	2	5.626	5.596	5.656	0.89	3.3
Dieldrin	1	6.859	6.827	6.887	0.92	
	2	6.678	6.647	6.707	0.89	3.3
Endosulfan I	1	6.687	6.656	6.716	0.93	
	2	6.487	6.456	6.516	0.93	0.0
Endosulfan II	1	7.193	7.161	7.221	0.97	
	2	7.047	7.016	7.076	0.95	2.1
Endosulfan Sulfate	1	7.847	7.814	7.874	1.0	
	2	7.513	7.482	7.542	0.97	3.1
Endrin	1	7.026	6.995	7.055	0.97	
	2	6.890	6.859	6.919	0.96	1.0
Endrin Aldehyde	1	7.510	7.478	7.538	0.94	
	2	7.300	7.269	7.329	0.94	0.0
Endrin Ketone	1	8.048	8.017	8.077	1.0	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B226044-BSD1 Date(s) Analyzed: 03/20/2019 03/20/2019

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	7.910	7.880	7.940	0.99	1.0
gamma-BHC (Lindane)	1	5.510	5.479	5.539	0.86	
	2	5.405	5.375	5.435	0.83	3.6
gamma-Chlordane	1	6.499	6.469	6.529	0.92	
	2	6.355	6.324	6.384	0.93	0.0
Heptachlor	1	5.808	5.777	5.837	0.87	
	2	5.663	5.632	5.692	0.85	2.3
Heptachlor Epoxide	1	6.412	6.380	6.440	0.92	
	2	6.226	6.195	6.255	0.90	2.2
Hexachlorobenzene	1	5.216	5.186	5.246	1.1	
	2	5.130	5.100	5.160	1.0	9.5
Methoxychlor	1	7.680	7.649	7.709	1.0	
	2	7.775	7.744	7.804	1.0	0.0

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
H-02	Gross violation of holding time. Analysis performed after 2X the allowable holding time.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
MS-07	Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-36	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
ASTM D516-11 in Water	
Sulfate	NY,NH,MA,CT,RI,VA,NC
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
Nitrate as N	NC,NY,MA,VA,ME,NH,CT,RI
SM 21-22 4500 P E in Water	
Phosphorus, Total	CT,MA,NH,NY,RI,NC,ME,VA
SM 5310B in Water	
Total Organic Carbon	CT,NH,NY,RI,NC,MA,VA
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 2320B in Water	
Alkalinity	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SW-846 6010 in Water	
Hardness	CT,MA,NH,NY
SW-846 6010D in Water	
Arsenic	CT,NH,NY,ME,VA,RI,NC
Barium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Sodium	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8081B in Water	
Alachlor	NC
Alachlor [2C]	NC
Aldrin	CT,NH,NY,ME,NC,VA
Aldrin [2C]	CT,NH,NY,ME,NC,VA
alpha-BHC	CT,NH,NY,ME,NC,VA
alpha-BHC [2C]	CT,NH,NY,ME,NC,VA
beta-BHC	CT,NH,NY,ME,NC,VA
beta-BHC [2C]	CT,NH,NY,ME,NC,VA
delta-BHC	CT,NH,NY,ME,NC,VA
delta-BHC [2C]	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane)	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane) [2C]	CT,NH,NY,ME,NC,VA
Chlordane	CT,NH,NY,ME,NC,VA
Chlordane [2C]	CT,NH,NY,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Water	
4,4'-DDD	CT,NH,NY,ME,NC,VA
4,4'-DDD [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDE	CT,NH,NY,ME,NC,VA
4,4'-DDE [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDT	CT,NH,NY,ME,NC,VA
4,4'-DDT [2C]	CT,NH,NY,ME,NC,VA
Dieldrin	CT,NH,NY,ME,NC,VA
Dieldrin [2C]	CT,NH,NY,ME,NC,VA
Endosulfan I	CT,NH,NY,ME,NC,VA
Endosulfan I [2C]	CT,NH,NY,ME,NC,VA
Endosulfan II	CT,NH,NY,ME,NC,VA
Endosulfan II [2C]	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate [2C]	CT,NH,NY,ME,NC,VA
Endrin	CT,NH,NY,ME,NC,VA
Endrin [2C]	CT,NH,NY,ME,NC,VA
Endrin Aldehyde	CT,NH,NY,ME,NC,VA
Endrin Aldehyde [2C]	CT,NH,NY,ME,NC,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NH,NY,ME,NC,VA
Heptachlor [2C]	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide [2C]	CT,NH,NY,ME,NC,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NH,NY,ME,NC,VA
Methoxychlor [2C]	CT,NH,NY,ME,NC,VA
Toxaphene	CT,NH,NY,ME,NC,VA
Toxaphene [2C]	CT,NH,NY,ME,NC,VA
SW-846 8151A in Water	
2,4-D	ME,NC,NH,CT,NY,VA
2,4-D [2C]	ME,NC,NH,CT,NY,VA
2,4-DB	ME,NC,NH,CT,NY,VA
2,4-DB [2C]	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex)	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex) [2C]	ME,NC,NH,CT,NY,VA
2,4,5-T	ME,NC,NH,CT,NY,VA
2,4,5-T [2C]	ME,NC,NH,CT,NY,VA
Dalapon	ME,NC,NH,CT,NY,VA
Dalapon [2C]	ME,NC,NH,CT,NY,VA
Dicamba	ME,NC,NH,CT,NY,VA
Dicamba [2C]	ME,NC,NH,CT,NY,VA
Dichloroprop	ME,NC,NH,CT,NY,VA
Dichloroprop [2C]	ME,NC,NH,CT,NY,VA
Dinoseb	ME,NC,NH,CT,NY,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8151A in Water	
Dinoseb [2C]	ME,NC,NH,CT,NY,VA
MCPA	NC,CT
MCPA [2C]	NC,CT
MCPP	NC,CT
MCPP [2C]	NC,CT
SW-846 8260C in Water	
Acetone	CT,ME,NH,VA,NY
Acrylonitrile	CT,ME,NH,VA,NY
tert-Amyl Methyl Ether (TAME)	ME,NH,VA,NY
Benzene	CT,ME,NH,VA,NY
Bromobenzene	NY
Bromochloromethane	ME,NH,VA,NY
Bromodichloromethane	CT,ME,NH,VA,NY
Bromoform	CT,ME,NH,VA,NY
Bromomethane	CT,ME,NH,VA,NY
2-Butanone (MEK)	CT,ME,NH,VA,NY
tert-Butyl Alcohol (TBA)	ME,NH,VA,NY
n-Butylbenzene	ME,VA,NY
sec-Butylbenzene	ME,VA,NY
tert-Butylbenzene	ME,VA,NY
tert-Butyl Ethyl Ether (TBEE)	ME,NH,VA,NY
Carbon Disulfide	CT,ME,NH,VA,NY
Carbon Tetrachloride	CT,ME,NH,VA,NY
Chlorobenzene	CT,ME,NH,VA,NY
Chlorodibromomethane	CT,ME,NH,VA,NY
Chloroethane	CT,ME,NH,VA,NY
Chloroform	CT,ME,NH,VA,NY
Chloromethane	CT,ME,NH,VA,NY
2-Chlorotoluene	ME,NH,VA,NY
4-Chlorotoluene	ME,NH,VA,NY
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	ME,NH,VA,NY
1,2-Dichlorobenzene	CT,ME,NH,VA,NY
1,3-Dichlorobenzene	CT,ME,NH,VA,NY
1,4-Dichlorobenzene	CT,ME,NH,VA,NY
trans-1,4-Dichloro-2-butene	ME,NH,VA,NY
Dichlorodifluoromethane (Freon 12)	ME,NH,VA,NY
1,1-Dichloroethane	CT,ME,NH,VA,NY
1,2-Dichloroethane	CT,ME,NH,VA,NY
1,1-Dichloroethylene	CT,ME,NH,VA,NY
cis-1,2-Dichloroethylene	ME,NY
trans-1,2-Dichloroethylene	CT,ME,NH,VA,NY
1,2-Dichloropropane	CT,ME,NH,VA,NY
1,3-Dichloropropane	ME,VA,NY
2,2-Dichloropropane	ME,NH,VA,NY

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Analyte	Certifications
SW-846 8260C in Water	
1,1-Dichloropropene	ME,NH,VA,NY
cis-1,3-Dichloropropene	CT,ME,NH,VA,NY
trans-1,3-Dichloropropene	CT,ME,NH,VA,NY
Diethyl Ether	NY
Diisopropyl Ether (DIPE)	ME,NH,VA,NY
1,4-Dioxane	NY
Ethylbenzene	CT,ME,NH,VA,NY
Hexachlorobutadiene	CT,ME,NH,VA,NY
2-Hexanone (MBK)	CT,ME,NH,VA,NY
Isopropylbenzene (Cumene)	ME,VA,NY
p-Isopropyltoluene (p-Cymene)	CT,ME,NH,VA,NY
Methyl Acetate	NY
Methyl tert-Butyl Ether (MTBE)	CT,ME,NH,VA,NY
Methyl Cyclohexane	NY
Methylene Chloride	CT,ME,NH,VA,NY
4-Methyl-2-pentanone (MIBK)	CT,ME,NH,VA,NY
Naphthalene	ME,NH,VA,NY
n-Propylbenzene	CT,ME,NH,VA,NY
Styrene	CT,ME,NH,VA,NY
1,1,1,2-Tetrachloroethane	CT,ME,NH,VA,NY
1,1,2,2-Tetrachloroethane	CT,ME,NH,VA,NY
Tetrachloroethylene	CT,ME,NH,VA,NY
Toluene	CT,ME,NH,VA,NY
1,2,3-Trichlorobenzene	ME,NH,VA,NY
1,2,4-Trichlorobenzene	CT,ME,NH,VA,NY
1,3,5-Trichlorobenzene	ME
1,1,1-Trichloroethane	CT,ME,NH,VA,NY
1,1,2-Trichloroethane	CT,ME,NH,VA,NY
Trichloroethylene	CT,ME,NH,VA,NY
Trichlorofluoromethane (Freon 11)	CT,ME,NH,VA,NY
1,2,3-Trichloropropane	ME,NH,VA,NY
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	VA,NY
1,2,4-Trimethylbenzene	ME,VA,NY
1,3,5-Trimethylbenzene	ME,VA,NY
Vinyl Chloride	CT,ME,NH,VA,NY
m+p Xylene	CT,ME,NH,VA,NY
o-Xylene	CT,ME,NH,VA,NY
SW-846 8270D in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Acetophenone	NY,NH,ME,NC,VA
Aniline	NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzidine	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Soil	
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Benzoic Acid	NY,NH,ME,NC,VA
Bis(2-chloroethoxy)methane	CT,NY,NH,ME,NC,VA
Bis(2-chloroethyl)ether	CT,NY,NH,ME,NC,VA
Bis(2-chloroisopropyl)ether	CT,NY,NH,ME,NC,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NH,ME,NC,VA
4-Bromophenylphenylether	CT,NY,NH,ME,NC,VA
Butylbenzylphthalate	CT,NY,NH,ME,NC,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NH,ME,NC,VA
4-Chloro-3-methylphenol	CT,NY,NH,ME,NC,VA
2-Chloronaphthalene	CT,NY,NH,NC,VA
2-Chlorophenol	CT,NY,NH,ME,NC,VA
4-Chlorophenylphenylether	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Dibenzofuran	CT,NY,NH,ME,NC,VA
Di-n-butylphthalate	CT,NY,NH,ME,NC,VA
1,2-Dichlorobenzene	NY,NH,ME,NC,VA
1,3-Dichlorobenzene	NY,NH,ME,NC,VA
1,4-Dichlorobenzene	NY,NH,ME,NC,VA
3,3-Dichlorobenzidine	CT,NY,NH,ME,NC,VA
2,4-Dichlorophenol	CT,NY,NH,ME,NC,VA
Diethylphthalate	CT,NY,NH,ME,NC,VA
2,4-Dimethylphenol	CT,NY,NH,ME,NC,VA
Dimethylphthalate	CT,NY,NH,ME,NC,VA
4,6-Dinitro-2-methylphenol	CT,NY,NH,ME,NC,VA
2,4-Dinitrophenol	CT,NY,NH,ME,NC,VA
2,4-Dinitrotoluene	CT,NY,NH,ME,NC,VA
2,6-Dinitrotoluene	CT,NY,NH,ME,NC,VA
Di-n-octylphthalate	CT,NY,NH,ME,NC,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	NY,NH,ME,NC,VA
Hexachlorobenzene	CT,NY,NH,ME,NC,VA
Hexachlorobutadiene	CT,NY,NH,ME,NC,VA
Hexachlorocyclopentadiene	CT,NY,NH,ME,NC,VA
Hexachloroethane	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
Isophorone	CT,NY,NH,ME,NC,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
2-Methylphenol	CT,NY,NH,ME,NC,VA
3/4-Methylphenol	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Soil	
2-Nitroaniline	CT,NY,NH,ME,NC,VA
3-Nitroaniline	CT,NY,NH,ME,NC,VA
4-Nitroaniline	CT,NY,NH,ME,NC,VA
Nitrobenzene	CT,NY,NH,ME,NC,VA
2-Nitrophenol	CT,NY,NH,ME,NC,VA
4-Nitrophenol	CT,NY,NH,ME,NC,VA
N-Nitrosodimethylamine	CT,NY,NH,ME,NC,VA
N-Nitrosodi-n-propylamine	CT,NY,NH,ME,NC,VA
Pentachloronitrobenzene	NY,NC
Pentachlorophenol	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Phenol	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
Pyridine	CT,NY,NH,ME,NC,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NH,ME,NC,VA
2,4,5-Trichlorophenol	CT,NY,NH,ME,NC,VA
2,4,6-Trichlorophenol	CT,NY,NH,ME,NC,VA
2-Fluorophenol	NC
SW-846 8270D in Water	
Acenaphthene	CT,NY,NC,ME,NH,VA
Acenaphthylene	CT,NY,NC,ME,NH,VA
Acetophenone	NY,NC
Aniline	CT,NY,NC,ME,VA
Anthracene	CT,NY,NC,ME,NH,VA
Benzidine	CT,NY,NC,ME,NH,VA
Benzo(a)anthracene	CT,NY,NC,ME,NH,VA
Benzo(a)pyrene	CT,NY,NC,ME,NH,VA
Benzo(b)fluoranthene	CT,NY,NC,ME,NH,VA
Benzo(g,h,i)perylene	CT,NY,NC,ME,NH,VA
Benzo(k)fluoranthene	CT,NY,NC,ME,NH,VA
Benzoic Acid	NY,NC,ME,NH,VA
Bis(2-chloroethoxy)methane	CT,NY,NC,ME,NH,VA
Bis(2-chloroethyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-chloroisopropyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NC,ME,NH,VA
4-Bromophenylphenylether	CT,NY,NC,ME,NH,VA
Butylbenzylphthalate	CT,NY,NC,ME,NH,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NC,ME,NH,VA
4-Chloro-3-methylphenol	CT,NY,NC,ME,NH,VA
2-Chloronaphthalene	CT,NY,NC,ME,NH,VA
2-Chlorophenol	CT,NY,NC,ME,NH,VA
4-Chlorophenylphenylether	CT,NY,NC,ME,NH,VA
Chrysene	CT,NY,NC,ME,NH,VA
Dibenz(a,h)anthracene	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
Dibenzofuran	CT,NY,NC,ME,NH,VA
Di-n-butylphthalate	CT,NY,NC,ME,NH,VA
1,2-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,3-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,4-Dichlorobenzene	CT,NY,NC,ME,NH,VA
3,3-Dichlorobenzidine	CT,NY,NC,ME,NH,VA
2,4-Dichlorophenol	CT,NY,NC,ME,NH,VA
Diethylphthalate	CT,NY,NC,ME,NH,VA
2,4-Dimethylphenol	CT,NY,NC,ME,NH,VA
Dimethylphthalate	CT,NY,NC,ME,NH,VA
4,6-Dinitro-2-methylphenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrophenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrotoluene	CT,NY,NC,ME,NH,VA
2,6-Dinitrotoluene	CT,NY,NC,ME,NH,VA
Di-n-octylphthalate	CT,NY,NC,ME,NH,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NC
Fluoranthene	CT,NY,NC,ME,NH,VA
Fluorene	NY,NC,ME,NH,VA
Hexachlorobenzene	CT,NY,NC,ME,NH,VA
Hexachlorobutadiene	CT,NY,NC,ME,NH,VA
Hexachlorocyclopentadiene	CT,NY,NC,ME,NH,VA
Hexachloroethane	CT,NY,NC,ME,NH,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NC,ME,NH,VA
Isophorone	CT,NY,NC,ME,NH,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NC,ME,NH,VA
2-Methylphenol	CT,NY,NC,NH,VA
3/4-Methylphenol	CT,NY,NC,NH,VA
Naphthalene	CT,NY,NC,ME,NH,VA
2-Nitroaniline	CT,NY,NC,ME,NH,VA
3-Nitroaniline	CT,NY,NC,ME,NH,VA
4-Nitroaniline	CT,NY,NC,ME,NH,VA
Nitrobenzene	CT,NY,NC,ME,NH,VA
2-Nitrophenol	CT,NY,NC,ME,NH,VA
4-Nitrophenol	CT,NY,NC,ME,NH,VA
N-Nitrosodimethylamine	CT,NY,NC,ME,NH,VA
N-Nitrosodi-n-propylamine	CT,NY,NC,ME,NH,VA
Pentachloronitrobenzene	NC
Pentachlorophenol	CT,NY,NC,ME,NH,VA
Phenanthrene	CT,NY,NC,ME,NH,VA
Phenol	CT,NY,NC,ME,NH,VA
Pyrene	CT,NY,NC,ME,NH,VA
Pyridine	CT,NY,NC,ME,NH,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NC,ME,NH,VA
2,4,5-Trichlorophenol	CT,NY,NC,ME,NH,VA
2,4,6-Trichlorophenol	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
2-Fluorophenol	NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2020
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2020
RI	Rhode Island Department of Health	LAO00112	12/30/2019
NC	North Carolina Div. of Water Quality	652	12/31/2019
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2019
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2019
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2019
NC-DW	North Carolina Department of Health	25703	07/31/2019

ALB 19C0662

con-test ANALYTICAL LABORATORY

http://www.contestlabs.com Doc # 380 Rev 1_03242017

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2M Associates
Address: H2M 179 River St Suite 1, Troy, NY 12180
Phone: (518) 270-1672 x114
Project Name: Cortlandville Sand + Gravel
Project Location: Cortlandville, NY
Project Number: 10009
Project Manager: Mike Pollaco
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: W. Bakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☐ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To:
Fax To #:

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/Time	~~Ending~~ Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	# of Containers	[2] Preservation Code	[3] Container Code	VOC	Pesticides	TOC	Alkalinity	Herbicides	SVOC	NO_3/Phos/NH_3	TKN/Cl/Boy/NO_3	Metals/Hardness
1	MW-2	3/13/19	1475		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
2	MW-3D	3/13/19	1710		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
3	MW-3S	3/13/19	1840		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
4	MW-4S	3/13/19	2010		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
5	DUP	3/13/19	—		X	GW	U	3	2	1	1	1	1	2	2	1	1	1	
6	Field Blank	3/13/19	1920			DI	C	3	-	-	-	-	-	-	-	-	-	-	
7	Trip Blank					DI	C	2	-	-	-	-	-	-	-	-	-	-	

Comments:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
☐ Lab to Filter

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] Container Codes:
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Relinquished by: (signature)	W. Bakes	Date/Time: 3/14/19 @ 9:50
Received by: (signature)		Date/Time: 3-14-19 12PM
Relinquished by: (signature)		Date/Time: 3.14.19 1300
Received by: (signature)		Date/Time: 1302
Relinquished by: (signature)		Date/Time: 1700
Received by: (signature)		Date/Time: 1700

Regulatory & Reporting Information
☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
☐ NY Restricted Use
☐ NY Unrestricted Use
☐ NY Part 375

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD

Other
NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP, LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Page 100 of 101

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client 1124 A

Received By SL Date 3/14/19 Time 1700

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 5 Actual Temp -3.0, 2.6, 5.2, 8.2

By Blank # _____ Actual Temp -

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? T Who was notified? Myriah

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? IC

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? T On COC? T

Do all samples have the proper pH? Acid ICL Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	20	1 Liter Plastic		16 oz Amb.	
HCL-	26	500 mL Amb.		500 mL Plastic	10	8oz Amb/Clear	
Meoh-		250 mL Amb.	5	250 mL Plastic	10	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	10	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

APPENDIX E-2
Quarter 2
Laboratory Analysis Reports

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 10, 2019

John Gansfuss
H2H Associates, LLC
179 River Street
Troy, NY 12180

Project Location: Cortlandville, NY
Client Job Number:
Project Number: 10009
Laboratory Work Order Number: 19E1264

Enclosed are results of analyses for samples received by the laboratory on May 22, 2019. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 6

Sample Results 10

19E1264-01 10

19E1264-02 20

19E1264-03 30

19E1264-04 40

19E1264-05 42

Sample Preparation Information 44

QC Data 47

Volatile Organic Compounds by GC/MS 47

B231545 47

B231691 51

Semivolatile Organic Compounds by GC/MS 57

B231813 57

Organochloride Pesticides by GC/ECD 62

B231811 62

Herbicides by GC/ECD 65

B231543 65

Metals Analyses (Total) 67

B231628 67

B232189 67

B232424 67

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 69

B231762 69

Table of Contents (continued)

B231851 69

B232034 69

B232197 69

B232246 70

B232285 70

B232845 70

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) 72

B231560 72

Pesticides Degradation Report 73

Dual Column RPD Report 75

Flag/Qualifier Summary 81

Certifications 82

Chain of Custody/Sample Receipt 88

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: John Gansfuss

REPORT DATE: 6/10/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19E1264

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-01	19E1264-01	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
MW-3S	19E1264-02	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	

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H2H Associates, LLC
179 River Street
Troy, NY 12180
ATTN: John Gansfuss

REPORT DATE: 6/10/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 10009

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19E1264

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Cortlandville, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-3D	19E1264-03	Ground Water		ASTM D516-11	
				EPA 300.0	MA M-CT007/CT PH-0618/NY11301
				SM 21-22 4500 P E	
				SM 5310B	
				SM19-22 4500 NH3 C	
				SM21-22 2320B	
				SM21-22 2540C	
				SM21-22 4500 CL B	
				SW-846 6010	
				SW-846 6010D	
				SW-846 7470A	
				SW-846 8081B	
				SW-846 8151A	
				SW-846 8260C	
				SW-846 8270D	
Field Blank	19E1264-04	Field Blank		SW-846 8260C	
Trip Blank	19E1264-05	Trip Blank Water		SW-846 8260C	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8151 samples were derivatized on 05/24/19.

For method 8151 sample analysis bracketed by LCS to monitor esterification. All recoveries in the bracketing LCS met method criteria.

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SW-846 8151A

Qualifications:

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Dinoseb [2C]
B231543-BS1, B231543-BSD1

SW-846 8260C

Qualifications:

L-02

Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.

Analyte & Samples(s) Qualified:

Methyl Acetate
B231545-BS1, B231545-BSD1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Methyl Acetate
B231691-BS1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Bromomethane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

Chloromethane
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

n-Butylbenzene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

trans-1,3-Dichloropropene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

trans-1,4-Dichloro-2-butene
19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231691-BLK1, B231691-BS1, B231691-BSD1, S036349-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bromomethane
B231545-BS1, B231545-BSD1, S036333-CCV1

Chloromethane
B231545-BS1, B231545-BSD1, S036333-CCV1

V-36

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Carbon Disulfide
B231691-BS1, B231691-BSD1, S036349-CCV1

SW-846 8270D

Qualifications:

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

L-05

Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the high side.

Analyte & Samples(s) Qualified:

Benzidine

B231813-BLK1, B231813-BS1, B231813-BSD1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine

B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Aniline

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

N-Nitrosodimethylamine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], S036618-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Benzoic Acid

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], S036618-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

3,3-Dichlorobenzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

4-Chloroaniline

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine

19E1264-01[MW-01], 19E1264-02[MW-3S], 19E1264-03[MW-3D], B231813-BLK1, B231813-BS1, B231813-BSD1, S036511-CCV1, S036618-CCV1

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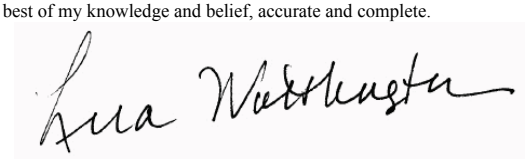
The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Technical Representative

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 7:51	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	105	70-130		5/25/19 7:51
Toluene-d8	105	70-130		5/25/19 7:51
4-Bromofluorobenzene	99.1	70-130		5/25/19 7:51

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Aniline	ND	5.0	3.7	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzidine	ND	20	12	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Benzoic Acid	ND	10	8.8	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:08	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	39.6	15-110		6/3/19 18:08
Phenol-d6	29.0	15-110		6/3/19 18:08
Nitrobenzene-d5	57.9	30-130		6/3/19 18:08
2-Fluorobiphenyl	68.3	30-130		6/3/19 18:08
2,4,6-Tribromophenol	75.6	15-110		6/3/19 18:08
p-Terphenyl-d14	86.8	30-130		6/3/19 18:08

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.29	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Aldrin [1]	ND	0.071	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
alpha-BHC [1]	ND	0.071	0.0046	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
beta-BHC [1]	ND	0.071	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
delta-BHC [1]	ND	0.071	0.043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
gamma-BHC (Lindane) [1]	ND	0.043	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Chlordane [1]	ND	0.29	0.17	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDD [1]	ND	0.057	0.0026	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDE [1]	ND	0.057	0.0023	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
4,4'-DDT [1]	ND	0.057	0.0034	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Dieldrin [1]	ND	0.0029	0.0028	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan I [1]	ND	0.071	0.0030	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan II [1]	ND	0.11	0.0041	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endosulfan sulfate [1]	ND	0.11	0.0035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin [1]	ND	0.11	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin aldehyde [1]	ND	0.11	0.090	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Endrin ketone [1]	ND	0.11	0.0071	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Heptachlor [1]	ND	0.071	0.0065	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Heptachlor epoxide [1]	ND	0.071	0.0057	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Hexachlorobenzene [1]	ND	0.071	0.056	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Methoxychlor [1]	ND	0.71	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG
Toxaphene [1]	ND	1.4	0.94	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:10	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	103	30-150		6/6/19 5:10
Decachlorobiphenyl [2]	103	30-150		6/6/19 5:10
Tetrachloro-m-xylene [1]	92.5	30-150		6/6/19 5:10
Tetrachloro-m-xylene [2]	94.7	30-150		6/6/19 5:10

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.51	0.11	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4-DB [1]	ND	0.51	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4,5-TP (Silvex) [1]	ND	0.051	0.010	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
2,4,5-T [1]	ND	0.10	0.025	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dalalpon [1]	ND	1.3	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dicamba [1]	ND	0.051	0.016	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dichloroprop [1]	ND	0.51	0.19	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
Dinoseb [1]	ND	0.26	0.048	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
MCPA [1]	ND	51	9.6	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG
MCPP [1]	ND	51	10	µg/L	1		SW-846 8151A	5/23/19	5/24/19 20:28	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	91.0	30-150		5/24/19 20:28
2,4-Dichlorophenylacetic acid [2]	93.0	30-150		5/24/19 20:28

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01
Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Barium	0.053	0.050	0.0053	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 10:57	AJL
Sodium	14	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:05	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:53	MJH
Hardness	220			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	170	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	6/3/19	6/4/19 11:00	EC
Chloride	42	2.0		mg/L	2		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	19	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 14:41	DJM

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01 | Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	270	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-01
Sampled: 5/21/2019 14:05

Sample ID: 19E1264-01

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	1.64	0.05	0.01	mg/L	1		E300.0		5/23/19 21:16	PEL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,1-Trichloroethane	0.27	1.0	0.20	µg/L	1	J	SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:22	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	103	70-130		5/25/19 8:22
Toluene-d8	106	70-130		5/25/19 8:22
4-Bromofluorobenzene	96.8	70-130		5/25/19 8:22

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Acenaphthylene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Acetophenone	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Aniline	ND	5.0	3.7	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Anthracene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzidine	ND	20	12	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(a)anthracene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(a)pyrene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(b)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(g,h,i)perylene	ND	5.0	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzo(k)fluoranthene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Benzoic Acid	ND	10	8.8	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroethoxy)methane	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroethyl)ether	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-chloroisopropyl)ether	ND	10	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Bromophenylphenylether	ND	10	3.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Butylbenzylphthalate	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Carbazole	ND	10	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chloroaniline	ND	10	2.2	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chloro-3-methylphenol	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Chloronaphthalene	ND	10	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Chlorophenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Chlorophenylphenylether	ND	10	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Chrysene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dibenz(a,h)anthracene	ND	5.0	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dibenzofuran	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Di-n-butylphthalate	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,3-Dichlorobenzene	ND	5.0	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,4-Dichlorobenzene	ND	5.0	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3,3-Dichlorobenzidine	ND	10	3.5	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Diethylphthalate	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dimethylphenol	ND	10	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Dimethylphthalate	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4,6-Dinitro-2-methylphenol	ND	10	7.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dinitrophenol	ND	10	7.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4-Dinitrotoluene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,6-Dinitrotoluene	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Di-n-octylphthalate	ND	10	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	10	5.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Fluoranthene	ND	5.0	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Fluorene	ND	5.0	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachlorobutadiene	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachlorocyclopentadiene	ND	10	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Hexachloroethane	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	3.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Isophorone	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1-Methylnaphthalene	ND	5.0	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Methylnaphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3/4-Methylphenol	ND	10	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Naphthalene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Nitroaniline	ND	10	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
3-Nitroaniline	ND	10	1.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Nitroaniline	ND	10	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Nitrobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2-Nitrophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
4-Nitrophenol	ND	10	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodimethylamine	ND	10	3.2	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	10	6.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
N-Nitrosodi-n-propylamine	ND	10	3.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pentachloronitrobenzene	ND	10	5.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pentachlorophenol	ND	10	8.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Phenanthrene	ND	5.0	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Phenol	ND	10	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pyrene	ND	5.0	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
Pyridine	ND	5.0	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
1,2,4-Trichlorobenzene	ND	5.0	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4,5-Trichlorophenol	ND	10	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL
2,4,6-Trichlorophenol	ND	10	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:34	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	38.2	15-110		6/3/19 18:34
Phenol-d6	28.3	15-110		6/3/19 18:34
Nitrobenzene-d5	53.1	30-130		6/3/19 18:34
2-Fluorobiphenyl	65.0	30-130		6/3/19 18:34
2,4,6-Tribromophenol	72.9	15-110		6/3/19 18:34
p-Terphenyl-d14	89.8	30-130		6/3/19 18:34

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.30	0.037	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Aldrin [1]	ND	0.074	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
alpha-BHC [1]	ND	0.074	0.0048	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
beta-BHC [1]	ND	0.074	0.036	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
delta-BHC [1]	ND	0.074	0.044	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
gamma-BHC (Lindane) [1]	ND	0.044	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Chlordane [1]	ND	0.30	0.18	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDD [1]	ND	0.059	0.0027	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDE [1]	ND	0.059	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
4,4'-DDT [1]	ND	0.059	0.0036	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Dieldrin [1]	ND	0.0030	0.0029	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan I [1]	ND	0.074	0.0031	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan II [1]	ND	0.12	0.0043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endosulfan sulfate [1]	ND	0.12	0.0037	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin [1]	ND	0.12	0.0025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin aldehyde [1]	ND	0.12	0.093	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Endrin ketone [1]	ND	0.12	0.0073	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Heptachlor [1]	ND	0.074	0.0068	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Heptachlor epoxide [1]	ND	0.074	0.0059	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Hexachlorobenzene [1]	ND	0.074	0.058	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Methoxychlor [1]	ND	0.74	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG
Toxaphene [1]	ND	1.5	0.98	µg/L	1		SW-846 8081B	5/28/19	6/6/19 5:37	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.3	30-150		6/6/19 5:37
Decachlorobiphenyl [2]	94.7	30-150		6/6/19 5:37
Tetrachloro-m-xylene [1]	84.3	30-150		6/6/19 5:37
Tetrachloro-m-xylene [2]	86.7	30-150		6/6/19 5:37

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.49	0.10	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4-DB [1]	ND	0.49	0.17	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4,5-TP (Silvex) [1]	ND	0.049	0.0099	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
2,4,5-T [1]	ND	0.098	0.024	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dicamba [1]	ND	0.049	0.015	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dichloroprop [1]	ND	0.49	0.19	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
Dinoseb [1]	ND	0.25	0.046	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
MCPA [1]	ND	49	9.2	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG
MCPP [1]	ND	49	9.6	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	88.1	30-150		5/24/19 21:07
2,4-Dichlorophenylacetic acid [2]	92.6	30-150		5/24/19 21:07

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S
Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Barium	0.041	0.050	0.0053	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Iron	ND	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 10:59	AJL
Sodium	22	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:12	EJB
Zinc	ND	0.020	0.0052	mg/L	1		SW-846 6010D	5/31/19	6/2/19 14:59	MJH
Hardness	250			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	210	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	6/3/19	6/4/19 11:00	EC
Chloride	51	2.0		mg/L	2		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	10	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 14:56	DJM

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S | Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	330	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3S
Sampled: 5/21/2019 10:45

Sample ID: 19E1264-02

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	1.92	0.05	0.01	mg/L	1		E300.0		5/23/19 21:24	PEL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Bromomethane	ND	5.0	0.78	µg/L	1	R-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
n-Butylbenzene	ND	1.0	0.21	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Chloromethane	ND	2.0	0.45	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1	V-05	SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/24/19	5/25/19 8:52	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	103	70-130		5/25/19 8:52
Toluene-d8	106	70-130		5/25/19 8:52
4-Bromofluorobenzene	99.2	70-130		5/25/19 8:52

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Acenaphthylene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Acetophenone	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Aniline	ND	5.4	4.0	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Anthracene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzidine	ND	22	13	µg/L	1	R-05, V-05, V-35	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(a)anthracene	ND	5.4	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(a)pyrene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(b)fluoranthene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(g,h,i)perylene	ND	5.4	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzo(k)fluoranthene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Benzoic Acid	ND	11	9.5	µg/L	1	V-20	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroethoxy)methane	ND	11	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroethyl)ether	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-chloroisopropyl)ether	ND	11	2.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Bis(2-Ethylhexyl)phthalate	ND	11	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Bromophenylphenylether	ND	11	3.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Butylbenzylphthalate	ND	11	2.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Carbazole	ND	11	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chloroaniline	ND	11	2.4	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chloro-3-methylphenol	ND	11	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Chloronaphthalene	ND	11	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Chlorophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Chlorophenylphenylether	ND	11	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Chrysene	ND	5.4	2.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dibenz(a,h)anthracene	ND	5.4	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dibenzofuran	ND	5.4	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Di-n-butylphthalate	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2-Dichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,3-Dichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,4-Dichlorobenzene	ND	5.4	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3,3-Dichlorobenzidine	ND	11	3.8	µg/L	1	V-34	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dichlorophenol	ND	11	2.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Diethylphthalate	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dimethylphenol	ND	11	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Dimethylphthalate	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4,6-Dinitro-2-methylphenol	ND	11	8.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dinitrophenol	ND	11	8.4	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4-Dinitrotoluene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,6-Dinitrotoluene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Di-n-octylphthalate	ND	11	3.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	11	5.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Fluoranthene	ND	5.4	2.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Fluorene	ND	5.4	2.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobenzene	ND	11	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachlorobutadiene	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachlorocyclopentadiene	ND	11	8.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Hexachloroethane	ND	11	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Indeno(1,2,3-cd)pyrene	ND	5.4	4.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Isophorone	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1-Methylnaphthalene	ND	5.4	3.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Methylnaphthalene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Methylphenol	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3/4-Methylphenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Naphthalene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Nitroaniline	ND	11	3.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
3-Nitroaniline	ND	11	1.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Nitroaniline	ND	11	1.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Nitrobenzene	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2-Nitrophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
4-Nitrophenol	ND	11	4.1	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodimethylamine	ND	11	3.4	µg/L	1	V-05	SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodiphenylamine/Diphenylamine	ND	11	6.6	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
N-Nitrosodi-n-propylamine	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pentachloronitrobenzene	ND	11	5.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pentachlorophenol	ND	11	8.7	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Phenanthrene	ND	5.4	2.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Phenol	ND	11	3.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pyrene	ND	5.4	3.8	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
Pyridine	ND	5.4	3.5	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2,4,5-Tetrachlorobenzene	ND	11	2.3	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
1,2,4-Trichlorobenzene	ND	5.4	2.0	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4,5-Trichlorophenol	ND	11	1.9	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL
2,4,6-Trichlorophenol	ND	11	2.2	µg/L	1		SW-846 8270D	5/28/19	6/3/19 18:59	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	37.3	15-110		6/3/19 18:59
Phenol-d6	28.1	15-110		6/3/19 18:59
Nitrobenzene-d5	53.9	30-130		6/3/19 18:59
2-Fluorobiphenyl	65.2	30-130		6/3/19 18:59
2,4,6-Tribromophenol	75.6	15-110		6/3/19 18:59
p-Terphenyl-d14	94.5	30-130		6/3/19 18:59

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alachlor [1]	ND	0.29	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Aldrin [1]	ND	0.071	0.025	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
alpha-BHC [1]	ND	0.071	0.0046	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
beta-BHC [1]	ND	0.071	0.035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
delta-BHC [1]	ND	0.071	0.043	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
gamma-BHC (Lindane) [1]	ND	0.043	0.020	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Chlordane [1]	ND	0.29	0.17	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDD [1]	ND	0.057	0.0026	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDE [1]	ND	0.057	0.0023	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
4,4'-DDT [1]	ND	0.057	0.0034	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Dieldrin [1]	ND	0.0029	0.0028	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan I [1]	ND	0.071	0.0030	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan II [1]	ND	0.11	0.0041	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endosulfan sulfate [1]	ND	0.11	0.0035	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin [1]	ND	0.11	0.0024	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin aldehyde [1]	ND	0.11	0.090	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Endrin ketone [1]	ND	0.11	0.0071	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Heptachlor [1]	ND	0.071	0.0065	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Heptachlor epoxide [1]	ND	0.071	0.0057	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Hexachlorobenzene [1]	ND	0.071	0.056	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Methoxychlor [1]	ND	0.71	0.014	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG
Toxaphene [1]	ND	1.4	0.94	µg/L	1		SW-846 8081B	5/28/19	6/6/19 6:04	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	92.7	30-150		6/6/19 6:04
Decachlorobiphenyl [2]	91.5	30-150		6/6/19 6:04
Tetrachloro-m-xylene [1]	84.9	30-150		6/6/19 6:04
Tetrachloro-m-xylene [2]	87.5	30-150		6/6/19 6:04

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Herbicides by GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	0.48	0.099	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4-DB [1]	ND	0.48	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4,5-TP (Silvex) [1]	ND	0.048	0.0096	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
2,4,5-T [1]	ND	0.095	0.023	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dalalpon [1]	ND	1.2	0.16	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dicamba [1]	ND	0.048	0.014	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dichloroprop [1]	ND	0.48	0.18	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
Dinoseb [1]	ND	0.24	0.044	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
MCPA [1]	ND	48	9.0	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG
MCPP [1]	ND	48	9.3	µg/L	1		SW-846 8151A	5/23/19	5/24/19 21:46	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	81.4	30-150		5/24/19 21:46
2,4-Dichlorophenylacetic acid [2]	82.6	30-150		5/24/19 21:46

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	0.010	0.0080	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Barium	0.048	0.050	0.0053	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Chromium	ND	0.010	0.0061	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Iron	1.9	0.050	0.040	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Lead	ND	0.010	0.0044	mg/L	1		SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Mercury	ND	0.00010	0.000034	mg/L	1		SW-846 7470A	5/23/19	5/25/19 11:05	AJL
Sodium	18	2.2	0.31	mg/L	1		SW-846 6010D	6/4/19	6/4/19 16:20	EJB
Zinc	0.0069	0.020	0.0052	mg/L	1	J	SW-846 6010D	5/31/19	6/2/19 15:04	MJH
Hardness	230			mg/L	1		SW-846 6010	5/31/19	6/3/19 7:22	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D | Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Alkalinity	160	1.0	0.069	mg/L	1		SM21-22 2320B	5/31/19	5/31/19 12:00	DJM
Ammonia as N	ND	0.30	0.30	mg/L	1		SM19-22 4500 NH3 C	5/30/19	5/31/19 10:00	EC
Chloride	51	5.0		mg/L	5		SM21-22 4500 CL B	6/7/19	6/7/19 15:45	KMV
Phosphorus, Total	ND	0.050	0.049	mg/L	1		SM 21-22 4500 P E	5/27/19	5/27/19 14:12	AIA
Sulfate	9.5	2.0	0.92	mg/L	1		ASTM D516-11	5/28/19	5/28/19 15:40	IS
Total Organic Carbon	ND	1.0	0.73	mg/L	1		SM 5310B	6/2/19	6/2/19 15:12	DJM

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D
Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	280	10	5.9	mg/L	1		SM21-22 2540C	5/23/19	5/23/19 13:20	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY
Sample Description:
Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: MW-3D
Sampled: 5/21/2019 11:50

Sample ID: 19E1264-03

Sample Matrix: Ground Water

E300.0

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate as Nitrogen	2.78	0.05	0.01	mg/L	1		E300.0		5/23/19 21:33	PEL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Field Blank | Sampled: 5/21/2019 11:20

Sample ID: 19E1264-04

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Field Blank | Sampled: 5/21/2019 11:20

Sample ID: 19E1264-04

Sample Matrix: Field Blank

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:11	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	104	70-130		5/23/19 14:11
Toluene-d8	100	70-130		5/23/19 14:11
4-Bromofluorobenzene	98.2	70-130		5/23/19 14:11

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Trip Blank | Sampled: 5/21/2019 00:00

Sample ID: 19E1264-05

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	3.8	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Acrylonitrile	ND	5.0	0.52	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Benzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromochloromethane	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromodichloromethane	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromoform	ND	1.0	0.46	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Bromomethane	ND	2.0	0.78	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Butanone (MEK)	ND	20	1.9	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butyl Alcohol (TBA)	ND	20	4.2	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
n-Butylbenzene	ND	1.0	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
sec-Butylbenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butylbenzene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Carbon Disulfide	ND	5.0	4.4	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Carbon Tetrachloride	ND	5.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chlorobenzene	ND	1.0	0.15	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chlorodibromomethane	ND	0.50	0.21	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloroethane	ND	2.0	0.35	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloroform	ND	2.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Chloromethane	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Chlorotoluene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
4-Chlorotoluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	0.53	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dibromoethane (EDB)	ND	0.50	0.19	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Dibromomethane	ND	1.0	0.37	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichlorobenzene	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3-Dichlorobenzene	ND	1.0	0.12	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,4-Dichlorobenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,4-Dichloro-2-butene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	0.26	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichloroethane	ND	1.0	0.41	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloroethylene	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
cis-1,2-Dichloroethylene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,2-Dichloroethylene	ND	1.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3-Dichloropropane	ND	0.50	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2,2-Dichloropropane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1-Dichloropropene	ND	2.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
cis-1,3-Dichloropropene	ND	0.50	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
trans-1,3-Dichloropropene	ND	0.50	0.23	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Diethyl Ether	ND	2.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Cortlandville, NY | Sample Description: | Work Order: 19E1264

Date Received: 5/22/2019

Field Sample #: Trip Blank | Sampled: 5/21/2019 00:00

Sample ID: 19E1264-05

Sample Matrix: Trip Blank Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Diisopropyl Ether (DIPE)	ND	0.50	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,4-Dioxane	ND	50	22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Ethylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Hexachlorobutadiene	ND	0.60	0.47	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
2-Hexanone (MBK)	ND	10	1.5	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Isopropylbenzene (Cumene)	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl Acetate	ND	1.0	0.42	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methyl Cyclohexane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Methylene Chloride	ND	5.0	0.34	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	1.7	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Naphthalene	ND	2.0	0.31	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
n-Propylbenzene	ND	1.0	0.13	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Styrene	ND	1.0	0.11	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	0.27	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	0.22	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Tetrachloroethylene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Tetrahydrofuran	ND	10	0.51	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Toluene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,3-Trichlorobenzene	ND	5.0	0.57	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,4-Trichlorobenzene	ND	1.0	0.40	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3,5-Trichlorobenzene	ND	1.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,1-Trichloroethane	ND	1.0	0.20	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2-Trichloroethane	ND	1.0	0.16	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Trichloroethylene	ND	1.0	0.24	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	0.33	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,3-Trichloropropane	ND	2.0	0.25	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	0.32	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,2,4-Trimethylbenzene	ND	1.0	0.18	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
1,3,5-Trimethylbenzene	ND	1.0	0.14	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
Vinyl Chloride	ND	2.0	0.45	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
m+p Xylene	ND	2.0	0.30	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH
o-Xylene	ND	1.0	0.17	µg/L	1		SW-846 8260C	5/23/19	5/23/19 14:38	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	102	70-130		5/23/19 14:38
Toluene-d8	99.3	70-130		5/23/19 14:38
4-Bromofluorobenzene	98.4	70-130		5/23/19 14:38

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

ASTM D516-11

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231851	100	100	05/28/19
19E1264-02 [MW-3S]	B231851	100	100	05/28/19
19E1264-03 [MW-3D]	B231851	100	100	05/28/19

SM 21-22 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231762	50.0	50.0	05/27/19
19E1264-02 [MW-3S]	B231762	50.0	50.0	05/27/19
19E1264-03 [MW-3D]	B231762	50.0	50.0	05/27/19

SM 5310B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232246	50.0	50.0	06/02/19
19E1264-02 [MW-3S]	B232246	50.0	50.0	06/02/19
19E1264-03 [MW-3D]	B232246	50.0	50.0	06/02/19

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-03 [MW-3D]	B232034	100	100	05/30/19

SM19-22 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232285	100	100	06/03/19
19E1264-02 [MW-3S]	B232285	100	100	06/03/19

SM21-22 2320B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232197	100	100	05/31/19
19E1264-02 [MW-3S]	B232197	100	100	05/31/19
19E1264-03 [MW-3D]	B232197	100	100	05/31/19

SM21-22 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
19E1264-01 [MW-01]	B231560	50.0	05/23/19
19E1264-02 [MW-3S]	B231560	50.0	05/23/19
19E1264-03 [MW-3D]	B231560	50.0	05/23/19

SM21-22 4500 CL B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

SM21-22 4500 CL B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232845	100	100	06/07/19
19E1264-02 [MW-3S]	B232845	100	100	06/07/19
19E1264-03 [MW-3D]	B232845	100	100	06/07/19

Prep Method: SW-846 3005A-SW-846 6010

Lab Number [Field ID]	Batch	Initial [mL]	Date
19E1264-01 [MW-01]	B232189	50.0	05/31/19
19E1264-02 [MW-3S]	B232189	50.0	05/31/19
19E1264-03 [MW-3D]	B232189	50.0	05/31/19

Prep Method: SW-846 3005A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B232189	50.0	50.0	05/31/19
19E1264-02 [MW-3S]	B232189	50.0	50.0	05/31/19
19E1264-03 [MW-3D]	B232189	50.0	50.0	05/31/19

Prep Method: SW-846 3015A-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01RE1 [MW-01]	B232424	45.0	50.0	06/04/19
19E1264-02RE1 [MW-3S]	B232424	45.0	50.0	06/04/19
19E1264-03RE1 [MW-3D]	B232424	45.0	50.0	06/04/19

Prep Method: SW-846 7470A Prep-SW-846 7470A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231628	6.00	6.00	05/23/19
19E1264-02 [MW-3S]	B231628	6.00	6.00	05/23/19
19E1264-03 [MW-3D]	B231628	6.00	6.00	05/23/19

Prep Method: SW-846 3510C-SW-846 8081B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231811	140	2.00	05/28/19
19E1264-02 [MW-3S]	B231811	135	2.00	05/28/19
19E1264-03 [MW-3D]	B231811	140	2.00	05/28/19

Prep Method: SW-846 3510C-SW-846 8151A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231543	980	5.00	05/23/19
19E1264-02 [MW-3S]	B231543	1020	5.00	05/23/19
19E1264-03 [MW-3D]	B231543	1050	5.00	05/23/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-04 [Field Blank]	B231545	5	5.00	05/23/19
19E1264-05 [Trip Blank]	B231545	5	5.00	05/23/19

Prep Method: SW-846 5030B-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231691	5	5.00	05/24/19
19E1264-02 [MW-3S]	B231691	5	5.00	05/24/19
19E1264-03 [MW-3D]	B231691	5	5.00	05/24/19

Prep Method: SW-846 3510C-SW-846 8270D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
19E1264-01 [MW-01]	B231813	1000	1.00	05/28/19
19E1264-02 [MW-3S]	B231813	1000	1.00	05/28/19
19E1264-03 [MW-3D]	B231813	930	1.00	05/28/19

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231545 - SW-846 5030B										
Blank (B231545-BLK1)				Prepared & Analyzed: 05/23/19						
Acetone	ND	50	µg/L							
Acrylonitrile	ND	5.0	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	0.50	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B											
Blank (B231545-BLK1)				Prepared & Analyzed: 05/23/19							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L								
Methyl Cyclohexane	ND	1.0	µg/L								
Methylene Chloride	ND	5.0	µg/L								
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L								
Naphthalene	ND	2.0	µg/L								
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*26.3*		µg/L	25.0		105	70-130				
Surrogate: Toluene-d8	*24.8*		µg/L	25.0		99.2	70-130				
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100	70-130				
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19							
Acetone	160	50	µg/L	100		160	70-160				†
Acrylonitrile	9.79	5.0	µg/L	10.0		97.9	70-130				
tert-Amyl Methyl Ether (TAME)	10.2	0.50	µg/L	10.0		102	70-130				
Benzene	10.6	1.0	µg/L	10.0		106	70-130				
Bromobenzene	10.4	1.0	µg/L	10.0		104	70-130				
Bromochloromethane	11.6	1.0	µg/L	10.0		116	70-130				
Bromodichloromethane	10.8	0.50	µg/L	10.0		108	70-130				
Bromoform	9.92	1.0	µg/L	10.0		99.2	70-130				
Bromomethane	7.36	2.0	µg/L	10.0		73.6	40-160			V-20	†
2-Butanone (MEK)	119	20	µg/L	100		119	40-160				†
tert-Butyl Alcohol (TBA)	90.7	20	µg/L	100		90.7	40-160				†
n-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
sec-Butylbenzene	11.2	1.0	µg/L	10.0		112	70-130				
tert-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
tert-Butyl Ethyl Ether (TBEE)	9.87	0.50	µg/L	10.0		98.7	70-130				
Carbon Disulfide	11.8	5.0	µg/L	10.0		118	70-130				
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130				
Chlorobenzene	10.6	1.0	µg/L	10.0		106	70-130				
Chlorodibromomethane	10.0	0.50	µg/L	10.0		100	70-130				
Chloroethane	10.6	2.0	µg/L	10.0		106	70-130				
Chloroform	10.7	2.0	µg/L	10.0		107	70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B												
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19								
Chloromethane	9.52	2.0	µg/L	10.0		95.2		40-160			V-20	†
2-Chlorotoluene	10.6	1.0	µg/L	10.0		106		70-130				
4-Chlorotoluene	10.6	1.0	µg/L	10.0		106		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	10.4	5.0	µg/L	10.0		104		70-130				
1,2-Dibromoethane (EDB)	10.8	0.50	µg/L	10.0		108		70-130				
Dibromomethane	10.7	1.0	µg/L	10.0		107		70-130				
1,2-Dichlorobenzene	11.3	1.0	µg/L	10.0		113		70-130				
1,3-Dichlorobenzene	11.3	1.0	µg/L	10.0		113		70-130				
1,4-Dichlorobenzene	10.8	1.0	µg/L	10.0		108		70-130				
trans-1,4-Dichloro-2-butene	10.2	2.0	µg/L	10.0		102		70-130				
Dichlorodifluoromethane (Freon 12)	10.3	2.0	µg/L	10.0		103		40-160				†
1,1-Dichloroethane	11.0	1.0	µg/L	10.0		110		70-130				
1,2-Dichloroethane	10.7	1.0	µg/L	10.0		107		70-130				
1,1-Dichloroethylene	11.2	1.0	µg/L	10.0		112		70-130				
cis-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
trans-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107		70-130				
1,2-Dichloropropane	10.8	1.0	µg/L	10.0		108		70-130				
1,3-Dichloropropane	10.3	0.50	µg/L	10.0		103		70-130				
2,2-Dichloropropane	9.69	1.0	µg/L	10.0		96.9		40-130				†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107		70-130				
cis-1,3-Dichloropropene	10.2	0.50	µg/L	10.0		102		70-130				
trans-1,3-Dichloropropene	10.4	0.50	µg/L	10.0		104		70-130				
Diethyl Ether	10.4	2.0	µg/L	10.0		104		70-130				
Diisopropyl Ether (DIPE)	10.6	0.50	µg/L	10.0		106		70-130				
1,4-Dioxane	95.2	50	µg/L	100		95.2		40-130				†
Ethylbenzene	10.5	1.0	µg/L	10.0		105		70-130				
Hexachlorobutadiene	11.3	0.60	µg/L	10.0		113		70-130				
2-Hexanone (MBK)	111	10	µg/L	100		111		70-160				†
Isopropylbenzene (Cumene)	10.8	1.0	µg/L	10.0		108		70-130				
p-Isopropyltoluene (p-Cymene)	11.0	1.0	µg/L	10.0		110		70-130				
Methyl Acetate	13.1	1.0	µg/L	10.0		**131**	*	70-130			L-02	
Methyl tert-Butyl Ether (MTBE)	11.0	1.0	µg/L	10.0		110		70-130				
Methyl Cyclohexane	11.1	1.0	µg/L	10.0		111		70-130				
Methylene Chloride	10.3	5.0	µg/L	10.0		103		70-130				
4-Methyl-2-pentanone (MIBK)	103	10	µg/L	100		103		70-160				†
Naphthalene	10.9	2.0	µg/L	10.0		109		40-130				†
n-Propylbenzene	10.8	1.0	µg/L	10.0		108		70-130				
Styrene	10.4	1.0	µg/L	10.0		104		70-130				
1,1,1,2-Tetrachloroethane	10.6	1.0	µg/L	10.0		106		70-130				
1,1,2,2-Tetrachloroethane	10.6	0.50	µg/L	10.0		106		70-130				
Tetrachloroethylene	11.1	1.0	µg/L	10.0		111		70-130				
Tetrahydrofuran	11.2	10	µg/L	10.0		112		70-130				
Toluene	10.9	1.0	µg/L	10.0		109		70-130				
1,2,3-Trichlorobenzene	11.1	5.0	µg/L	10.0		111		70-130				
1,2,4-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130				
1,3,5-Trichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130				
1,1,1-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130				
1,1,2-Trichloroethane	11.4	1.0	µg/L	10.0		114		70-130				
Trichloroethylene	11.4	1.0	µg/L	10.0		114		70-130				
Trichlorofluoromethane (Freon 11)	9.93	2.0	µg/L	10.0		99.3		70-130				
1,2,3-Trichloropropane	10.3	2.0	µg/L	10.0		103		70-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B											
LCS (B231545-BS1)				Prepared & Analyzed: 05/23/19							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.2	1.0	µg/L	10.0		112	70-130				
1,2,4-Trimethylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
1,3,5-Trimethylbenzene	10.6	1.0	µg/L	10.0		106	70-130				
Vinyl Chloride	9.68	2.0	µg/L	10.0		96.8	40-160				†
m+p Xylene	21.3	2.0	µg/L	20.0		106	70-130				
o-Xylene	10.8	1.0	µg/L	10.0		108	70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.7*		µg/L	25.0		103	70-130				
Surrogate: Toluene-d8	*25.4*		µg/L	25.0		101	70-130				
Surrogate: 4-Bromofluorobenzene	*24.9*		µg/L	25.0		99.5	70-130				
LCS Dup (B231545-BSD1)				Prepared & Analyzed: 05/23/19							
Acetone	160	50	µg/L	100		160	70-160	0.400	25		†
Acrylonitrile	10.6	5.0	µg/L	10.0		106	70-130	7.47	25		
tert-Amyl Methyl Ether (TAME)	10.5	0.50	µg/L	10.0		105	70-130	2.13	25		
Benzene	10.4	1.0	µg/L	10.0		104	70-130	1.71	25		
Bromobenzene	10.3	1.0	µg/L	10.0		103	70-130	1.06	25		
Bromochloromethane	11.4	1.0	µg/L	10.0		114	70-130	1.83	25		
Bromodichloromethane	10.5	0.50	µg/L	10.0		105	70-130	2.35	25		
Bromoform	9.58	1.0	µg/L	10.0		95.8	70-130	3.49	25		
Bromomethane	8.30	2.0	µg/L	10.0		83.0	40-160	12.0	25	V-20	†
2-Butanone (MEK)	123	20	µg/L	100		123	40-160	2.65	25		†
tert-Butyl Alcohol (TBA)	95.2	20	µg/L	100		95.2	40-160	4.83	25		†
n-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130	0.183	25		
sec-Butylbenzene	11.2	1.0	µg/L	10.0		112	70-130	0.445	25		
tert-Butylbenzene	10.8	1.0	µg/L	10.0		108	70-130	0.644	25		
tert-Butyl Ethyl Ether (TBEE)	10.0	0.50	µg/L	10.0		100	70-130	1.71	25		
Carbon Disulfide	11.4	5.0	µg/L	10.0		114	70-130	3.27	25		
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130	0.00	25		
Chlorobenzene	10.5	1.0	µg/L	10.0		105	70-130	0.945	25		
Chlorodibromomethane	9.79	0.50	µg/L	10.0		97.9	70-130	2.32	25		
Chloroethane	10.4	2.0	µg/L	10.0		104	70-130	1.34	25		
Chloroform	10.5	2.0	µg/L	10.0		105	70-130	1.42	25		
Chloromethane	9.93	2.0	µg/L	10.0		99.3	40-160	4.22	25	V-20	†
2-Chlorotoluene	10.7	1.0	µg/L	10.0		107	70-130	0.844	25		
4-Chlorotoluene	10.9	1.0	µg/L	10.0		109	70-130	2.14	25		
1,2-Dibromo-3-chloropropane (DBCP)	11.6	5.0	µg/L	10.0		116	70-130	10.8	25		
1,2-Dibromoethane (EDB)	11.0	0.50	µg/L	10.0		110	70-130	1.93	25		
Dibromomethane	10.3	1.0	µg/L	10.0		103	70-130	4.38	25		
1,2-Dichlorobenzene	11.2	1.0	µg/L	10.0		112	70-130	0.801	25		
1,3-Dichlorobenzene	11.4	1.0	µg/L	10.0		114	70-130	0.967	25		
1,4-Dichlorobenzene	11.2	1.0	µg/L	10.0		112	70-130	3.00	25		
trans-1,4-Dichloro-2-butene	10.5	2.0	µg/L	10.0		105	70-130	3.57	25		
Dichlorodifluoromethane (Freon 12)	9.93	2.0	µg/L	10.0		99.3	40-160	3.66	25		†
1,1-Dichloroethane	10.7	1.0	µg/L	10.0		107	70-130	2.22	25		
1,2-Dichloroethane	10.6	1.0	µg/L	10.0		106	70-130	0.848	25		
1,1-Dichloroethylene	11.1	1.0	µg/L	10.0		111	70-130	0.810	25		
cis-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108	70-130	0.371	25		
trans-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107	70-130	0.375	25		
1,2-Dichloropropane	10.5	1.0	µg/L	10.0		105	70-130	3.47	25		
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104	70-130	0.771	25		
2,2-Dichloropropane	9.44	1.0	µg/L	10.0		94.4	40-130	2.61	25		†
1,1-Dichloropropene	10.7	2.0	µg/L	10.0		107	70-130	0.187	25		

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231545 - SW-846 5030B												
LCS Dup (B231545-BSD1)				Prepared & Analyzed: 05/23/19								
cis-1,3-Dichloropropene	10.0	0.50	µg/L	10.0		100		70-130	1.68	25		
trans-1,3-Dichloropropene	10.0	0.50	µg/L	10.0		100		70-130	3.34	25		
Diethyl Ether	10.5	2.0	µg/L	10.0		105		70-130	0.575	25		
Diisopropyl Ether (DIPE)	10.5	0.50	µg/L	10.0		105		70-130	0.285	25		
1,4-Dioxane	107	50	µg/L	100		107		40-130	11.9	50		† ‡
Ethylbenzene	10.4	1.0	µg/L	10.0		104		70-130	1.53	25		
Hexachlorobutadiene	11.8	0.60	µg/L	10.0		118		70-130	4.57	25		
2-Hexanone (MBK)	111	10	µg/L	100		111		70-160	0.595	25		†
Isopropylbenzene (Cumene)	10.7	1.0	µg/L	10.0		107		70-130	1.67	25		
p-Isopropyltoluene (p-Cymene)	10.9	1.0	µg/L	10.0		109		70-130	0.640	25		
Methyl Acetate	13.4	1.0	µg/L	10.0		**134**	*	70-130	2.19	25	L-02	
Methyl tert-Butyl Ether (MTBE)	10.9	1.0	µg/L	10.0		109		70-130	0.913	25		
Methyl Cyclohexane	10.5	1.0	µg/L	10.0		105		70-130	5.00	25		
Methylene Chloride	10.7	5.0	µg/L	10.0		107		70-130	4.29	25		
4-Methyl-2-pentanone (MIBK)	105	10	µg/L	100		105		70-160	2.13	25		†
Naphthalene	11.1	2.0	µg/L	10.0		111		40-130	2.45	25		†
n-Propylbenzene	10.7	1.0	µg/L	10.0		107		70-130	0.835	25		
Styrene	10.5	1.0	µg/L	10.0		105		70-130	0.573	25		
1,1,1,2-Tetrachloroethane	10.5	1.0	µg/L	10.0		105		70-130	0.475	25		
1,1,2,2-Tetrachloroethane	11.1	0.50	µg/L	10.0		111		70-130	3.87	25		
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107		70-130	3.77	25		
Tetrahydrofuran	11.4	10	µg/L	10.0		114		70-130	1.51	25		
Toluene	10.4	1.0	µg/L	10.0		104		70-130	4.23	25		
1,2,3-Trichlorobenzene	11.0	5.0	µg/L	10.0		110		70-130	0.452	25		
1,2,4-Trichlorobenzene	11.0	1.0	µg/L	10.0		110		70-130	0.545	25		
1,3,5-Trichlorobenzene	10.6	1.0	µg/L	10.0		106		70-130	0.284	25		
1,1,1-Trichloroethane	10.8	1.0	µg/L	10.0		108		70-130	0.184	25		
1,1,2-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130	4.13	25		
Trichloroethylene	10.8	1.0	µg/L	10.0		108		70-130	4.96	25		
Trichlorofluoromethane (Freon 11)	9.78	2.0	µg/L	10.0		97.8		70-130	1.52	25		
1,2,3-Trichloropropane	10.4	2.0	µg/L	10.0		104		70-130	1.06	25		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.8	1.0	µg/L	10.0		108		70-130	3.37	25		
1,2,4-Trimethylbenzene	10.6	1.0	µg/L	10.0		106		70-130	2.04	25		
1,3,5-Trimethylbenzene	10.6	1.0	µg/L	10.0		106		70-130	0.378	25		
Vinyl Chloride	9.93	2.0	µg/L	10.0		99.3		40-160	2.55	25		†
m+p Xylene	21.3	2.0	µg/L	20.0		106		70-130	0.00	25		
o-Xylene	11.0	1.0	µg/L	10.0		110		70-130	1.56	25		
Surrogate: 1,2-Dichloroethane-d4	*25.8*		µg/L	25.0		103		70-130				
Surrogate: Toluene-d8	*24.7*		µg/L	25.0		98.8		70-130				
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.4		70-130				
Batch B231691 - SW-846 5030B												
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Acetone	ND	50	µg/L									
Acrylonitrile	ND	5.0	µg/L									
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L									
Benzene	ND	1.0	µg/L									
Bromobenzene	ND	1.0	µg/L									
Bromochloromethane	ND	1.0	µg/L									
Bromodichloromethane	ND	0.50	µg/L									
Bromoform	ND	1.0	µg/L									

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231691 - SW-846 5030B										
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19						
Bromomethane	ND	2.0	µg/L							R-05
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
n-Butylbenzene	ND	1.0	µg/L							V-05
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	5.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							V-05
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							V-05
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							V-05
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							V-05
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl Acetate	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							
Methyl Cyclohexane	ND	1.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L							
Naphthalene	0.32	2.0	µg/L							J
n-Propylbenzene	ND	1.0	µg/L							
Styrene	ND	1.0	µg/L							
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L							

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231691 - SW-846 5030B											
Blank (B231691-BLK1)				Prepared: 05/24/19 Analyzed: 05/25/19							
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*26.4*		µg/L	25.0		106	70-130				
Surrogate: Toluene-d8	*26.1*		µg/L	25.0		105	70-130				
Surrogate: 4-Bromofluorobenzene	*24.4*		µg/L	25.0		97.4	70-130				
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19							
Acetone	132	50	µg/L	100		132	70-160				†
Acrylonitrile	11.3	5.0	µg/L	10.0		113	70-130				
tert-Amyl Methyl Ether (TAME)	8.66	0.50	µg/L	10.0		86.6	70-130				
Benzene	9.72	1.0	µg/L	10.0		97.2	70-130				
Bromobenzene	9.74	1.0	µg/L	10.0		97.4	70-130				
Bromochloromethane	11.0	1.0	µg/L	10.0		110	70-130				
Bromodichloromethane	9.65	0.50	µg/L	10.0		96.5	70-130				
Bromoform	8.74	1.0	µg/L	10.0		87.4	70-130				
Bromomethane	4.84	2.0	µg/L	10.0		48.4	40-160			R-05	†
2-Butanone (MEK)	110	20	µg/L	100		110	40-160				†
tert-Butyl Alcohol (TBA)	104	20	µg/L	100		104	40-160				†
n-Butylbenzene	7.99	1.0	µg/L	10.0		79.9	70-130			V-05	
sec-Butylbenzene	8.54	1.0	µg/L	10.0		85.4	70-130				
tert-Butylbenzene	8.48	1.0	µg/L	10.0		84.8	70-130				
tert-Butyl Ethyl Ether (TBEE)	8.87	0.50	µg/L	10.0		88.7	70-130				
Carbon Disulfide	10.5	5.0	µg/L	10.0		105	70-130			V-36	
Carbon Tetrachloride	10.2	5.0	µg/L	10.0		102	70-130				
Chlorobenzene	10.0	1.0	µg/L	10.0		100	70-130				
Chlorodibromomethane	10.3	0.50	µg/L	10.0		103	70-130				
Chloroethane	10.5	2.0	µg/L	10.0		105	70-130				
Chloroform	9.92	2.0	µg/L	10.0		99.2	70-130				
Chloromethane	6.93	2.0	µg/L	10.0		69.3	40-160			V-05	†
2-Chlorotoluene	9.65	1.0	µg/L	10.0		96.5	70-130				
4-Chlorotoluene	9.32	1.0	µg/L	10.0		93.2	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	9.31	5.0	µg/L	10.0		93.1	70-130				
1,2-Dibromoethane (EDB)	9.97	0.50	µg/L	10.0		99.7	70-130				
Dibromomethane	11.0	1.0	µg/L	10.0		110	70-130				
1,2-Dichlorobenzene	9.61	1.0	µg/L	10.0		96.1	70-130				
1,3-Dichlorobenzene	9.39	1.0	µg/L	10.0		93.9	70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B231691 - SW-846 5030B												
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19								
1,4-Dichlorobenzene	9.27	1.0	µg/L	10.0		92.7		70-130				
trans-1,4-Dichloro-2-butene	8.17	2.0	µg/L	10.0		81.7		70-130			V-05	
Dichlorodifluoromethane (Freon 12)	9.94	2.0	µg/L	10.0		99.4		40-160				†
1,1-Dichloroethane	10.0	1.0	µg/L	10.0		100		70-130				
1,2-Dichloroethane	10.8	1.0	µg/L	10.0		108		70-130				
1,1-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
cis-1,2-Dichloroethylene	9.80	1.0	µg/L	10.0		98.0		70-130				
trans-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
1,2-Dichloropropane	9.92	1.0	µg/L	10.0		99.2		70-130				
1,3-Dichloropropane	9.95	0.50	µg/L	10.0		99.5		70-130				
2,2-Dichloropropane	6.25	1.0	µg/L	10.0		62.5		40-130			V-05	†
1,1-Dichloropropene	9.86	2.0	µg/L	10.0		98.6		70-130				
cis-1,3-Dichloropropene	8.49	0.50	µg/L	10.0		84.9		70-130				
trans-1,3-Dichloropropene	8.18	0.50	µg/L	10.0		81.8		70-130			V-05	
Diethyl Ether	10.9	2.0	µg/L	10.0		109		70-130				
Diisopropyl Ether (DIPE)	9.88	0.50	µg/L	10.0		98.8		70-130				
1,4-Dioxane	125	50	µg/L	100		125		40-130				†
Ethylbenzene	9.66	1.0	µg/L	10.0		96.6		70-130				
Hexachlorobutadiene	9.68	0.60	µg/L	10.0		96.8		70-130				
2-Hexanone (MBK)	107	10	µg/L	100		107		70-160				†
Isopropylbenzene (Cumene)	9.73	1.0	µg/L	10.0		97.3		70-130				
p-Isopropyltoluene (p-Cymene)	8.46	1.0	µg/L	10.0		84.6		70-130				
Methyl Acetate	13.8	1.0	µg/L	10.0		**138**	*	70-130			L-07	
Methyl tert-Butyl Ether (MTBE)	9.69	1.0	µg/L	10.0		96.9		70-130				
Methyl Cyclohexane	10.4	1.0	µg/L	10.0		104		70-130				
Methylene Chloride	10.2	5.0	µg/L	10.0		102		70-130				
4-Methyl-2-pentanone (MIBK)	108	10	µg/L	100		108		70-160				†
Naphthalene	9.65	2.0	µg/L	10.0		96.5		40-130				†
n-Propylbenzene	9.25	1.0	µg/L	10.0		92.5		70-130				
Styrene	9.56	1.0	µg/L	10.0		95.6		70-130				
1,1,1,2-Tetrachloroethane	9.44	1.0	µg/L	10.0		94.4		70-130				
1,1,2,2-Tetrachloroethane	9.96	0.50	µg/L	10.0		99.6		70-130				
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107		70-130				
Tetrahydrofuran	10.6	10	µg/L	10.0		106		70-130				
Toluene	9.91	1.0	µg/L	10.0		99.1		70-130				
1,2,3-Trichlorobenzene	9.67	5.0	µg/L	10.0		96.7		70-130				
1,2,4-Trichlorobenzene	9.16	1.0	µg/L	10.0		91.6		70-130				
1,3,5-Trichlorobenzene	9.17	1.0	µg/L	10.0		91.7		70-130				
1,1,1-Trichloroethane	9.84	1.0	µg/L	10.0		98.4		70-130				
1,1,2-Trichloroethane	10.1	1.0	µg/L	10.0		101		70-130				
Trichloroethylene	10.4	1.0	µg/L	10.0		104		70-130				
Trichlorofluoromethane (Freon 11)	9.98	2.0	µg/L	10.0		99.8		70-130				
1,2,3-Trichloropropane	9.88	2.0	µg/L	10.0		98.8		70-130				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12.0	1.0	µg/L	10.0		120		70-130				
1,2,4-Trimethylbenzene	8.39	1.0	µg/L	10.0		83.9		70-130				
1,3,5-Trimethylbenzene	8.90	1.0	µg/L	10.0		89.0		70-130				
Vinyl Chloride	9.29	2.0	µg/L	10.0		92.9		40-160				†
m+p Xylene	19.2	2.0	µg/L	20.0		96.0		70-130				
o-Xylene	9.54	1.0	µg/L	10.0		95.4		70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.2*		µg/L	25.0		101		70-130				
Surrogate: Toluene-d8	*25.2*		µg/L	25.0		101		70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes	
Batch B231691 - SW-846 5030B												
LCS (B231691-BS1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		100	70-130					
LCS Dup (B231691-BSD1)				Prepared: 05/24/19 Analyzed: 05/25/19								
Acetone	115	50	µg/L	100		115	70-160	13.9		25		†
Acrylonitrile	10.6	5.0	µg/L	10.0		106	70-130	5.75		25		
tert-Amyl Methyl Ether (TAME)	8.40	0.50	µg/L	10.0		84.0	70-130	3.05		25		
Benzene	9.19	1.0	µg/L	10.0		91.9	70-130	5.61		25		
Bromobenzene	9.48	1.0	µg/L	10.0		94.8	70-130	2.71		25		
Bromochloromethane	10.7	1.0	µg/L	10.0		107	70-130	3.41		25		
Bromodichloromethane	9.35	0.50	µg/L	10.0		93.5	70-130	3.16		25		
Bromoform	8.47	1.0	µg/L	10.0		84.7	70-130	3.14		25		
Bromomethane	6.28	2.0	µg/L	10.0		62.8	40-160	**25.9**	*	25	R-05	†
2-Butanone (MEK)	102	20	µg/L	100		102	40-160	8.36		25		†
tert-Butyl Alcohol (TBA)	94.5	20	µg/L	100		94.5	40-160	9.25		25		†
n-Butylbenzene	8.10	1.0	µg/L	10.0		81.0	70-130	1.37		25	V-05	
sec-Butylbenzene	8.49	1.0	µg/L	10.0		84.9	70-130	0.587		25		
tert-Butylbenzene	8.53	1.0	µg/L	10.0		85.3	70-130	0.588		25		
tert-Butyl Ethyl Ether (TBEE)	8.41	0.50	µg/L	10.0		84.1	70-130	5.32		25		
Carbon Disulfide	9.94	5.0	µg/L	10.0		99.4	70-130	5.48		25	V-36	
Carbon Tetrachloride	9.56	5.0	µg/L	10.0		95.6	70-130	6.87		25		
Chlorobenzene	9.97	1.0	µg/L	10.0		99.7	70-130	0.500		25		
Chlorodibromomethane	9.80	0.50	µg/L	10.0		98.0	70-130	4.59		25		
Chloroethane	9.72	2.0	µg/L	10.0		97.2	70-130	8.00		25		
Chloroform	9.57	2.0	µg/L	10.0		95.7	70-130	3.59		25		
Chloromethane	6.73	2.0	µg/L	10.0		67.3	40-160	2.93		25	V-05	†
2-Chlorotoluene	9.50	1.0	µg/L	10.0		95.0	70-130	1.57		25		
4-Chlorotoluene	9.31	1.0	µg/L	10.0		93.1	70-130	0.107		25		
1,2-Dibromo-3-chloropropane (DBCP)	9.23	5.0	µg/L	10.0		92.3	70-130	0.863		25		
1,2-Dibromoethane (EDB)	9.65	0.50	µg/L	10.0		96.5	70-130	3.26		25		
Dibromomethane	10.6	1.0	µg/L	10.0		106	70-130	4.44		25		
1,2-Dichlorobenzene	9.50	1.0	µg/L	10.0		95.0	70-130	1.15		25		
1,3-Dichlorobenzene	9.40	1.0	µg/L	10.0		94.0	70-130	0.106		25		
1,4-Dichlorobenzene	9.22	1.0	µg/L	10.0		92.2	70-130	0.541		25		
trans-1,4-Dichloro-2-butene	7.88	2.0	µg/L	10.0		78.8	70-130	3.61		25	V-05	
Dichlorodifluoromethane (Freon 12)	9.83	2.0	µg/L	10.0		98.3	40-160	1.11		25		†
1,1-Dichloroethane	9.75	1.0	µg/L	10.0		97.5	70-130	2.73		25		
1,2-Dichloroethane	10.4	1.0	µg/L	10.0		104	70-130	3.58		25		
1,1-Dichloroethylene	10.2	1.0	µg/L	10.0		102	70-130	5.62		25		
cis-1,2-Dichloroethylene	9.24	1.0	µg/L	10.0		92.4	70-130	5.88		25		
trans-1,2-Dichloroethylene	10.2	1.0	µg/L	10.0		102	70-130	5.92		25		
1,2-Dichloropropane	9.99	1.0	µg/L	10.0		99.9	70-130	0.703		25		
1,3-Dichloropropane	9.68	0.50	µg/L	10.0		96.8	70-130	2.75		25		
2,2-Dichloropropane	5.94	1.0	µg/L	10.0		59.4	40-130	5.09		25	V-05	†
1,1-Dichloropropene	9.24	2.0	µg/L	10.0		92.4	70-130	6.49		25		
cis-1,3-Dichloropropene	8.34	0.50	µg/L	10.0		83.4	70-130	1.78		25		
trans-1,3-Dichloropropene	7.90	0.50	µg/L	10.0		79.0	70-130	3.48		25	V-05	
Diethyl Ether	10.6	2.0	µg/L	10.0		106	70-130	2.61		25		
Diisopropyl Ether (DIPE)	9.41	0.50	µg/L	10.0		94.1	70-130	4.87		25		
1,4-Dioxane	118	50	µg/L	100		118	40-130	6.28		50		† ‡
Ethylbenzene	9.45	1.0	µg/L	10.0		94.5	70-130	2.20		25		
Hexachlorobutadiene	9.66	0.60	µg/L	10.0		96.6	70-130	0.207		25		
2-Hexanone (MBK)	100	10	µg/L	100		100	70-160	6.61		25		†

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231691 - SW-846 5030B										
LCS Dup (B231691-BSD1)				Prepared: 05/24/19 Analyzed: 05/25/19						
Isopropylbenzene (Cumene)	9.60	1.0	µg/L	10.0		96.0	70-130	1.35	25	
p-Isopropyltoluene (p-Cymene)	8.37	1.0	µg/L	10.0		83.7	70-130	1.07	25	
Methyl Acetate	13.0	1.0	µg/L	10.0		130	70-130	5.45	25	
Methyl tert-Butyl Ether (MTBE)	9.26	1.0	µg/L	10.0		92.6	70-130	4.54	25	
Methyl Cyclohexane	10.7	1.0	µg/L	10.0		107	70-130	3.23	25	
Methylene Chloride	9.90	5.0	µg/L	10.0		99.0	70-130	3.38	25	
4-Methyl-2-pentanone (MIBK)	100	10	µg/L	100		100	70-160	7.99	25	†
Naphthalene	9.51	2.0	µg/L	10.0		95.1	40-130	1.46	25	†
n-Propylbenzene	9.22	1.0	µg/L	10.0		92.2	70-130	0.325	25	
Styrene	9.27	1.0	µg/L	10.0		92.7	70-130	3.08	25	
1,1,1,2-Tetrachloroethane	9.25	1.0	µg/L	10.0		92.5	70-130	2.03	25	
1,1,2,2-Tetrachloroethane	9.68	0.50	µg/L	10.0		96.8	70-130	2.85	25	
Tetrachloroethylene	10.7	1.0	µg/L	10.0		107	70-130	0.374	25	
Tetrahydrofuran	10.1	10	µg/L	10.0		101	70-130	4.72	25	
Toluene	9.51	1.0	µg/L	10.0		95.1	70-130	4.12	25	
1,2,3-Trichlorobenzene	9.97	5.0	µg/L	10.0		99.7	70-130	3.05	25	
1,2,4-Trichlorobenzene	9.47	1.0	µg/L	10.0		94.7	70-130	3.33	25	
1,3,5-Trichlorobenzene	9.08	1.0	µg/L	10.0		90.8	70-130	0.986	25	
1,1,1-Trichloroethane	9.37	1.0	µg/L	10.0		93.7	70-130	4.89	25	
1,1,2-Trichloroethane	9.75	1.0	µg/L	10.0		97.5	70-130	3.82	25	
Trichloroethylene	9.75	1.0	µg/L	10.0		97.5	70-130	6.55	25	
Trichlorofluoromethane (Freon 11)	9.40	2.0	µg/L	10.0		94.0	70-130	5.99	25	
1,2,3-Trichloropropane	9.57	2.0	µg/L	10.0		95.7	70-130	3.19	25	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.8	1.0	µg/L	10.0		118	70-130	1.09	25	
1,2,4-Trimethylbenzene	8.41	1.0	µg/L	10.0		84.1	70-130	0.238	25	
1,3,5-Trimethylbenzene	8.69	1.0	µg/L	10.0		86.9	70-130	2.39	25	
Vinyl Chloride	8.95	2.0	µg/L	10.0		89.5	40-160	3.73	25	†
m+p Xylene	18.9	2.0	µg/L	20.0		94.6	70-130	1.42	25	
o-Xylene	9.42	1.0	µg/L	10.0		94.2	70-130	1.27	25	
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100	70-130			
Surrogate: Toluene-d8	*25.0*		µg/L	25.0		100	70-130			
Surrogate: 4-Bromofluorobenzene	*25.5*		µg/L	25.0		102	70-130			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C										
Blank (B231813-BLK1)				Prepared: 05/28/19 Analyzed: 05/30/19						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	5.0	µg/L							V-05
Anthracene	ND	5.0	µg/L							
Benzidine	ND	20	µg/L							L-05, R-05, V-04, V-05, V-35
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Benzoic Acid	ND	10	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
Carbazole	ND	10	µg/L							
4-Chloroaniline	ND	10	µg/L							V-34
4-Chloro-3-methylphenol	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							V-34
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							
Hexachloroethane	ND	10	µg/L							
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
1-Methylnaphthalene	ND	5.0	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C											
Blank (B231813-BLK1)				Prepared: 05/28/19 Analyzed: 05/30/19							
2-Methylphenol	ND	10	µg/L								
3/4-Methylphenol	ND	10	µg/L								
Naphthalene	ND	5.0	µg/L								
2-Nitroaniline	ND	10	µg/L								
3-Nitroaniline	ND	10	µg/L								
4-Nitroaniline	ND	10	µg/L								
Nitrobenzene	ND	10	µg/L								
2-Nitrophenol	ND	10	µg/L								
4-Nitrophenol	ND	10	µg/L								
N-Nitrosodimethylamine	ND	10	µg/L								
N-Nitrosodiphenylamine/Diphenylamine	ND	10	µg/L								
N-Nitrosodi-n-propylamine	ND	10	µg/L								
Pentachloronitrobenzene	ND	10	µg/L								
Pentachlorophenol	ND	10	µg/L								
Phenanthrene	ND	5.0	µg/L								
Phenol	ND	10	µg/L								
Pyrene	ND	5.0	µg/L								
Pyridine	ND	5.0	µg/L								
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L								
1,2,4-Trichlorobenzene	ND	5.0	µg/L								
2,4,5-Trichlorophenol	ND	10	µg/L								
2,4,6-Trichlorophenol	ND	10	µg/L								
Surrogate: 2-Fluorophenol	*100*		µg/L	200		50.0		15-110			
Surrogate: Phenol-d6	*72.3*		µg/L	200		36.2		15-110			
Surrogate: Nitrobenzene-d5	*67.2*		µg/L	100		67.2		30-130			
Surrogate: 2-Fluorobiphenyl	*85.0*		µg/L	100		85.0		30-130			
Surrogate: 2,4,6-Tribromophenol	*191*		µg/L	200		95.3		15-110			
Surrogate: p-Terphenyl-d14	*98.7*		µg/L	100		98.7		30-130			
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19							
Acenaphthene	40.0	5.0	µg/L	50.0		79.9		40-140			
Acenaphthylene	40.4	5.0	µg/L	50.0		80.8		40-140			
Acetophenone	38.2	10	µg/L	50.0		76.4		40-140			
Aniline	38.0	5.0	µg/L	50.0		76.1		40-140			V-05
Anthracene	43.1	5.0	µg/L	50.0		86.2		40-140			
Benzidine	93.1	20	µg/L	50.0		**186**	*	40-140			L-05, R-05, V-04, V-05, V-35
Benzo(a)anthracene	42.0	5.0	µg/L	50.0		84.0		40-140			
Benzo(a)pyrene	44.9	5.0	µg/L	50.0		89.8		40-140			
Benzo(b)fluoranthene	41.4	5.0	µg/L	50.0		82.7		40-140			
Benzo(g,h,i)perylene	48.0	5.0	µg/L	50.0		96.0		40-140			
Benzo(k)fluoranthene	42.0	5.0	µg/L	50.0		84.0		40-140			
Benzoic Acid	21.7	10	µg/L	50.0		43.4		10-130			†
Bis(2-chloroethoxy)methane	44.7	10	µg/L	50.0		89.4		40-140			
Bis(2-chloroethyl)ether	36.0	10	µg/L	50.0		72.0		40-140			
Bis(2-chloroisopropyl)ether	38.8	10	µg/L	50.0		77.5		40-140			
Bis(2-Ethylhexyl)phthalate	35.4	10	µg/L	50.0		70.8		40-140			
4-Bromophenylphenylether	42.6	10	µg/L	50.0		85.1		40-140			
Butylbenzylphthalate	39.3	10	µg/L	50.0		78.5		40-140			
Carbazole	43.9	10	µg/L	50.0		87.7		40-140			
4-Chloroaniline	43.3	10	µg/L	50.0		86.6		40-140			V-34
4-Chloro-3-methylphenol	41.0	10	µg/L	50.0		82.0		30-130			
2-Chloronaphthalene	38.7	10	µg/L	50.0		77.3		40-140			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B231813 - SW-846 3510C											
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19							
2-Chlorophenol	39.9	10	µg/L	50.0		79.8	30-130				
4-Chlorophenylphenylether	43.1	10	µg/L	50.0		86.3	40-140				
Chrysene	41.2	5.0	µg/L	50.0		82.5	40-140				
Dibenz(a,h)anthracene	42.5	5.0	µg/L	50.0		84.9	40-140				
Dibenzofuran	41.1	5.0	µg/L	50.0		82.2	40-140				
Di-n-butylphthalate	38.6	10	µg/L	50.0		77.1	40-140				
1,2-Dichlorobenzene	39.9	5.0	µg/L	50.0		79.7	40-140				
1,3-Dichlorobenzene	39.1	5.0	µg/L	50.0		78.2	40-140				
1,4-Dichlorobenzene	39.8	5.0	µg/L	50.0		79.5	40-140				
3,3-Dichlorobenzidine	51.4	10	µg/L	50.0		103	40-140			V-34	
2,4-Dichlorophenol	44.8	10	µg/L	50.0		89.6	30-130				
Diethylphthalate	39.4	10	µg/L	50.0		78.9	40-140				
2,4-Dimethylphenol	43.3	10	µg/L	50.0		86.6	30-130				
Dimethylphthalate	40.5	10	µg/L	50.0		81.1	40-140				
4,6-Dinitro-2-methylphenol	42.0	10	µg/L	50.0		83.9	30-130				
2,4-Dinitrophenol	39.3	10	µg/L	50.0		78.6	30-130				
2,4-Dinitrotoluene	44.0	10	µg/L	50.0		87.9	40-140				
2,6-Dinitrotoluene	45.8	10	µg/L	50.0		91.6	40-140				
Di-n-octylphthalate	35.7	10	µg/L	50.0		71.4	40-140				
1,2-Diphenylhydrazine/Azobenzene	35.4	10	µg/L	50.0		70.9	40-140				
Fluoranthene	44.8	5.0	µg/L	50.0		89.7	40-140				
Fluorene	42.6	5.0	µg/L	50.0		85.2	40-140				
Hexachlorobenzene	43.2	10	µg/L	50.0		86.3	40-140				
Hexachlorobutadiene	37.2	10	µg/L	50.0		74.5	40-140				
Hexachlorocyclopentadiene	35.5	10	µg/L	50.0		71.0	30-140				†
Hexachloroethane	34.6	10	µg/L	50.0		69.3	40-140				
Indeno(1,2,3-cd)pyrene	46.4	5.0	µg/L	50.0		92.8	40-140				
Isophorone	40.8	10	µg/L	50.0		81.6	40-140				
1-Methylnaphthalene	41.6	5.0	µg/L	50.0		83.2	40-140				
2-Methylnaphthalene	42.9	5.0	µg/L	50.0		85.8	40-140				
2-Methylphenol	38.6	10	µg/L	50.0		77.2	30-130				
3/4-Methylphenol	34.4	10	µg/L	50.0		68.8	30-130				
Naphthalene	40.2	5.0	µg/L	50.0		80.4	40-140				
2-Nitroaniline	32.0	10	µg/L	50.0		64.0	40-140				
3-Nitroaniline	44.2	10	µg/L	50.0		88.4	40-140				
4-Nitroaniline	48.2	10	µg/L	50.0		96.4	40-140				
Nitrobenzene	35.7	10	µg/L	50.0		71.5	40-140				
2-Nitrophenol	41.5	10	µg/L	50.0		83.0	30-130				
4-Nitrophenol	20.4	10	µg/L	50.0		40.8	10-130				†
N-Nitrosodimethylamine	22.0	10	µg/L	50.0		43.9	40-140				
N-Nitrosodiphenylamine/Diphenylamine	44.8	10	µg/L	50.0		89.7	40-140				
N-Nitrosodi-n-propylamine	34.3	10	µg/L	50.0		68.6	40-140				
Pentachloronitrobenzene	45.9	10	µg/L	50.0		91.8	40-140				
Pentachlorophenol	42.0	10	µg/L	50.0		84.0	30-130				
Phenanthrene	43.3	5.0	µg/L	50.0		86.6	40-140				
Phenol	19.6	10	µg/L	50.0		39.3	20-130				†
Pyrene	44.5	5.0	µg/L	50.0		89.0	40-140				
Pyridine	22.4	5.0	µg/L	50.0		44.7	10-140				†
1,2,4,5-Tetrachlorobenzene	38.9	10	µg/L	50.0		77.7	40-140				
1,2,4-Trichlorobenzene	42.1	5.0	µg/L	50.0		84.1	40-140				
2,4,5-Trichlorophenol	44.5	10	µg/L	50.0		89.0	30-130				
2,4,6-Trichlorophenol	41.8	10	µg/L	50.0		83.7	30-130				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes	
Batch B231813 - SW-846 3510C													
LCS (B231813-BS1)				Prepared: 05/28/19 Analyzed: 05/30/19									
Surrogate: 2-Fluorophenol	*121*		µg/L	200		60.7		15-110					
Surrogate: Phenol-d6	*86.5*		µg/L	200		43.2		15-110					
Surrogate: Nitrobenzene-d5	*77.8*		µg/L	100		77.8		30-130					
Surrogate: 2-Fluorobiphenyl	*91.5*		µg/L	100		91.5		30-130					
Surrogate: 2,4,6-Tribromophenol	*205*		µg/L	200		103		15-110					
Surrogate: p-Terphenyl-d14	*98.8*		µg/L	100		98.8		30-130					
LCS Dup (B231813-BSD1)				Prepared: 05/28/19 Analyzed: 05/30/19									
Acenaphthene	38.2	5.0	µg/L	50.0		76.5		40-140	4.43		20		
Acenaphthylene	38.8	5.0	µg/L	50.0		77.6		40-140	3.97		20		
Acetophenone	34.2	10	µg/L	50.0		68.5		40-140	10.9		20		
Aniline	34.1	5.0	µg/L	50.0		68.2		40-140	10.9		50	V-05	‡
Anthracene	41.1	5.0	µg/L	50.0		82.3		40-140	4.65		20		
Benzidine	72.8	20	µg/L	50.0		**146**	*	40-140	**24.5**	*	20	L-05, R-05, V-04, V-05, V-35	
Benzo(a)anthracene	39.6	5.0	µg/L	50.0		79.3		40-140	5.83		20		
Benzo(a)pyrene	42.2	5.0	µg/L	50.0		84.4		40-140	6.27		20		
Benzo(b)fluoranthene	39.0	5.0	µg/L	50.0		78.0		40-140	5.92		20		
Benzo(g,h,i)perylene	44.7	5.0	µg/L	50.0		89.4		40-140	7.14		20		
Benzo(k)fluoranthene	39.3	5.0	µg/L	50.0		78.5		40-140	6.72		20		
Benzoic Acid	19.2	10	µg/L	50.0		38.3		10-130	12.3		50		† ‡
Bis(2-chloroethoxy)methane	41.0	10	µg/L	50.0		82.1		40-140	8.49		20		
Bis(2-chloroethyl)ether	34.1	10	µg/L	50.0		68.2		40-140	5.45		20		
Bis(2-chloroisopropyl)ether	35.5	10	µg/L	50.0		71.0		40-140	8.83		20		
Bis(2-Ethylhexyl)phthalate	33.4	10	µg/L	50.0		66.9		40-140	5.69		20		
4-Bromophenylphenylether	40.5	10	µg/L	50.0		81.0		40-140	4.93		20		
Butylbenzylphthalate	36.7	10	µg/L	50.0		73.4		40-140	6.79		20		
Carbazole	41.6	10	µg/L	50.0		83.3		40-140	5.22		20		
4-Chloroaniline	39.6	10	µg/L	50.0		79.1		40-140	9.00		20	V-34	
4-Chloro-3-methylphenol	37.5	10	µg/L	50.0		75.0		30-130	8.94		20		
2-Chloronaphthalene	37.7	10	µg/L	50.0		75.5		40-140	2.43		20		
2-Chlorophenol	36.4	10	µg/L	50.0		72.7		30-130	9.31		20		
4-Chlorophenylphenylether	41.3	10	µg/L	50.0		82.6		40-140	4.38		20		
Chrysene	38.7	5.0	µg/L	50.0		77.4		40-140	6.33		20		
Dibenz(a,h)anthracene	41.8	5.0	µg/L	50.0		83.6		40-140	1.57		20		
Dibenzofuran	39.4	5.0	µg/L	50.0		78.8		40-140	4.25		20		
Di-n-butylphthalate	36.9	10	µg/L	50.0		73.8		40-140	4.43		20		
1,2-Dichlorobenzene	36.0	5.0	µg/L	50.0		71.9		40-140	10.3		20		
1,3-Dichlorobenzene	35.2	5.0	µg/L	50.0		70.4		40-140	10.5		20		
1,4-Dichlorobenzene	35.4	5.0	µg/L	50.0		70.9		40-140	11.5		20		
3,3-Dichlorobenzidine	48.1	10	µg/L	50.0		96.1		40-140	6.70		20	V-34	
2,4-Dichlorophenol	41.4	10	µg/L	50.0		82.7		30-130	7.96		20		
Diethylphthalate	37.2	10	µg/L	50.0		74.5		40-140	5.69		20		
2,4-Dimethylphenol	38.5	10	µg/L	50.0		77.1		30-130	11.7		20		
Dimethylphthalate	38.2	10	µg/L	50.0		76.5		40-140	5.79		50		‡
4,6-Dinitro-2-methylphenol	39.6	10	µg/L	50.0		79.2		30-130	5.81		50		‡
2,4-Dinitrophenol	37.7	10	µg/L	50.0		75.5		30-130	4.08		50		‡
2,4-Dinitrotoluene	42.1	10	µg/L	50.0		84.2		40-140	4.30		20		
2,6-Dinitrotoluene	43.2	10	µg/L	50.0		86.4		40-140	5.87		20		
Di-n-octylphthalate	34.4	10	µg/L	50.0		68.8		40-140	3.74		20		
1,2-Diphenylhydrazine/Azobenzene	33.5	10	µg/L	50.0		66.9		40-140	5.72		20		
Fluoranthene	42.9	5.0	µg/L	50.0		85.7		40-140	4.47		20		
Fluorene	40.4	5.0	µg/L	50.0		80.8		40-140	5.35		20		

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231813 - SW-846 3510C										
LCS Dup (B231813-BSD1)				Prepared: 05/28/19 Analyzed: 05/30/19						
Hexachlorobenzene	41.1	10	µg/L	50.0		82.3	40-140	4.82	20	
Hexachlorobutadiene	34.1	10	µg/L	50.0		68.3	40-140	8.66	20	
Hexachlorocyclopentadiene	33.1	10	µg/L	50.0		66.1	30-140	7.17	50	† ‡
Hexachloroethane	31.3	10	µg/L	50.0		62.6	40-140	10.1	50	‡
Indeno(1,2,3-cd)pyrene	43.1	5.0	µg/L	50.0		86.2	40-140	7.40	50	‡
Isophorone	38.0	10	µg/L	50.0		76.0	40-140	7.01	20	
1-Methylnaphthalene	38.7	5.0	µg/L	50.0		77.4	40-140	7.30	20	
2-Methylnaphthalene	38.8	5.0	µg/L	50.0		77.5	40-140	10.1	20	
2-Methylphenol	34.4	10	µg/L	50.0		68.8	30-130	11.6	20	
3/4-Methylphenol	30.8	10	µg/L	50.0		61.6	30-130	11.0	20	
Naphthalene	36.3	5.0	µg/L	50.0		72.7	40-140	10.1	20	
2-Nitroaniline	30.8	10	µg/L	50.0		61.6	40-140	3.95	20	
3-Nitroaniline	42.8	10	µg/L	50.0		85.6	40-140	3.31	20	
4-Nitroaniline	45.2	10	µg/L	50.0		90.4	40-140	6.40	20	
Nitrobenzene	32.9	10	µg/L	50.0		65.8	40-140	8.22	20	
2-Nitrophenol	39.8	10	µg/L	50.0		79.6	30-130	4.13	20	
4-Nitrophenol	19.1	10	µg/L	50.0		38.2	10-130	6.43	50	† ‡
N-Nitrosodimethylamine	21.3	10	µg/L	50.0		42.6	40-140	3.10	20	
N-Nitrosodiphenylamine/Diphenylamine	42.7	10	µg/L	50.0		85.4	40-140	4.82	20	
N-Nitrosodi-n-propylamine	30.8	10	µg/L	50.0		61.6	40-140	10.8	20	
Pentachloronitrobenzene	43.6	10	µg/L	50.0		87.2	40-140	5.18	20	
Pentachlorophenol	39.3	10	µg/L	50.0		78.6	30-130	6.57	50	‡
Phenanthrene	41.0	5.0	µg/L	50.0		82.1	40-140	5.41	20	
Phenol	17.4	10	µg/L	50.0		34.9	20-130	11.9	20	†
Pyrene	41.2	5.0	µg/L	50.0		82.5	40-140	7.63	20	
Pyridine	19.4	5.0	µg/L	50.0		38.8	10-140	14.3	50	† ‡
1,2,4,5-Tetrachlorobenzene	36.7	10	µg/L	50.0		73.5	40-140	5.61	20	
1,2,4-Trichlorobenzene	38.4	5.0	µg/L	50.0		76.9	40-140	8.99	20	
2,4,5-Trichlorophenol	43.1	10	µg/L	50.0		86.1	30-130	3.33	20	
2,4,6-Trichlorophenol	40.5	10	µg/L	50.0		81.1	30-130	3.16	50	‡
Surrogate: 2-Fluorophenol	*107*		µg/L	200		53.4	15-110			
Surrogate: Phenol-d6	*76.5*		µg/L	200		38.3	15-110			
Surrogate: Nitrobenzene-d5	*71.0*		µg/L	100		71.0	30-130			
Surrogate: 2-Fluorobiphenyl	*87.4*		µg/L	100		87.4	30-130			
Surrogate: 2,4,6-Tribromophenol	*201*		µg/L	200		100	15-110			
Surrogate: p-Terphenyl-d14	*92.4*		µg/L	100		92.4	30-130			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
Blank (B231811-BLK1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	ND	0.080	µg/L							
alpha-Chlordane [2C]	ND	0.080	µg/L							
gamma-Chlordane	ND	0.080	µg/L							
gamma-Chlordane [2C]	ND	0.080	µg/L							
Alachlor	ND	0.32	µg/L							
Alachlor [2C]	ND	0.32	µg/L							
Aldrin	ND	0.016	µg/L							
Aldrin [2C]	ND	0.016	µg/L							
alpha-BHC	ND	0.080	µg/L							
alpha-BHC [2C]	ND	0.080	µg/L							
beta-BHC	ND	0.080	µg/L							
beta-BHC [2C]	ND	0.080	µg/L							
delta-BHC	ND	0.080	µg/L							
delta-BHC [2C]	ND	0.080	µg/L							
gamma-BHC (Lindane)	ND	0.016	µg/L							
gamma-BHC (Lindane) [2C]	ND	0.016	µg/L							
Chlordane	ND	0.16	µg/L							
Chlordane [2C]	ND	0.16	µg/L							
4,4'-DDD	ND	0.016	µg/L							
4,4'-DDD [2C]	ND	0.016	µg/L							
4,4'-DDE	ND	0.016	µg/L							
4,4'-DDE [2C]	ND	0.016	µg/L							
4,4'-DDT	ND	0.016	µg/L							
4,4'-DDT [2C]	ND	0.016	µg/L							
Dieldrin	ND	0.0016	µg/L							
Dieldrin [2C]	ND	0.0016	µg/L							
Endosulfan I	ND	0.080	µg/L							
Endosulfan I [2C]	ND	0.080	µg/L							
Endosulfan II	ND	0.080	µg/L							
Endosulfan II [2C]	ND	0.080	µg/L							
Endosulfan Sulfate	ND	0.080	µg/L							
Endosulfan Sulfate [2C]	ND	0.080	µg/L							
Endrin	ND	0.080	µg/L							
Endrin [2C]	ND	0.080	µg/L							
Endrin Aldehyde	ND	0.080	µg/L							
Endrin Aldehyde [2C]	ND	0.080	µg/L							
Endrin Ketone	ND	0.080	µg/L							
Endrin Ketone [2C]	ND	0.080	µg/L							
Heptachlor	ND	0.016	µg/L							
Heptachlor [2C]	ND	0.016	µg/L							
Heptachlor Epoxide	ND	0.016	µg/L							
Heptachlor Epoxide [2C]	ND	0.016	µg/L							
Hexachlorobenzene	ND	0.064	µg/L							
Hexachlorobenzene [2C]	ND	0.064	µg/L							
Methoxychlor	ND	0.32	µg/L							
Methoxychlor [2C]	ND	0.32	µg/L							
Toxaphene	ND	0.80	µg/L							
Toxaphene [2C]	ND	0.80	µg/L							
Surrogate: Decachlorobiphenyl	*3.11*		µg/L	3.20		97.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*3.09*		µg/L	3.20		96.5	30-150			
Surrogate: Tetrachloro-m-xylene	*2.83*		µg/L	3.20		88.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.92*		µg/L	3.20		91.1	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
LCS (B231811-BS1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	1.3	0.080	µg/L	1.60		83.7	0-200			
alpha-Chlordane [2C]	1.3	0.080	µg/L	1.60		83.0	0-200			
gamma-Chlordane	1.3	0.080	µg/L	1.60		78.6	0-200			
gamma-Chlordane [2C]	1.4	0.080	µg/L	1.60		84.6	0-200			
Alachlor	1.3	0.32	µg/L	1.60		83.5	40-140			
Alachlor [2C]	1.3	0.32	µg/L	1.60		79.0	40-140			
Aldrin	1.3	0.016	µg/L	1.60		80.6	40-140			
Aldrin [2C]	1.3	0.016	µg/L	1.60		80.7	40-140			
alpha-BHC	1.2	0.080	µg/L	1.60		77.9	40-140			
alpha-BHC [2C]	1.3	0.080	µg/L	1.60		81.6	40-140			
beta-BHC	1.3	0.080	µg/L	1.60		83.8	40-140			
beta-BHC [2C]	1.3	0.080	µg/L	1.60		78.8	40-140			
delta-BHC	1.4	0.080	µg/L	1.60		86.9	40-140			
delta-BHC [2C]	1.4	0.080	µg/L	1.60		85.5	40-140			
gamma-BHC (Lindane)	1.3	0.016	µg/L	1.60		82.4	40-140			
gamma-BHC (Lindane) [2C]	1.3	0.016	µg/L	1.60		84.0	40-140			
4,4'-DDD	1.4	0.016	µg/L	1.60		86.9	40-140			
4,4'-DDD [2C]	1.4	0.016	µg/L	1.60		88.0	40-140			
4,4'-DDE	1.4	0.016	µg/L	1.60		87.4	40-140			
4,4'-DDE [2C]	1.4	0.016	µg/L	1.60		87.0	40-140			
4,4'-DDT	1.4	0.016	µg/L	1.60		86.5	40-140			
4,4'-DDT [2C]	1.4	0.016	µg/L	1.60		86.1	40-140			
Dieldrin	1.4	0.0016	µg/L	1.60		84.7	40-140			
Dieldrin [2C]	1.3	0.0016	µg/L	1.60		83.9	40-140			
Endosulfan I	1.3	0.080	µg/L	1.60		78.9	40-140			
Endosulfan I [2C]	1.3	0.080	µg/L	1.60		79.9	40-140			
Endosulfan II	1.3	0.080	µg/L	1.60		82.8	40-140			
Endosulfan II [2C]	1.3	0.080	µg/L	1.60		82.3	40-140			
Endosulfan Sulfate	1.5	0.080	µg/L	1.60		92.5	40-140			
Endosulfan Sulfate [2C]	1.3	0.080	µg/L	1.60		83.0	40-140			
Endrin	1.3	0.080	µg/L	1.60		84.0	40-140			
Endrin [2C]	1.3	0.080	µg/L	1.60		81.8	40-140			
Endrin Aldehyde	1.2	0.080	µg/L	1.60		71.9	40-140			
Endrin Aldehyde [2C]	1.3	0.080	µg/L	1.60		79.9	40-140			
Endrin Ketone	1.4	0.080	µg/L	1.60		89.8	40-140			
Endrin Ketone [2C]	1.4	0.080	µg/L	1.60		85.7	40-140			
Heptachlor	1.2	0.016	µg/L	1.60		77.7	40-140			
Heptachlor [2C]	1.3	0.016	µg/L	1.60		78.9	40-140			
Heptachlor Epoxide	1.3	0.016	µg/L	1.60		81.0	40-140			
Heptachlor Epoxide [2C]	1.3	0.016	µg/L	1.60		79.7	40-140			
Hexachlorobenzene	1.4	0.064	µg/L	1.60		86.3	40-140			
Hexachlorobenzene [2C]	1.3	0.064	µg/L	1.60		80.3	40-140			
Methoxychlor	1.4	0.32	µg/L	1.60		84.9	40-140			
Methoxychlor [2C]	1.4	0.32	µg/L	1.60		86.3	40-140			
Surrogate: Decachlorobiphenyl	*2.83*		µg/L	3.20		88.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.76*		µg/L	3.20		86.2	30-150			
Surrogate: Tetrachloro-m-xylene	*2.61*		µg/L	3.20		81.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.65*		µg/L	3.20		82.8	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231811 - SW-846 3510C										
LCS Dup (B231811-BSD1)				Prepared: 05/28/19 Analyzed: 06/05/19						
alpha-Chlordane	1.4	0.080	µg/L	1.60		88.1	0-200	5.08		
alpha-Chlordane [2C]	1.4	0.080	µg/L	1.60		87.0	0-200	4.70		
gamma-Chlordane	1.3	0.080	µg/L	1.60		83.4	0-200	5.94		
gamma-Chlordane [2C]	1.4	0.016	µg/L	1.60		89.3	0-200	5.34		
Alachlor	1.4	0.32	µg/L	1.60		84.9	40-140	1.68	20	
Alachlor [2C]	1.3	0.32	µg/L	1.60		81.4	40-140	2.98	20	
Aldrin	1.4	0.016	µg/L	1.60		84.8	40-140	5.01	20	
Aldrin [2C]	1.3	0.016	µg/L	1.60		84.3	40-140	4.30	20	
alpha-BHC	1.3	0.080	µg/L	1.60		81.4	40-140	4.38	20	
alpha-BHC [2C]	1.4	0.080	µg/L	1.60		86.5	40-140	5.78	20	
beta-BHC	1.4	0.080	µg/L	1.60		89.0	40-140	5.97	20	
beta-BHC [2C]	1.3	0.080	µg/L	1.60		83.2	40-140	5.51	20	
delta-BHC	1.5	0.080	µg/L	1.60		92.4	40-140	6.18	20	
delta-BHC [2C]	1.4	0.080	µg/L	1.60		90.4	40-140	5.53	20	
gamma-BHC (Lindane)	1.4	0.016	µg/L	1.60		86.5	40-140	4.90	20	
gamma-BHC (Lindane) [2C]	1.4	0.016	µg/L	1.60		88.5	40-140	5.23	20	
4,4'-DDD	1.5	0.016	µg/L	1.60		90.8	40-140	4.41	20	
4,4'-DDD [2C]	1.5	0.016	µg/L	1.60		90.8	40-140	3.11	20	
4,4'-DDE	1.5	0.016	µg/L	1.60		91.5	40-140	4.52	20	
4,4'-DDE [2C]	1.5	0.016	µg/L	1.60		91.1	40-140	4.56	20	
4,4'-DDT	1.4	0.016	µg/L	1.60		89.9	40-140	3.85	20	
4,4'-DDT [2C]	1.4	0.016	µg/L	1.60		89.0	40-140	3.22	20	
Dieldrin	1.4	0.0016	µg/L	1.60		88.4	40-140	4.31	20	
Dieldrin [2C]	1.4	0.0016	µg/L	1.60		86.8	40-140	3.43	20	
Endosulfan I	1.3	0.080	µg/L	1.60		82.5	40-140	4.50	20	
Endosulfan I [2C]	1.3	0.080	µg/L	1.60		82.8	40-140	3.47	20	
Endosulfan II	1.4	0.080	µg/L	1.60		86.2	40-140	4.02	20	
Endosulfan II [2C]	1.4	0.080	µg/L	1.60		84.7	40-140	2.81	20	
Endosulfan Sulfate	1.5	0.080	µg/L	1.60		96.6	40-140	4.38	20	
Endosulfan Sulfate [2C]	1.4	0.080	µg/L	1.60		85.9	40-140	3.42	20	
Endrin	1.4	0.080	µg/L	1.60		87.8	40-140	4.37	20	
Endrin [2C]	1.4	0.080	µg/L	1.60		84.5	40-140	3.34	20	
Endrin Aldehyde	1.2	0.080	µg/L	1.60		75.1	40-140	4.36	20	
Endrin Aldehyde [2C]	1.3	0.080	µg/L	1.60		82.4	40-140	3.07	20	
Endrin Ketone	1.5	0.080	µg/L	1.60		93.5	40-140	4.02	20	
Endrin Ketone [2C]	1.4	0.080	µg/L	1.60		89.0	40-140	3.73	20	
Heptachlor	1.3	0.016	µg/L	1.60		81.6	40-140	4.91	20	
Heptachlor [2C]	1.3	0.016	µg/L	1.60		82.2	40-140	4.12	20	
Heptachlor Epoxide	1.4	0.016	µg/L	1.60		84.7	40-140	4.57	20	
Heptachlor Epoxide [2C]	1.3	0.016	µg/L	1.60		82.7	40-140	3.71	20	
Hexachlorobenzene	1.4	0.064	µg/L	1.60		89.4	40-140	3.56	20	
Hexachlorobenzene [2C]	1.3	0.064	µg/L	1.60		83.6	40-140	3.96	20	
Methoxychlor	1.4	0.32	µg/L	1.60		87.9	40-140	3.51	20	
Methoxychlor [2C]	1.4	0.32	µg/L	1.60		88.7	40-140	2.71	20	
Surrogate: Decachlorobiphenyl	*2.98*		µg/L	3.20		93.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.97*		µg/L	3.20		92.7	30-150			
Surrogate: Tetrachloro-m-xylene	*2.77*		µg/L	3.20		86.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.86*		µg/L	3.20		89.3	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231543 - SW-846 3510C										
Blank (B231543-BLK1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	ND	0.50	µg/L							
2,4-D [2C]	ND	0.50	µg/L							
2,4-DB	ND	0.50	µg/L							
2,4-DB [2C]	ND	0.50	µg/L							
2,4,5-TP (Silvex)	ND	0.050	µg/L							
2,4,5-TP (Silvex) [2C]	ND	0.050	µg/L							
2,4,5-T	ND	0.10	µg/L							
2,4,5-T [2C]	ND	0.10	µg/L							
Dalapon	ND	1.2	µg/L							
Dalapon [2C]	ND	1.2	µg/L							
Dicamba	ND	0.050	µg/L							
Dicamba [2C]	ND	0.050	µg/L							
Dichloroprop	ND	0.50	µg/L							
Dichloroprop [2C]	ND	0.50	µg/L							
Dinoseb	ND	0.25	µg/L							
Dinoseb [2C]	ND	0.25	µg/L							
MCPA	ND	50	µg/L							
MCPA [2C]	ND	50	µg/L							
MCPP	ND	50	µg/L							
MCPP [2C]	ND	50	µg/L							
Surrogate: 2,4-Dichlorophenylacetic acid	*1.86*		µg/L	2.00		93.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.93*		µg/L	2.00		96.3	30-150			
LCS (B231543-BS1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	2.53	0.50	µg/L	2.50		101	40-140			
2,4-D [2C]	2.46	0.50	µg/L	2.50		98.4	40-140			
2,4-DB	2.93	0.50	µg/L	2.50		117	40-140			
2,4-DB [2C]	2.73	0.50	µg/L	2.50		109	40-140			
2,4,5-TP (Silvex)	0.260	0.050	µg/L	0.250		104	40-140			
2,4,5-TP (Silvex) [2C]	0.238	0.050	µg/L	0.250		95.1	40-140			
2,4,5-T	0.258	0.10	µg/L	0.250		103	40-140			
2,4,5-T [2C]	0.248	0.10	µg/L	0.250		99.3	40-140			
Dalapon	4.93	1.2	µg/L	6.25		78.8	40-140			
Dalapon [2C]	4.78	1.2	µg/L	6.25		76.5	40-140			
Dicamba	0.225	0.050	µg/L	0.250		90.0	40-140			
Dicamba [2C]	0.234	0.050	µg/L	0.250		93.4	40-140			
Dichloroprop	2.62	0.50	µg/L	2.50		105	40-140			
Dichloroprop [2C]	2.49	0.50	µg/L	2.50		99.6	40-140			
Dinoseb	1.04	0.25	µg/L	1.25		83.3	10-140			
Dinoseb [2C]	0.933	0.25	µg/L	1.25		74.7	10-140			V-06
MCPA	238	50	µg/L	250		95.1	40-140			
MCPA [2C]	217	50	µg/L	250		87.0	40-140			
MCPP	257	50	µg/L	250		103	40-140			
MCPP [2C]	221	50	µg/L	250		88.3	40-140			
Surrogate: 2,4-Dichlorophenylacetic acid	*2.04*		µg/L	2.00		102	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.95*		µg/L	2.00		97.5	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231543 - SW-846 3510C										
LCS Dup (B231543-BSD1)				Prepared: 05/23/19 Analyzed: 05/24/19						
2,4-D	2.28	0.50	µg/L	2.50		91.3	40-140	10.5	20	
2,4-D [2C]	2.20	0.50	µg/L	2.50		88.0	40-140	11.1	20	
2,4-DB	2.58	0.50	µg/L	2.50		103	40-140	12.7	20	
2,4-DB [2C]	2.43	0.50	µg/L	2.50		97.2	40-140	11.8	20	
2,4,5-TP (Silvex)	0.250	0.050	µg/L	0.250		100	40-140	3.92	20	
2,4,5-TP (Silvex) [2C]	0.215	0.050	µg/L	0.250		86.2	40-140	9.83	20	
2,4,5-T	0.228	0.10	µg/L	0.250		91.2	40-140	12.5	20	
2,4,5-T [2C]	0.221	0.10	µg/L	0.250		88.4	40-140	11.6	20	
Dalapon	4.58	1.2	µg/L	6.25		73.2	40-140	7.36	20	
Dalapon [2C]	4.39	1.2	µg/L	6.25		70.3	40-140	8.45	20	
Dicamba	0.213	0.050	µg/L	0.250		85.3	40-140	5.29	20	
Dicamba [2C]	0.212	0.050	µg/L	0.250		84.9	40-140	9.53	20	
Dichloroprop	2.37	0.50	µg/L	2.50		95.0	40-140	9.87	20	
Dichloroprop [2C]	2.24	0.50	µg/L	2.50		89.5	40-140	10.7	20	
Dinoseb	1.03	0.25	µg/L	1.25		82.3	10-140	1.24	20	
Dinoseb [2C]	0.870	0.25	µg/L	1.25		69.6	10-140	7.01	20	V-06
MCPA	201	50	µg/L	250		80.4	40-140	16.9	20	
MCPA [2C]	203	50	µg/L	250		81.3	40-140	6.70	20	
MCPP	240	50	µg/L	250		95.9	40-140	7.06	20	
MCPP [2C]	207	50	µg/L	250		82.8	40-140	6.48	20	
Surrogate: 2,4-Dichlorophenylacetic acid	*1.80*		µg/L	2.00		90.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*1.81*		µg/L	2.00		90.6	30-150			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231628 - SW-846 7470A Prep										
Blank (B231628-BLK1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	ND	0.00010	mg/L							
LCS (B231628-BS1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	0.00395	0.00010	mg/L	0.00400		98.7	80-120			
LCS Dup (B231628-BSD1)				Prepared: 05/23/19 Analyzed: 05/25/19						
Mercury	0.00395	0.00010	mg/L	0.00400		98.7	80-120	0.0962	20	
Batch B232189 - SW-846 3005A										
Blank (B232189-BLK1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	ND	0.010	mg/L							
Barium	ND	0.050	mg/L							
Chromium	ND	0.010	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
Zinc	ND	0.020	mg/L							
LCS (B232189-BS1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	0.499	0.010	mg/L	0.500		99.9	80-120			
Barium	0.504	0.050	mg/L	0.500		101	80-120			
Chromium	0.503	0.010	mg/L	0.500		101	80-120			
Iron	4.03	0.050	mg/L	4.00		101	80-120			
Lead	0.507	0.010	mg/L	0.500		101	80-120			
Zinc	1.04	0.020	mg/L	1.00		104	80-120			
LCS Dup (B232189-BSD1)				Prepared: 05/31/19 Analyzed: 06/02/19						
Arsenic	0.487	0.010	mg/L	0.500		97.4	80-120	2.54	20	
Barium	0.501	0.050	mg/L	0.500		100	80-120	0.455	20	
Chromium	0.501	0.010	mg/L	0.500		100	80-120	0.364	20	
Iron	4.00	0.050	mg/L	4.00		100	80-120	0.697	20	
Lead	0.501	0.010	mg/L	0.500		100	80-120	1.36	20	
Zinc	1.01	0.020	mg/L	1.00		101	80-120	3.34	20	
Batch B232424 - SW-846 3015A										
Blank (B232424-BLK1)				Prepared & Analyzed: 06/04/19						
Sodium	ND	2.2	mg/L							
LCS (B232424-BS1)				Prepared & Analyzed: 06/04/19						
Sodium	4.11	2.2	mg/L	4.44		92.4	80-120			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232424 - SW-846 3015A										
LCS Dup (B232424-BSD1)				Prepared & Analyzed: 06/04/19						
Sodium	4.07	2.2	mg/L	4.44		91.7	80-120	0.827	20	

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231762 - SM 21-22 4500 P E										
Blank (B231762-BLK1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	ND	0.050	mg/L							
LCS (B231762-BS1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.20	0.050	mg/L	0.205		99.0	90-128			
LCS Dup (B231762-BSD1)				Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.22	0.050	mg/L	0.205		106	90-128	6.41	16.2	
Duplicate (B231762-DUP1)		**Source: 19E1264-03**		Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.050	0.050	mg/L		ND			NC	44.2	
Matrix Spike (B231762-MS1)		**Source: 19E1264-03**		Prepared & Analyzed: 05/27/19						
Phosphorus, Total	0.32	0.050	mg/L	0.300	ND	108	26-170			
Batch B231851 - ASTM D516-11										
Blank (B231851-BLK1)				Prepared & Analyzed: 05/28/19						
Sulfate	ND	2.0	mg/L							
LCS (B231851-BS1)				Prepared & Analyzed: 05/28/19						
Sulfate	20	2.0	mg/L	20.0		98.4	83.1-111			
LCS Dup (B231851-BSD1)				Prepared & Analyzed: 05/28/19						
Sulfate	20	2.0	mg/L	20.0		98.0	83.1-111	0.458	10.9	
Batch B232034 - SM19-22 4500 NH3 C										
Blank (B232034-BLK1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B232034-BS1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110			
LCS Dup (B232034-BSD1)				Prepared: 05/30/19 Analyzed: 05/31/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110	0.00	13.2	
Batch B232197 - SM21-22 2320B										
Blank (B232197-BLK1)				Prepared & Analyzed: 05/31/19						
Alkalinity	ND	1.0	mg/L							

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232197 - SM21-22 2320B										
LCS (B232197-BS1)				Prepared & Analyzed: 05/31/19						
Alkalinity	44	1.0	mg/L	44.4		98.4	85.8-110			
LCS Dup (B232197-BSD1)				Prepared & Analyzed: 05/31/19						
Alkalinity	44	1.0	mg/L	44.4		98.4	85.8-110	0.00	7.92	
Batch B232246 - SM 5310B										
Blank (B232246-BLK1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	ND	1.0	mg/L							
LCS (B232246-BS1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	10.1	1.0	mg/L	10.0		101	83.4-116			
LCS Dup (B232246-BSD1)				Prepared & Analyzed: 06/02/19						
Total Organic Carbon	10.1	1.0	mg/L	10.0		101	83.4-116	0.683	9.95	
Batch B232285 - SM19-22 4500 NH3 C										
Blank (B232285-BLK1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	ND	0.30	mg/L							
LCS (B232285-BS1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	4.8	0.30	mg/L	5.00		95.8	85.2-110			
LCS Dup (B232285-BSD1)				Prepared: 06/03/19 Analyzed: 06/04/19						
Ammonia as N	5.0	0.30	mg/L	5.00		101	85.2-110	5.28	13.2	
Batch B232845 - SM21-22 4500 CL B										
Blank (B232845-BLK1)				Prepared & Analyzed: 06/07/19						
Chloride	ND	1.0	mg/L							
LCS (B232845-BS1)				Prepared & Analyzed: 06/07/19						
Chloride	10	1.0	mg/L	11.1		94.6	85.2-112			
LCS Dup (B232845-BSD1)				Prepared & Analyzed: 06/07/19						
Chloride	10	1.0	mg/L	11.1		94.6	85.2-112	0.00	8.24	
Duplicate (B232845-DUP1)	**Source: 19E1264-03**			Prepared & Analyzed: 06/07/19						
Chloride	50	5.0	mg/L		51			2.47	12.3	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B232845 - SM21-22 4500 CL B										
Matrix Spike (B232845-MS1)	**Source: 19E1264-03**			Prepared & Analyzed: 06/07/19						
Chloride	100	5.0	mg/L	50.0	51	99.9	74.2-129			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B231560 - SM21-22 2540C										
Blank (B231560-BLK1)				Prepared & Analyzed: 05/23/19						
Total Dissolved Solids	ND	10	mg/L							
LCS (B231560-BS1)				Prepared & Analyzed: 05/23/19						
Total Dissolved Solids	280	10	mg/L	293		97.3	59.4-118			

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM1** **Analyzed:** **06/04/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	0.77
Endrin [1]	2.49

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	0.81
Endrin [2]	2.48

BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM2** **Analyzed:** **06/04/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.07
Endrin [1]	2.35

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	1.07
Endrin [2]	2.39

BREAKDOWN REPORT

Lab Sample ID: **S036837-PEM3** **Analyzed:** **06/05/2019**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	1.83
Endrin [1]	2.04

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM3	Analyzed:	06/05/2019

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	1.84
Endrin [2]	2.10

BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM4	Analyzed:	06/05/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.16
Endrin [1]	2.03

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.17
Endrin [2]	2.06

BREAKDOWN REPORT

Lab Sample ID:	S036837-PEM5	Analyzed:	06/06/2019

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.48
Endrin [1]	2.26

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.50
Endrin [2]	2.38

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS

Lab Sample ID: B231543-BS1 Date(s) Analyzed: 05/24/2019 05/24/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	14.703	0.000	0.000	0.258	
	2	14.771	0.000	0.000	0.248	4.7
2,4,5-TP (Silvex)	1	14.102	0.000	0.000	0.260	
	2	13.953	0.000	0.000	0.238	8.8
2,4-D	1	12.358	0.000	0.000	2.53	
	2	12.291	0.000	0.000	2.46	1.6
2,4-DB	1	15.863	0.000	0.000	2.93	
	2	15.862	0.000	0.000	2.73	6.0
Dalapon	1	4.067	0.000	0.000	4.93	
	2	3.725	0.000	0.000	4.78	2.5
Dicamba	1	10.389	0.000	0.000	0.225	
	2	10.226	0.000	0.000	0.234	1.7
Dichloroprop	1	11.881	0.000	0.000	2.62	
	2	11.653	0.000	0.000	2.49	4.3
Dinoseb	1	17.175	0.000	0.000	1.04	
	2	16.464	0.000	0.000	0.933	6.9
MCPA	1	11.157	0.000	0.000	238	
	2	11.014	0.000	0.000	217	10.1
MCPP	1	10.854	0.000	0.000	257	
	2	10.555	0.000	0.000	221	16.2

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS Dup

Lab Sample ID: B231543-BSD1 Date(s) Analyzed: 05/24/2019 05/24/2019

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	14.704	0.000	0.000	0.228	
	2	14.771	0.000	0.000	0.221	4.0
2,4,5-TP (Silvex)	1	14.104	0.000	0.000	0.250	
	2	13.954	0.000	0.000	0.215	15.1
2,4-D	1	12.358	0.000	0.000	2.28	
	2	12.292	0.000	0.000	2.20	4.4
2,4-DB	1	15.865	0.000	0.000	2.58	
	2	15.863	0.000	0.000	2.43	6.8
Dalapon	1	4.066	0.000	0.000	4.58	
	2	3.725	0.000	0.000	4.39	4.7
Dicamba	1	10.390	0.000	0.000	0.213	
	2	10.226	0.000	0.000	0.212	0.9
Dichloroprop	1	11.881	0.000	0.000	2.37	
	2	11.653	0.000	0.000	2.24	6.9
Dinoseb	1	17.175	0.000	0.000	1.03	
	2	16.462	0.000	0.000	0.870	13.9
MCPA	1	11.155	0.000	0.000	201	
	2	11.012	0.000	0.000	203	1.5
MCPP	1	10.852	0.000	0.000	240	
	2	10.554	0.000	0.000	207	14.8

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B231811-BS1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.381	7.353	7.413	1.4	
	2	7.392	7.363	7.423	1.4	0.0
4,4'-DDE	1	6.934	6.906	6.966	1.4	
	2	6.955	6.927	6.987	1.4	0.0
4,4'-DDT	1	7.596	7.567	7.627	1.4	
	2	7.634	7.605	7.665	1.4	0.0
Alachlor	1	6.361	6.333	6.393	1.3	
	2	6.120	6.092	6.152	1.3	0.0
Aldrin	1	6.267	6.239	6.299	1.3	
	2	6.188	6.160	6.220	1.3	0.0
alpha-BHC	1	5.538	5.510	5.570	1.2	
	2	5.466	5.438	5.498	1.3	0.0
alpha-Chlordane	1	6.880	6.852	6.912	1.3	
	2	6.827	6.799	6.859	1.3	0.0
beta-BHC	1	5.798	5.770	5.830	1.3	
	2	5.741	5.712	5.772	1.3	0.0
delta-BHC	1	5.918	5.889	5.949	1.4	
	2	5.932	5.903	5.963	1.4	0.0
Dieldrin	1	7.158	7.130	7.190	1.4	
	2	7.070	7.041	7.101	1.3	7.4
Endosulfan I	1	6.981	6.953	7.013	1.3	
	2	6.867	6.840	6.900	1.3	0.0
Endosulfan II	1	7.503	7.475	7.535	1.3	
	2	7.460	7.432	7.492	1.3	0.0
Endosulfan Sulfate	1	8.145	8.117	8.177	1.5	
	2	7.937	7.910	7.970	1.3	14.3
Endrin	1	7.333	7.304	7.364	1.3	
	2	7.297	7.269	7.329	1.3	0.0
Endrin Aldehyde	1	7.826	7.798	7.858	1.2	
	2	7.723	7.695	7.755	1.3	8.0
Endrin Ketone	1	8.329	8.301	8.361	1.4	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B231811-BS1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	8.306	8.276	8.336	1.4	0.0
gamma-BHC (Lindane)	1	5.743	5.714	5.774	1.3	
	2	5.688	5.660	5.720	1.3	0.0
gamma-Chlordane	1	6.784	6.755	6.815	1.3	
	2	6.721	6.693	6.753	1.4	7.4
Heptachlor	1	6.060	6.032	6.092	1.2	
	2	5.973	5.944	6.004	1.3	8.0
Heptachlor Epoxide	1	6.694	6.666	6.726	1.3	
	2	6.586	6.558	6.618	1.3	0.0
Hexachlorobenzene	1	5.429	5.401	5.461	1.4	
	2	5.379	5.351	5.411	1.3	7.4
Methoxychlor	1	7.972	7.944	8.004	1.4	
	2	8.159	8.130	8.190	1.4	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B231811-BSD1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	7.382	7.353	7.413	1.5	
	2	7.393	7.363	7.423	1.5	0.0
4,4'-DDE	1	6.935	6.906	6.966	1.5	
	2	6.956	6.927	6.987	1.5	0.0
4,4'-DDT	1	7.597	7.567	7.627	1.4	
	2	7.635	7.605	7.665	1.4	0.0
Alachlor	1	6.361	6.333	6.393	1.4	
	2	6.121	6.092	6.152	1.3	7.4
Aldrin	1	6.268	6.239	6.299	1.4	
	2	6.190	6.160	6.220	1.3	7.4
alpha-BHC	1	5.539	5.510	5.570	1.3	
	2	5.468	5.438	5.498	1.4	7.4
alpha-Chlordane	1	6.881	6.852	6.912	1.4	
	2	6.829	6.799	6.859	1.4	0.0
beta-BHC	1	5.799	5.770	5.830	1.4	
	2	5.742	5.712	5.772	1.3	7.4
delta-BHC	1	5.918	5.889	5.949	1.5	
	2	5.933	5.903	5.963	1.4	6.9
Dieldrin	1	7.159	7.130	7.190	1.4	
	2	7.071	7.041	7.101	1.4	0.0
Endosulfan I	1	6.982	6.953	7.013	1.3	
	2	6.868	6.840	6.900	1.3	0.0
Endosulfan II	1	7.505	7.475	7.535	1.4	
	2	7.461	7.432	7.492	1.4	0.0
Endosulfan Sulfate	1	8.146	8.117	8.177	1.5	
	2	7.939	7.910	7.970	1.4	13.3
Endrin	1	7.333	7.304	7.364	1.4	
	2	7.299	7.269	7.329	1.4	0.0
Endrin Aldehyde	1	7.827	7.798	7.858	1.2	
	2	7.724	7.695	7.755	1.3	8.0
Endrin Ketone	1	8.330	8.301	8.361	1.5	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS Dup

Lab Sample ID: B231811-BSD1 Date(s) Analyzed: 06/05/2019 06/05/2019

Instrument ID (1): ECD6 Instrument ID (2): ECD6

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	8.306	8.276	8.336	1.4	6.9
gamma-BHC (Lindane)	1	5.744	5.714	5.774	1.4	
	2	5.689	5.660	5.720	1.4	0.0
gamma-Chlordane	1	6.785	6.755	6.815	1.3	
	2	6.723	6.693	6.753	1.4	7.4
Heptachlor	1	6.061	6.032	6.092	1.3	
	2	5.973	5.944	6.004	1.3	0.0
Heptachlor Epoxide	1	6.695	6.666	6.726	1.4	
	2	6.588	6.558	6.618	1.3	7.4
Hexachlorobenzene	1	5.430	5.401	5.461	1.4	
	2	5.380	5.351	5.411	1.3	7.4
Methoxychlor	1	7.973	7.944	8.004	1.4	
	2	8.160	8.130	8.190	1.4	0.0

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-02	Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.
L-05	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the high side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.
V-36	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
ASTM D516-11 in Water	
Sulfate	NY,NH,MA,CT,RI,VA,NC
SM 21-22 4500 P E in Water	
Phosphorus, Total	CT,MA,NH,NY,RI,NC,ME,VA
SM 5310B in Water	
Total Organic Carbon	CT,NH,NY,RI,NC,MA,VA
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 2320B in Water	
Alkalinity	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 4500 CL B in Water	
Chloride	NH,CT,MA,NY,RI,NC,ME,VA
SW-846 6010 in Water	
Hardness	CT,MA,NH,NY
SW-846 6010D in Water	
Arsenic	CT,NH,NY,ME,VA,RI,NC
Barium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Sodium	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8081B in Water	
Alachlor	NC
Alachlor [2C]	NC
Aldrin	CT,NH,NY,ME,NC,VA
Aldrin [2C]	CT,NH,NY,ME,NC,VA
alpha-BHC	CT,NH,NY,ME,NC,VA
alpha-BHC [2C]	CT,NH,NY,ME,NC,VA
beta-BHC	CT,NH,NY,ME,NC,VA
beta-BHC [2C]	CT,NH,NY,ME,NC,VA
delta-BHC	CT,NH,NY,ME,NC,VA
delta-BHC [2C]	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane)	CT,NH,NY,ME,NC,VA
gamma-BHC (Lindane) [2C]	CT,NH,NY,ME,NC,VA
Chlordane	CT,NH,NY,ME,NC,VA
Chlordane [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDD	CT,NH,NY,ME,NC,VA
4,4'-DDD [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDE	CT,NH,NY,ME,NC,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Water	
4,4'-DDE [2C]	CT,NH,NY,ME,NC,VA
4,4'-DDT	CT,NH,NY,ME,NC,VA
4,4'-DDT [2C]	CT,NH,NY,ME,NC,VA
Dieldrin	CT,NH,NY,ME,NC,VA
Dieldrin [2C]	CT,NH,NY,ME,NC,VA
Endosulfan I	CT,NH,NY,ME,NC,VA
Endosulfan I [2C]	CT,NH,NY,ME,NC,VA
Endosulfan II	CT,NH,NY,ME,NC,VA
Endosulfan II [2C]	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate	CT,NH,NY,ME,NC,VA
Endosulfan Sulfate [2C]	CT,NH,NY,ME,NC,VA
Endrin	CT,NH,NY,ME,NC,VA
Endrin [2C]	CT,NH,NY,ME,NC,VA
Endrin Aldehyde	CT,NH,NY,ME,NC,VA
Endrin Aldehyde [2C]	CT,NH,NY,ME,NC,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NH,NY,ME,NC,VA
Heptachlor [2C]	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide	CT,NH,NY,ME,NC,VA
Heptachlor Epoxide [2C]	CT,NH,NY,ME,NC,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NH,NY,ME,NC,VA
Methoxychlor [2C]	CT,NH,NY,ME,NC,VA
Toxaphene	CT,NH,NY,ME,NC,VA
Toxaphene [2C]	CT,NH,NY,ME,NC,VA
SW-846 8151A in Water	
2,4-D	ME,NC,NH,CT,NY,VA
2,4-D [2C]	ME,NC,NH,CT,NY,VA
2,4-DB	ME,NC,NH,CT,NY,VA
2,4-DB [2C]	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex)	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex) [2C]	ME,NC,NH,CT,NY,VA
2,4,5-T	ME,NC,NH,CT,NY,VA
2,4,5-T [2C]	ME,NC,NH,CT,NY,VA
Dalapon	ME,NC,NH,CT,NY,VA
Dalapon [2C]	ME,NC,NH,CT,NY,VA
Dicamba	ME,NC,NH,CT,NY,VA
Dicamba [2C]	ME,NC,NH,CT,NY,VA
Dichloroprop	ME,NC,NH,CT,NY,VA
Dichloroprop [2C]	ME,NC,NH,CT,NY,VA
Dinoseb	ME,NC,NH,CT,NY,VA
Dinoseb [2C]	ME,NC,NH,CT,NY,VA
MCPA	NC,CT
MCPA [2C]	NC,CT

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8151A in Water	
MCPP	NC,CT
MCPP [2C]	NC,CT
SW-846 8260C in Water	
Acetone	CT,ME,NH,VA,NY
Acrylonitrile	CT,ME,NH,VA,NY
tert-Amyl Methyl Ether (TAME)	ME,NH,VA,NY
Benzene	CT,ME,NH,VA,NY
Bromobenzene	NY
Bromochloromethane	ME,NH,VA,NY
Bromodichloromethane	CT,ME,NH,VA,NY
Bromoform	CT,ME,NH,VA,NY
Bromomethane	CT,ME,NH,VA,NY
2-Butanone (MEK)	CT,ME,NH,VA,NY
tert-Butyl Alcohol (TBA)	ME,NH,VA,NY
n-Butylbenzene	ME,VA,NY
sec-Butylbenzene	ME,VA,NY
tert-Butylbenzene	ME,VA,NY
tert-Butyl Ethyl Ether (TBEE)	ME,NH,VA,NY
Carbon Disulfide	CT,ME,NH,VA,NY
Carbon Tetrachloride	CT,ME,NH,VA,NY
Chlorobenzene	CT,ME,NH,VA,NY
Chlorodibromomethane	CT,ME,NH,VA,NY
Chloroethane	CT,ME,NH,VA,NY
Chloroform	CT,ME,NH,VA,NY
Chloromethane	CT,ME,NH,VA,NY
2-Chlorotoluene	ME,NH,VA,NY
4-Chlorotoluene	ME,NH,VA,NY
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	ME,NH,VA,NY
1,2-Dichlorobenzene	CT,ME,NH,VA,NY
1,3-Dichlorobenzene	CT,ME,NH,VA,NY
1,4-Dichlorobenzene	CT,ME,NH,VA,NY
trans-1,4-Dichloro-2-butene	ME,NH,VA,NY
Dichlorodifluoromethane (Freon 12)	ME,NH,VA,NY
1,1-Dichloroethane	CT,ME,NH,VA,NY
1,2-Dichloroethane	CT,ME,NH,VA,NY
1,1-Dichloroethylene	CT,ME,NH,VA,NY
cis-1,2-Dichloroethylene	ME,NY
trans-1,2-Dichloroethylene	CT,ME,NH,VA,NY
1,2-Dichloropropane	CT,ME,NH,VA,NY
1,3-Dichloropropane	ME,VA,NY
2,2-Dichloropropane	ME,NH,VA,NY
1,1-Dichloropropene	ME,NH,VA,NY
cis-1,3-Dichloropropene	CT,ME,NH,VA,NY
trans-1,3-Dichloropropene	CT,ME,NH,VA,NY

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C in Water	
Diethyl Ether	NY
Diisopropyl Ether (DIPE)	ME,NH,VA,NY
1,4-Dioxane	NY
Ethylbenzene	CT,ME,NH,VA,NY
Hexachlorobutadiene	CT,ME,NH,VA,NY
2-Hexanone (MBK)	CT,ME,NH,VA,NY
Isopropylbenzene (Cumene)	ME,VA,NY
p-Isopropyltoluene (p-Cymene)	CT,ME,NH,VA,NY
Methyl Acetate	NY
Methyl tert-Butyl Ether (MTBE)	CT,ME,NH,VA,NY
Methyl Cyclohexane	NY
Methylene Chloride	CT,ME,NH,VA,NY
4-Methyl-2-pentanone (MIBK)	CT,ME,NH,VA,NY
Naphthalene	ME,NH,VA,NY
n-Propylbenzene	CT,ME,NH,VA,NY
Styrene	CT,ME,NH,VA,NY
1,1,1,2-Tetrachloroethane	CT,ME,NH,VA,NY
1,1,2,2-Tetrachloroethane	CT,ME,NH,VA,NY
Tetrachloroethylene	CT,ME,NH,VA,NY
Toluene	CT,ME,NH,VA,NY
1,2,3-Trichlorobenzene	ME,NH,VA,NY
1,2,4-Trichlorobenzene	CT,ME,NH,VA,NY
1,3,5-Trichlorobenzene	ME
1,1,1-Trichloroethane	CT,ME,NH,VA,NY
1,1,2-Trichloroethane	CT,ME,NH,VA,NY
Trichloroethylene	CT,ME,NH,VA,NY
Trichlorofluoromethane (Freon 11)	CT,ME,NH,VA,NY
1,2,3-Trichloropropane	ME,NH,VA,NY
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	VA,NY
1,2,4-Trimethylbenzene	ME,VA,NY
1,3,5-Trimethylbenzene	ME,VA,NY
Vinyl Chloride	CT,ME,NH,VA,NY
m+p Xylene	CT,ME,NH,VA,NY
o-Xylene	CT,ME,NH,VA,NY
SW-846 8270D in Water	
Acenaphthene	CT,NY,NC,ME,NH,VA
Acenaphthylene	CT,NY,NC,ME,NH,VA
Acetophenone	NY,NC
Aniline	CT,NY,NC,ME,VA
Anthracene	CT,NY,NC,ME,NH,VA
Benzidine	CT,NY,NC,ME,NH,VA
Benzo(a)anthracene	CT,NY,NC,ME,NH,VA
Benzo(a)pyrene	CT,NY,NC,ME,NH,VA
Benzo(b)fluoranthene	CT,NY,NC,ME,NH,VA
Benzo(g,h,i)perylene	CT,NY,NC,ME,NH,VA
Benzo(k)fluoranthene	CT,NY,NC,ME,NH,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
Benzoic Acid	NY,NC,ME,NH,VA
Bis(2-chloroethoxy)methane	CT,NY,NC,ME,NH,VA
Bis(2-chloroethyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-chloroisopropyl)ether	CT,NY,NC,ME,NH,VA
Bis(2-Ethylhexyl)phthalate	CT,NY,NC,ME,NH,VA
4-Bromophenylphenylether	CT,NY,NC,ME,NH,VA
Butylbenzylphthalate	CT,NY,NC,ME,NH,VA
Carbazole	NC
4-Chloroaniline	CT,NY,NC,ME,NH,VA
4-Chloro-3-methylphenol	CT,NY,NC,ME,NH,VA
2-Chloronaphthalene	CT,NY,NC,ME,NH,VA
2-Chlorophenol	CT,NY,NC,ME,NH,VA
4-Chlorophenylphenylether	CT,NY,NC,ME,NH,VA
Chrysene	CT,NY,NC,ME,NH,VA
Dibenz(a,h)anthracene	CT,NY,NC,ME,NH,VA
Dibenzofuran	CT,NY,NC,ME,NH,VA
Di-n-butylphthalate	CT,NY,NC,ME,NH,VA
1,2-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,3-Dichlorobenzene	CT,NY,NC,ME,NH,VA
1,4-Dichlorobenzene	CT,NY,NC,ME,NH,VA
3,3-Dichlorobenzidine	CT,NY,NC,ME,NH,VA
2,4-Dichlorophenol	CT,NY,NC,ME,NH,VA
Diethylphthalate	CT,NY,NC,ME,NH,VA
2,4-Dimethylphenol	CT,NY,NC,ME,NH,VA
Dimethylphthalate	CT,NY,NC,ME,NH,VA
4,6-Dinitro-2-methylphenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrophenol	CT,NY,NC,ME,NH,VA
2,4-Dinitrotoluene	CT,NY,NC,ME,NH,VA
2,6-Dinitrotoluene	CT,NY,NC,ME,NH,VA
Di-n-octylphthalate	CT,NY,NC,ME,NH,VA
1,2-Diphenylhydrazine/Azobenzene	NY,NC
Fluoranthene	CT,NY,NC,ME,NH,VA
Fluorene	NY,NC,ME,NH,VA
Hexachlorobenzene	CT,NY,NC,ME,NH,VA
Hexachlorobutadiene	CT,NY,NC,ME,NH,VA
Hexachlorocyclopentadiene	CT,NY,NC,ME,NH,VA
Hexachloroethane	CT,NY,NC,ME,NH,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NC,ME,NH,VA
Isophorone	CT,NY,NC,ME,NH,VA
1-Methylnaphthalene	NC
2-Methylnaphthalene	CT,NY,NC,ME,NH,VA
2-Methylphenol	CT,NY,NC,NH,VA
3/4-Methylphenol	CT,NY,NC,NH,VA
Naphthalene	CT,NY,NC,ME,NH,VA
2-Nitroaniline	CT,NY,NC,ME,NH,VA
3-Nitroaniline	CT,NY,NC,ME,NH,VA
4-Nitroaniline	CT,NY,NC,ME,NH,VA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D in Water	
Nitrobenzene	CT,NY,NC,ME,NH,VA
2-Nitrophenol	CT,NY,NC,ME,NH,VA
4-Nitrophenol	CT,NY,NC,ME,NH,VA
N-Nitrosodimethylamine	CT,NY,NC,ME,NH,VA
N-Nitrosodi-n-propylamine	CT,NY,NC,ME,NH,VA
Pentachloronitrobenzene	NC
Pentachlorophenol	CT,NY,NC,ME,NH,VA
Phenanthrene	CT,NY,NC,ME,NH,VA
Phenol	CT,NY,NC,ME,NH,VA
Pyrene	CT,NY,NC,ME,NH,VA
Pyridine	CT,NY,NC,ME,NH,VA
1,2,4,5-Tetrachlorobenzene	NY,NC
1,2,4-Trichlorobenzene	CT,NY,NC,ME,NH,VA
2,4,5-Trichlorophenol	CT,NY,NC,ME,NH,VA
2,4,6-Trichlorophenol	CT,NY,NC,ME,NH,VA
2-Fluorophenol	NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2020
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2020
RI	Rhode Island Department of Health	LAO00112	12/30/2019
NC	North Carolina Div. of Water Quality	652	12/31/2019
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2019
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2019
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2020
NC-DW	North Carolina Department of Health	25703	07/31/2019

KHF 14E1264

con-test ANALYTICAL LABORATORY

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

Doc # 380 Rev 1_03242017

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2H Associates
Address: 179 River St, Troy, NY 12180
Phone:
Project Name: Cortlandville S&G
Project Location: Cortlandville, NY
Project Number:
Project Manager: John Gansfuss
Con-Test Quote Name/Number:
Invoice Recipient: John Gansfuss
Sampled By: William Oakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: jgansfuss@H2Hassociates.com
Fax To #:

								2	2	1	1	1	2	1	1	3	2	
										X		N		X		H	H	
								A	A	P	A	P	A	P	P	G	G	
Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/~~Time~~	~~Ending~~ ~~Date~~/Time	Composite	Grab	[1]Matrix Code	Conc Code	SVOCs	Herbicides	TOC	Alkalinity	Metals/Hardness	Pestacides	PHOS/NH3	TDS/Cl/SO4/NO3	VOCs	VOCs	
1	MW-01	5/21	1405		X	GW	U	X	X	X	X	X	X	X	X	X		
2	MW-3S	5/21	1045		X	GW	U	X	X	X	X	X	X	X	X	X		
3	MW-3D	5/21	1150		X	GW	U	X	X	X	X	X	X	X	X	X		
4	FB	5/21	1120			O	C									X		
5	TB					O	C										X	

ANALYSIS REQUESTED

# of Containers
[2] Preservation Code
[3] Container Code

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
☐ Lab to Filter

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) DI

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
William Oakes	5/22/19 0800
Received by: (signature)	Date/Time: 5-22-19 10:20 AM
Relinquished by: (signature)	Date/Time: 5-22-19 12:00 PM
Received by: (signature)	Date/Time: 5-22-19 12:00
Relinquished by: (signature)	Date/Time: 5-22-19 13:45
Received by: (signature) 5.4 5.6 5.5 5/22/19	Date/Time: 1345

Program & Regulatory Information
☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
☐ NY Restricted Use
☐ NY Unrestricted Use
☐ NY Part 375
Other:

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD
Other:

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client H2H

Received By SC Date 5/22/19 Time 1345

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____
Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.4, 5.8, 3.5
By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? _____
Are there Rushes? F Who was notified? _____
Are there Short Holds? F Who was notified? _____
Is there enough Volume? T
Is there Headspace where applicable? F MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? T
Were trip blanks received? T On COC? T
Do all samples have the proper pH? Acid T<2 Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	12	1 Liter Plastic		16 oz Amb.	
HCL-	14	500 mL Amb.		500 mL Plastic	6	8oz Amb/Clear	
Meoh-		250 mL Amb.	3	250 mL Plastic	6	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	6	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test ANALYTICAL LABORATORY

KMF 14E1264

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Doc # 380 Rev 1_03242017

CHAIN OF CUSTODY RECORD (New York)

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: H2H Associates
Address: 179 River St, Troy, NY 12180
Phone:
Project Name: Cortlandville S&G
Project Location: Cortlandville, NY
Project Number:
Project Manager: John Gansfuss
Con-Test Quote Name/Number:
Invoice Recipient: John Gansfuss
Sampled By: William Oakes

Requested Turnaround Time
7-Day ☐ 10-Day ☒
Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: jgansfuss@H2Hassociates.com
Fax To #:

								2	2	1	1	1	2	1	1	3	2	
										X		N		X		H	H	
								A	A	P	A	P	A	P	P	G	G	

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	~~Beginning~~ Date/~~Time~~	~~Ending~~ ~~Date~~/Time	Composite	Grab	[1]Matrix Code	Conc Code	SVOCs	Herbicides	TOC	Alkalinity	Metals/Hardness	Pesticides	Phos/NH3	TDS/Cl/SO4/NO3	VOCs	UOCs	
1	MW-01	5/21	1405		X	GW	U	X	X	X	X	X	X	X	X	X		
2	MW-3S	5/21	1045		X	GW	U	X	X	X	X	X	X	X	X	X		
3	MW-3D	5/21	1150		X	GW	U	X	X	X	X	X	X	X	X	X		
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5	TB					O	C										X	

# of Containers
[2] Preservation Code
[3] Container Code

Dissolved Metals Samples
☐ Field Filtered
☐ Lab to Filter

Orthophosphate Samples
☐ Field Filtered
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Received by: (signature) 5.4 5.8 5.5	Date/Time: 5/22/19 1345

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☐ AWQ STDS ☐ NY TOGS
☐ NYC Sewer Discharge ☐ NY CP-51
☐ Part 360 GW (Landfill)
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☐ NY Unrestricted Use
☐ NY Part 375
Other:

Deliverables
☐ Enhanced Data Package
☐ NYSDEC EQuIS EDD
☐ EQuIS (Standard) EDD
☐ NY Regulatory EDD
☐ NY Regs Hits-Only EDD
Other:

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

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Doc# 277 Rev 5 2017

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Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? T

Were trip blanks received? T On COC? T

Do all samples have the proper pH? Acid T<2 Base _____

Vials	#	Containers:	#		#		#
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HCL-	14	500 mL Amb.		500 mL Plastic	6	8oz Amb/Clear	
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Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass	6 SL	Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass	\	Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Appendix 2 - CCSWCD Response to July 2019 Report

Cortland County Soil and Water Conservation District
100 Grange Place, Room 202, Cortland, NY 13045
Phone: (607) 756-5991 • Fax: (607) 756-0029
www.cortlandswcd.org

SWCD - Celebrating 70 years of promoting the conservation and wise use of our county's natural resources

January 2, 2020

Dick Tupper, Town Supervisor
Town of Cortlandville
Raymond G. Thorpe Municipal Building
3577 Terrace Road
Cortland, NY 13045

Re: Cortlandville Sand & Gravel Mine
NYSDEC Permit # 7-1122-00043/00008

Dear Mr. Tupper:

We have reviewed the July 23, 2019 Baseline Quarters 1 & 2 Hydrogeologic Investigation Report as well as the Response to SWCD Comments relative to the revised proposed permit modification for the above-referenced project.

Many of our comments have been adequately addressed; we appreciate the effort made by the applicant and its consultants to acknowledge and address our concerns, expressed on behalf of the Town of Cortlandville.

However, we disagree with the conclusion, presented in multiple locations in both documents, that because the mine does not recharge the Lime Hollow public water supply well, numerous activities at the mine present minimal risk to this water supply well and the safety of the drinking water supply for the Town of Cortlandville as well as potentially the drinking water supply of the City of Cortland.

Much is known about the Otter-Dry Creek aquifer. The United States Geological Survey (USGS) conducted extensive investigations of the aquifer system, and developed a 3-dimensional numerical model to simulate groundwater flow based on these data (USGS, 1996). The models MODFLOW and MODPATH were used to delineate recharge areas for the municipal water supplies of Cortlandville and Cortland. Their results showed that no single recharge condition completely characterized the capture zone to the supply wells. Their report concludes (page 58):

> "The municipal well for the Town of Cortlandville at Lime Hollow Road began pumping in 1991; therefore, the contributing area for this well during high

> recharge condition of 1990 was not simulated. The contributing areas for this well under average- and low-recharge conditions extend to the ground-water divide in the southwestern part of the study area…"

The above-referenced documents mislead by concluding that the USGS (1996) report provides evidence that the mine does not recharge the Lime Hollow well.

In 2002, the Cortland County SWCD delineated wellhead protection areas using the USGS model with assistance from the USGS and the Cortland County Health Department (CCHD; Cortland County SWCD 2002). USGS also provided technical review of the modeling results.

In the 2002 study, high and low recharge conditions were selected to simulate Zone 1A and 1B wellhead protections areas:

> Zone 1A (2-year Travel Time) - Within this zone of the aquifer, it takes groundwater 2 years or less to reach the well. This zone represents the highest risk of contamination, and should receive the highest degree of protection.
>
> Zone 1B (5-year Travel Time) - Within this zone of the aquifer, it takes groundwater 5 years or less to reach the well. This zone represents a significant risk of contamination to the well, but not as high as Zone 1A because any potential contamination may undergo increased effects of dilution, degradation, and other physical, chemical or biological processes that reduce its ultimate affect on water quality at the well.

The wellhead protection map produced by the Cortland County SWCD illustrating the location of these zones for the Lime Hollow water supply well is attached. This map clearly shows the Cortlandville Sand and Gravel Mine within the most vulnerable recharge zone (Zone 1A). The modeling process and finalization of this map was reviewed by the USGS.

Thus, we challenge all statements in the above-referenced documents that are based on the view that activities at the mine and water discharged from the mine have no potential to affect the Lime Hollow well. Considerable evidence exists to the contrary.

Please call me at 756-5991 if you have any questions.

Sincerely,

Kathleen E. McGrath

Kathleen E. McGrath
Water Quality Specialist

Attach.

Cc: Joe Dlugolenski, Thomas Rigley, R7 DEC
Amanda Barber, Cortland SWCD
John Proud, Town of Cortlandville
John Gansfuss, H2H

References cited

USGS. 1996. Hydrogeology, Water Quality, and Simulation of Ground-water Flow in a Glacial-Aquifer System, Cortland County, New York. Water-Resources Investigations Report 96-4255. Ithaca, NY.

Cortland County SWCD. 2002. Delineation of Wellhead Protection Areas: Town of Cortlandville and City of Cortland, NY. Cortland, NY.

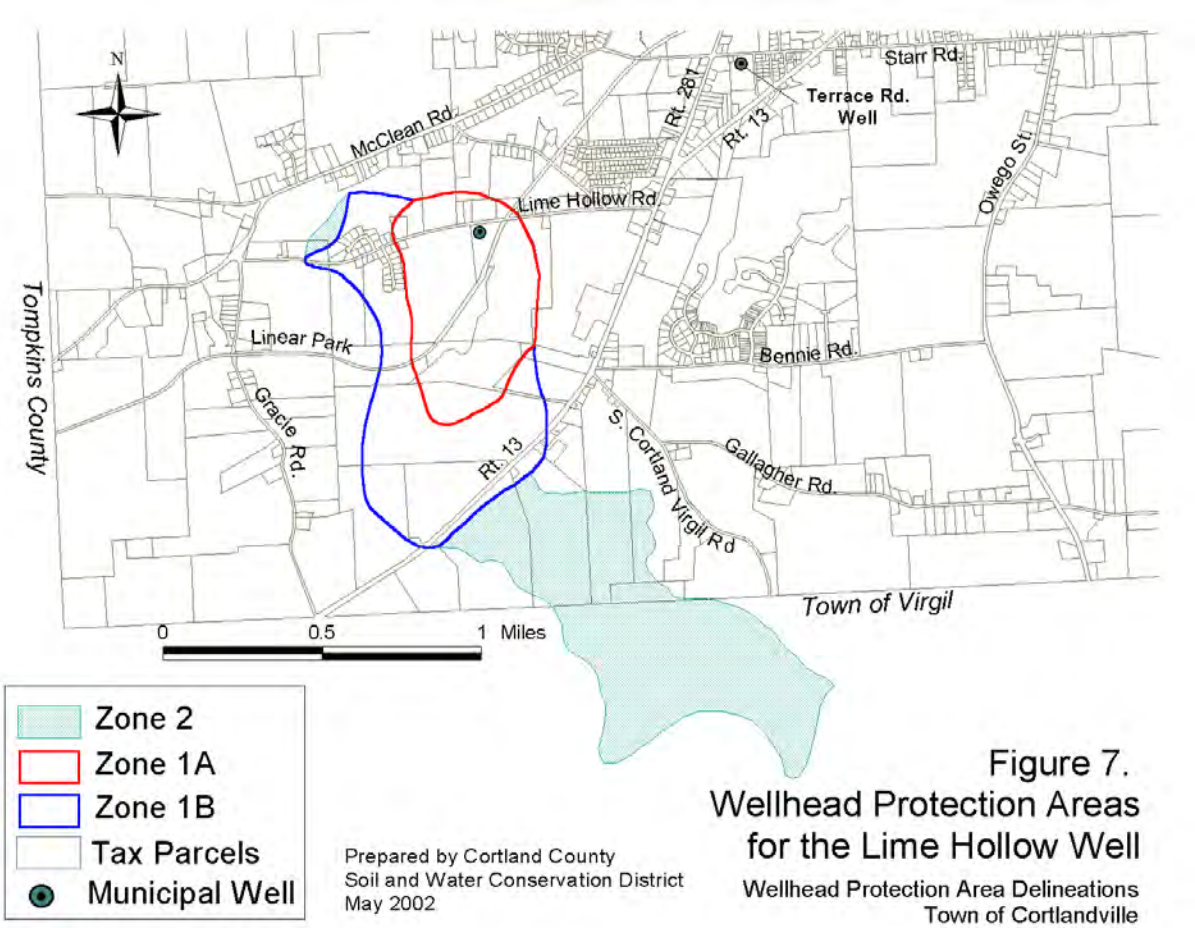

Figure 7.
Wellhead Protection Areas
for the Lime Hollow Well

Wellhead Protection Area Delineations
Town of Cortlandville

Appendix 2a - H2H Report in Response to CCSWCD Comments

H2H GEOSCIENCE ENGINEERING
179 River Street, Troy, NY 12180
518.270.1620
www.h2hg-e.com

January 23, 2020

Kathleen McGrath
Water Quality Specialist
Cortland County Soil and Water Conservation District
100 Grange Place, Room 202
Cortland, NY 13045

Via email: Kathleen.McGrath@cortlandswcd.org

Subject: **H2H's Response to SWCD's Response to Hydrogeologic Investigation Submittals**
Proposed Mine Permit Modification
Cortlandville Sand & Gravel Mine

Dear Ms. McGrath:

H2H has reviewed SWCD's response letter for the Baseline Quarters 1 & 2 Hydrogeologic Investigation Report and the Response to SWCD Comments that we submitted to the agencies on July 23, 2019. Our comments on the letter, a preliminary synopsis of recent findings, and proposed next steps are summarized below.

Background
The referenced hydrogeologic investigation report pertained to the first half (Q1 and Q2) of a one-year study[1] required by SWCD/NYSDEC in support of the permit modification application. Groundwater levels are typically high during this period compared to the last half of the year. The report indicated that the groundwater flow direction at the north end of the proposed mine pond is toward the northeast. The report concluded that the proposed mine pond would have de minimis hydraulic interaction with and impact to the Town's wells. The report provided the evidence upon which that statement was based. SWCD did not raise additional technical questions in its comment letter or request clarifications regarding the investigation.

USGS Model
Hydrogeologic Model - SWCD comments reference the 1996 U.S. Geological Survey (USGS) model. The USGS model was developed for a 6-square mile area of the aquifer that includes the site. The model predicts groundwater levels and flow directions under three different scenarios – high, average and low groundwater recharge/levels. A more recent Fact Sheet published by USGS in 2004 and based on the 1996 modeling shows the location and extent of the simulated contributing recharge area for the Lime Hollow Road wells during low recharge conditions (Figure 1). H2H considers the low recharge scenario most critical because the hydraulic gradient and the groundwater levels are both at their minimum levels. Since the radius of influence is a function of both hydraulic gradient and aquifer thickness, any impact to the Town's well that might occur would do so under these conditions, if at all.

The contributing area extends to the southwest and hydraulically upgradient of the municipal wells because of the water table that slopes toward the wells. This recharge area is generally parallel to the elongate-proposed mine pond. Three northeasterly aligned natural ponds are present between the contributing recharge area on the west and the proposed mine pond on the east. The 1996 USGS report text suggests (page 25) that the municipal well may induce some recharge from the nearest pond (North Pond) although this pond is shown outside the contributing area. Groundwater seepage from the North Pond normally flows to the northeast as stated in the H2H report.

Comparison of 2019 Groundwater Levels with USGS Simulations - H2H compared the observed 2019 groundwater levels with the USGS simulations. In general, the 2019 levels fell between the USGS's average and low recharge scenarios. The 2019 groundwater levels were generally less than the average USGS simulated groundwater levels, but higher than the low

[1] Data collection for this period was from February 5 through May 20, 2019.

recharge water levels. The lowest observed groundwater levels in 2019 were approximately 1160.5 feet in October 2019 in contrast to simulated USGS low level of approximately 1158 feet (Figure 2). The 2019 data fall within the simulated ranges.

Scenario for Mine Pond Water to Reach Municipal Wells Indirectly - The USGS model does not implicate the proposed mine pond area as a source of recharge to the municipal wells. However, H2H identifies a scenario whereby a limited amount of mine pond water could affect (recharge) the wells indirectly. In general, seepage at the north end of the proposed mine pond would recharge groundwater that would flow to the northeast. Seepage from the cove-like northwest corner of the mine pond, however, could recharge the south end of the North Pond located along the flow path to the northeast (Figure 1). Thus, depending upon the permeability of the bottom of the North Pond, some surface water from the proposed mine pond located more than 900 feet from the wells may indirectly eventually reach the wells under certain conditions per the USGS[2] report. Groundwater recharging the North Pond is diluted by precipitation recharge. Considering the distance involved and the complex surface water-to-groundwater-to-surface water-to groundwater-to well scenario. H2H infers that well recharge from this potential source would be de minimis, if at all likely. A scenario whereby the North Pond dries up during low groundwater levels is discussed later.

Effect of Fully-Developed Mine Pond – Groundwater levels would rise in the vicinity of the north half of the fully-developed mine pond by approximately 2.23 feet during high groundwater elevation conditions and 0.74 feet during low groundwater elevation conditions. Groundwater flow directions in this immediate vicinity would be directed away from the mine pond, but the lateral extent of this effect is uncertain. If groundwater levels are higher in the vicinity of MW-3S it is likely that the water level in the North Pond and the existing ponds to the south may be higher. This may be beneficial for the wetlands. The ponds could dry up less frequently and for shorter durations and could more frequently serve as a flow divide between the municipal wells and the proposed mine pond area. It is anticipated that the prevailing northeasterly flow directions would continue in the mine area, but the potential remains for some de minimis amount of groundwater recharge from the North Pond might flow to the municipal well as per the USGS report.

Wellhead Protection Area

SWCD's comment letter also referenced the wellhead protection area delineated in 2002 partly using the USGS model results. The mine lies within the delineated protection area, Zone 1A, which is possibly a reason for the request to conduct a hydrogeologic investigation in the first place. H2H understands that many factors and assumptions contribute to delineation of a wellhead protection area: political, economic, town planning, environmental and technical considerations. Generic NYS Department of Health guidelines and the presence of a nearby subdivision southwest of the municipal wells and an un-remediated (at that time) inactive hazardous waste site east of the municipal wells may have been considerations during the delineating process. H2H concurs that ordinarily, absent data to the contrary, well head protection area delineations should be conservatively expansive to ensure protection of public water supplies. The H2H report provided site-specific data that suggest that the extent of the well-head protection area is conservatively large relative to the mine site.

Recent Findings

Groundwater Quality - The Quarter 3 and 4 groundwater quality analyses are consistent with the Quarters 1 and 2 data. Considering that the proposed mine pond would be a groundwater flow-through pond, it is our opinion that lake water infiltrating and becoming groundwater would be indistinguishable from the municipal well water. In other words, the quality of groundwater, if any, flowing from the proposed mine pond is expected to be essentially the same as the untreated municipal well water.

Groundwater Flow Directions - H2H is continuing to evaluate the data for Quarters 3 and 4 which includes the seasonal low groundwater level period (Figure 2). Using customized software, H2H has calculated the apparent groundwater flow direction for the three monitoring wells, MW-2S, MW-3S, MW-3D, and MW-4S, nearest the municipal wells (Figure 3). These flow directions were calculated at 10-minute intervals for each water level measurement for the available period of

[2] In this scenario the North Pond would be associated with a water flow divide – some flow northeast and some flow west.

record[3]. A rose diagram was developed to summarize the average daily flow directions during the monitoring period (Figure 3a). The new data is consistent with the H2H and USGS hydrogeologic reports in indicating predominantly northeasterly groundwater flow in the site area adjacent to the wells as indicated in the groundwater contours (Figure 1). The flow direction varies from north 13 degrees east (NNE) to north 31 degrees east (NE). Such flow would not affect the municipal wells.

Drawdown Effects in MW-3S from Municipal Well Pumping - Careful analysis made possible by the use of the continual high-resolution 10-minute water level measurement interval reveals that the water level in monitoring well MW-3S may be very slightly (less than 2 inches) affected by municipal well drawdown when ambient groundwater levels were lowest and (inferred) municipal well drawdown greatest. Well MW-3S is the closest monitoring well to the closest municipal well, no.7. It is located 910 feet away. MW-3S represents the closest location that infiltrated mine pond seepage would approach the municipal wells.

The municipal well's apparent effect on water levels at MW-3S is based on two lines of evidence. First, transient un-sustained 4.8-inch spikes of water levels are observed only in MW-3S and may be related to abrupt water level disturbances from pump startup/shutdown and low water levels in the well (Figure 4). Second, the counterclockwise rotational shift of the calculated apparent net flow directions during the period of low groundwater associated with relatively lower water levels at MW-3S (Figure 3). The apparent drawdown effect appears to be associated with calculated apparent flow directions east of north 13 degrees east. This unique period occurred discontinuously for 14 days over an approximately 3-week period during late October and early November (October 23 – November 14). The magnitude of the observed drawdown effect was typically on the order of only 1.8 inches with a maximum of 3 inches during a one-hour period on the morning of Sunday, October 27[4] during the World Series. These magnitudes are considered negligible and beyond the practical edge of the radius of influence which is taken as 1 foot of drawdown. The North Pond was dry during this period as expected because of the low groundwater levels. A drawdown effect (approximately 2.4 inches) was also observed at MW-3S briefly on the morning of September 2, 2019, Labor Day, which H2H infers was another period of unusually high pumping.

Drawdown Effect at Other Well Locations - The drawdown effect was not observed at MW-2S or MW-4S where northeasterly flow likely persisted during these periods. Monitoring wells MW-2S and MW-4S are substantially more distant from the municipal well than MW-3S and well beyond its radius of influence.

Shallow Groundwater Flow Rate and Travel Time to Municipal Well - It can be estimated how far the shallow groundwater at MW-3S may have migrated toward the municipal wells and contributing recharge area during this 3-week time period assuming that groundwater flow was directly toward the wells[5]. The required parameters are hydraulic conductivity, maximum drawdown in nearest municipal well, estimated well efficiency, aquifer drawdown at the municipal well, hydraulic gradient, effective porosity, pumping duration of interest, distance of MW-3S from the nearest municipal well (No. 7), and distance of MW-3S to the nearest edge of the USGS contributing recharge area under low flow conditions. Estimated parametric values are:

- **Hydraulic conductivity** – 880 ft/day as described in the 1996 USGS report for the Lime Hollow Road well; based on data in the 1996 USGS report the average hydraulic conductivity for the unconfined outwash aquifer is 786 ft/day, 12 percent lower than estimated for the municipal well[6].
- **Maximum drawdown in municipal well no**. 7 – 11 feet, based on the maximum difference of static and pumping water levels observed in the well during first quarter 2019;
- **Well efficiency** – 75%, a typical estimate for a gravel-packed well in an unconfined aquifer;
- **Aquifer drawdown** – 8.25 feet, based on the maximum apparent drawdown observed and estimated well efficiency, i.e. 11.0 feet / 0.75;

[3] Over 40,000 data points through November 20, 2019.
[4] Apparent flow direction was north 7 degrees west.
[5] Darcy equation: Groundwater flow velocity = hydraulic conductivity x hydraulic gradient / effective porosity.
[6] High estimate of hydraulic conductivity leads to overestimated flow rate and travel distance, and underestimated travel time to the municipal well.

- **Hydraulic gradient from MW-3S to well no. 7** - 0.0091 based on the estimated maximum drawdown in the aquifer at the municipal well no. 7, and a distance of 910 feet, i.e. 8.25 feet / 910 feet.
- **Effective porosity** – 0.30, as described in the H2H hydrogeologic report.
- **Pumping duration** – 14 days, the number of days during the three-week period in October-November during which MW-3S is suspected of being affected by the municipal well pumping.
- **Distance to well no. 7** – 910 feet, scaled from H2H site plan map.
- **Distance to near edge of contributing recharge area** – 520 feet, scaled from USGS map.

The estimated maximum groundwater flow velocity would be 26.7 ft/day ((880 ft/day x 0.0091) / 0.30). Travel distance during a 14-day period would be approximately 374 feet, or 40 percent of the distance to the nearest municipal well. At other times the groundwater flow would revert to northeasterly. The distance from MW-3S to the simulated USGS contributing area is approximately 520 feet, which is also beyond the estimated flow distance. Despite the conservative assumptions, groundwater from the MW-3S area would fall well short of reaching the contributing area and the municipal well. Although MW-3S appears to have been located at the fringe of the municipal well's radius of influence during a brief transient three-week period under low groundwater conditions, it was not within the municipal well's capture zone.

Comparison of Shallow and Deep Groundwater Levels at MW-3 - H2H compared water levels in shallow well MW-3S, which screens the upper part of the aquifer, with its adjacent deeper well, MW-3D, which screens the lower part of the aquifer at the same horizon as the municipal wells. The apparent municipal well-induced drawdown effect is not observable in the deeper well data (Figure 4). Drawdown at the municipal production wells on the order of 11 feet or less is apparently restricted to the upper part of the aquifer included within MW-3S's screened interval. The drawdown effect is not observed in the MW-3D data. The reason for the difference is uncertain at this time. Review of concurrent municipal well pumping records may shed light on the causes. Possibilities include but are not limited to one or more of the following possible conditions:

- The drawdown effect at the distance of MW-3 from the municipal well only occurs in the shallow part of the aquifer;
- The relatively low magnitude and short duration of the drawdown effect do not exceed thresholds needed to transmit the effect from the upper to the lower part of the aquifer;
- Aquifer anisotropy (horizontal hydraulic conductivity is estimated as 10 times greater than vertical hydraulic conductivity) damps transmittal of near surface drawdown effects to the deeper part of the aquifer, e.g. relatively low sub-horizontal hydraulic conductivity seams may be present; or
- The effective radius of influence is smaller for the deep part of the aquifer because of greater hydraulic head attenuation with distance than the shallower parts of the aquifer possibly because of lower hydraulic conductivity.

Regardless of the operative conditions, it appears likely that groundwater flow in the deeper part of the aquifer adjacent to the municipal well intakes may persist in a northeasterly direction. In this case, well recharge water would not be affected by groundwater recharge from the vicinity of MW-3 or the proposed mine pond. It follows that the contributing area simulated by USGS for low recharge conditions is the area from which deeper groundwater directly recharges the municipal wells under high pumping rate conditions.

Effect of Mine Pond Water on Municipal Wells – It is improbable for any pond water to reach the municipal wells. Even if it did, the amount of intercepted mine pond seepage groundwater flowing to well no. 7 would be de minimis. Groundwater flows into the well's cone of depression radially from all directions. Groundwater from the direction of the mine would represent only a very small fraction of the inflow and would be diluted by a factor that generally depends upon the ratio of the mine water flow path width to the circumference of the cone of depression.

Concluding Remarks

The hydrogeologic data collected to date provide insight into the local hydrogeologic conditions. H2H maintains a technical position that the proposed mine pond would have a minimal inconsequential hydraulic interaction with and effect on the Town's wells. The potential for significant adverse impacts to the municipal well would be negligible.

To recap, the lines of evidence suggesting inconsequential effect include:

1. The contributing recharge area based on the USGS low flow condition simulations shows no connection with the proposed mine pond's flow path;

2. The complex hypothetical water flow path from the proposed mine pond to the municipal wells shows no direct connection;

3. The high potential for the existing ponds to serve as a recharge source (boundary) for the municipal wells;

4. The anticipated high quality of the proposed mine pond surface water;

5. The prevailing northeasterly groundwater flow direction in the proposed mine pond area as measured;

6. The transient low-amplitude water level disturbances (drawdown?) at MW-3S with incomplete flow pathway to nearest municipal well;

7. The discontinuity between the water level disturbance (drawdown?) effects in the shallow and deep parts of the aquifer; and

8. The dilution of potential mine pond water recharge to the municipal well because of precipitation recharge to the North Pond and the relatively narrow width of the inferred mine pond seepage water's transient hypothetical flow path toward the nearest municipal well.

Next Steps

H2H plans to complete the one-year hydrogeologic investigation and address all the data from all four quarters, especially the last two. One more site visit is planned for February 2020 to retrieve the water level recorder data. A report addendum will be issued in late winter that updates the findings and includes recommendations for long-term monitoring.

We would be happy to discuss this with you further. If you have any questions regarding this information, please contact me at 518.270.1620 ext. 115, or Rich Hisert at ext. 105.

Sincerely,

H2H Geoscience Engineering, PLLC

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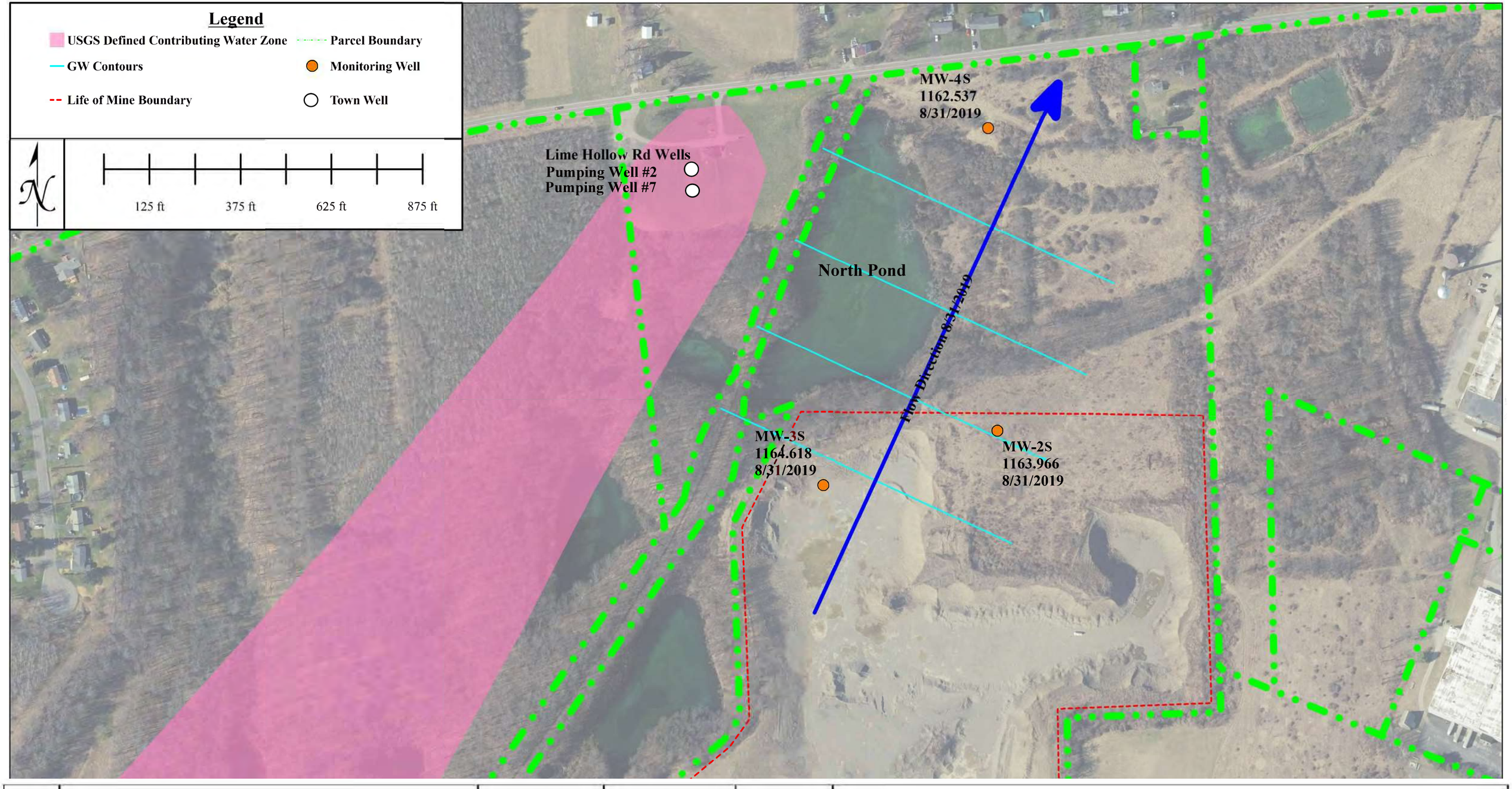
Senior Project Engineering Geologist

William J. Oakes III
Project Geologist

Attachments as noted

c. Chris Henry, Rt 13 Rocks LLC
Joe Dlugolenski, Thomas Rigley, Region 7, NYSDEC
Amanda Barber, Cortland SWCD
John Proud, Town of Cortlandville
Mike Polacco, Will Oakes, Richard A. Hisert, PhD, P.G., H2H



DATE	REVISIONS RECORD/DESCRIPTION

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY:	WJO
CHECKED BY:	JG
DATE:	1/20/2020

Groundwater Flow Direction Under Mean Flow Conditions

Cortlandville Sand and Gravel

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H Geoscience Engineering

TROY, NY WWW.H2HASSOCIATES.COM

Figure 1

SHEET 1 OF 1

Figure 2 - Cortlandville Sand and Gravel - Hydrographs - 2/6/2019-11/20/2019

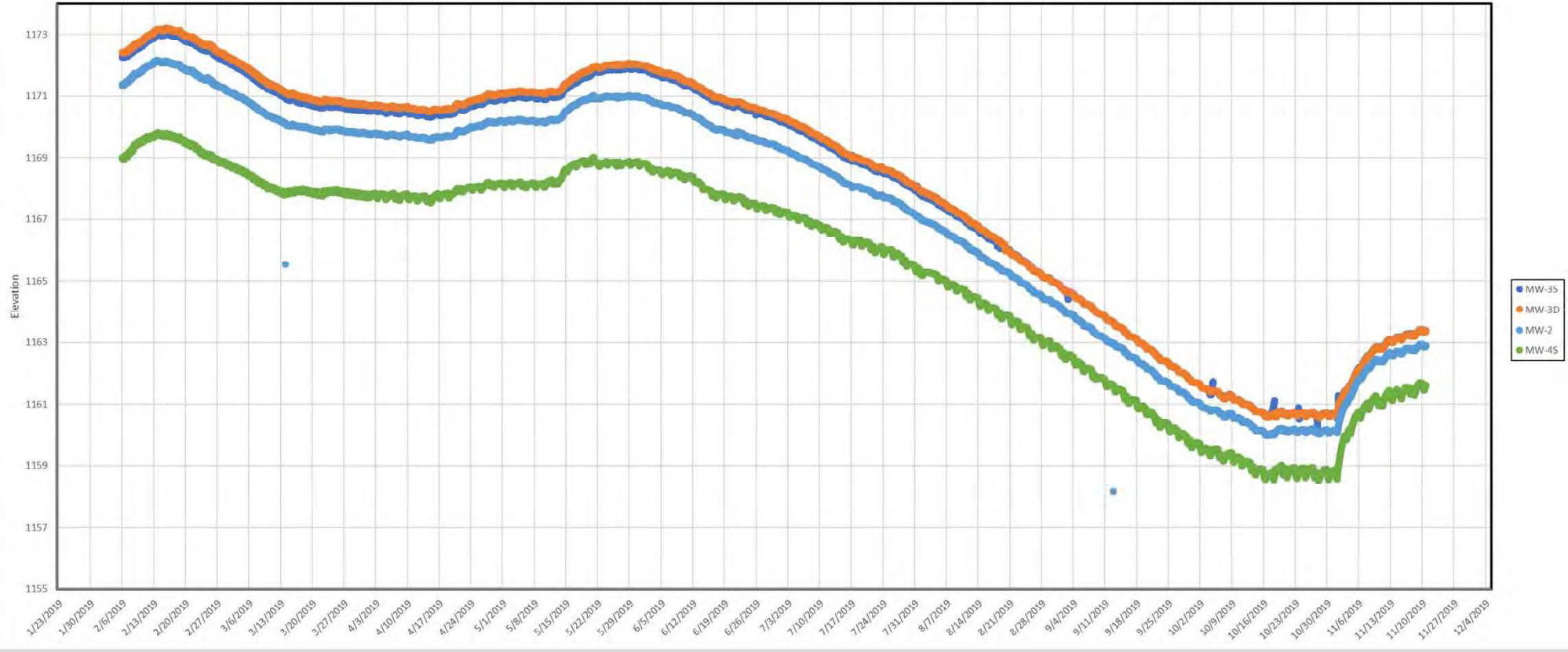


Figure 3 - Groundwater Flow Direction

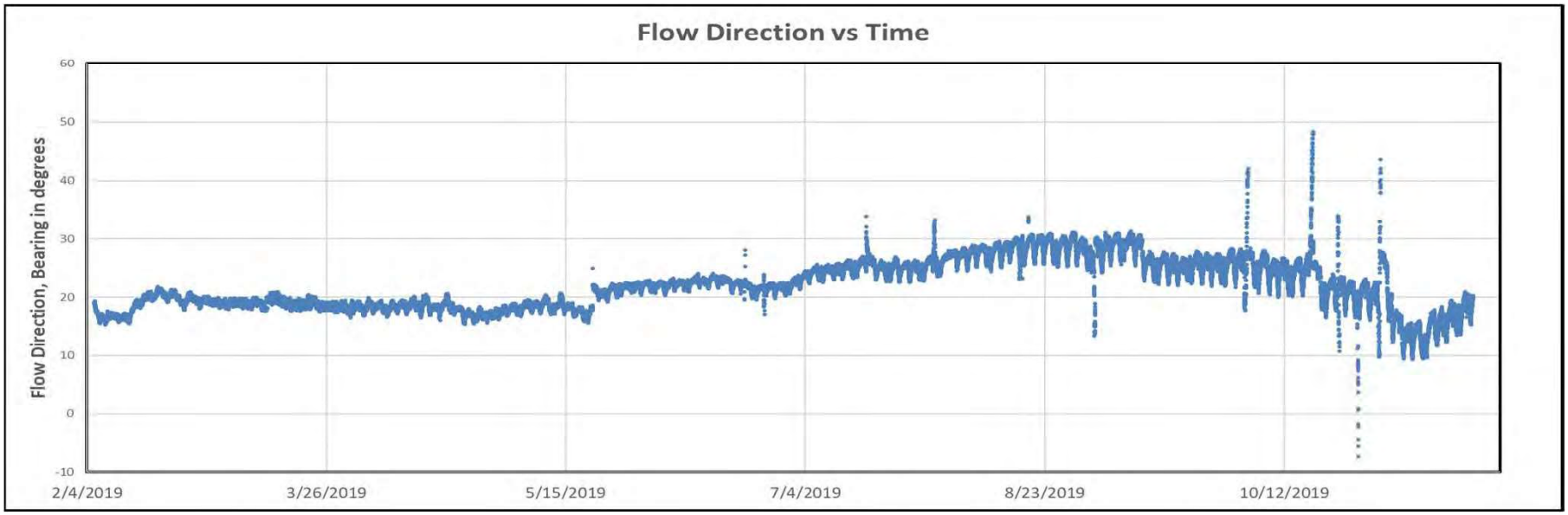
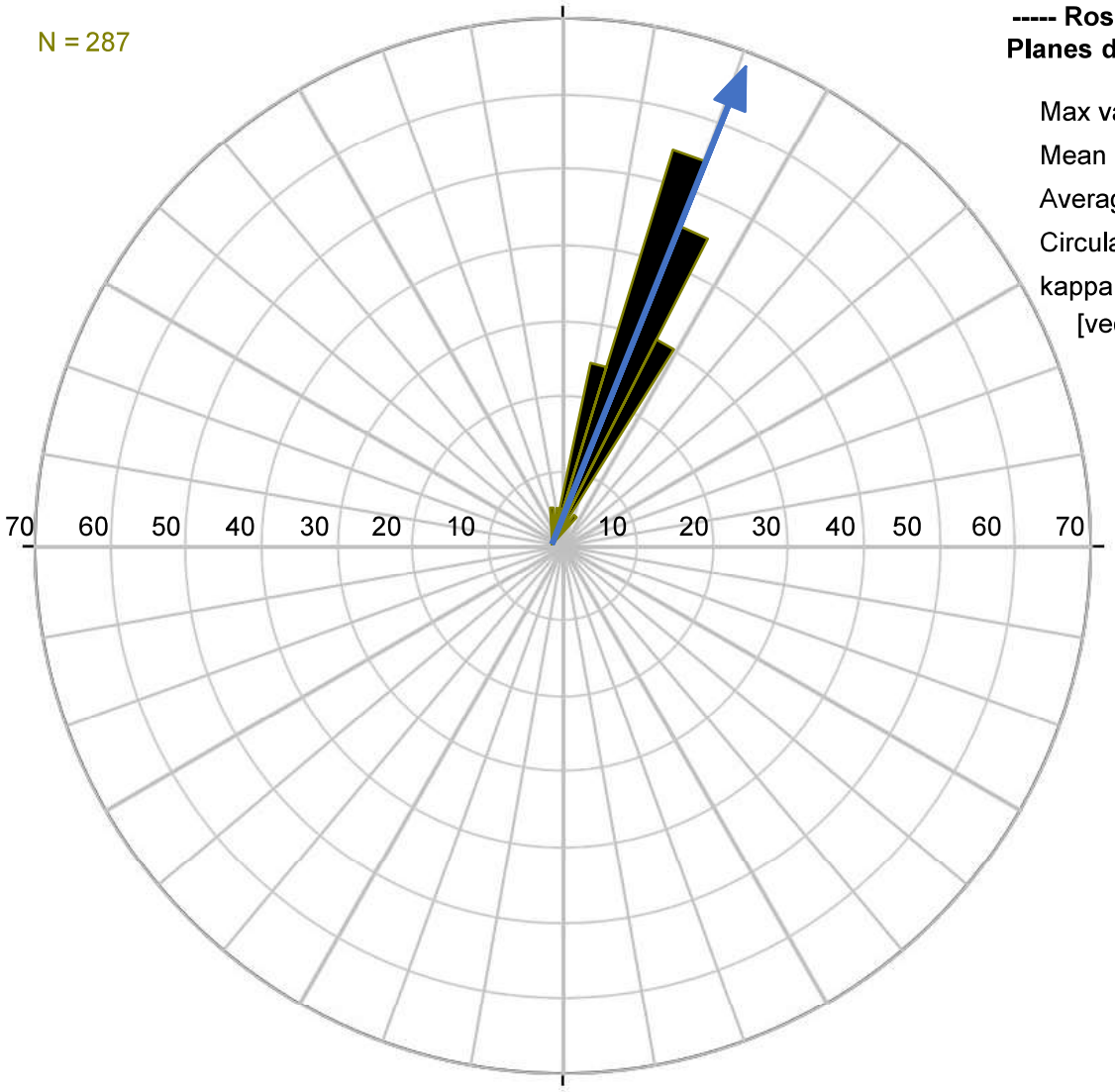


Figure 3a - Groundwater Flow Direction

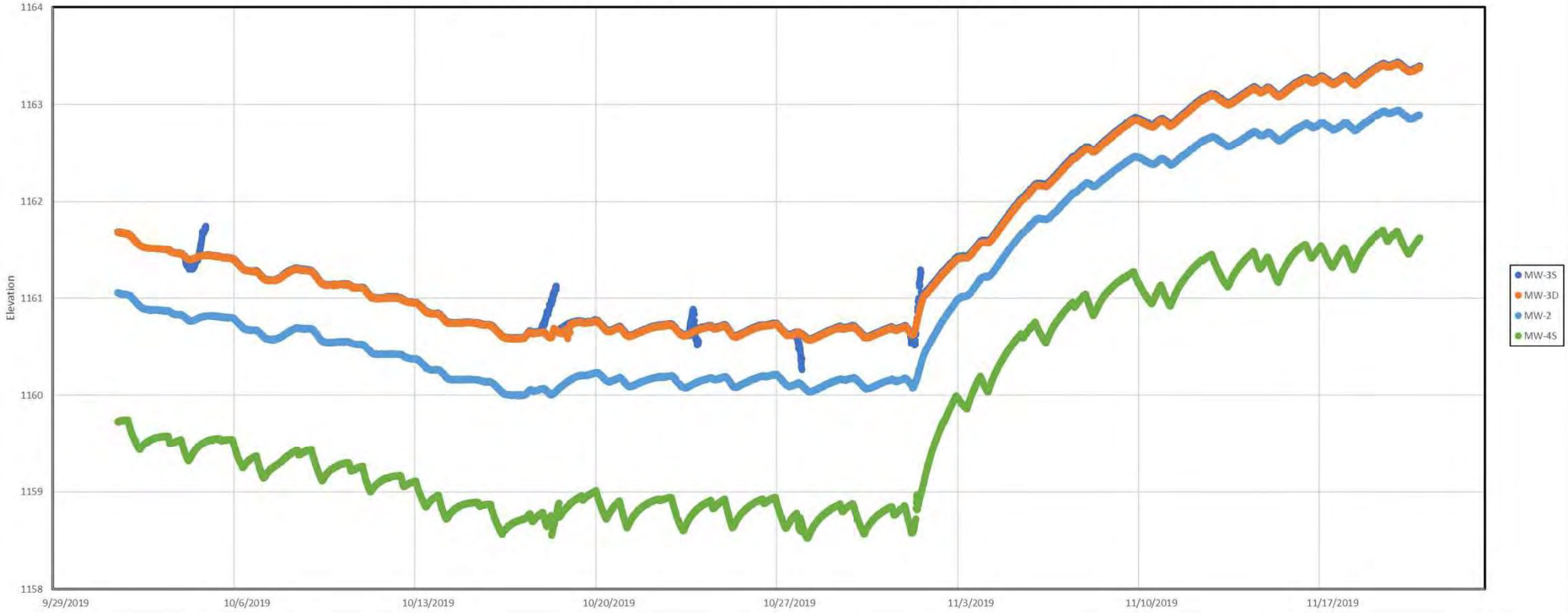


----- Rose diagram/Circular Histogram | 1/16/2020 -----
Planes data set (petals parallel Flow direction):
MW-3S, MW-4S, MW-2

Max value	= 37.6% between 016° and 020°
Mean Vector	= 021.9° ± 00.3°
Average Length	= 0.9971
Circular Variance	= 0.0029
kappa	= 100.

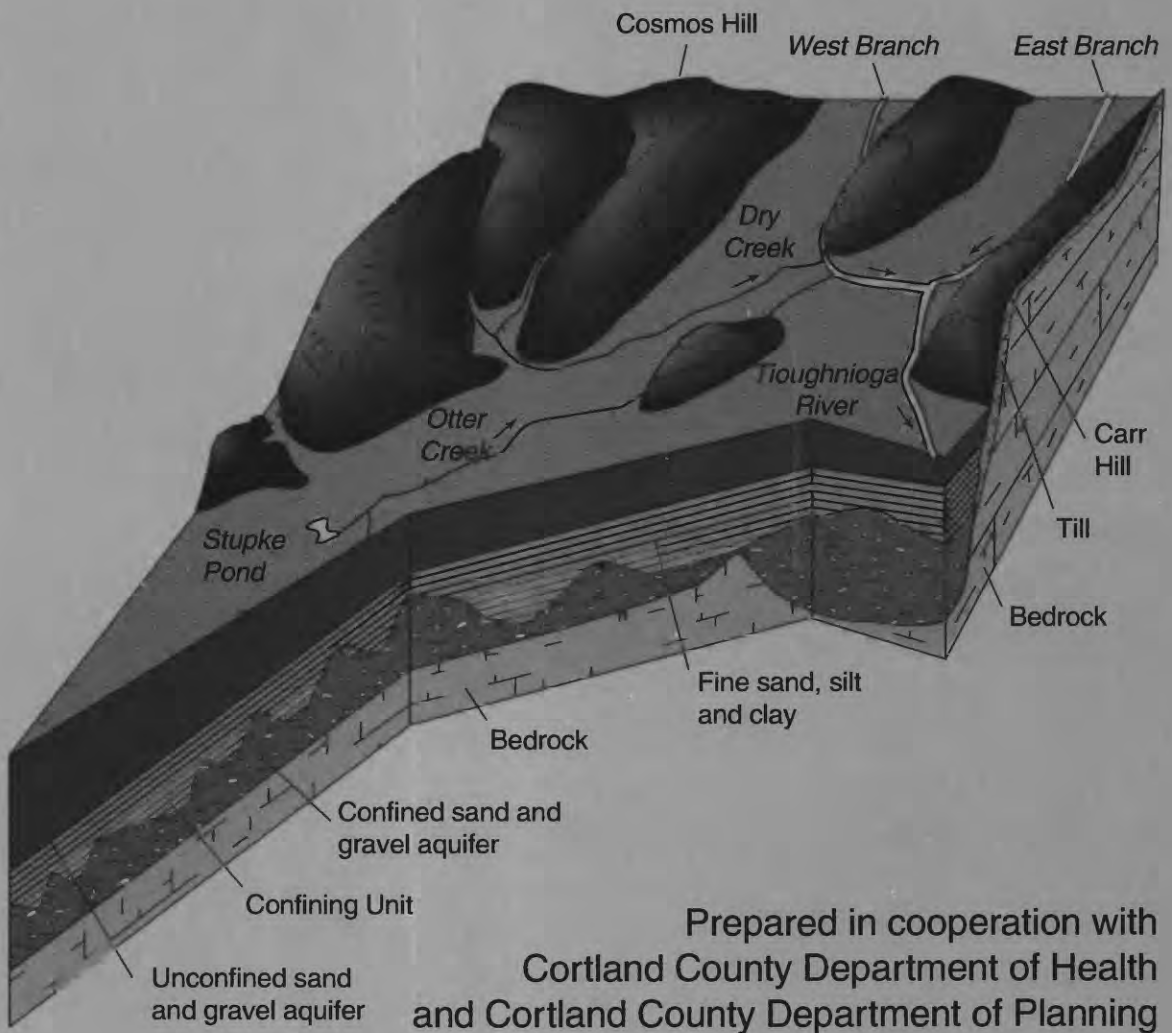
[vector mean; uncertainty is 1 standard error,
for 95% confidence level multiply by 1.96]

Figure 4 - Cortlandville Sand and Gravel - Hydrographs - 10/1/2019-11/20/2019



Appendix 3 – USGS WRI 96-4255

HYDROGEOLOGY, WATER QUALITY, AND SIMULATION OF GROUND-WATER FLOW IN A GLACIAL-AQUIFER SYSTEM, CORTLAND COUNTY, NEW YORK



Prepared in cooperation with
Cortland County Department of Health
and Cortland County Department of Planning

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U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 96-4255

Hydrology, Water-Quality, and Simulation of Ground-Water Flow in a Glacial Aquifer System, Cortland County, New York

By Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 96-4255

Prepared in cooperation with the
CORTLAND COUNTY DEPARTMENT OF HEALTH
CORTLAND COUNTY DEPARTMENT OF PLANNING



Ithaca, New York
1998

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

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CONTENTS

Abstract 1
Introduction 2
Purpose and Scope 3
Previous Investigations 3
Methods of Investigation 3
Well Inventory, Test Drilling, Levels, Water-Level Measurements, and Aquifer Test 4
Streamflow Measurements 4
Seismic-Refraction Surveys 4
Water Sampling and Analysis 4
Simulation Models 5
Description of the Study Area 5
Physiography and Bedrock Geology 5
Climate 6
Land Use 8
Acknowledgments 9
Hydrogeology 9
Glacial Geology 10
Bedrock Scouring 10
Kames and Kame Terraces 12
Valley Heads Moraine System 15
Proglacial Lakes and Lacustrine Deposits in Valleys 15
Glaciofluvial Sediments (Outwash) of the Valley Heads Episode 16
Ice Readvance and Drainage of Proglacial Lake During Late Stages of Deglaciation 16
Hydrology of the Glacial-Aquifer System 17
Geometry of Aquifers and Confining Unit 18
Hydraulic Conductivity 18
Unconfined Aquifer 19
Confined Aquifer 20
Confining Unit 20
Ground-Water Levels and Flowpaths 21
Unconfined Aquifer 21
Confined Aquifer 21
Sources of Recharge 22
Direct Infiltration of Precipitation on the Valley 22
Upland Sources 22
Induced Infiltration by Ground-Water Withdrawals 25
Infiltration from Recharge Basins 25
Ground-Water Discharge 25
Seepage to Streams 25
Municipal and Industrial Withdrawals 26
Underflow From the Study Area 26
Water Quality 26
Volatile Organic Compounds 28
Extent and Migration of Trichloroethylene in the Unconfined Aquifer 28
Horizontal Migration 28
Vertical Migration 29
Effects of Remediation Efforts 29
Long-Term Trends of Trichloroethylene Concentrations 35
Fate and Migration of Trichloroethylene 35
Inorganic Chemical Constituents and Physical Characteristics 38
Specific Conductance, pH, and Alkalinity 38
Chloride and Sodium 38
Trace Elements (Iron and Manganese) 39
Nitrogen 41
Temporal Changes 42
Ground-Water Chemistry and Land Use 42

Simulation of Ground-Water Flow 45
Description and Design of Numerical Model 45
Model Grid 47
Geometry of Model Layers 47
Hydraulic Conductivity 48
Unconfined Aquifer 48
Confined Aquifer 48
Stream-Aquifer Interaction 48
Boundary Conditions 49
Ground-Water Withdrawals and Recharge Basins 50
Model Calibration 50
Model Sensitivity 56
Model Applications 58
Areas Contributing Recharge to Municipal Wells 58
Flowpaths to Wells and Streams from Sources of Contamination 59
Typewriter Plant 59
Superfund Site 59
Summary 61
References Cited 64

APPENDIXES

1. Records of wells and test borings in the Cortland, N.Y., study area 67
2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area 75
3. Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area 81

PLATES

1-5 Maps of Cortland, N.Y. study area showing:
1. Well locations and surficial geology in a glacial-aquifer system.
2. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during high-recharge conditions in the unconfined glacial aquifer, Cortland, New York
3. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during average-recharge conditions in the unconfined glacial aquifer, Cortland, New York
4. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during low-recharge conditions in the unconfined glacial aquifer, Cortland, New York
5. Finite-difference grid and boundaries used to model the glacial-aquifer system

FIGURES

1. Map showing location and principal geographic features of study area, Cortland County, N.Y 2
2. Map showing physiographic features of New York 6
3. Diagram showing geologic time scale and when geologic units in the study area were formed 7
4. Graph showing annual precipitation at Cortland, 1973-92 8
5. Graph showing monthly precipitation and departure from normal at Cortland, from January 1990 through May 1993 9
6. Map showing preglacial drainage in study area 10
7. Hydrogeologic sections:
A. Section A-A′ 11
B. Section B-B′ 12
C. Section C-C′ 13

D. Section D-D' 14
8. Map showing bedrock surface altitude in Cortland study area 14
9. Map showing location of Valley Heads ice and moraines that dammed drainage in valleys of the Tioughnioga River basin 15
10. Map showing upper surface altitude of lacustrine unit in Cortland study area 17
11. Map showing positions of the Valley Heads ice, and of outwash that was deposited in valleys of the Tioughnioga River basin 18
12. Block diagram showing generalized hydrogeologic framework of the glacial-aquifer system in the Cortland study area 19
13. Block diagram showing sources of recharge to stratified drift in valleys in the glaciated Northeast 24
14. Map showing locations of streamflow-measurement sites in Cortland study area 27
15. Maps showing extent of trichloroethylene plume and contours of equal trichloroethylene concentration in Cortland study area:
A. April 3-5, 1990 30
B. September 17-20, 1990 31
C. April 27, 1993 32
16. Diagrams showing vertical distribution of TCE in ground water at two well sites: A. Well 341, 4,000 feet northeast of TCE source, July 19, 1990. B. Well 381, 750 feet from TCE source, September 23-26,1992 33
17. Graphs showing trichloroethylene concentration at three wells: A. Well 350, November 4, 1986-May 20, 1993. B. Well 347, December 12, 1986-May 20, 1993. C. Well 364, December 12, 1986-April 29, 1993 34
18. Diagram showing physical, chemical, and biological processes that affect the fate and distribution of trichloroethylene in the unconfined aquifer at Cortland 36
19. Diagram showing transformation pathways of trichloroethylene under anaerobic conditions 37
20. Graph showing dissolved chloride concentrations in water from wells at the City of Cortland well field for 1943-76, 1980, and 1990 41
21. Map showing distribution of dissolved chloride concentration in the unconfined aquifer in the Cortland area, April 1990 41
22. Boxplots showing concentration of alkalinity, dissolved calcium, nitrite plus nitrate, and dissolved chloride from selected wells in the Cortland, study area in 1976, 1980, and 1990:
A. By year. B. By land use 44
23. Geohydrologic section showing conceptual model of ground-water flow in the glacial-aquifer system in the Cortland study area 46
24. Maps showing location of active and inactive grid boundaries in layers 1-3 of the three-dimensional ground-water flow model in the Cortland study area 47
25. Maps showing simulated head for in model layers 1-3 during steady-state simulations:
A. high-recharge conditions 53
B. average-recharge conditions 54
C. low-recharge conditions 55
26. Graph showing results of sensitivity analyses for hydraulic head in the glacial-aquifer system in Cortland study area 56
27. Graphs showing results of sensitivity analyses for ground-water discharge to major streams during average recharge conditions in the glacial aquifer system in the Cortland study area:
A. West Branch Tioughnioga River B. Reaches A and B of Tioughnioga River 57
28. Maps showing flowpaths and traveltimes of ground water from two sources of contamination in Cortland study area during (A) high-, (B) average-, and (C) low-recharge conditions 60

TABLES

1. Land use in the Otter Creek-Dry Creek basin, Cortland County, N.Y., 1992 8
2. Results of aquifer tests in the glacial-aquifer system in the Cortland, N.Y. study area 20
3. Streamflow losses and gains in tributary streams in the Cortland study area, 1990-91 23
4. Ground-water discharge to West Branch Tioughnioga River, Tioughnioga River, and to Otter Creek during average- and low-flow conditions, 1991 25

5. Ground-water withdrawals from the Cortland study area by major pumping wells during low-, average-, and high-recharge conditions, 1990-91 27
6. Range of half-lives for trichloroethylene and its degradation products 38
7. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland study area during April and September 1990 39
8. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during: A. April 1990. B. September 1990 40
9. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water sampled during three studies in Cortland, N.Y. study area 43
10. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water in the Cortland, N.Y. study area, by land use 45
11. Difference between measured and simulated heads at 49 selected wells in the Cortland, N.Y. study area for high-, average-, and low-recharge conditions 51
12. Measured and simulated streamflow gains and losses, for selected stream reaches during high-, average-, and low-recharge conditions in the Cortland, N.Y. study area 52
13. Steady-state water budgets for the glacial-aquifer system at Cortland N.Y, for high-, average-, and low-recharge conditions 52

CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To Obtain
	Length	
inch (in.)	2.54	centimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Slope	
foot per mile (ft/mi)	0.1894	meter per kilometer
foot per foot (ft/ft)	0.3084	meter per meter
	Area	
square mile (mi^2)	2.590	square kilometer
acre	0.40483	hectare
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
inch per year (in/yr)	25.4	millimeter per year
million gallons per day (Mgal/d)	3.785	cubic meters per day
gallons per minute (gal/min)	0.06309	liter per second
feet per day	0.3084	meter per day
	Temperature	
degrees Fahrenheit (°F)	°C = 5/9 (°F-32)	degrees Celsius

Specific Conductance

microsiemens per centimeter at 25° Celsius (µS/cm)

Equivalent Concentration Terms

milligrams per liter (mg/L) = micrograms per gram (mg/g) = parts per million
micrograms per liter (µg/L) = micrograms per kilogram (µg/kg) = parts per billion

Vertical Datum: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York

By Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller

Abstract

The glacial-aquifer system in Cortland County consists of an unconfined sand and gravel aquifer 40 to 80 feet thick, underlain by a lacustrine and till unit 1 to 155 feet thick that, in turn, is underlain by a confined sand and gravel aquifer 1 to 170 feet thick. The two aquifers are hydraulically connected in some places along the valley walls where the confining layer is absent.

Water in the unconfined aquifer generally moves from areas of recharge along the valley walls toward the center of the valley, then flows northeastward down the Otter Creek-Dry Creek valley and discharges to pumping wells, the West Branch Tioughnioga River, and the Tioughnioga River. Water is pumped from the unconfined aquifer at municipal and industrial wells at a rate of 6.76 to 7.20 million gallons per day.

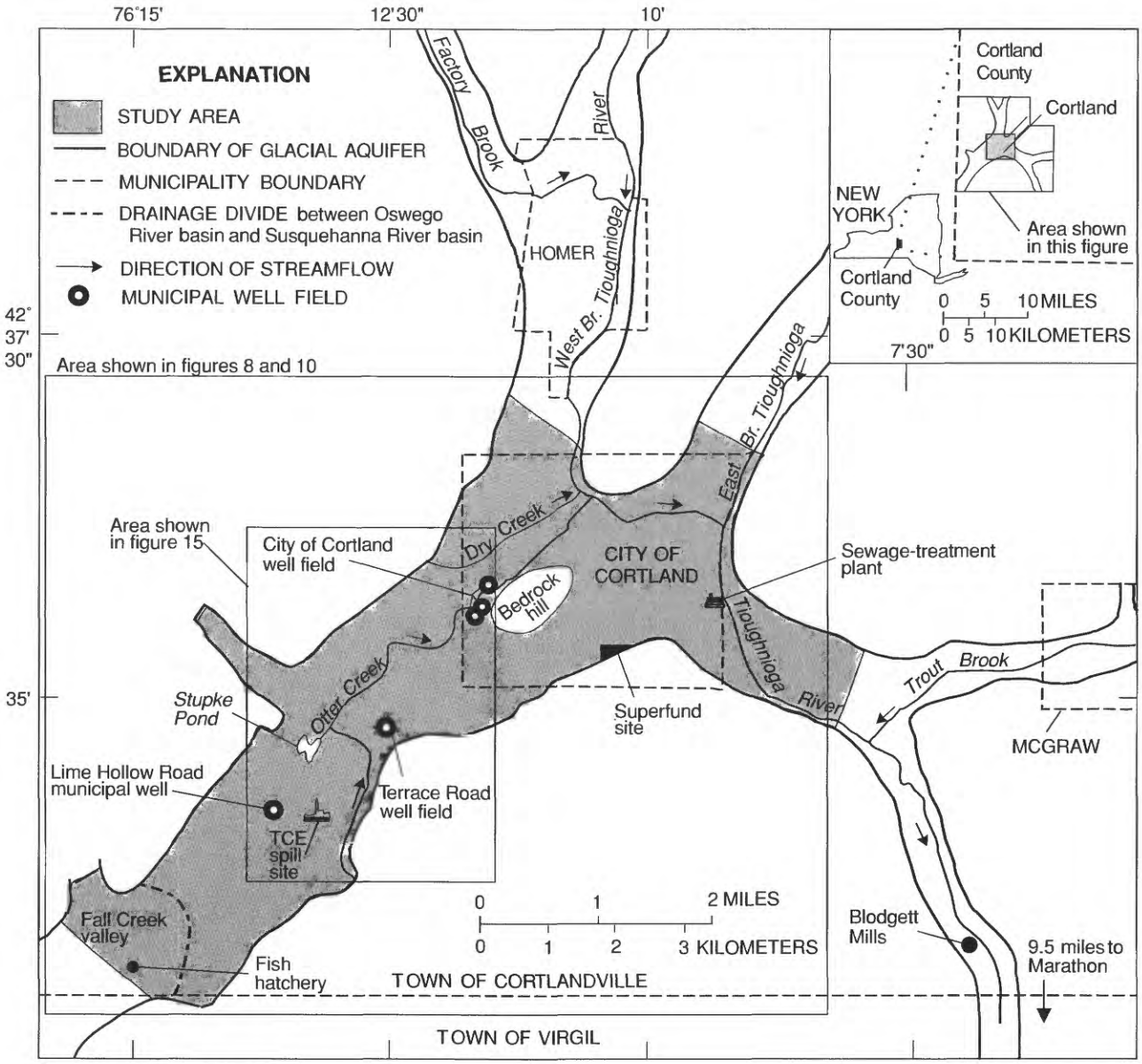
Trichloroethylene (TCE) that was detected in water samples from several wells in 1986 was considered a threat to municipal-water supplies. Results of ground-water sampling in April and September 1990 and in April 1993 indicated that a TCE plume, as defined by concentrations equal to or greater than 5 micrograms per liter, had migrated 1.25 miles northeastward in the unconfined aquifer from a spill area at a typewriter production plant in the west-central part of the aquifer. The extent of the plume was the same in all three sampling periods, indicating that steady-state conditions had been reached. TCE concentrations were below the U.S. Environmental Protection Agency's "Maximum Contaminant Level" of 5 micrograms per liter 1 mile upgradient from the City of Cortland municipal wells, which are 2.25 miles downgradient (northeast) of the spill area. Inorganic- and organic-chemical analyses of ground-water samples collected during April and September 1990 indicate that water generally meets New York State drinking-water standards except in the part of the unconfined aquifer that is contaminated by TCE.

A ground-water flow model (MODFLOW) was used to simulate high-, average-, and low-recharge conditions in the aquifer system, and a particle-tracking routine (MODPATH) was used with output from the flow model to estimate the area contributing water to municipal wells and to delineate flowpaths of ground water from two sources of contamination. The simulated water budgets indicate that the largest source of recharge to the aquifer system (55 to 58 percent of total recharge) is from the uplands; this recharge includes seepage losses from upland streams that flow onto the aquifer, and unchanneled runoff and ground-water inflow from the uplands. The second-largest source of recharge is precipitation (33 to 39 percent of total recharge) that directly falls over the aquifer. Most ground-water discharge (57 to 71 percent of total) occurs as seepage from the aquifer system into streams, and some (26 to 40 percent of the total) occurs as discharge to pumping wells. Results of particle-tracking analyses indicate that the contributing areas are U-shaped and extend over most of the aquifer upgradient from the pumping wells. The largest contributing areas were obtained in the simulation of low-recharge conditions, and the smallest areas were obtained in the simulation of high-recharge conditions. Ground-water flowpaths from sources of contamination shifted southward in the low-recharge simulation in response to changes in the distribution of recharge.

INTRODUCTION

Glacial aquifers are the principal sources of water for many communities in upstate New York, but the high permeability and shallow depth to the water table in these aquifers make them highly susceptible to contamination. Potential contamination sources can include leaking petroleum-product storage tanks, leachate from landfills and septic systems, road-deicing salts, agricultural pesticides and fertilizers, and chemical spills (such as solvents and degreasers) at commercial and industrial facilities. Protection of these aquifers from contamination is critical in areas where ground-water use is great and alternative sources of drinking water are not readily available. Water managers need information on (1) the size and location of the areas that contribute recharge to their public-supply wells, and (2) the direction and rate of flow of ground water from known or potential sources of contamination, to protect the quality of the water.

The City of Cortland and surrounding communities obtain water supplies from a highly productive glacial aquifer system (fig. 1). This system has been designated as a "Primary Aquifer" by the New York



Base from U.S.Geological Survey
1:62,500 series: Cortland (1903) and Groton (1903)

Figure 1. Location and principal geographic features of study area, Cortland County, N.Y.

State Department of Environmental Conservation and as a "Sole Source Aquifer" by the U.S. Environmental Protection Agency (EPA) under the Safe Drinking Water Act.

Several parts of the glacial-aquifer system have been contaminated by: (1) solvents and degreasers, including trichloroethylene (TCE), trichloroethane (TCA), and dichloroethylene (DCE); (2) gasoline that leaked from tanks from at least two service stations; (3) bacteria from failing septic systems; and (4) leachate from inactive hazardous-waste sites. Concentrations of chloride and nitrate in the aquifer generally meet State standards for drinking water but have been steadily increasing since the 1950's as a result of road salt, lawn and garden fertilizers, and leachate from septic systems (Buller and others, 1978).

A study of ground-water contamination (O'Brien and Gere Engineers, Inc., 1987) at a typewriter-production plant in the western part of the aquifer, at which solvents and degreasers were found, resulted in a legal settlement that included funds to study the hydrogeologic framework of the aquifer, the migration of contaminants from the site, and the investigation of other possible sources of offsite contamination. In 1989, the U.S. Geological Survey (USGS), in cooperation with the Cortland County Departments of Health and Planning, began a 3 1/2-year hydrogeologic, water-quality, and numerical modeling study of the glacial-aquifer system in Cortland County. Major objectives of the study were to increase knowledge on how the aquifer system works; provide a numerical ground-water flow model to help manage the ground-water resource; and to determine (a) the extent of a TCE plume, (b) the current ground-water quality in the aquifer, (c) changes (if any) in water quality during the 15-year period since wells were sampled by Buller and others (1978), and (d) whether the ground water meets New York State drinking-water standards.

Purpose and Scope

This report describes the hydrogeology of the glacial-aquifer system including (1) the geologic framework; (2) the ground-water flow system, including ground-water and surface-water interaction, water levels, and water budgets; (3) the water quality, with an emphasis on the extent, trends, and fate of TCE; and (4) results of model simulations of ground-water flow for high-, average-, and low-recharge conditions, including (a) the estimation of recharge areas to municipal wells, and (b) the advective flowpaths of contaminants migrating from sources of contamination. Also included are (1) geologic sections; (2) maps and diagrams depicting well locations, geology, ground-water levels, and direction of ground-water flow for measured and simulated high-, average-, and low-recharge conditions; recharge areas to public water supplies, concentrations of TCE and several other selected chemical constituents, and flowpaths and traveltimes of contaminants; and (3) tables of climate and land-use data, well records, a water budget, and data on hydraulic properties of the aquifers and on water quality.

Previous Investigations

USGS investigations of glacial aquifers in Cortland County began when Asselstine (1946) identified sources of ground-water supplies and collected well and water-quality data. Randall (1972) collected well and test-boring records in the study area. Buller and others (1978) and Miller and others (1981) studied surficial geology, movement of ground water, and water quality in the Otter Creek-Dry Creek valley. Cosner and Harsh (1978) constructed a two-dimensional ground-water model of the glacial aquifer in the Otter Creek-Dry Creek valley; this model was later modified by Reynolds (1985).

Several hydrogeological and engineering consultants conducted site-specific studies at chemical-spill sites in the study area. O'Brien and Gere Engineers, Inc. (1987 and 1990) studied the hydrogeology and organic-chemical contamination in ground water at the typewriter-production plant in the western part of the study area. Blasland, Bouck and Lee, Engineers (1992) investigated the hydrogeology and extent of chemical contamination of an EPA-designated "Superfund site," locally known as the Rosen Superfund Site, in the southeastern part of the study area (pl. 1). Apfel (1967) studied the availability of ground water at a machine-tool plant in the southwestern part of the study area, and Galson Technical Services, Inc., (1988) investigated the hydrogeology and extent of a petroleum-product spill at that site. Resource Engineering (1987) investigated the hydrogeology and extent of contamination from paint-stripping activities at a center for the handicapped in the northern part of the study area.

Methods of Investigation

Hydrogeologic data were collected from several sources, including published reports by the USGS

consulting firms, and data in files of local drillers and government agencies. USGS fieldwork during this study included a well inventory, test drilling, leveling, an aquifer test, water-level measurements, streamflow measurements, two seismic-refraction surveys, and three rounds of ground-water sampling.

Well Inventory, Test Drilling, Levels, Water-level Measurements, and Aquifer Test

Records of 215 wells were collected and compiled (appendix 1). The well inventory was augmented by test drilling in which 20 observation wells and 4 test holes were installed by auger, cable-tool, and air-rotary rigs to obtain data on stratigraphy, hydraulic properties, water quality, and water levels in the aquifers.

Leveling was done to about 100 wells to determine the elevations of water-level-measuring points, which were mostly the tops of the well casings. These elevations were determined by standard surveying methods (Kennedy, 1990) and are generally accurate to within 0.01 ft. Levels were also run to determine channel profiles of major streams that flow over the aquifer. The stream-channel elevations were used in the stream-routing package for the ground-water models.

Water levels were measured monthly in 50 wells from July 1989 through October 1991 and during three synoptic rounds in more than 100 wells during March 28-29, 1990 (high-recharge conditions), May 28-June 4, 1991 (average-recharge conditions), and October 7-9, 1991 (low-recharge conditions). These water-level data were contoured to show the potentiometric surfaces (pls. 2 through 4) for high-, average-, and low-recharge conditions and were used to calibrate the models.

An aquifer test was conducted July 16, 1991 at the Town of Cortlandville municipal well at Lime Hollow Road (fig. 1) to calculate the hydraulic conductivity of the aquifer materials. Drawdown data were analyzed through a curve-fitting procedure that uses type curves developed by Nueman (1974) for partially penetrating wells in an unconfined aquifer.

Streamflow Measurements

Streamflow was measured by current meters in several reaches of most streams in the study area during each of the three recharge conditions that were modeled; techniques are described by Buchanan and Somers (1969). Streamflow measurements were used to identify the location and the amount of gain or loss in streams.

Seismic-Refraction Surveys

Seismic-refraction surveys were conducted at two sites (pl. 1) to supplement data from test drilling. These surveys obtained continuous records on depth to water table and to bedrock. Seismic-refraction techniques used in this study are described by Haeni (1988). A series of 12 geophones spaced 100 ft apart were laid on the ground, and arrival times of compressional waves generated by explosives were recorded and plotted as a function of source-to-geophone distances. A three-layer (unsaturated unconsolidated sediments, saturated unconsolidated sediments, and top of bedrock) boundary-formula computer analysis (Scott and others, 1972) was used to calculate depths to water table and to bedrock.

Water Sampling and Analysis

Water samples were collected from wells and streams in April 1990, September 1990, and April 1993. The main purpose of the two 1990 sampling rounds was to map the extent of TCE migrating from the former typewriter-manufacturing plant in the western part of the aquifer under high- and low-recharge conditions and to define the general chemical quality of ground water throughout the study area. The purpose of the April 1993 sampling was to evaluate what effects remedial practices used at the typewriter plant were having on concentrations of TCE in ground water.

Selection of purging techniques to remove standing water from well casings before sample collection depended on well construction and water-yielding capacity of the well. At least three volumes of water were pumped or bailed from monitoring wells with good yield prior to sample collection. Monitoring wells with low yield were pumped dry, then allowed to partly recover before they were sampled. Large wells (6-in. diameter and larger) were purged with a stainless-steel submersible pump or a 4-in. diameter bailer; wells of 2-in. diameter and smaller were purged either by a Teflon[1] bladder pump, a peristaltic pump (with Tygon tubing), or a stainless-steel bailer. The pumps of domestic wells were turned on for 10 to 15 minutes (the estimated time for evacuation of three volumes of standing water in the casing) before sample was

[1] Use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government.

collected. All sampling and purging equipment were thoroughly cleaned between sampling.

The Chemistry Department at State University of New York (SUNY) College at Cortland analyzed the water samples collected in April 1990 for (1) pH, specific conductance, and total alkalinity; (2) common ions (calcium, chloride, magnesium, sodium, and potassium; nitrate as nitrogen); and (3) volatile organic compounds (VOCs). Temperature and specific conductance of water was measured in the field at the time samples were collected.

The SUNY Chemistry Department also analyzed water samples collected in September 1990 and June 1993 for VOCs. The USGS National Water-Quality Laboratory in Denver, Co., analyzed water samples collected in September 1990 for nutrients, metals and common anions. VOC analyses were done by purge-and-trap/gas chromatograph methods, modified from USEPA 501 methods (U.S. Environmental Protection Agency, 1979).

Quality-control procedures for samples collected during April 1990 consisted of analyses of duplicate samples, replicate samples, and field and laboratory spikes of inorganic constituents. Two samples that were to be analyzed for VOCs were split and spiked; one set consisting of two samples was sent to the USGS National Water Quality Laboratory, and one set was sent to the Chemistry Department at SUNY College at Cortland. Analytical results and recoveries reported by the two laboratories compared favorably.

Simulation Models

A three-dimensional, finite-difference, groundwater flow model, MODFLOW (McDonald and Harbaugh, 1988), was developed to represent the glacial aquifer system and was used for steady-state simulation of three recharge conditions (high, average, and low). The models were used to compute water levels and water budgets. Particle-tracking postprocessing programs, MODPATH and MODPATH-PLOT (Pollock, 1989), were used to estimate the recharge areas of municipal wells, the flowpaths of the advective phase of chemical migration, and traveltime of the advective phase of contaminants migrating from chemical-spill sites to discharge areas.

Description of Study Area

The study area, in the Otter Creek-Dry Creek valley and in parts of West Branch, East Branch, and Tioughnioga River valleys (fig. 1), forms a rectangle 6 mi long by 2 mi wide in the Town of Cortlandville, in the southwestern part of Cortland County (fig. 1). The City of Cortland lies within the study area and within the Town of Cortlandville. The population of the Cortland area increased about 7 percent during 1970-90 and, in 1990, was about 24,100 (U.S. Bureau of Census, 1990).

Physiography and Bedrock Geology

The study area is in the glaciated part of the Allegheny Plateau (fig. 2). The rocks of the plateau consist of gently folded layers of shale with some siltstone, sandstone, and limestone that dip to the south at 40 ft/mi. These rocks are part of the "Catskill Delta" complex (Woodrow and Sevon, 1985) and were deposited in marine seas during late Devonian time (fig. 3). The rocks were then uplifted above sea level millions of years later and then eroded to a nearly flat plain by the middle of the Cenozoic (Isachsen and others, 1991). The rocks were again uplifted during Late Cenozoic time to form the Allegheny Plateau, which was dissected by streams to form a hilly terrain.

Bedrock in the study area is far less permeable than the overlying glacial sand and gravel aquifers. Bedrock forms the bottom of the aquifer system in the study area. Relief in the study area is about 720 ft, and summits are as high as 1,800 ft above sea level. The lowest elevation, about 1,080 ft, is the channel of Tioughnioga River, in the eastern part of the study area. The bedrock surface has a relief of about 1,000 ft in areas where it is more than 300 ft below the flood plain. Uplands have moderately sloping hillsides ranging from 9 to 18 percent.

Muller (1970) described the drainage pattern at Cortland as "the hub of five valleys that converge from the north, northeast, east, south, and southwest" (fig. 1). All five valleys drain into the Tioughnioga River in the eastern part of the study area. Most of the study area is drained by Otter Creek and Dry Creek, which flow northeastward and drain into the West Branch Tioughnioga River in the north-central part of the study area. The western part of the study area contains several kettle ponds, some with bottom sediments of marl that have been mined in the past. Most of the ponds are dry during late summer and fall. Stupke

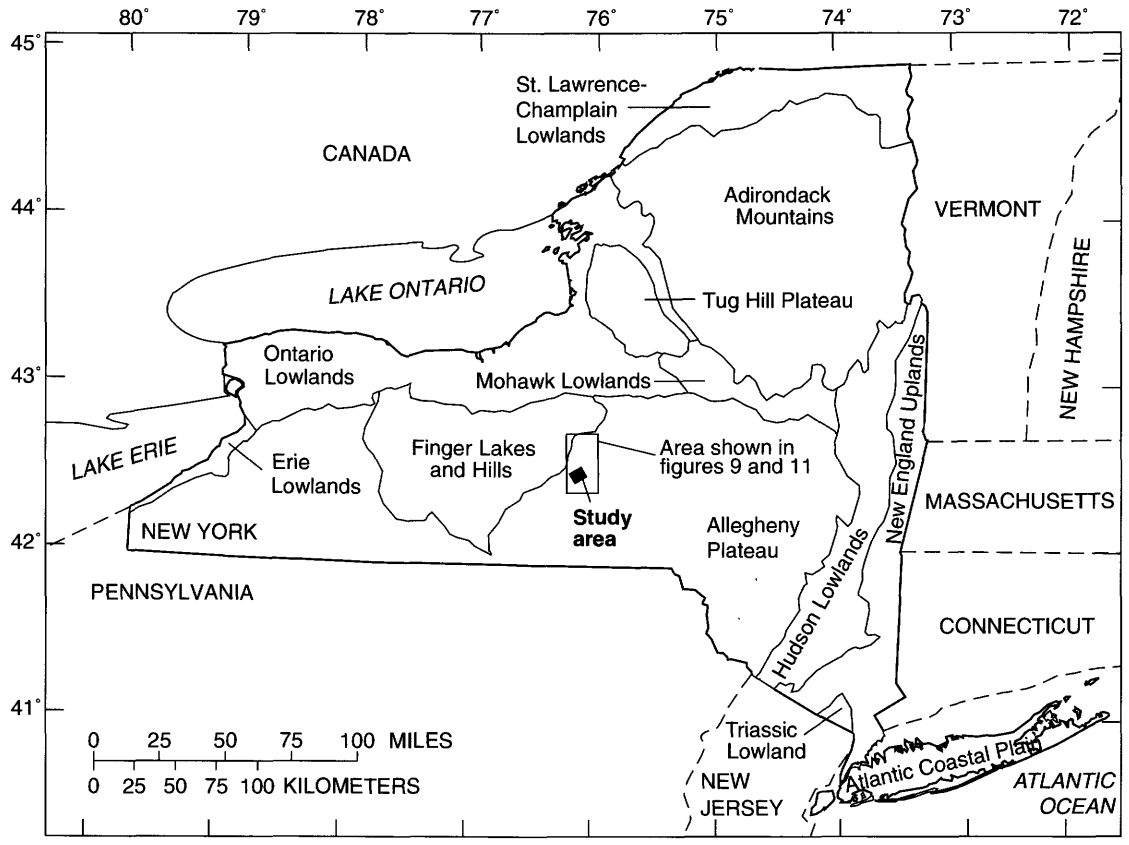


Figure 2. Physiographic features of New York. (Modified from Cressey, 1966, fig. 9, p. 26.)

pond (fig. 1) is a large kettle pond that has no inlet; its outlet is a headwater tributary of Otter Creek.

Climate

Two types of air masses provide the dominant weather characteristics of Cortland—cold, dry airmasses from the northern interior of the continent, which prevail during the cold half of the year, and warm, humid airmasses from the Gulf of Mexico and southwestern part of the continent, which are typical during the warm half of the year (Dethier, 1966). A third, but less common type is the marine airmasses, which move along the North Atlantic Coast (northeasters) and produce occasional cool, wet, cloudy conditions. Large bodies of water near Cortland, such as Lake Ontario, 70 mi to the north, tend to moderate air temperatures and supply moisture to the cold, continental airmasses during the cold season.

Mean annual temperature of Cortland is 45.7 °F (National Oceanic and Atmospheric Administration, 1990). Winters are long, cloudy, and cold, with minimum temperatures ranging from 0 to -10 °F for an average of 13 days per winter (National Oceanic and Atmospheric Administration, 1992). Summer has warm daytime temperatures, cool evenings, and occasional periods of high, uncomfortable humidity. Summer daytime temperatures typically range from the mid-70s to mid-80s reach 90 °F or higher on average of 8 days a year (Roffner, 1985).

The annual precipitation at Cortland for 1973-92 is shown in figure 4; the average for the 20-year period was 41.2 in., and the range was from 32.3 in. in 1982 to 50.6 in. in 1977. Monthly precipitation is normally distributed fairly uniformly throughout the year, but from January 1990 to May 1993 it ranged from 1.35 in. in March 1990 to 8.42 in. in July 1992 (fig. 5). Irrigation for agricultural crops is rarely needed. Severe droughts are rare, but minor droughts that occur periodically cause concern about degradation of water quality of streams during extreme low-flow conditions and of fish survival in reaches that are downgradient of sewage discharges.

Snowfall in Cortland averaged 90.9 in. during 1973-92 (National Oceanic and Atmospheric Administration, 1992). Continuous snow cover typically starts in late December and lasts until mid-March. Some snow is a result of the "lake effect," a process whereby an artic cold front from Canada crosses Lake

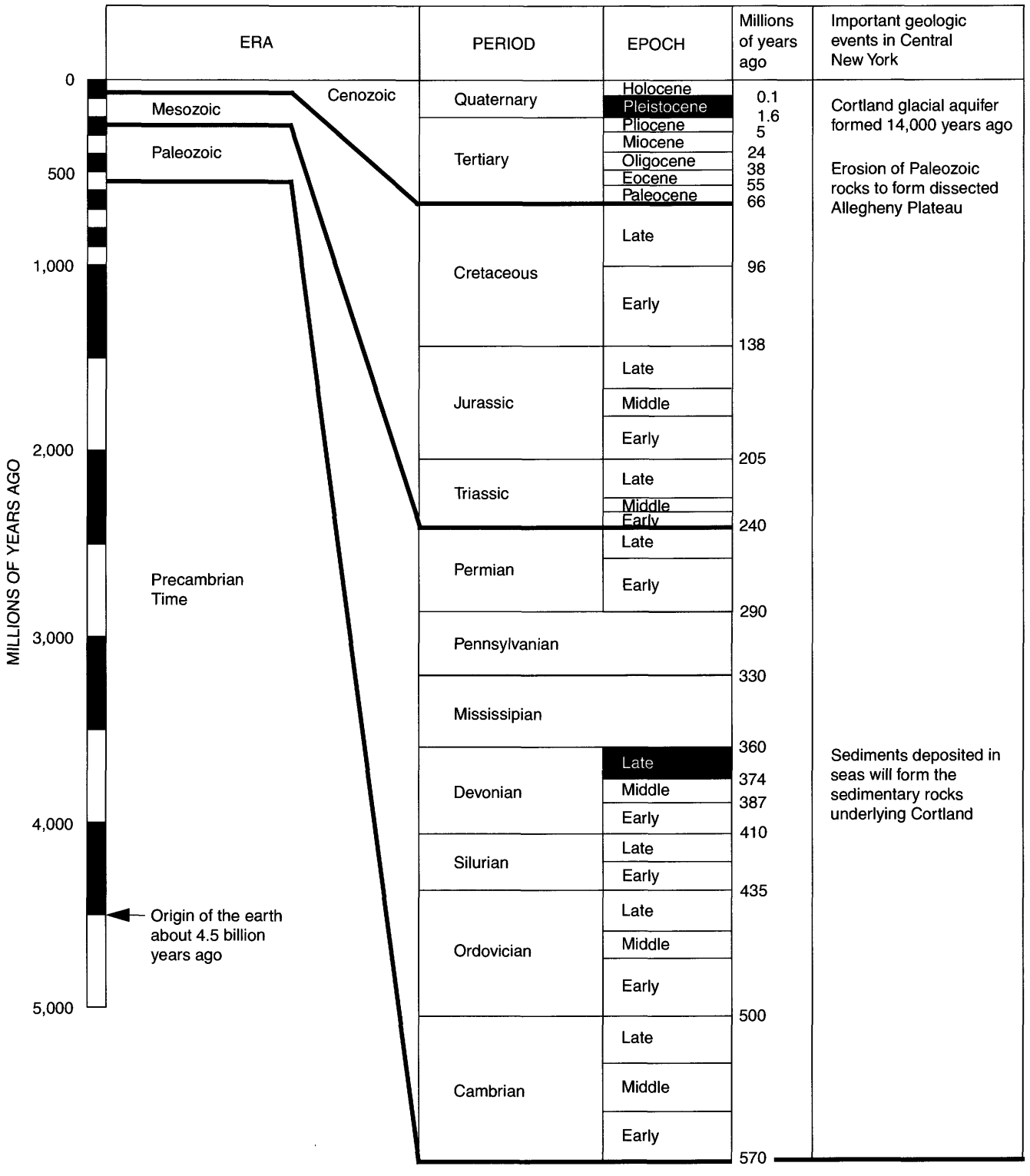


Figure 3. Geologic time scale.

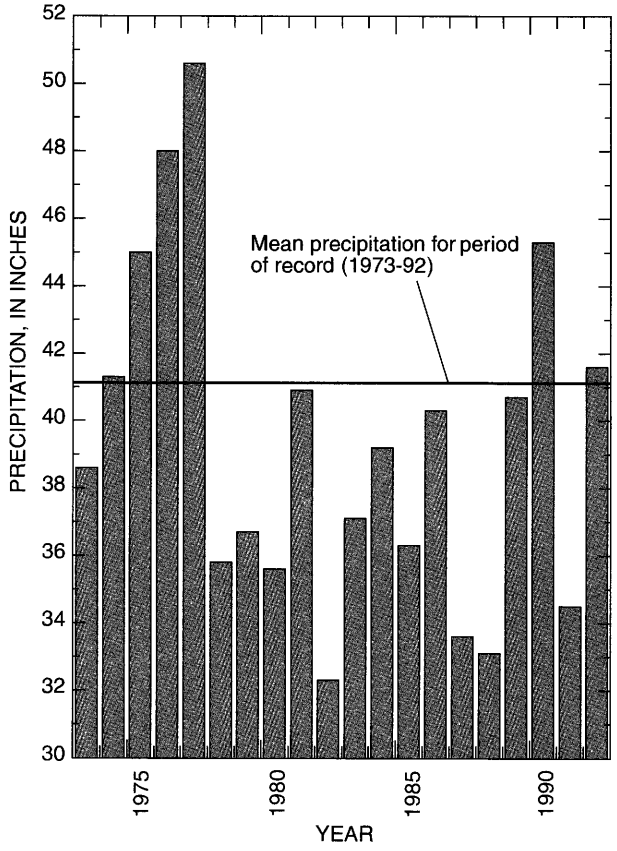


Figure 4. Annual precipitation at Cortland, N.Y., 1973-92. (Data from National Oceanic and Atmospheric Administration, 1992)

Ontario and the Finger Lakes, is warmed in the low elevations and picks up moisture, and then releases some of the moisture as snow as the air rises over the uplands (orographic effects). When the lakes freeze by midwinter,"lake effect" snow becomes infrequent because the ice prevents evaporation off the lake. The heaviest snowfalls, typically 1 to 2 ft, occur when northeasters move inland and cross over or close to Cortland. A severe "northeaster," locally known as the "Blizzard of 93," dumped 3 ft of snow on Cortland during March 13-14, 1993 (National Oceanic and Atmospheric Administration, 1993).

Land Use

Land use in the Otter Creek-Dry Creek basin was inventoried from the 1992 Cortland County Tax Assessment Rolls and from field inspections made in 1992 (table 1).

Agricultural land occupies 35.5 percent of the Otter Creek-Dry Creek drainage basin (5 percent of land over the aquifer). The study area contains three working farms that grow mostly hay and corn. Agricultural land has been decreasing since the 1950's. The prime farmland is in flat outwash valleys, which are also most suitable for urban development; consequently, pressure to convert farmland to residential, commercial, and industrial has increased. The trend of decreasing farm land will probably continue.

Residential, the largest land use, accounts for 29 percent of the Otter Creek-Dry Creek drainage basin. Most of the residential area is within the City of Cortland, and all residential areas within the City of Cortland are sewered. Surrounding the city, in the Town of Cortlandville, are many large suburban housing developments. Most of the residential areas in the Town of Cortlandville are sewered, although residential growth has recently begun to outpace the extension of sewer lines. Most of the residential areas in the bedrock uplands are unsewered.

Commercial land use (8 percent of the Otter Creek-Dry Creek drainage basin) has been continually expanding, especially since 1985, primarily in the form of strip development along major transportation corridors. Most commerce consists of retail sales and services.

Industrial land use also constitutes 8 percent of the Otter Creek-Dry Creek basin. Manufacturing, processing, and warehousing are included in this category. Major products in 1992 were foundation garments, plastic houseware, polystyrene packaging, industrial filters, fishing line, machine tools, and wood products. (The typewriter plant moved to Mexico in 1994.)

Sand and gravel mining constitutes about 2.8 percent of land in the Otter Creek-Dry Creek drainage basin. Most of the gravel is extracted for asphalt production.

Table 1. Land use in the Otter Creek-Dry Creek basin, Cortland County, N.Y., 1992
[Data from Cortland Department of Planning, 1992]

Land use	Percentage of total basin area
Agricultural cropland and pasture	35.5
Residential (sewered)	19
Residential (unsewered)	10
Commercial	8
Industrial	8
Forest and brushland	5
Churches, institutions, and public services	4.4
Parks, athletic fields, and golf courses	3
Sand and gravel mining	2.8
Major transportation corridors	2.0
Water and wetlands	0.9
Other recreational areas	0.8
Cemeteries	0.6

Public land constitutes 7 percent of the Otter Creek-Dry Creek drainage basin. Fortuitously, the City of Cortland owns a 180-acre forested watershed that borders the city's well field; thus, the city's water managers have been able to protect their ground-water supply from contamination, largely by controlling the land use on this property. Other substantial public lands in the study area are the SUNY college campus and a 100-acre fish laboratory owned by the U.S. Fish and Wildlife Service. The campus extends over the aquifer and a bedrock hill (pl. 1). The fish laboratory is on the west side of the ground-water divide in the western part of the aquifer. Other small parcels of public lands include municipal recreational parks and government institution and service sites.

Regulation is the primary means of controlling land use in the study area. Both the City of Cortland and the Town of Cortlandville have zoning ordinances, subdivision controls, and land-use plans. At the County level, the Cortland County Health Department enforces the New York State Sanitary Code, and the Cortland County Planning Board reviews land-use proposals of countywide significance. The Town of Cortlandville adopted an Aquifer Protection District amendment to its zoning ordinance in 1988, to regulate certain land uses over the aquifer.

Acknowledgments

Special thanks are extended to James Feuss, Director of Cortland County Health Department, for providing well and chemical data. Thanks are also extended to Douglas Withey, Superintendent of Cortland County Water Board, for providing pumping data and access for collection of hydrogeologic data in the Waterworks area. Thanks are also extended to Hayne Smith, Town of Cortlandville Engineer, for arranging the aquifer test at the municipal well at Lime Hollow Road.

HYDROGEOLOGY

The glacial aquifer system in the study area, and the ground-water and surface-water flow conditions within it, are the result of glacial processes. Hydrogeologists use concepts and principles of geologic processes and the chronological order in which they

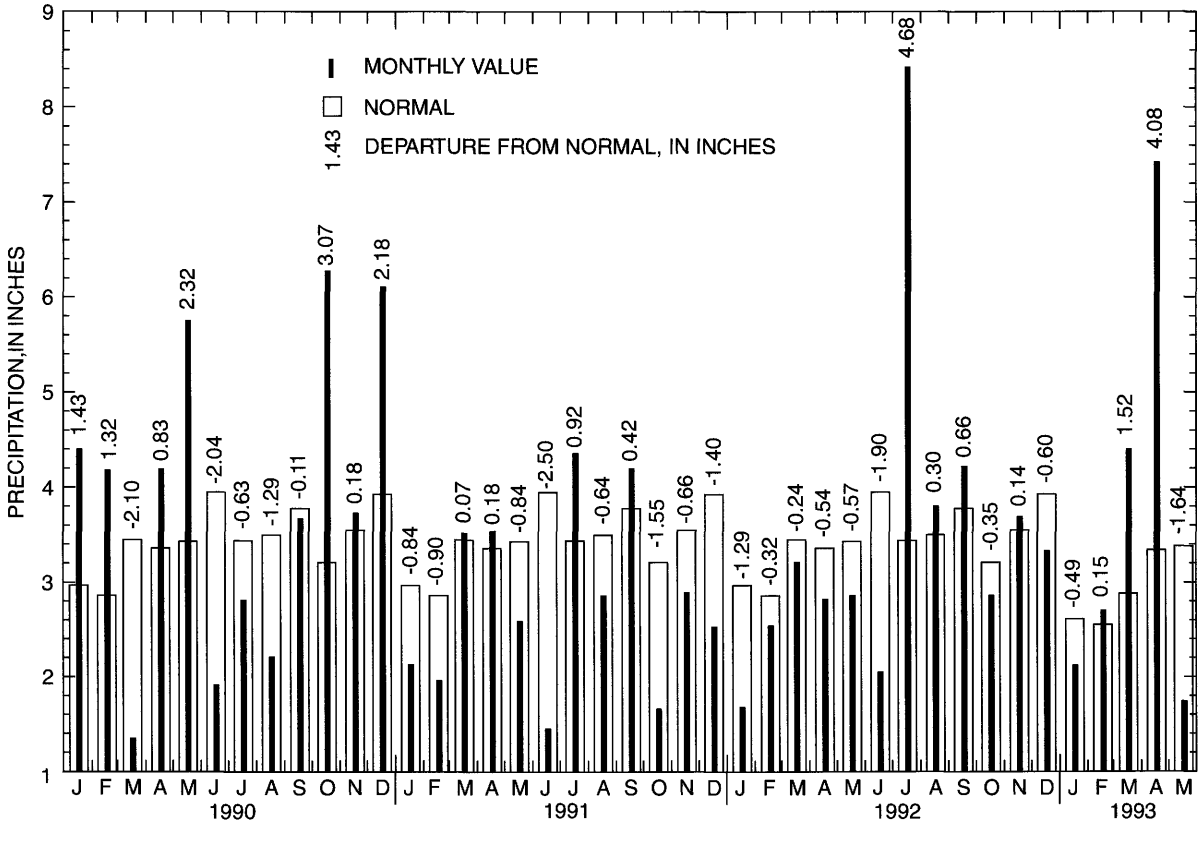


Figure 5. Monthly precipitation and departure from normal at Cortland, N.Y., January 1990 through May 1993. (Data from National Oceanic and Atmospheric Administration.)

have occurred to conceptionalize and interpret the hydrogeologic framework of an aquifer. These processes, when sufficiently understood, form a basis for interpolation and correlation between data points. Glacial processes are highly diverse and have resulted in complex stratigraphy and ground-water flow patterns in the study area; therefore, extensive data are needed for accurate representation of the hydrogeologic system.

Glacial Geology

Erosion by ice and meltwaters during the last glaciation modified the bedrock topography in the study area and removed most of the previously deposited unconsolidated materials (Muller and others, 1988); thus, sediments from the last glaciation (Late Wisconsinan) are prevalent. Some of the sediments that were eroded by ice became entrained in the glacier, or were dragged along its bottom, where they were ground up and later deposited as lodgment till atop bedrock or older glacial deposits. Lodgment till consists of poorly sorted clay, silt, sand, and stones that were compacted by the ice and is a poor aquifer; it is often referred to by drillers and farmers as "hardpan" or "boulder clay"— their testimony to its toughness to drill into or plow.

Valleys in the study area form a dendritic drainage pattern and increase in width to the southwest, indicating that water in the preglacial drainage system in the East and West Branch Tioughnioga River Valleys flowed southward, that Trout Brook flowed westward, and that a stream in the reach of the Tioughnioga River Valley between Polkville and Blodgett Mills flowed northwestward (fig. 6). All four streams converged at Cortland to form a major ancestral river that flowed southwestward in the Otter Creek valley. The southwestward route of the Tioughnioga River was blocked by ice in the Fall Creek valley during Late Wisconsian time and was diverted to the southeast, where it now flows in a narrow valley and exits the study area near Bloggett Mills (fig. 1). The diversion of the Tioughnioga River in the study area resulted in a "separated valley" (Randall and others, 1988), which is a broad valley that is partly filled with stratified drift, is drained by minor streams (Otter Creek and Dry Creek), and abuts a large stream at one end (Tioughnioga River). The small streams in separated valleys are vulnerable to depletion by large ground-water withdrawals, which lower the water table below the streambed and thereby induces water to seep through the streambed into the aquifer.

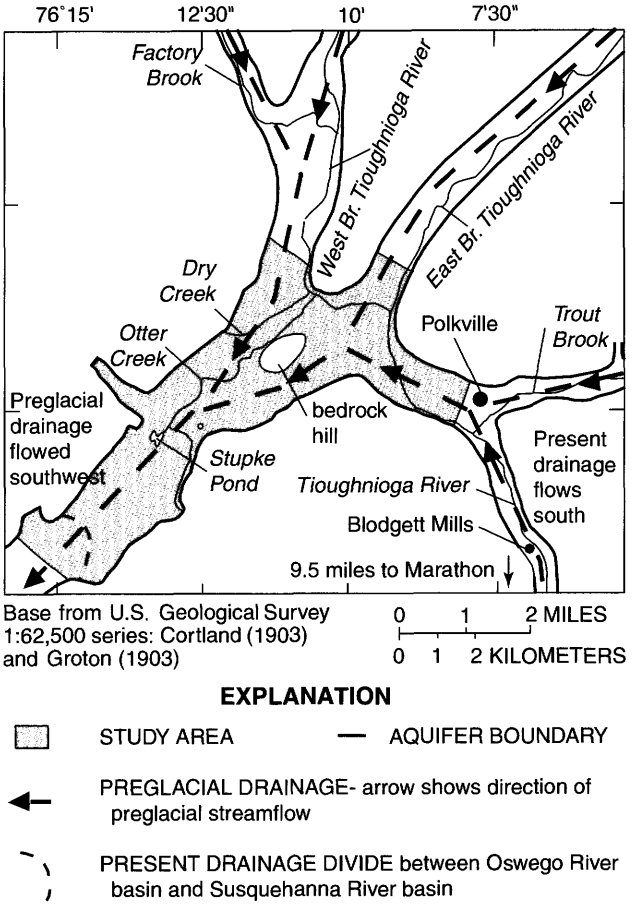


Figure 6. Preglacial drainage in Cortland, N.Y., study area.

Bedrock Scouring

Flowing ice and subglacial meltwaters first removed older unconsolidated deposits, then scoured the underlying Devonian-age shales and siltstones, resulting in widened and deepened bedrock valleys characteristic of glacial terrain. The bedrock valleys are asymmetrical in some places, such as in the Otter Creek Valley near South Cortland (geologic sections A-A′ and B-B′, figs. 7A and 7B), where a buried bedrock bench runs along the northern valley wall, and are nearly symmetrical in other places, such as in the West Branch Tioughnioga River valley (sections C-C′ and D-D′, figs. 7C and 7D).

The longitudinal bedrock profile is nearly flat in the West Branch Tioughnioga River and Otter Creek-Dry Creek valleys, where elevations range from 900 to 950 ft above sea level (figs. 7C and 8). The bedrock floor slopes southward in the East Branch Tioughnioga

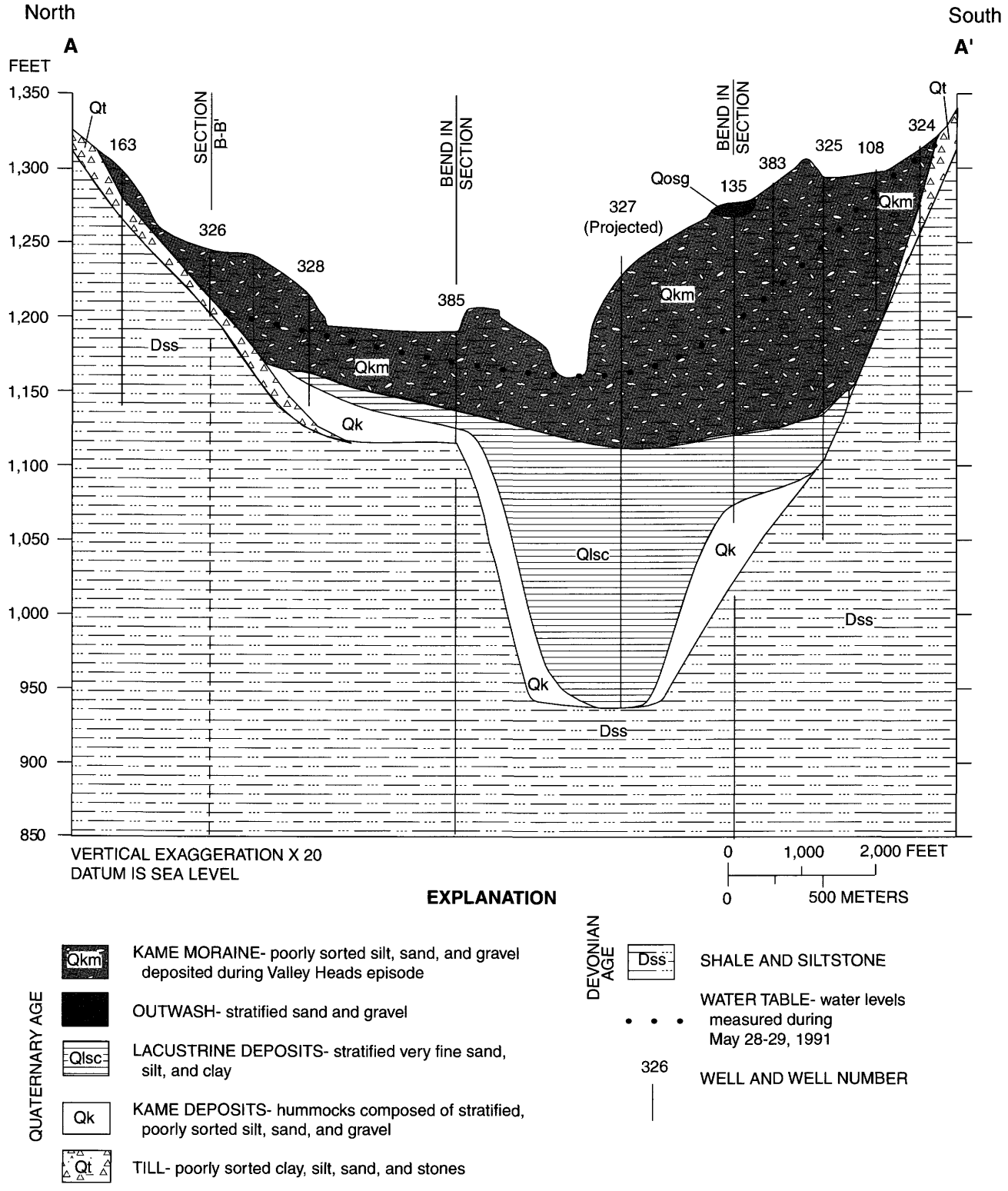


Figure 7A. Hydrogeologic section A-A′. (Line of section and well locations are shown in pl. 1.)

River Valley (Reynolds, 1987) and slopes northwestward in the Tioughnioga River Valley from the col (preglacial divide) near Messengerville to the eastern part of the City of Cortland. A conspicuous depression in the bedrock floor in the eastern part of the city (fig. 8) at well 430 (pl. 1) is the location of the lowest

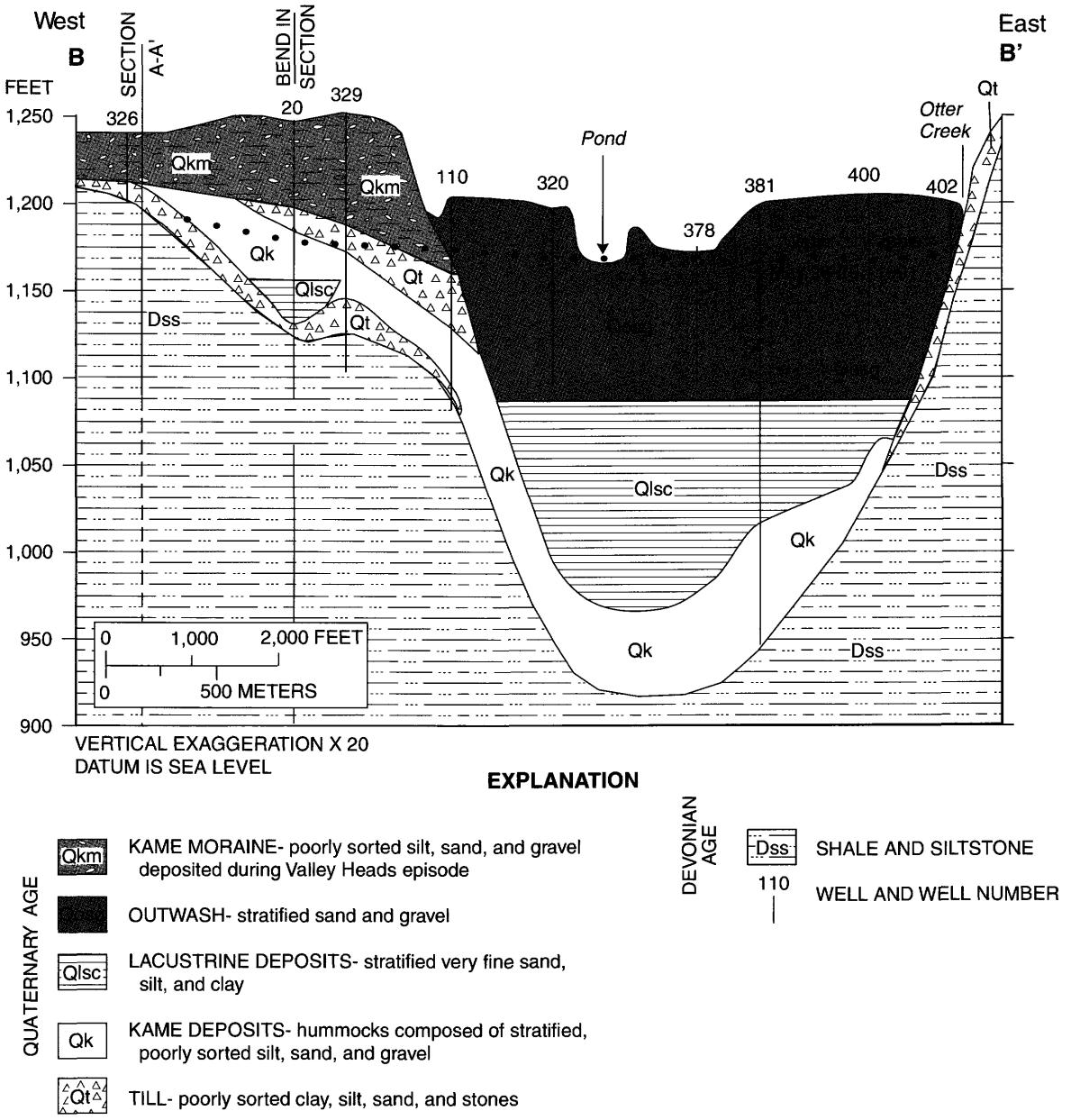


Figure 7B. Hydrogeologic section B-B′. (Line of section and well locations shown in pl. 1.)

elevation of the bedrock surface (801 ft) and the thickest valley fill found in the study area (313 ft thick).

In the center of the city is an isolated, 120-ft-high, egg-shaped (from top view) bedrock hill (fig. 1) that is surrounded by valley-fill deposits more than 200 ft thick. This landform is known as an umlaufberg (Muller, 1970), which formed when meltwaters deposited outwash around the hill and buried a preglacial bedrock spur between the northeast side of the hill and the bedrock massif hills to the north. The SUNY campus is on this hill.

Kames and Kame Terraces

As the glacier began to retreat from its maximum extent in northern New Jersey about 19,000 years before present (Late Wisconsinan time) it took about 5,000 years for the ice front to recede northward and give ground to the Cortland area (Muller and Calkin, 1993). As the glacier receded from the study area (between 14,000 and 15,000 years before present), the uplands emerged first because the ice was thinner there than in the valleys. Meltwater and upland streams that

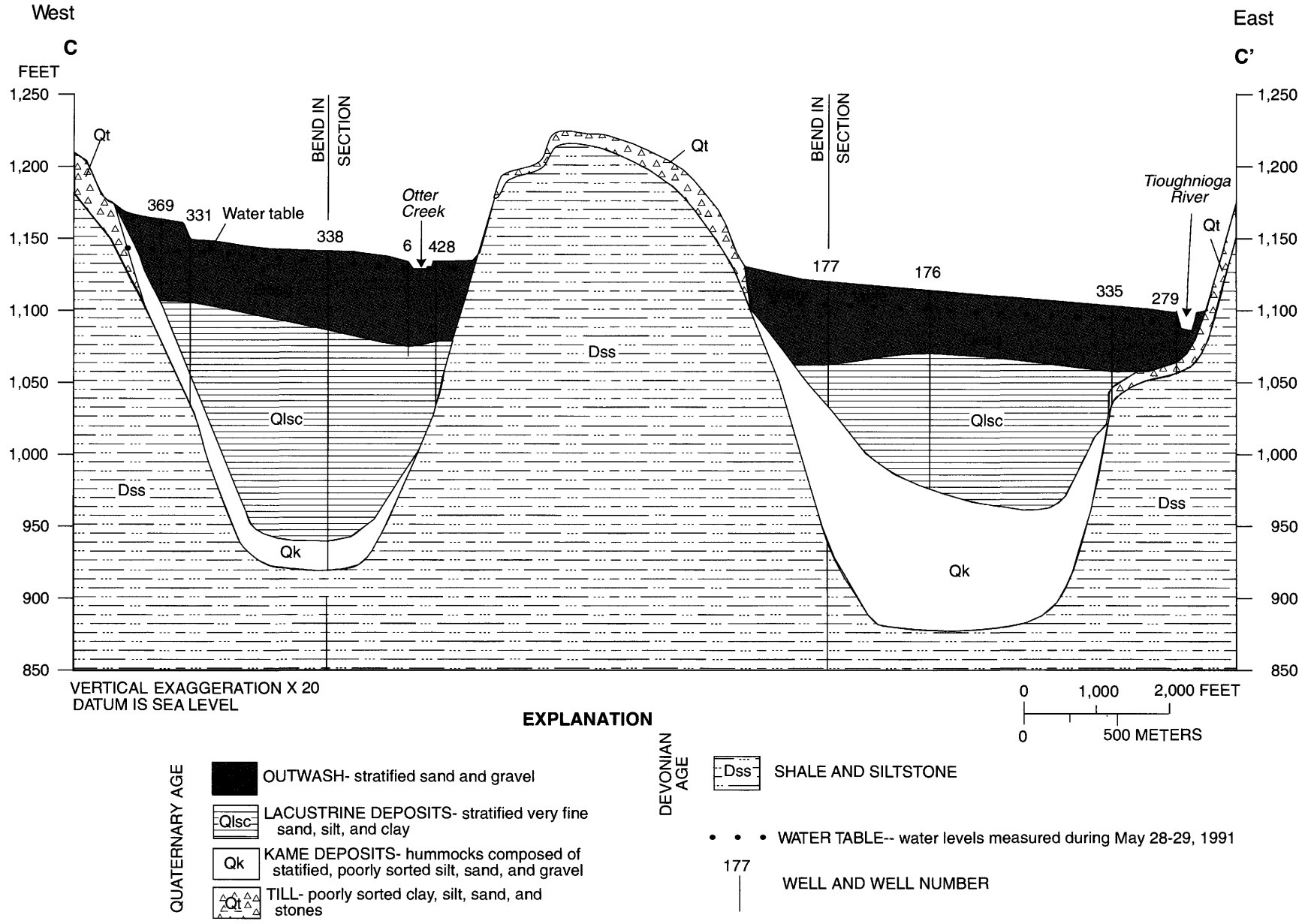


Figure 7C. Hydrogeologic section C-C′. (Line of section and well locations are shown on pl. 1.)

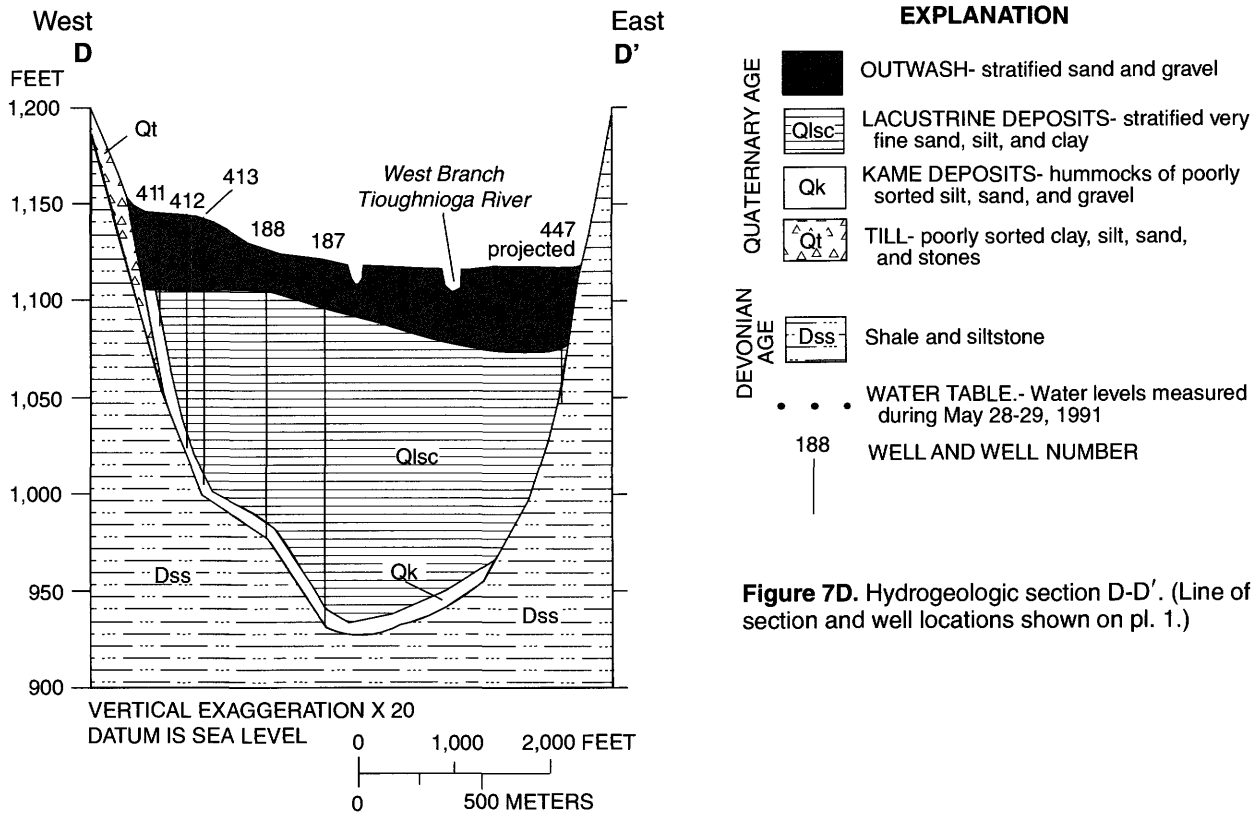


Figure 7D. Hydrogeologic section D-D′. (Line of section and well locations shown on pl. 1.)

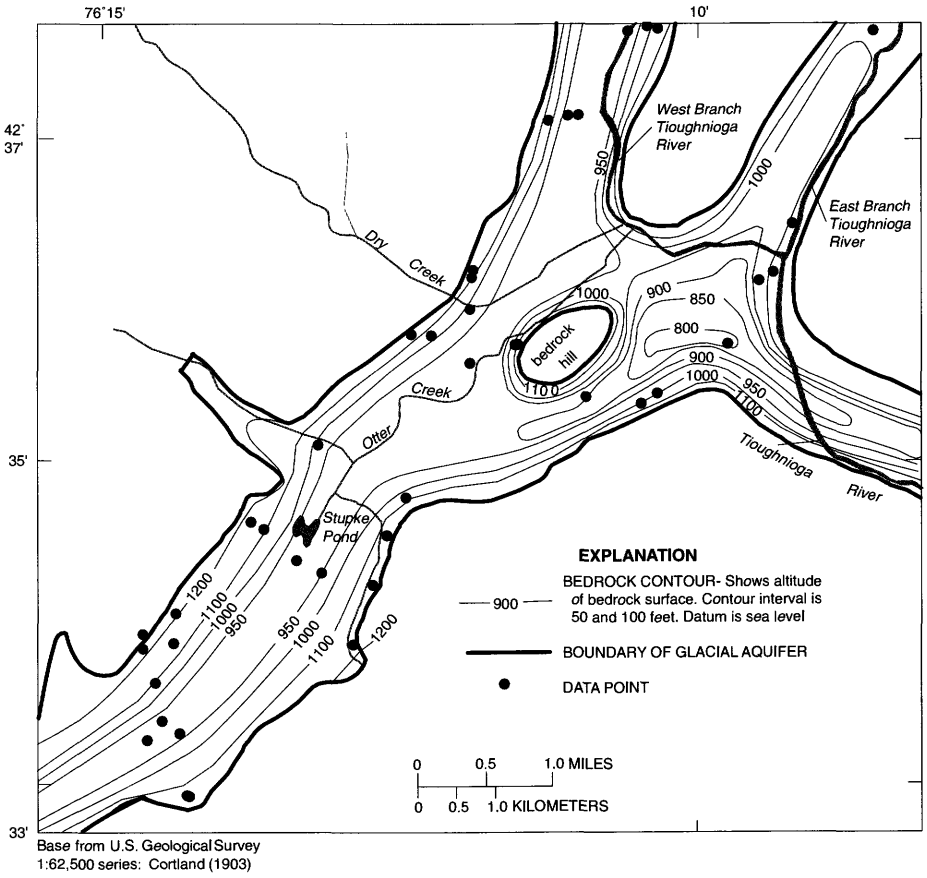


Figure 8. Bedrock-surface altitude in Cortland, N.Y., study area.

drained into the valleys deposited sand and gravel, silt, and clay on the remaining ice and between the ice and the bedrock hillside. When the ice melted, the sediments atop and next to it collapsed, forming hummocky mounds of ice-contact deposits known as kames and kame terraces. Kames typically consist of poorly sorted silty sand and gravel of moderate permeability, but discontinuous zones of well-sorted, highly permeable, coarse sand and gravel are found in some places. Large areas of kames are found on hillsides at Cortland High School in the southeast part of the study area, South Cortland, and in the East Branch Tioughnioga River Valley (pl. 1).

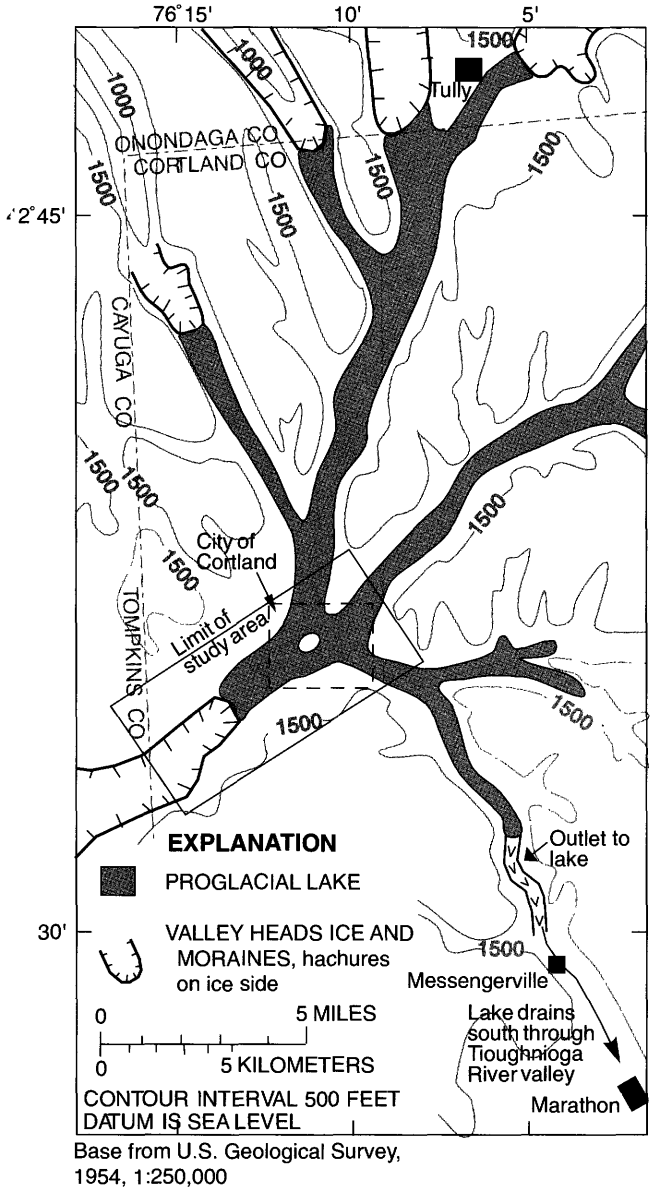


Figure 9. Location of Valley Heads ice and moraines that dammed drainage in valleys of the Tioghnioga River basin. (Location is shown in fig. 2.)

Kame deposits on hillsides are typically 10 to 80 ft thick and form minor aquifers where they are saturated; in some places, however, kame deposits may be only seasonally saturated. Kame deposits in the central parts of the valley form confined aquifers where they are overlain by lacustrine very fine sand, silt, and clay. Buried kame deposits are typically 60 to 170 ft thick in the western and eastern parts of the study area (figs. 7B, 7C), and 2 to 30 ft thick in the West Branch Tioughnioga River Valley (fig. 7D). Kame deposits in areas where the confining layer is absent, or pinches out before extending to the edges of the valley, are overlain by outwash sand and gravel (fig. 7C) and form a continuous unconfined aquifer.

Valley Heads Moraine System

A major standstill of the ice front in the northern part of the Allegheny Plateau of central New York between 14,000 and 14,900 years ago resulted in deposition of large amounts of sediment that formed the Valley Heads Moraine system (Muller and Calkin, 1993). A Valley Heads Moraine formed in the western part of the study area and in valleys north of it (fig. 9). This moraine is called "Valley Heads" because it formed a drainage divide between, and headwater areas of, the southward draining Susquehanna River basin and the northward draining St. Lawrence River basin.

The crest of the Valley Heads Moraine in the western part of the study area is characterized by kame and kettle topography (pl. 1). Kettles formed where blocks of ice melted, leaving depressions. The ice side (southwest side) of the moraine is relatively steep and hummocky, whereas the northeast side grades from hummocky terrain to a moderately sloping, pitted outwash plain that, in turn, grades to a slightly sloping, smooth outwash plain. The moraine deposits consist of heterogeneous sediments including coarse kamic sand and gravel in the upper part, and fine-grained sediments, such as till and lacustrine material, in the lower part.

Proglacial Lakes and Lacustrine Deposits in Valleys

Glaciers were imposing obstructions to streams in northward draining valleys—the ice formed dams that impounded water in valleys. These impoundments are known as proglacial lakes. During the retreat of Late Wisconsinan ice in central New York, proglacial lakes occupied large parts of valley systems, including the Tioughnioga River drainage system (fig. 9).

Upland streams and meltwaters from the glacier transported and deposited gravel, sand, silt, and clay into proglacial lakes. The coarse-grained, heavy sediments carried by these streams (sand and gravel) were deposited nearshore to form deltas, whereas the fine, light sediments (very fine sand, silt, and clay) were carried further out into the lake, were they settled to form a lake-bottom deposit (lacustrine unit). This lacustrine unit is found throughout the valley in the study area except where it thins and pinches out along the valley edges (fig. 10). It is as much as 90 ft thick in the eastern part of the study area, 15 ft thick in the northern and central parts, and 170 ft thick in the southwestern part. This unit underlies the upper outwash aquifer and overlies the confined aquifer.

A delta was found at the well 341 site (pl. 1), on McLean Road in the central part of the aquifer. The well penetrated a sequence of coarse sediments that graded with increasing depth to fine sediments from 0 to 83 ft below land surface. The sequence is interpreted as coarse outwash from land surface to 37 ft below land surface that overlies deltaic sediments from 37 to 83 ft below land surface. This sequence, in turn, overlies fine-grained lacustrine sediment.

The proglacial-lake outlet was south of Messengerville (fig. 9). Elevations of proglacial-lake outlets are useful because they indicate the maximum lake level and, thus, the maximum elevation at which lacustrine deposits can be found. The exact elevation of this outlet is uncertain, however, because the Tioughnioga River eroded much of the sediment plug that formed the outlet channel. The lake's water level can be estimated from other evidence, however. For example, the absence of beaches and hanging deltas that would be expected to flank hillsides along the valleys suggest that the highest water level was lower than the present valley-floor elevation (about 1,100 ft). The highest elevation at which lacustrine deposits were found at drilling sites in the study was 1,090 ft (penetrated by well 429 in the southern part of the city); therefore, the maximum lake level was probably between 1,090 and 1,100 ft.

Glaciofluvial Sediments (Outwash) of the Valley Heads Episode

As the sediment plug that dammed the proglacial lake at Messingerville (fig. 9) was eroded, allowing the proglacial lake to drain to the south in the Tioughnioga River valley, meltwater from retreating Valley Heads ice throughout the area developed a braided-stream system that deposited large amounts of glaciofluvial sediments (outwash) on top of the lacustrine sediments. The outwash forms a wedge-shaped deposit that is more than 100 ft thick near the head of outwash in the western part of the study area (fig. 7B, geologic section B-B′) and thins eastward to 35 to 45 ft thick in the southern and eastern parts of Cortland (fig. 7C, geologic sectionC-C′). Outwash in the study area grades from coarse boulder gravel at the head of outwash in the southwestern part to coarse cobble and pebbly, sand and gravel in distal reaches in the central and eastern parts of the study area. The outwash, along with local deltaic deposits, forms most of the highly permeable unconfined aquifer in the study area (fig. 11). Drilling with percussion-tool and air-rotary drilling rigs is difficult near the head of outwash, where boulder gravel is present, and augering is nearly impossible. The large amount of very coarse sediments that form the outwash in the study area indicate that large discharges of fast-flowing meltwaters characterized the period of the Valley Heads standstill.

Ice Readvance and Drainage of Proglacial Lake During Late Stages of Deglaciation

A discontinuous 10- to 20-ft-thick layer of till that overlies the morainal and outwash deposits in the western part of the study area indicates that ice readvanced or surged northeastward to about Stupke Pond during the late stages of the Valley Heads episode. The till is typically found 10 to 30 ft below land surface and is overlain by 10 to 30 ft of sand and gravel deposited by subsequent meltwater.

The final glacial event to affect the study area was the draining of a proglacial lake that formed in the Fall Creek valley between the retreating ice front and the western side of the Valley Heads Moraine. The lake drained eastward through an outlet on the moraine at an elevation of about 1,195 ft and eroded a 200-ft-wide, 10- to 20-ft deep channel in the moraine and created a widening swath through the outwash in the western and central parts of the study area (pl. 1). This erosion of outwash left 10- to 20-ft-high cutbanks (pl. 1) along the channel, and outwash terraces above it. Test boring 345, in the middle of the channel, encountered boulders the size of bowling balls to depth of 20 ft below land surface, indicating that large volumes of fast-moving water had flowed through the channel.

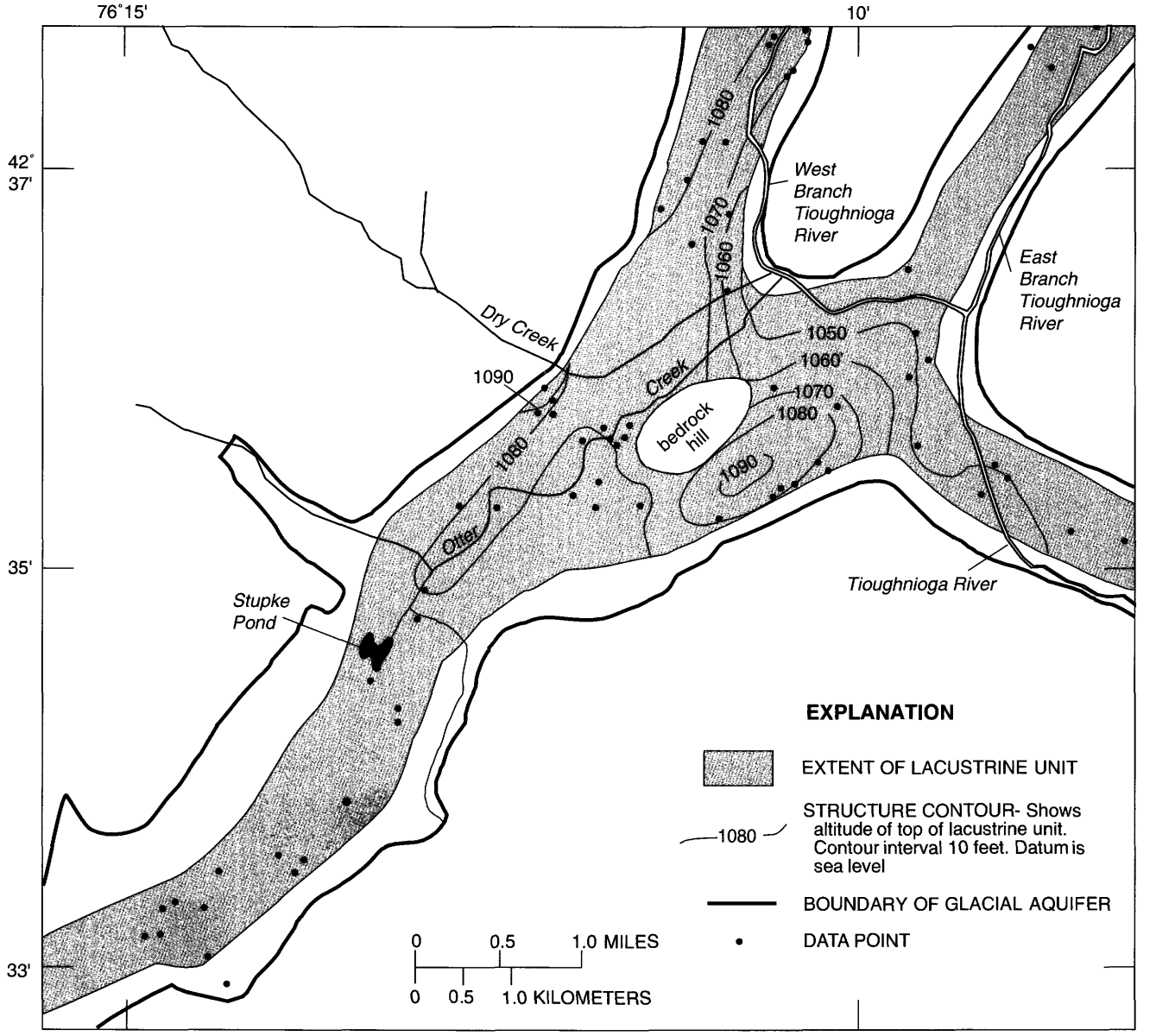
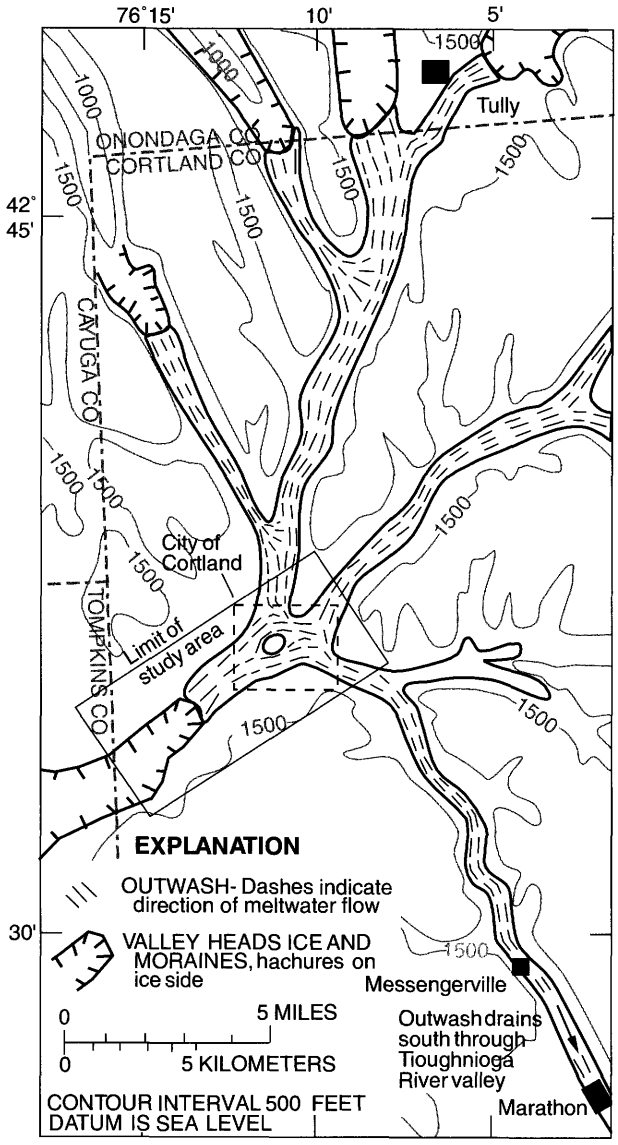


Figure 10. Upper surface altitude of lacustrine unit in Cortland, N.Y., study area.

Hydrology of the Glacial-Aquifer System

The aquifer system in the study area is part of a large regional glacial-aquifer system that occupies major valleys in the Tioughnioga River basin (fig. 11). The regional aquifer system is bounded laterally by till-covered bedrock hillsides (pl. 1) and beneath by the bedrock valley floor. The aquifer system in the study area consists of a 40-to 80-ft-thick unconfined sand and gravel aquifer that overlies a 1- to 155-ft-thick lacustrine confining layer that, in turn, overlies a 1- to 170-ft-thick confined sand and gravel aquifer (fig. 12). The base of the confined aquifer is the till and bedrock. Although the confining unit impedes groundwater movement between the upper and lower aquifers in the middle of the valley, the two aquifers are in hydraulic contact where the confining layer is absent in many places along the valley walls. The unconfined sand and gravel aquifer in the study area is one of the most productive aquifers in New York State and has been designated as a "Primary Aquifer" by the New York State Department of Environmental Conservation, and as a "Sole Source Aquifer" by the U.S. Environmental Protection Agency.



Base from U.S. Geological Survey, 1954, 1:250,000

Figure 11. Positions of Valley Heads ice, and of outwash that was deposited in valleys of the Tioughnioga River basin. (Location is shown in fig. 9.)

Geometry of Aquifers and Confining Unit

The unconfined aquifer forms a wedge-shaped deposit that thins and slopes downward to the northeast. The saturated thickness of the unconfined aquifer (from the water table to the top of the underlying lacustrine confining unit) is as much as 80 ft in the western part of the study area and thins northeastward to about 40 ft at the Tioughnioga River in the eastern part. The unconfined aquifer is underlain in most places by the lacustrine unit, which has a flat or gently northeastward sloping surface.

The lacustrine unit, which forms a confining unit that separates the unconfined aquifer from the confined aquifer (fig. 7, geologic sections A-A′, B-B′, C-C′, and D-D′), is an extensive lens-shaped deposit that consists of interbedded very fine sand, silt, and clay. It is typically 60 to 140 ft thick but is much as 155 ft thick in the middle of the valley. It thins toward the valley walls, where it pinches out. It typically lies 100 to 130 ft below land surface in the western part of the study area, 55 to 85 ft in the central part, and 35 to 65 ft in the eastern part. This unit extends beyond the study area in all valleys (fig. 10).

Beneath the confining unit is the confined sand and gravel aquifer, which is found everywhere except in the middle of the valley in the western part of the study area, where several well records indicate the lacustrine deposit to lie directly over bedrock. The bottom of the confined aquifer is the bedrock valley floor or, in some places, the top of till that overlies bedrock. The top of the confined aquifer has an undulating surface that is typical of hummocky kames and(or) bead-shaped glaciofluvial deltas that form the aquifer. The confined aquifer ranges from 1 to 170 ft thick.

Hydraulic Conductivity

Hydraulic conductivity is a measure of the ability of deposits to transmit water. Well-sorted, coarse-grained sediments have high hydraulic conductivity because they have many large interconnected pore spaces through which water can flow, whereas fine-grained sediments have low hydraulic conductivity because they have fewer and smaller interconnected pore spaces. Although clay may be well sorted and can have high porosity, it has the lowest hydraulic conductivity because the pores are so small that molecular attraction between clay particles and water prevents significant movement of water. Hydraulic conductivity of well-sorted sand and gravel typically exceeds 500 ft/d; that of medium to coarse sand and moderately sorted, fine sandy gravel typically ranges from 25 to 500 ft/d; that of fine sand and poorly sorted silty gravel typically ranges from 1 to 25 ft/d; and that of silt, clay, and till typically is less than 1 ft/d (Heath, 1983).

Hydraulic conductivity of outwash can differ widely from place to place because the complex depositional processes in meltwater environments resulted in a heterogeneous mixture of particle sizes. As stream channels were abandoned, buried, moved

laterally, aggraded, or downcut, the outwash materials became mixed; the particle size in a channel reflects the flow velocity of meltwater discharging from the ice and also the place of deposition within the channel, such as, inside a meander bend, where the velocity is much lower than along the outside of the bend.

Wells that pump large amounts of water are preferred for aquifer tests because tests at these wells affect a relatively large volume of the aquifer and tend to average the effects of local anomalies within the aquifer, whereas slug tests and aquifer tests that remove only small amounts of water affect a relatively small volume of aquifer and are, therefore, more likely to tap a zone that might not be representative of the aquifer. Hydraulic-conductivity values of aquifers in the study area, as determined from aquifer tests that used large pumping rates, are given in table 2.

Unconfined Aquifer

Hydraulic-conductivity values of the unconfined aquifer in the study area, as determined from aquifer tests that used large pumping rates, ranged from 85 to 1,150 ft/d (table 2). The largest values (880 to 1,150 ft/d) were in the unconfined outwash deposits in the western and central parts of the study area, which were close to the ice front during the Valley Heads standstill, where fast-flowing meltwater deposited well-sorted coarse gravel and washed away most of the fine-grained sediment, and redeposited it in more distal reaches. Moderately high values (220 to 380 ft/d) were measured in distal reaches of unconfined outwash aquifer in the eastern part of the study area, where meltwater velocity was lower than that near the ice front and resulted in deposition of finer, less sorted sand and gravel. A moderately low value

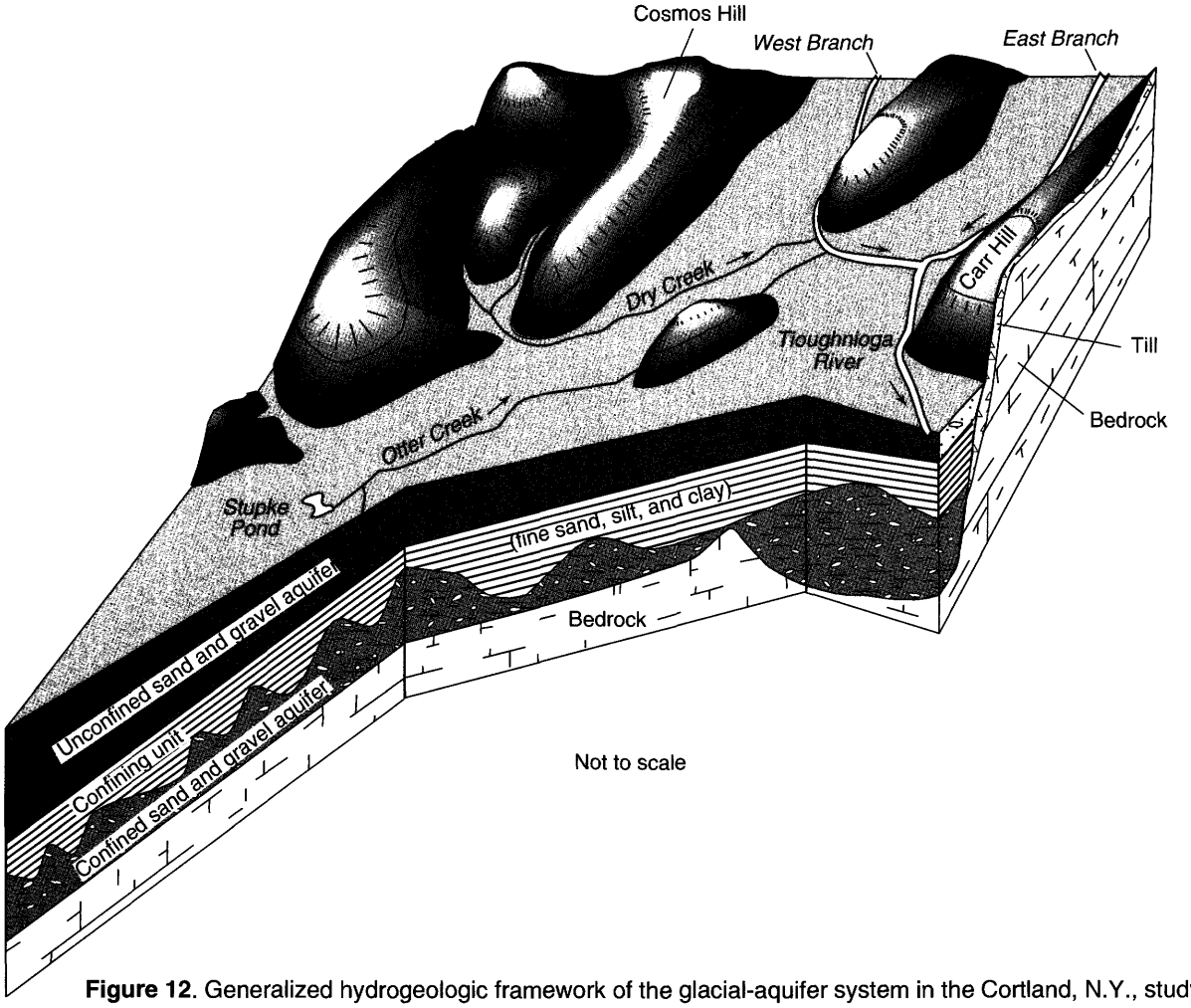


Figure 12. Generalized hydrogeologic framework of the glacial-aquifer system in the Cortland, N.Y., study area.

Table 2. Results of aquifer tests in the glacial-aquifer system in the Cortland, N.Y. study area.

[Well locations are shown in pl. 1, gal/min = gallons per minute, ft/d = feet per day.]

USGS well number	Location	Date	Aquifer	Average pumping rate (gal/min)	Average hydraulic conductivity (ft/d)
317	City of Cortland	9-12-75	Unconfined (outwash)	3,000	1,150[a]
11	Barry School	4-26-76	Unconfined (outwash)	1,200	1,050[a]
355	Town of Cortlandville (Terrace Road)	3-15-76	Unconfined (outwash)	630	950[a]
432	Town of Cortlandville (Lime Hollow Road)	7-16-91	Unconfined (outwash)	1,430	880[b]
434	Smith Corona Corporation	12-26-90	Unconfined (outwash)	975	900[c]
386	ETL Testing Laboratories	9-11-80	Unconfined (outwash)	350	350[d]
447	Rosen Superfund site	1-19-95	Unconfined (outwash)	80	220[e]
435	Monarch Tool Corporation	8-4-67	Unconfined (kame)	150	85[f]
151	Tunison Fish Hatchery	3-12-68	Confined (kame)	125	60[a]
409	Tunison Fish Hatchery	8-14-62	Confined (kame)	82	65[a]

a Cosner and Harsh, 1978
b Determined during this study
c O'Brien and Gere Engineers, Inc., 1990
d Reynolds, 1985
e Blasland, Bouck and Lee, Engineers, 1992
f Apfel, 1967

(85 ft/d) was determined from an aquifer test at an industrial well installed in unconfined kame deposits in the western part of the unconfined aquifer; this reflects the poorly sorted silty sand and gravel that is typical of kame material.

The gradation from high hydraulic conductivity in the western part of the study area to moderately high values in the eastern part is consistent with the observed northeastward decrease in grain size of sediment samples collected during test drilling. Coarse cobble gravel predominates in the western and central parts, whereas coarse sand and gravel is common in the eastern part. The northeastward fining of sediments reflects the increasing distance from the source of sediments at the ice front, and the decrease in the gradients of meltwater channels (from 40 ft/mi in the western part to 20 ft/mi in the eastern part). It also reflects a decrease in bedload particle-size through mechanical erosion during transport.

Moderately high hydraulic conductivity values (260 to 380 ft/d) were determined by three diffusivity analyses (transmissivity divided by storage coefficient), and one specific capacity analysis, in the unconfined outwash deposits along the Tioughnioga River in the eastern part of the study area by Reynolds (1985, 1987). Low to moderately low values (3.4 to 140 ft/d) were obtained by slug tests in small-diameter monitoring wells installed in the unconfined aquifer near the valley wall at the Rosen Superfund site (pl. 1) (Blasland, Bouck and Lee, Engineers, 1992). These low values probably result from the mixing along the valley walls of poorly sorted, silty sand and gravel inwash from uplands with well-sorted outwash.

Confined Aquifer

Low- to moderately low hydraulic conductivity values (16 to 65 ft/d) were obtained for the confined aquifer from two aquifer tests at the fish hatchery in the southwestern part of the study area and one slug test at the Rosen Superfund site (fig. 1). Hydraulic conductivity values determined from aquifer tests at the fish hatchery ranged from 60 to 65 ft/d, and the value determined by a slug test at the Rosen Superfund site was 16 ft/d. These aquifer tests probably represented poorly sorted kame deposits.

Confining Unit

A hydraulic conductivity value of 2.0 ft/d was obtained from analysis of a slug test of a 2-in.-diameter monitoring well installed in the confining unit at the Rosen Superfund site (Blasland, Bouck and Lee, Engineers, 1992). Hydraulic conductivity values of the confining layer were estimated in other locations from grain-size characteristics observed in split-spoon samples and from air-rotary and cable-tool drill cuttings. A value of 2.0 ft/d was estimated for the confining unit where it consists of very fine to fine sand and silt; this value also was estimated for a similar fine-grained deposit in New Hampshire

(Tepper and others, 1990). A value of 0.1 ft/d is estimated for areas where the confining layer consists of silt and clay.

Ground-Water Levels and Flowpaths

Water-level measurements can be used to define the slope of the water table in the unconfined aquifer and of the potentiometric surface in the confined aquifer. The slope determines the direction of ground-water flow. Water levels in about 100 wells were measured during March 28-29, 1990; from May 28-June 4, 1991; and October 7-9, 1991, to obtain values representing periods of high, average, and low recharge, respectively (pl. 2-4). These measurements were used to calibrate the ground-water flow model, as discussed further on. Ground-water levels also were measured monthly in about 50 wells from July 1989 through October 1991 to determine annual water-level fluctuations. The water-level measurements made during this study indicated a hydraulic head loss of about 100 ft over the 6-mi length of the study area, from the ground-water divide in the western part to the Tioughnioga River in the east.

Ground water moves from areas of high head to areas of low head, and the directions of flow depend on local factors such as aquifer geometry, distribution of recharge, and location of discharge areas (streams, ponds, wetlands, and pumping wells). These factors also determine the altitude and slope of the water table (or of the potentiometric surface in a confined aquifer). Ground water flows roughly perpendicular to the potentiometric contours (lines of equal head), as shown in plates 2-4.

Unconfined Aquifer

Water in the unconfined aquifer generally moves laterally from the edges of the valley toward the center, then northeastward along the axis of the Otter Creek-Dry Creek valley and discharges to pumping wells and to the West Branch Tioughnioga and the Tioughnioga Rivers. The study area contains four major pumping centers: (1) the City of Cortland well field, (2) the well field for the Town of Cortlandville on Terrace Road, (3) a well for the Town of Cortlandville on Lime Hollow Road, and (4) the purge well at the typewriter plant in the western part of the study area (pl. 2-4).

The hydraulic gradient in the unconfined aquifer in the middle of the valley typically ranges from 0.0027 ft/ft during periods of low water levels to 0.0037 ft/ft during periods of high water levels. The steeper hydraulic gradients along the edges of the valley in some areas than in the middle probably result from kame deposits of low hydraulic conductivity and(or) proximity to major recharge areas, such as where upland streams flow onto the aquifer and lose water to the coarse sediments.

Ground-water flowpaths during periods of high, average, and low recharge shift with the magnitude and distribution of recharge. For example, water infiltrating from upland tributary streams that flow onto the Otter Creek-Dry Creek valley forms a fan-shaped ground-water mound within the unconfined aquifer. Water spreads from the apex of the mound (where the stream enters the edge of the valley) toward middle of the valley where, in effect, it "pushes" the flowpath of ground water in the middle of the valley (the water is moving down the axis of the valley) toward the opposite side of the valley.

The extent of the "push effect" depends upon the local geology, the size of the upland tributary basin, and recharge conditions at the opposite valley wall. The median annual-minimum streamflow is highly dependent on the size of a drainage basin and the amount of sand and gravel in it (Thomas, 1966). Drainage basins that are underlain by significant amounts of sand and gravel (more than 20 percent of the basin) have significantly higher streamflow during low-flow periods than basins underlain entirely by till or bedrock. During low-recharge conditions, streamflow in small upland till and bedrock basins and on unchanneled hillsides is minimal or absent and would provide little or no recharge to the main valley from these streams. Streams in large upland tributary basins that contain significant amounts of sand and gravel tend to be perennial, however, and provide a continuous amount of recharge to the aquifer (Thomas, 1966).

Confined Aquifer

The study area contains only 15 wells that tap the confined aquifer because the unconfined aquifer has adequate yields in most places, making more costly deep wells unnecessary. Therefore, the inferred directions of ground-water movement in the confined aquifer are less certain than those in the unconfined aquifer, which are based on water-level measurements in more than 100 wells.

The direction of ground-water flow in the confined aquifer, as inferred from water-level measurements

made in 15 wells finished in the confined aquifer, generally follows that in the unconfined aquifer; that is, from the edges of the Otter Creek-Dry Creek valley toward the center, then northeastward down the valley axis. Ground water in the West Branch and East Branch Tioughnioga River valleys flows southward and southwestward, respectively, then, southeastward as underflow down the Tioughnioga River valley at the confluence with the Otter Creek-Dry Creek valley.

Vertical (downward) gradients were measured in some nested piezometers along the edges of the valley where the confining unit is absent. These areas are where water in the unconfined aquifer flows vertically downward to the confined aquifer.

Conceptually, water in the confined aquifer may move up into the unconfined aquifer along the edges of the valley in the eastern part of the study area, as indicated by ground-water-flow simulations (discussed in the modeling section). Monitoring wells would need to be installed along the edges of the valley in this area to determine whether such upward flow actually occurs.

Sources of Recharge

The aquifer system receives recharge from three sources under natural (nonpumping) conditions– (1) infiltration of precipitation on the aquifer, (2) upland sources, such as runoff from unchanneled hillsides and seepage from bedrock that border the aquifer, and (3) seepage from tributary streams that flow onto the aquifer (fig. 13). The unconfined aquifer receives additional recharge from (1) infiltration beneath recharge basins at an industrial site in the western part of the aquifer, and (2) induced infiltration from streams and ponds near the major pumping wells.

Direct Infiltration of Precipitation on the Valley

Part of the precipitation that falls on surficial sand and gravel is returned to the atmosphere by evapotranspiration; the remainder infiltrates and recharges the aquifer. Thus, the amount of recharge by infiltration (R_i) equals precipitation (P) minus evapotranspiration (ET), assuming that ground-water evapotranspiration is negligible:

$$R_i = P - ET \quad (1)$$

Rates of recharge from precipitation vary seasonally. Most of the precipitation that falls during the dormant period of vegetation (typically from mid-October through the end of April) infiltrates into the aquifer, but little reaches the aquifer during the growing season (May through September) because it is lost through evapotranspiration.

In the Northeast, evapotranspiration in any year can be estimated as the long-term average annual precipitation minus long-term average annual stream runoff (Lyford and Cohen, 1987). Average annual runoff for 53 years (1939-91) in the Tioughnioga River basin, measured at a streamflow gage at Cortland (USGS station 01509000, pls. 2-4) was 23.0 in. (Campbell and others, 1992); thus, the average annual evapotranspiration would equal 18.2 in. (long-term average annual precipitation of 41.2 in. minus long-term average annual runoff of 23.0 in.), and the long-term average annual recharge would be 23.0 in. (long-term average annual precipitation of 41.2 in. minus average annual evapotranspiration of 18.2 in.).

Upland Sources

Although direct infiltration of precipitation on the valley has been considered the chief source of recharge to sand and gravel aquifers, recent studies in the glaciated Northeast indicate that, in regions of moderate to high topographic relief (where hills rise more than 500 ft above the adjacent valley floor), more than half of the natural recharge to surficial stratified-drift aquifers in the valleys can be derived from upland runoff (Morrissey and others, 1987). For example, 58 percent or more of the recharge in two glacial aquifers in valleys in central New York was derived from (1) unchanneled runoff from hillsides that border the valley-fill aquifer, and (2) seepage loss from upland tributary streams that flow over the aquifer (Randall and others, 1988).

Recharge to valley-fill aquifers from adjacent unchanneled hillsides include surface runoff and the lateral movement of ground water (within upland till, sand and gravel, and bedrock) that flows toward the valley and seeps into the aquifer along the its edges (fig. 13). All precipitation that is not lost through evapotranspiration in the unchanneled drainage areas in the uplands is assumed to become either runoff or ground water that will eventually reach the valley and infiltrate into the aquifer. If a stream is at the base of the hill, however, runoff and ground water from the hillside will discharge into the stream rather than to the aquifer.

The amount of recharge from runoff from adjacent unchanneled hillsides annually can be calculated by the following equation:

$$R = P - ET \times DA \quad (2)$$

where R = recharge from runoff from unchanneled hillsides
P = precipitation
ET = evapotranspiration
DA = drainage area of hillside

Tributary streams (channeled flow) that drain till-and-bedrock basins in the uplands are major sources of aquifer recharge where they enter and flow over the permeable surficial sand and gravel in the main valley. Small tributaries that flow onto the aquifer typically go dry, especially during the summer, when flow in streams is small and the water table in the valley-fill aquifer falls below the streambed, allowing water in the stream to seep below the channel. The rate of recharge from losing tributaries is controlled largely by the vertical hydraulic conductivity and thickness of the streambed and by the hydraulic heads in the stream and aquifer. Rates of recharge from tributaries were calculated from several sets of streamflow measurements made during periods of high, average, and low recharge in 1990-91 in most tributary streams that flow onto the aquifer (table 3). Discharges at the measuring sites are shown in plates 2 through 4. Most tributary streams in the study area lose water to the aquifer where they flow onto the valley; an exception is Otter Creek, which can be divided into three reaches that have two flow regimes; these are (1) the reach from the point where Otter Creek enters the valley to where it joins the outlet to Stupke Pond, (2) the reach from Stupke Pond to the umlaufberg, and (3) the reach where Otter Creek flows north of the umlaufberg to its mouth. Reaches 1 and 3 lose water during the entire year; and reach 2 typically gains water during high-recharge conditions but loses water during periods of average and low recharge. Reach 3 is hydraulically connected to the aquifer during most of the year, except when the water table is lower than the streambed in the summer, causing Otter Creek to dry up. Otter Creek can be considered the main trunk stream in the Otter Creek-Dry Creek valley because it has the only reach in the valley that gains water, even though for only part of the year.

Only part of the water in upland tributaries recharges the aquifer during periods of high streamflow (during spring and during large storms throughout the year); the remainder flows over the aquifer and discharges into the West Branch Tioughnioga and Tioughnioga Rivers. During average- and low-flow conditions (summer, fall, and winter), however, all of the water in most tributary streams recharges the aquifer, except in Dry Creek, which goes dry only during extended droughts. As the water table declines through the summer, losing streams typically dry up in the upstream direction, starting at the mouth, whereas gaining streams typically dry up in the downstream direction, starting at the headwaters.

Table 3. Streamflow losses and gains in tributary streams above unconfined aquifer in the Cortland study area, 1990-91.

[Values are in cubic feet per second; location of tributaries and streamflow-measurement sites are shown in pls. 2-4.]

Tributary stream	Streamflow loss (-) or gain (+) between measurement sites near valley wall and near mouth, or where streams dry up		
	March 29,1990 (high recharge)	May 30-June 4, 1991 (average recharge)	October 9, 1991 (low recharge)
UPPER REACH OF OTTER CREEK (from valley wall to outlet to Stupke Pond)	-1.20	-0.41	Dry at valley wall
Dry Creek	-0.81	-0.54	-0.37
Perplexity Creek	-0.65	-0.20	Dry at valley wall
Tributary A	-0.95	-0.12	Dry at valley wall
Tributary B	-0.40	-0.12	Dry at valley wall
Tributary C	-0.41	Dry at valley wall	Dry at valley wall
Tributary D	-2.10	-0.23	Dry at valley wall
Tributary E	-1.22	-0.11	Dry at valley wall
Estimated loss from other tributaries not measured	-0.50	-0.05	Dry at valley wall
Sum of tributary losses	-8.24	-2.73	-0.37
LOWER REACH OF OTTER CREEK (Stupke Pond to mouth)	+8.60	-0.42	Entire reach was dry

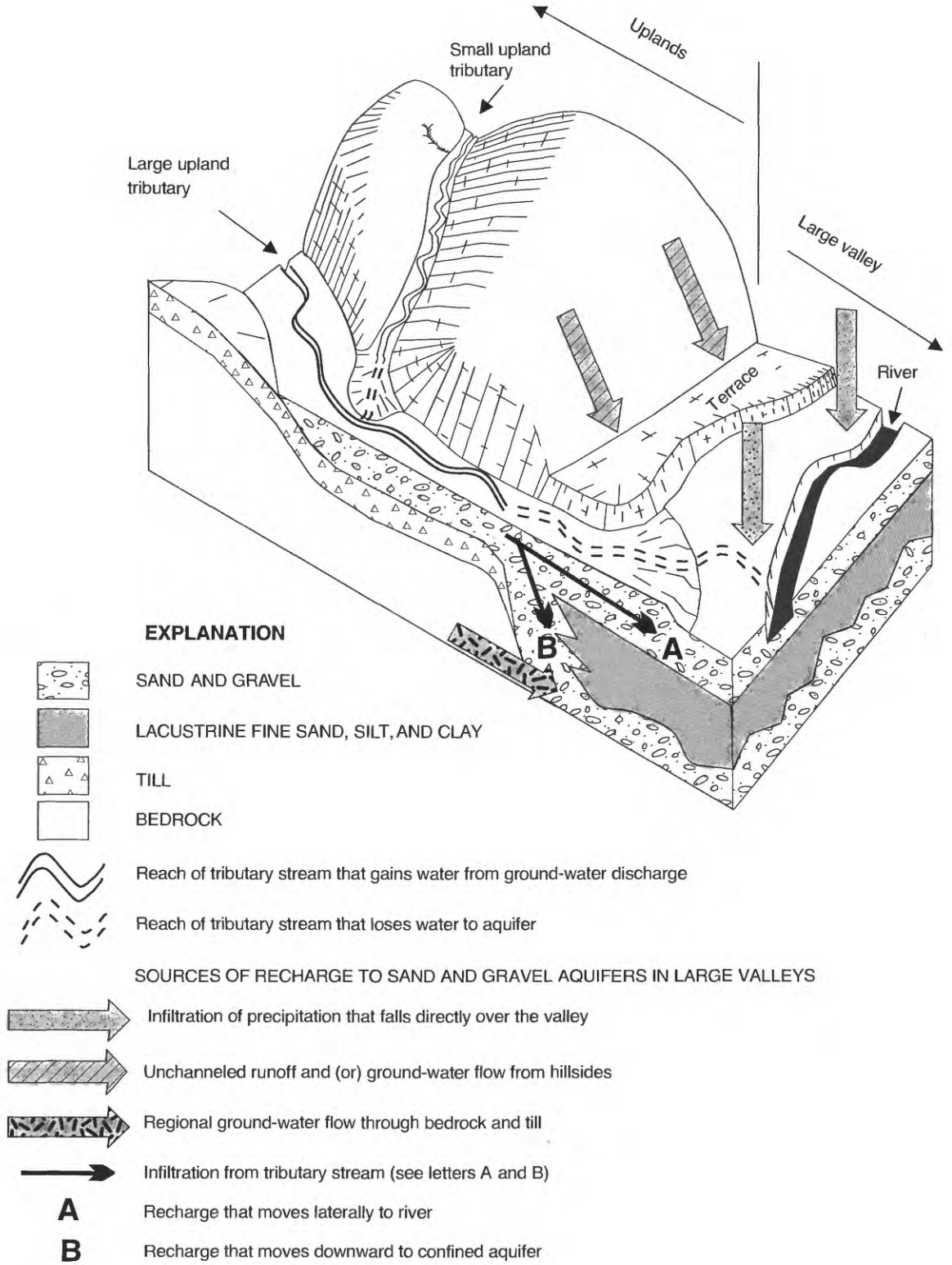


Figure 13. Sources of recharge to stratified drift in valleys in the glaciated Northeast. (Modified from Morrissey and others, 1987, fig. 1.)

Induced Infiltration by Ground-Water Withdrawals

Pumping affects Otter Creek where it flows through the City of Cortland well field because that reach of the creek is hydraulically connected to the aquifer (pl. 2-4). Pumping lowers the water table beneath the stream surface and thereby induces infiltration from the stream to the aquifer. Pumping of a City of Cortland municipal well during low-flow conditions once caused a nearby reach of Otter Creek to dry up, and when the pump was turned off, water reappeared in the creek (James Roberts, former manager of Cortland Water Department, oral commun., 1990). The rate of induced infiltration for a pumping rate of 4.29 Mgal/d, as estimated from results of numerical model simulation of average-conditions, is 0.6 ft^3/s. No induced infiltration can occur when Otter Creek dries up.

The municipal well for the Town of Cortlandville on Lime Hollow Road may induce some infiltration from a pond 400 ft south of the well. The similarity of water levels in the pond to those in the municipal well suggests that the pond is hydraulically connected to the aquifer.

Infiltration From Recharge Basins

A recovery well (well 434, pl. 1) at the typewriter plant in the western part of the study area is pumped at a rate of about 980 gal/min. The water is routed through an air stripper, where most volatile-organic chemicals are removed, then discharged to recharge basins about 750 ft north of the plant (pl. 2-4), where it infiltrates back to the aquifer.

Ground-Water Discharge

Water in the unconfined aquifer discharges (1) as seepage into major streams and, seasonally, to some reaches of Otter Creek; (2) to pumping wells; and (3) as seepage to springs that are headwaters to the Fall Creek valley in the western part of the study area. Most of the water pumped from municipal wells is eventually piped to the sewage-treatment plant as wastewater, where it is treated and discharged into the Tioughnioga River in the eastern part of the study area (pl. 2). Most water in the confined aquifer leaves the study area as underflow in the Tioughnioga River valley in the southeastern part of the study area.

Seepage to Streams

Most of the ground water that discharges to streams enters the West Branch Tioughnioga and Tioughnioga Rivers; lesser amounts enter the reach of Otter Creek from the Stupke Pond outlet to the umlaufberg in the central part of the study area. The confining unit prevents most water in the confined aquifer from flowing upward into the unconfined aquifer and into the streams.

Measurements of streamflow in the West Branch Tioughnioga and Tioughnioga Rivers and in Otter Creek (fig. 14) indicate that total ground-water discharge to these streams was 17.8 ft^3/s for average-recharge conditions and 8.4 ft^3/s for low-recharge conditions (table 4); measurements in these large streams during periods of high recharge were impractical (for safety reasons).

Table 4. Ground-water discharge to West Branch Tioughnioga River, Tioughnioga River, and Otter Creek during average- and low-flow conditions, 1991.

[All values are in cubic feet per second. Location of measurement sites and reaches shown in fig. 14].

Reach	Site no.	Average-flow conditions: Measured discharge	Average-flow conditions: Net gain within reach (upstream value minus downstream value)	Low-flow conditions: Measured discharge	Low-flow conditions: Net gain within reach (upstream value minus downstream value)
A. West Branch Tioughnioga River	1	31.4		12.8	
	2	40.6	9.2	18.7	5.9
A and B. Tioughnioga River	1	83.2		53.3	
	3	99.2		64.4	
minus discharge from sewage treatment pland		-8.4	7.6	-8.6	
	subtotal	90.8		55.7	2.5
B-E. Otter Creek	3	1.4		0.0	
	7	2.4	1.0	0.0	0.0
		TOTALS	17.8		8.4

Municipal and Industrial Withdrawals

Total ground-water withdrawal from the glacial-aquifer system by municipal and industrial wells ranges from 6.76 to 7.20 Mgal/d (table 5), most of which is from the unconfined aquifer. The largest user is the City of Cortland, which, during 1984-92, pumped 3.9 to 4.3 Mgal/d (data from records at the Cortland Water Department). Substantial leaks in the distribution system (Douglas Withey, manager of Cortland Water Department, oral commun., 1994) result in conveyance losses that return some of the water to the aquifer; therefore, actual discharge from pumping is somewhat less than the reported values.

The Town of Cortlandville pumped from 0.65 to 0.99 Mgal/d of water from its two well fields during 1990-91 (Hayne Smith, Town of Cortlandville Engineer, oral commun., 1992). A purge well at the typewriter plant pumped at a rate of 0.69 Mgal/d from December 1989 through October 1990, and at a rate of 1.43 Mgal/d from October 1990 to at least December 1994. All pumped water from the purge well is returned to the aquifer through recharge basins 750 ft north of the plant. When the purge well was pumped continuously (since October 1990),the other production wells for the plant were not used.

Underflow From the Study Area

Within the confined aquifer, water that is northeast of the ground-water divide in the western part of the study area flows northeastward and leaves the study area as underflow through the Tioughnioga River valley at an estimated rate of 40,500 ft^3/d (0.5 ft^3/s), as calculated from Darcy's equation for one-dimensional flow in a prism of porous material:

$$Q = \frac{KA(h_2 - h_1)}{L} \qquad (3)$$

where Q = flow (L^3t^{-1})

K = hydraulic conductivity of the aquifer (Lt^{-1});

A = cross-sectional area perpendicular to flow (L^2);

h_2-h_1 = head difference across the prism of flow (L);

L = length of flowpath (L).

The following hydraulic values were used to calculate underflow (Q) out of the Tioughnioga River valley:

hydraulic conductivity (K)	150 ft/d
cross-sectional area (A) of valley	135,000 ft^2
head difference (h^2-h^1)	0.002 ft
length (L)	1 ft.

Ground water that is west of the divide in the western part of the study area flows southwestward and leaves the study area as underflow to the Fall Creek valley, also at an estimated rate of about 40,500 ft^3/d, or 0.5 ft^3/s.

WATER QUALITY

Water from 15 wells was sampled about monthly by the Cortland State College and Cortland County Department of Planning during 1987-93. In addition, the USGS and these two groups conducted three synoptic rounds of sampling to (1) define the extent of a trichloroethylene (TCE) plume that resulted from a spill at the typewriter plant in the western part of the study area; (2) assess the contamination-remediation efforts at the source (the plant site); and (3) compare current concentrations of common ions, metals, and nutrients in ground water throughout the study area with historical data to detect changes or trends in water quality over time. TCE was used at the typewriter plant for degreasing mechanical parts from 1958 through October 1986 (O'Brien and Gere Engineers, Inc., 1987). Results of chemical analyses are given in appendix 3.

The first round of sampling (April 4-5, 1990, a high-recharge period), entailed collection of samples from 60 wells (31 observation wells, 26 private wells, and 3 municipal wells). All samples were analyzed for common ions, metals, nutrients, and volatile-organic compounds (VOC's). The second round (September 17-20, 1990, a low-recharge period), entailed collection of samples from 31 of the 60 wells sampled previously to verify results from the first sampling, and from an additional 9 observation wells that were installed after the first sampling to obtain data needed to define the extent of the TCE plume. Of the 40 samples collected during the second round, all were analyzed for nutrients, and 30 were analyzed for common ions, metals, and VOCs. The third round of sampling, 3 years later (April 27, 1993), entailed collection and analysis of samples from 18 wells for TCE and its degradation products to determine whether remedial efforts at the typewriter plant site had improved water quality downgradient of the site.

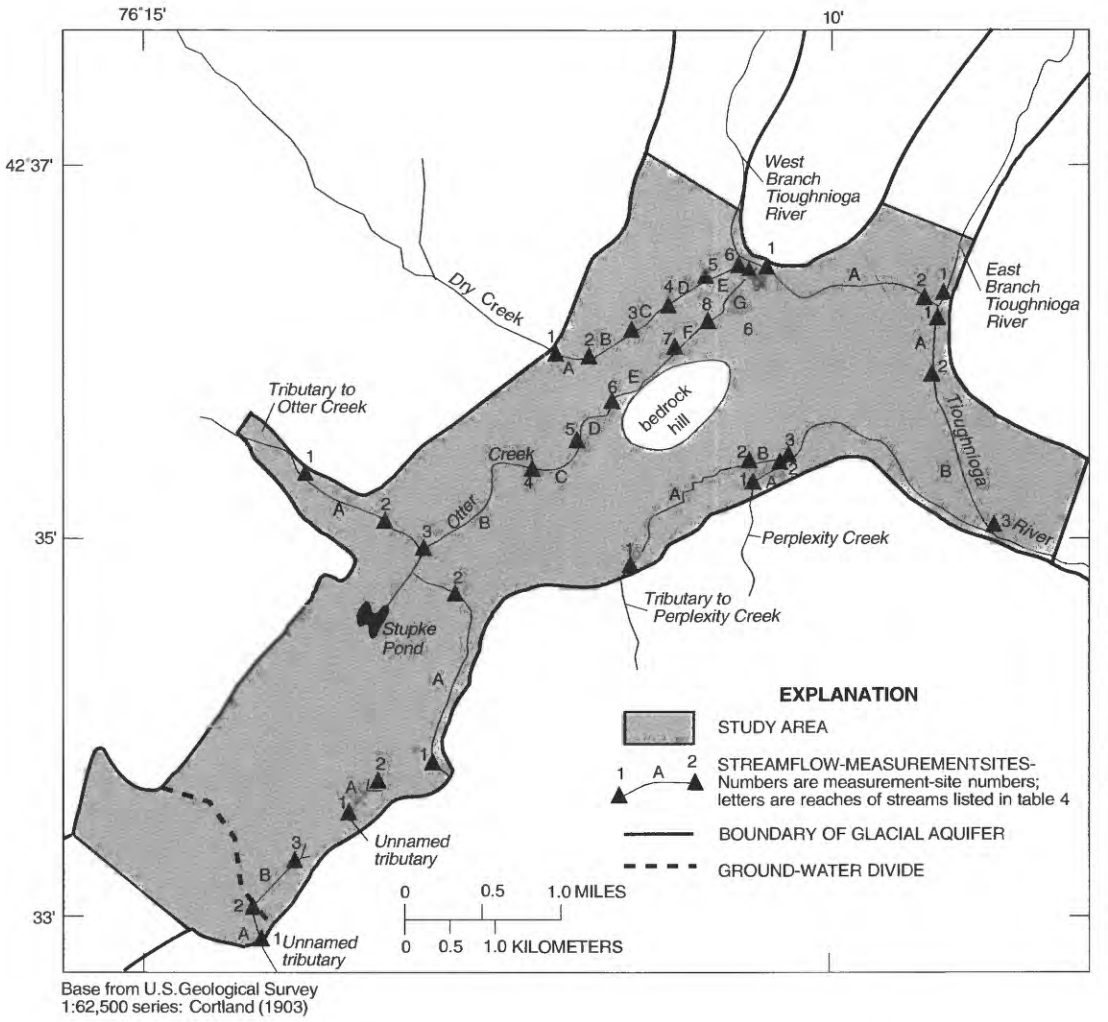


Figure 14. Location of streamflow-measurement sites in Cortland, N.Y., study area.

Table 5. Ground-water withdrawals from the Cortland, N.Y. study area by major pumping wells during low-, average-, and high-recharge conditions, 1990-91.

[All values are in millions of gallons per day. Locations of wells are shown on pl. 1.]

Well number	Owner	Recharge conditions and dates of measurement		
		Low recharge (Oct 7-9, 1991)	Average recharge (May 28-June 4, 1991)	High recharge (Mar. 28-29, 1990)
317	City of Cortland	4.09	4.28	4.41
354, 355	Town of Cortlandville, Terrace Road	0.56	0.40	0.65
432	Town of Cortlandville, Lime Hollow Road	.16	.59	Not pumping
434	Smith Corona Corp., recovery well	1.43	.69	.69
392	Smith Corona Corp., production wells	Not pumping	.48	.36
386	ETL Testing Labs	.22	.22	.22
373	Cortland Hospital	Not pumping	.18	.18
140, 139	Tunison Fish Hatchery	.20	.20	.20
138	Tunison Fish Hatchery	.10	.10	.10
	TOTALS	6.76	7.14	7.20

Volatile Organic Compounds

The U.S. chemical industry produces large amounts of volatile organic compounds (VOCs) that are used extensively by industries and by homeowners. Large-scale production and use of VOCs has resulted in many instances of soil- and ground-water contamination, most of which has resulted from leaks or spills at manufacturing plants, petroleum-product storage tanks, and chemical-waste disposal sites (Plumb, 1991). VOCs are low-molecular-weight hydrocarbons having very low (less than 2 percent) solubility in water, and rapid volatization. VOCs on the USEPA list of "Priority Pollutants" (U.S. Environmental Protection Agency, 1991) include trichloroethylene (TCE), benzene, 1,1,1-trichloroethane, and *cis*-1,2-dichloroethylene. Each is toxic to some degree, and most, including TCE, are believed to be carcinogenic (National Academy of Sciences, 1977). The USEPA "Maximum Contaminant Levels" (MCLs) for drinking water supplied by municipal water systems is 5 µg/L for TCE and benzene; 200 µg/L for 1,1,1-trichloroethane, and 70 µg/L for *cis*-1,2-dichloroethylene (U.S. Environmental Protection Agency, 1991). The MCL is an enforceable, health-based regulation set by the USEPA.

Many VOCs, including many of the chlorinated hydrocarbons (CHCs), are solvents used in degreasers and cleaners for metal and electronic parts, and also in paint removers, dry-cleaning fluids, drain cleaners, spot removers, and septic-tank cleaners. Other VOCs, such as benzene and toluene, are used in fuels. TCE is a CHC and a common industrial solvent that has been in commercial use for about 40 years. CHCs are persistent in the environment because they resist chemical and biological degradation; the average half-life for abiotic CHC transformations range from 2 months to 10^{10} years, and CHC half-lives for biodegradation range from 2 weeks to 8 months (Barbee, 1994). Anaerobic reductive dehalogenation (typically dechlorination) of CHCs is the primary biodegradation process in ground water; for example, *cis*-1,2-dichloroethylene is a reductive dechlorination product of TCE (Barrio-Lage and others, 1986; Wilson and others, 1991).

Extent and Migration of Trichloroethylene Contamination in the Unconfined Aquifer

The Chemistry Department at SUNY College at Cortland detected TCE in samples from a well in the central part of the unconfined aquifer in 1986. The well is 0.25 mi north of the Cortlandville municipal well field and 1.25 mi southwest and upgradient of the Cortland well field, and City and Town water managers and Cortland County health officials were concerned that the TCE could migrate to drinking-water supplies. In December 1986, samples were taken from about 23 observation wells and domestic wells by the college Chemistry Department and the Cortland County Department of Health to determine the extent and source of VOC contamination. Most of these wells were resampled about monthly during 1986-93. Most samples were analyzed by the college Chemistry Department; the rest were analyzed by the USGS laboratory in Denver, Co., and Buck Laboratory in Cortland.

From December 1986 through 1993, TCE was found in concentrations above the MCL of 5 µg/L at many wells in the central part of the unconfined aquifer. The highest TCE concentration found beyond the typewriter plant was 222 µg/L, in well 350 (owner Pace) on Pheasant Run (pl. 1) on April 9, 1987. This well 350 is 1,000 ft downgradient from the TCE source area at the plant. *cis*-1,2-Dichloroethylene, a solvent and reductive dehalogenation product of TCE, was also found in offsite wells where TCE was detected, but concentrations were below the MCL of 70 µg/L.

Horizontal Migration

Analyses of samples collected offsite by the Cortland County Department of Health and the college Chemistry Department, and of samples collected on the typewriter plant site by O'Brien and Gere Engineers, Inc. (1987), indicated that TCE in ground water was migrating northeastward. Hydrogeological consultants working for the plant found much higher concentrations of TCE and *cis*-1,2-dichloroethylene in wells at the plant site than in offsite wells and identified TCE-contaminated soils near the northwest side of the main plant building (O'Brien and Gere Engineers, Inc., 1987). The highest TCE concentrations found were at well site 448 (local well no. MW-7), installed by the consultants along the northwest perimeter of the main plant building (pl. 1), where TCE and *cis*-1,2-dichloroethylene concentrations of 10,000 and 7,600 µg/L, respectively, were found on August 3, 1989. TCE concentrations that day in 19 other wells on the site ranged from <1 to 270 µg/L, and *cis*-1,2-dichloroethylene concentrations ranged from <1.0 to 1,700 µg/L (O'Brien and Gere Engineers, Inc., 1990).

The extent of the TCE plume during the three rounds of sampling is shown in figures 15A, B, and C, respectively; the plume is defined where concentrations exceeded the MCL of 5 µg/L. The extent of the plume was roughly the same during all three sampling rounds, indicating that steady-state conditions probably had been reached. The plume extends 1.25 mi northeast from the plant and follows head gradients and the direction of ground-water flow.

Vertical Migration

The vertical distribution of TCE in the unconfined aquifer at wells 341 and 381 is plotted in figure 16. The TCE concentrations at well 341 (fig. 16A), which is 4,000 ft northeast of the TCE source at the plant, are higher in the middle zone than in the lower and upper zones of the unconfined aquifer, but the TCE concentration at well 381, which is 750 ft northeast of the TCE source, was uniformly distributed with depth (fig. 16B). The vertical distribution of TCE at well 341 (fig. 16A) is likely the result of (1) vertical dispersion of TCE with increasing distance from the source; (2) the vertical distribution of hydraulic conductivity in the aquifer, and (3) dilution by recharge (from precipitation). Coarse-grained sediments that form the top and middle zones of the aquifer and have high hydraulic conductivity provide a preferred pathway for ground-water flow and dissolved contaminants, but the fine-grained sediments of lower hydraulic conductivity in the lower zone retard downward ground-water movement and are a less preferred pathway. Little or no TCE was detected in the confined aquifer, which is protected by the lacustrine confining unit, which prevents the movement of water in the unconfined aquifer into the confined aquifer.

Effects of Remediation Efforts

A recovery well was installed at the typewriter plant as part of a "pump and treat" method for onsite remediation. Contaminated water is pumped from the aquifer and routed through an air stripper, where VOCs are volatilized and released into the atmosphere. The treated water is then piped 750 ft north of the plant and discharged into recharge basins, where it infiltrates to the water table. The return of pumped water to the aquifer causes little or no net loss of ground water. A cone of depression that has formed around the recovery well, and a ground-water mound that has formed beneath the recharge basins, alters the ground-water flow paths in the vicinity of the plant.

The effects of pumping by the TCE-recovery well and the rate of ground-water flow are essential considerations in evaluations of TCE concentrations in the plume. If the pump-and-treat system keeps the contaminated water from leaving the site, concentrations of VOCs will decrease over time through degradation and dispersion, and through downvalley movement of the tail of the plume that developed before pumping .

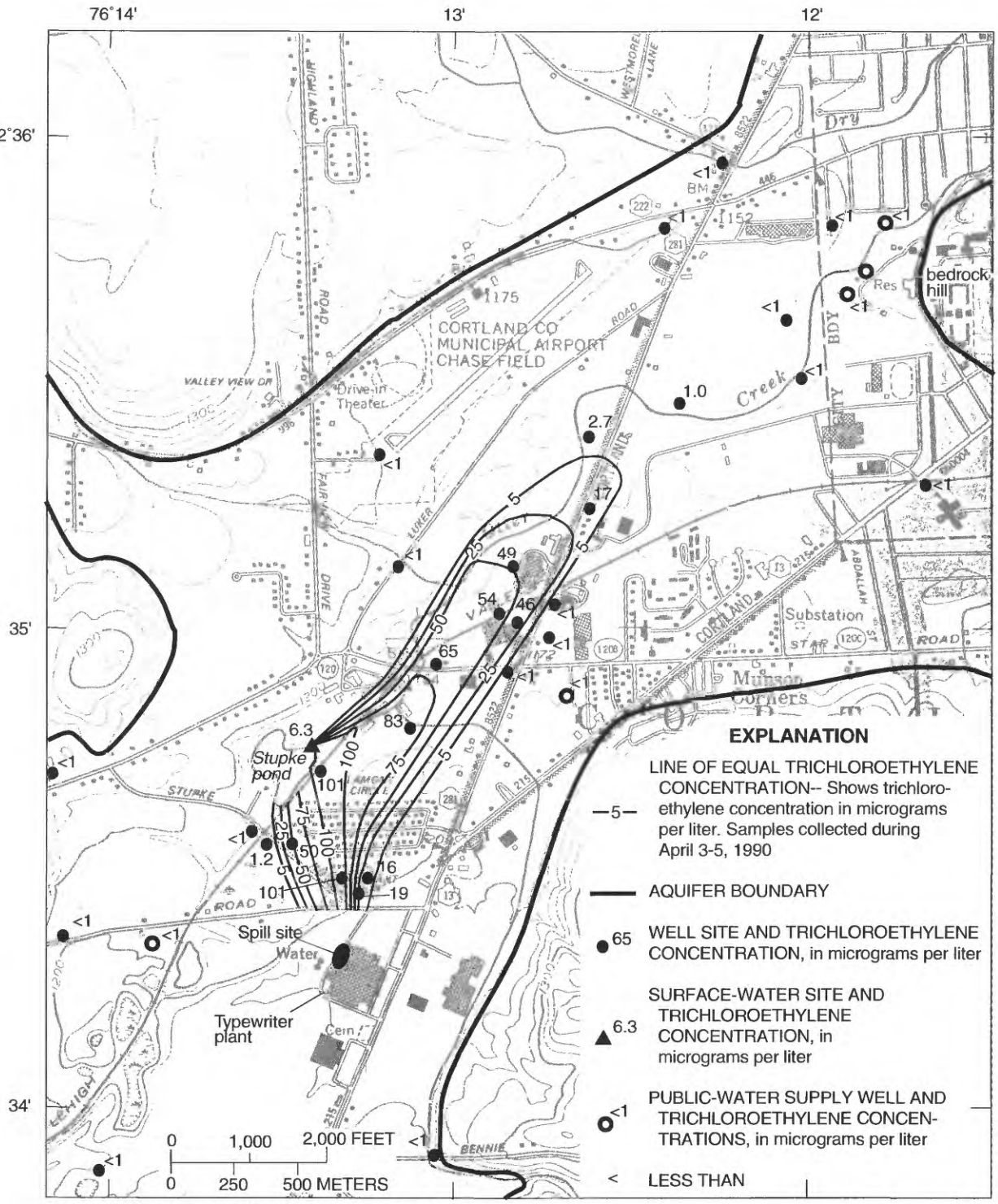
The recovery well was pumped intermittently from December 1989 through October 1990 at a rate of about 980 gal/min for 12 to 18 hours daily and continuously at this rate since October 1990. The TCE concentrations in most wells that were sampled in April 1990 (110 days after the beginning of intermittent pumping) were probably not significantly affected by the pumping because all wells that were sampled, except for well 22 (local well number CT-22), were more than 1,000 ft from the source of TCE– the distance ground water would move in 110 days at a velocity of 9 ft/d (velocity = hydraulic conductivity of 1,000 ft/d, divided by porosity of 0.3, times the hydraulic gradient of 0.0027 ft/ft).

The highest TCE concentrations found during the April 1990 sampling were just above 100 µg/L at well 350 (owner Pace) and well 121 (local well number CT-21), which are 1,000 and 2,400 ft northeast of the source of TCE, respectively (fig. 15A and pl. 1). These two wells have had the highest TCE concentrations of any offsite wells.

Pumping of the recovery well might have affected TCE concentrations at wells as far as 0.5 mi (2,640 ft) northeast of the source by the time of the second sampling round (September 17-20, 1990), as calculated for a pumping duration of 288 days (9.5 months) and a ground-water flow rate of 9 ft/d. TCE concentrations beyond this distance from the source were probably not affected yet.

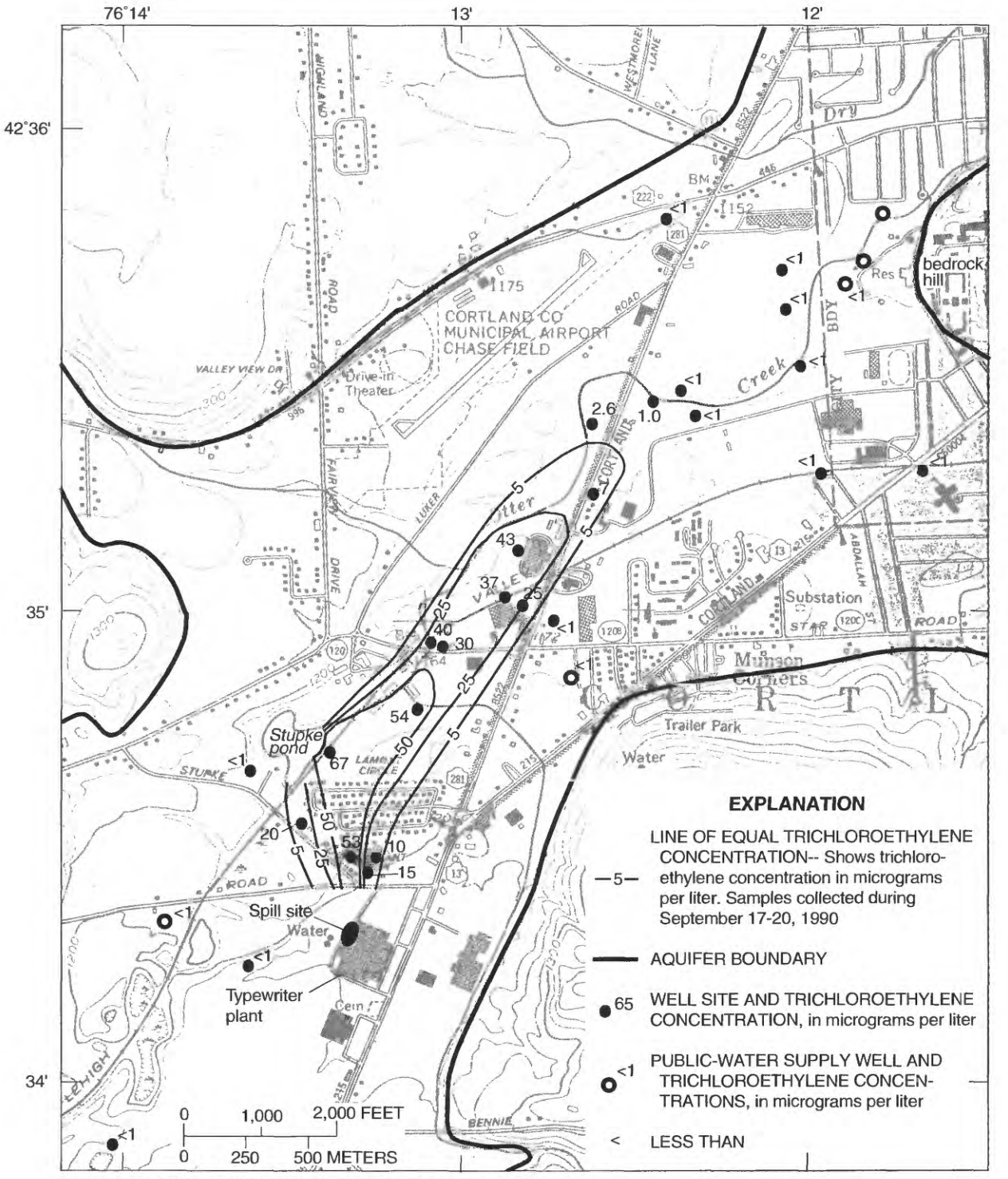
The extent of the TCE plume in September 1990 was about the same as in April 1990, but TCE concentrations were typically 30 to 50 percent lower; this could partly reflect the tendency of TCE concentrations at wells not yet affected by the recovery well to be lower during low-recharge periods (summer and fall) than during high-recharge periods (spring), as explained further on.

By the time of the third sampling round, 3 years later (in April 1993), the recovery well had been operating for 1,186 days (3.25 years), the last 2.5 years of which it had pumped continuously. During those 2.5



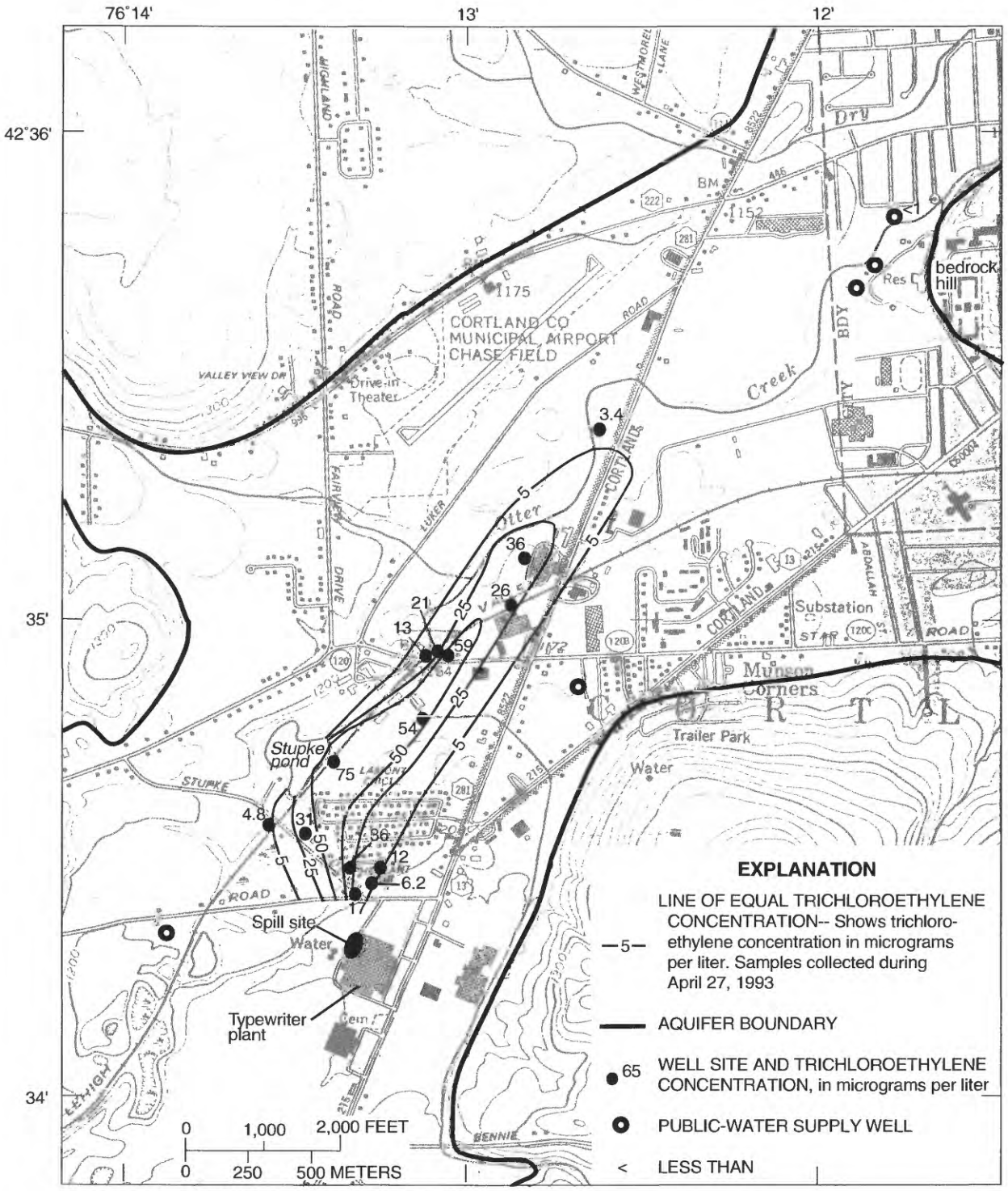
Base from New York State Department of Transportation
1:24,000 series: Cortland, New York (1980)

Figure 15A. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, April 3-5, 1990.



Base from NewYork State Department of Transportation
1:24,000 series: Cortland, NewYork (1980)

Figure 15B. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, September 17-20, 1990.



Base from New York State Department of Transportation
1:24,000 series: Cortland, New York (1980)

Figure 15C. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, April 27, 1993.

years, ground water would had moved more than 1.5 mi from the source–a distance greater than the length of the plume (about 1.25 mi). Therefore, water at all wells sampled during April 1993 would have been affected by the recovery-well operation.

The "pump and treat" remedial program was expected to capture all contaminated ground water on the site; TCE concentrations at the site were expected to decline rapidly, and those offsite were expected to decline significantly. These expectations were bolstered by analyses of several random samples collected in the fall of 1992, which showed that TCE concentrations had decreased significantly, some to the lowest values since December 1986 (fig. 17). These decreases prior to the April 1993 sampling suggested that the pump-and-treat system at the plant site was effective. A large amount of recharge in the winter and spring of 1993 (fig. 5), which included the blizzard of 1993, reversed this trend of improvement, however.

Results of the April 1993 sampling indicated that TCE concentrations at most wells in the middle and distal parts of the plume (figs. 15C, 17B, 17C) had increased significantly since the preceding fall and were nearly as high as those detected during April 1990 (fig. 15A) and September 1990 (fig. 14B). These elevated concentrations could not have been due to additional TCE emanating from the plant area because the ground-water traveltime from there to the middle and distal parts of the plume is from 1.5 to 2.5 years. The elevated TCE concentrations can be explained, however, by desorption of TCE that had previously sorbed onto sediments in the unsaturated zone. The above-normal recharge of March and April 1993 raised the water table to its highest level in at least 10 years and resaturated upper parts of the aquifer that had been

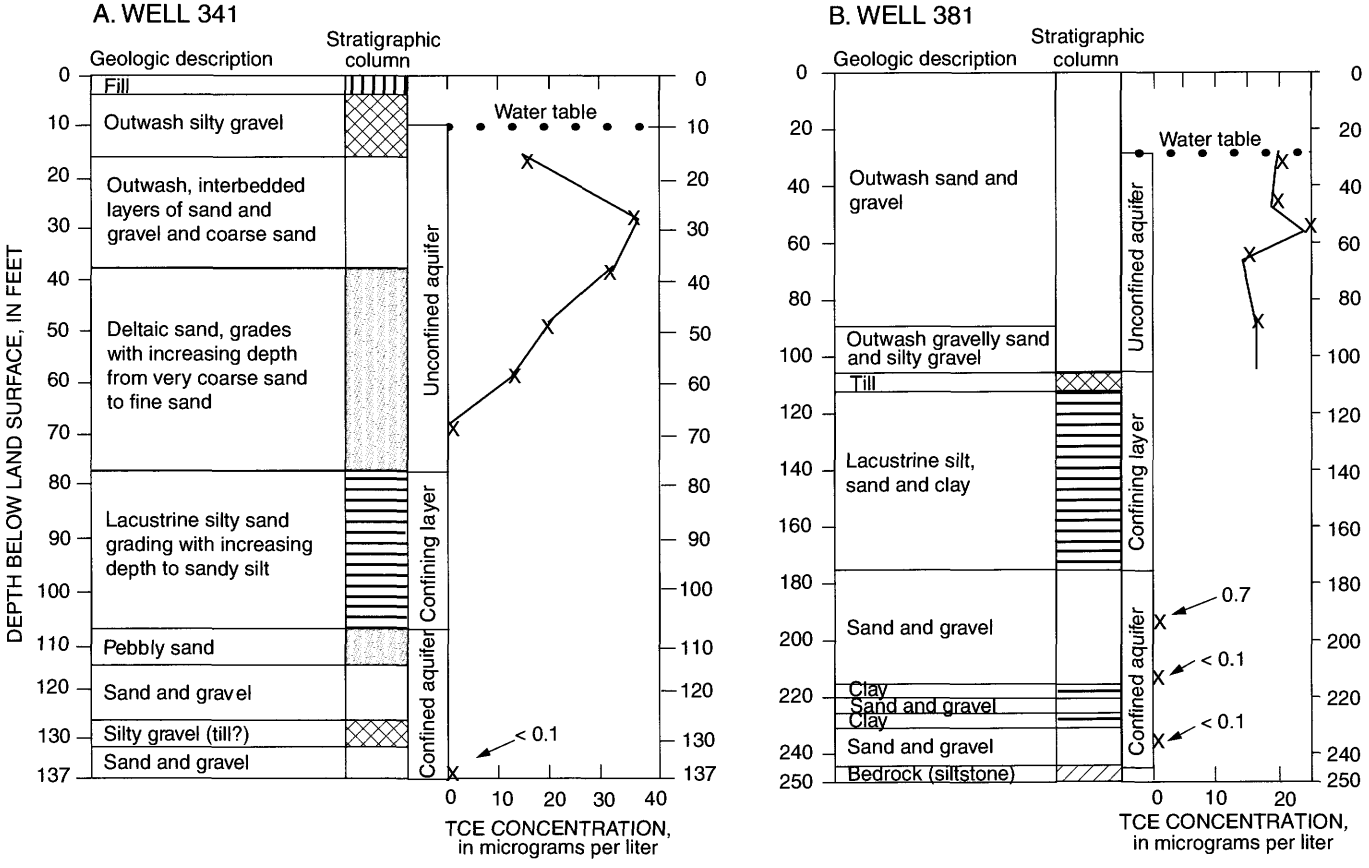


Figure 16. Vertical distribution of trichloroethylene (TCE) in ground water at two wells in Cortland, N.Y., study area: A. Well 341, 4,000 feet northeast of typewriter plant site, July 19, 1990. B. Well 381, 750 feet northeast of plant site, September 23-26, 1992. (Well locations shown on pl. 1.)

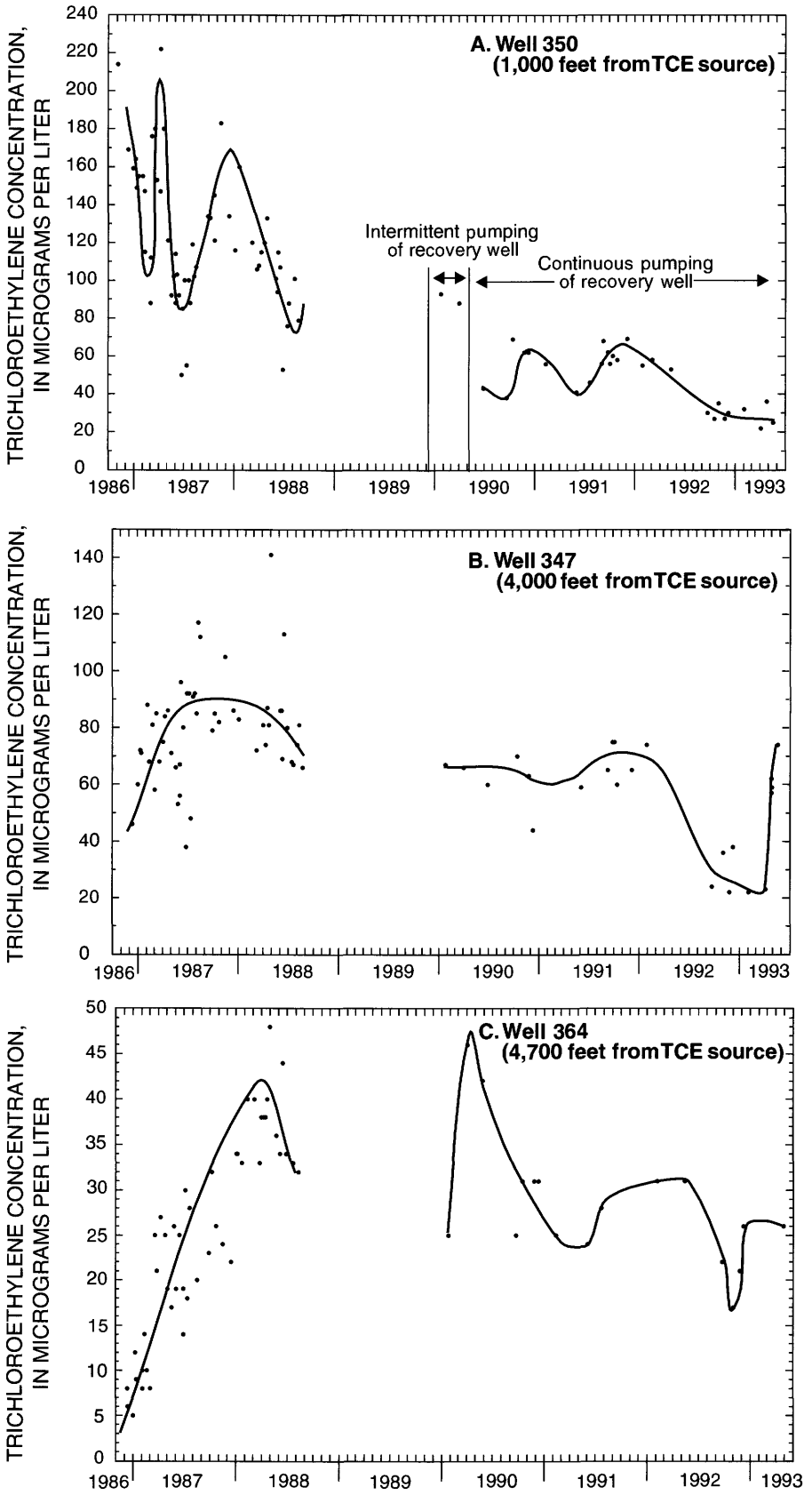


Figure 17. Trichloroethylene concentration at wells 350, 347, and 364 from November 1986 through May 1993. (Locations shown on pl. 1.)

unsaturated and that contained TCE that had not been thoroughly flushed by precipitation.

Results of the April 1993 sampling indicated that TCE concentrations had increased in the middle and distal wells but had declined significantly at some wells near the source, such as well 350 (owner Pace, fig. 17A), and at other wells on Pheasant Run (pl. 1) that had the highest TCE concentrations of the offsite wells. The lowered TCE concentrations at these wells could be explained by changes of ground-water flow paths near the plant site as a result of pumping by the recovery well and infiltration of the pumped water in recharge basins.

Long-Term Trends In TCE Concentrations

The year in which the TCE spill occurred was estimated from the arrival of the front of the plume at well 364 early in 1987 (fig. 17C) and from results of a particle-tracking program (MODPATH) in the back-tracking mode. The program calculated the ground-water traveltime to range from 21 months for high-recharge conditions to 23 months for low-recharge conditions. Subtracting 21 to 23 months from the time when the front of the TCE plume reached well 364 (early in 1987) indicates the time of the spill to be as early 1985. After the front of the plume reached well 364 in early 1987, the TCE concentrations at this well fluctuated only slightly through late 1992 (fig. 17C).

The highest concentrations of TCE in most offsite wells since the first sampling began in 1986 were found during 1987-88. Concentrations decreased slightly thereafter from 1989 through mid-1992, then decreased sharply at the end of the 1992, probably in response to (1) removal of contaminated soil, and (2) capture of contaminated ground water by the recovery well. These decreases were followed in the spring of 1993 by increases to about the same levels as those during 1989-91, however. As explained previously, the simultaneous increases of TCE concentrations in middle and distal parts of the plume suggest local releases of TCE to the aquifer, such as through desorption from a diffuse TCE source in the previously unsaturated zone of the aquifer, rather than to new TCE migrating from the source area at the typewriter plant. Desorption of TCE in the unsaturated zone can occur when (1) precipitation infiltrates the soil, and (2) a rising water table saturates the previously unsaturated zone.

TCE concentrations at wells within 1,500 ft of the typewriter plant, such as well 350 (fig. 17A), showed seasonal fluctuations. TCE concentrations were highest during the spring and lowest during the summer and fall. Hydrogeologic consultants (O'Brien and Gere, Engineers., 1990) also reported seasonal TCE fluctuations in wells at the plant. TCE concentrations at wells more than 1,500 ft from the plant showed little fluctuation, however (for example, well 364, about 4,500 ft downgradient of the plant, fig. 17C and pl. 1), indicating that seasonal fluctuations of TCE concentrations decrease with increasing distance from the TCE source.

Fate and Migration of Trichloroethylene

The fate and migration of TCE through an aquifer system are affected by physical, chemical, and biological processes. Physical processes include advection, dispersion, and nonaqueous-phase flow; chemical processes include volatilization, sorption, and dissolution; and biological processes include aerobic and anaerobic biotransformations (MacKay and others, 1985). Some of these processes are illustrated in figure 18.

The physical processes of advection, dispersion, and nonaqueous-phase flow affect the transport of TCE in the study area. The advective phase of TCE plume generally follows the direction of ground-water flow as it moves northeastward from the typewriter plant and either discharges into Stupke Pond and Otter Creek or remains in the central part of the aquifer. Physical dispersion of TCE results from differing rates of ground-water flow that result from varying lengths of flowpaths (some flowpaths follow a more circuitous route than others) and local variations in the hydraulic conductivity of the aquifer.

The relatively constant TCE concentrations that were found in most offsite wells before operation of the recovery well (1987 through the end of 1990) suggest a slow desorption of TCE from contaminated aquifer sediments and (or) dissolution of a dense, nonaqueous-phase liquid (DNAPL) in the aquifer. DNAPLs migrate downward under gravitational force in the unsaturated zone, where they may disperse, dissolve, degrade, or be removed by pumping or excavation.

DNAPL's in the unsaturated zone tend to partition into a gaseous phase and migrate as volatilized constituents. Most soil-gas TCE will diffuse upward in response to natural concentration gradients and will eventually escape into the atmosphere, but some will be adsorbed onto sediments in the unsaturated zone (Cho, and others, 1991) by one or more of the follow-

ing sorption mechanisms: (1) mineral-surface absorption, (2) partitioning into natural organic matter, (3) partitioning into water that coats the surface of sediments, and (4) adsorption into micropores. The amount of natural organic matter already on the unsaturated sediments is reported as the dominant factor for absorption of CHCs onto sediments, but where the organic content of the sediment is low, absorption in micropores may contribute significantly to sorbate uptake (Farrell and Reinhard, 1994).

Where a spilled DNAPL exceeds the retaining capacity of the unsaturated zone, it seeps to the water table and sinks downward within the aquifer (fig. 18), where some of it becomes trapped in pore spaces, some dissolves in the ground water, and the rest continues downward (DNAPL is denser than water) until it encounters a stratigraphic layer of low permeability (such as at the bottom of the aquifer), where it will accumulate as a pool. Continuous dissolution and dispersion of DNAPL's within the pore spaces of the saturated sediments and in the pool at the bottom of the aquifer then provides a constant release of contaminants (Barbee, 1994). DNAPL pools have been difficult to locate because they are relatively small and commonly migrate downslope along the bottom of aquifer and accumulate in local depressions. No such pools have been found in the study area to date; they may have dispersed or migrated elsewhere, or they could have eluded detection by the few test wells that extend to the bottom of the aquifer.

The rate and extent of chemical and microbial transformation of TCE in the subsurface are controlled by the physiochemical properties of TCE, by chemical properties of soil and water, and the microbial population in the soil (Barbee, 1994). The three major isomers formed by reductive dehalogenation of TCE

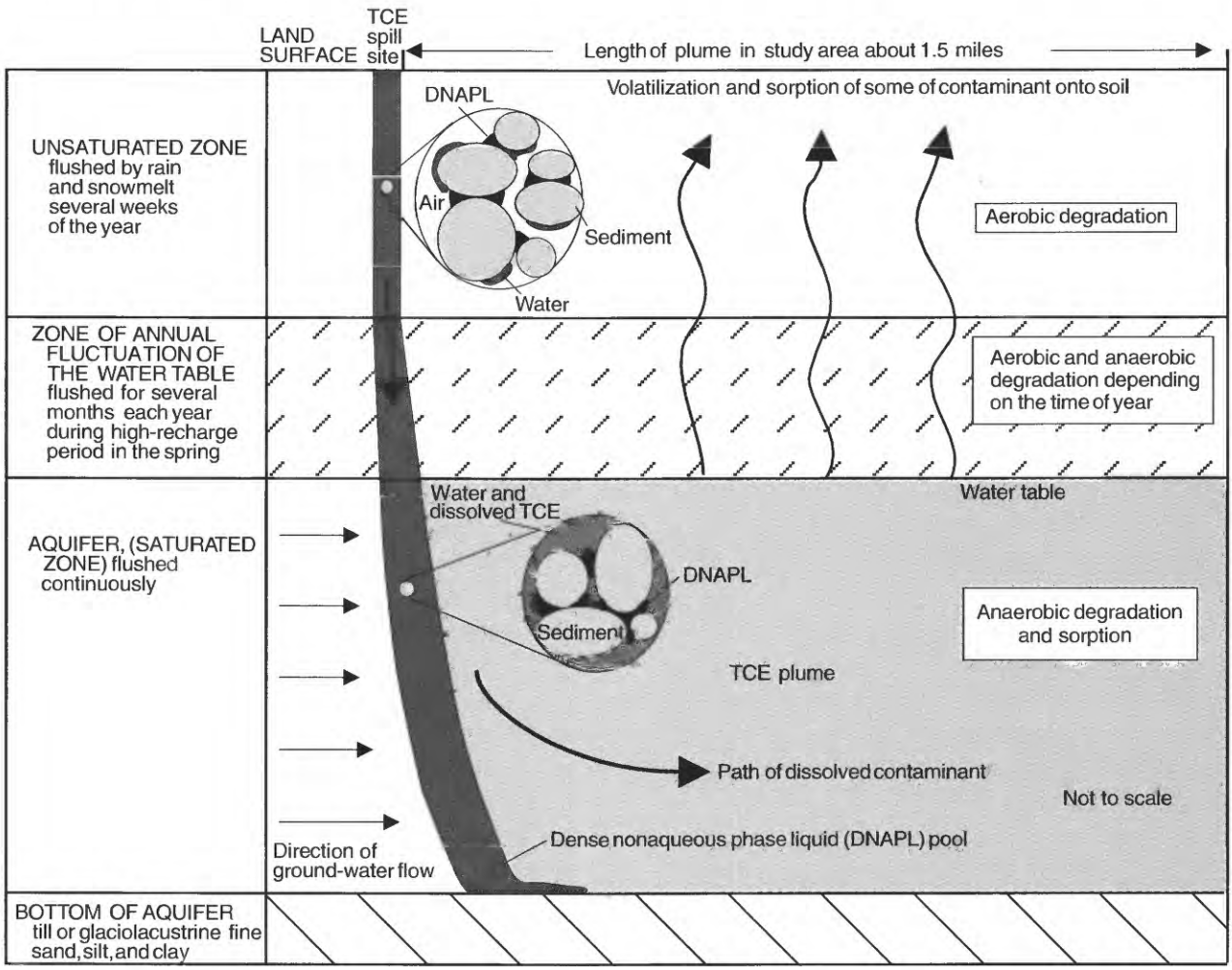


Figure 18. Physical, chemical, and biological processes that affect the fate and distribution of trichloroethylene (TCE) in and above the unconfined aquifer at Cortland, N.Y.

under methanogenic conditions by anaerobic soil microorganisms are *cis*-1,2-DCE, *trans*-1,2-DCE and 1,1-DCE (Ehlke and others, 1991; Imbrigiotta and others, 1991; Davis and Olsen, 1990). *Cis*-1,2-DCE is by far the most common transformation product in ground water in the study area, as well as in most other parts in the United States. The ratio of the *cis* form to the *trans* form of 1,2-DCE in laboratory experiments is about 30:1 (Davis and Olsen, 1990). Primary and secondary chemical and microbiological transformation pathways of TCE under anaerobic conditions are depicted in figure 19.

Anaerobic mechanisms such as hydrolysis and dehalogenation are the primary abiotic transformation pathways of TCE breakdown in typically reduced subsurface environments, but reactivity ranges over 10 orders of magnitude (Barbee, 1994). Under typical ground-water conditions, chlorinated ethenes such as TCE are relatively nonreactive; and 1,2-DCE is the least reactive product. Only under strongly basic conditions will chlorinated ethenes hydrolyze (Jeffers and others, 1989).

Biological transformation of CHCs can occur under a wide range of environmental conditions. The most significant process in the subsurface is microbially mediated dehalogenation (McCarty, 1991). The bacterial process, called cometabolism, involves an inducer/substrate (such as methane) that activates as an enzyme pathway that, in turn, oxidizes the substrate to generate carbon and energy for bacterial growth, while also oxidizing CHCs, such as TCE (McCarty, 1991). The cometabolic reductive dehalogenation process results in degradation products of halogenated and nonhalogenated aliphatic hydrocarbons (fig. 19) that can serve as primary substrates for further biodegra dation of CHCs (Barbee, 1994). The biotransformation of TCE may produce degradation products that are persistent in the environment (such as *cis*-1,2-DCE and *trans*-1,2-DCE), and that are greater health threats than TCE, (such as vinyl chloride, which is carcinogenic to humans). The half-lives for TCE and its chlorinated degradation products are given in table 6.

Further transformation of *cis*-1,2-DCE is uncertain. The half-life of *cis*-1,2-DCE through abiotic hydrolysis is at least 85 million years (table 6); thus, the likelihood of detecting the products of further degradation would be small—only on rare occasions and in trace amounts was 1,2-DCA detected. Other possible transformation compounds, such as vinyl chloride, were not detected. The ultimate transformation products of TCE are carbon dioxide, water, and chloride (fig. 19).

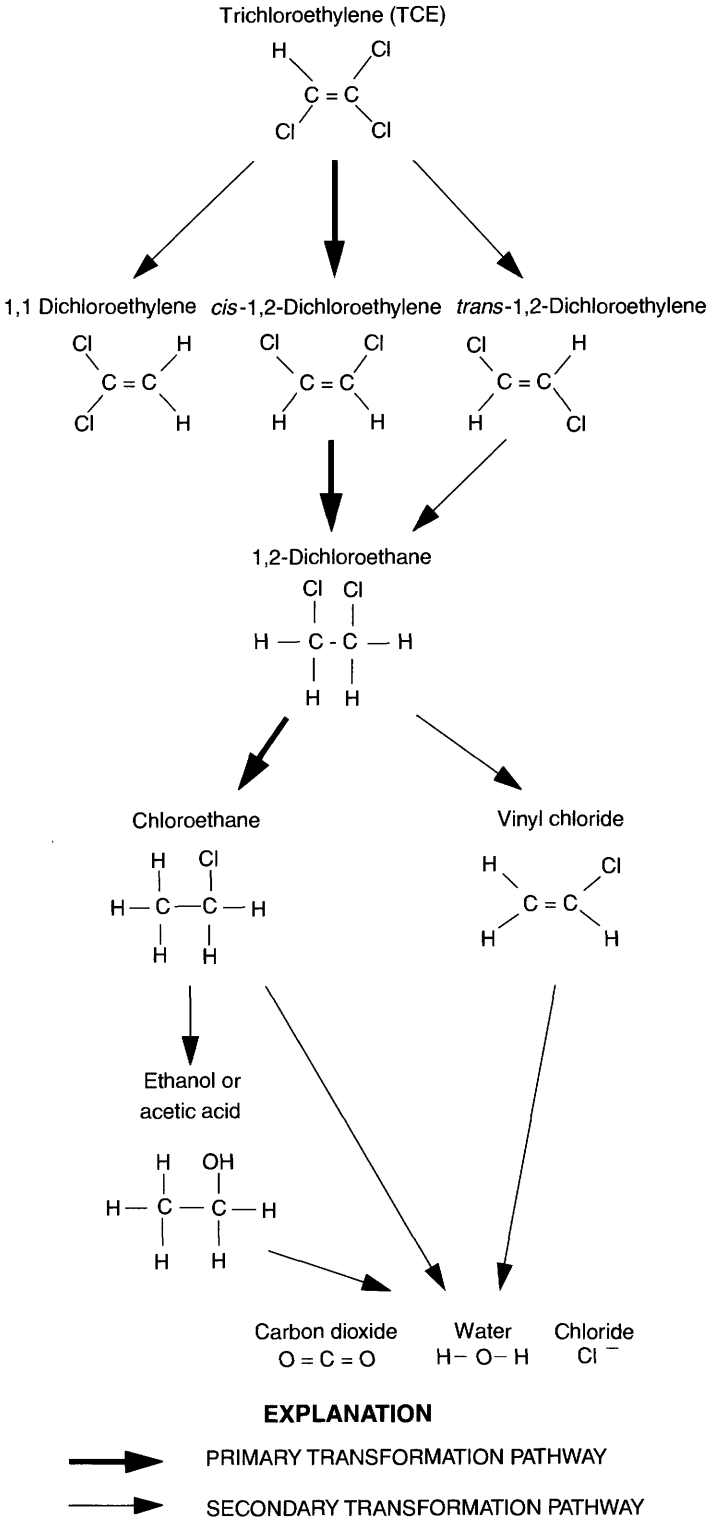


Figure 19. Transformation pathways of trichloroethylene under anaerobic conditions. (Modified from Davis and Olsen, 1990, fig. 1.)

Table 6. Range of half-lives for trichloroethylene and its degradation products.

[> = greater than, data from Barbee, 1994]

Chlorinated hydrocarbon	Half-life process	
	Abiotic hydrolysis or dehalogenation half-life (years)	Anaerobic biodegradation half-life (days)
Trichloroethylene	0.42 - 1.1	33 - 320
cis-1,2-dichloro-ethlene	8.5×10^{7} - 2.1×10^{10}	88 - 339
trans-1,2-dichloro-ethylene	8.5×10^{9} - 2.1×10^{10}	53 - 147
1,1-Dichloroethylene	4.7×10^{7} - 1.2×10^{8}	81 - 173
1,2-Dichloroethane	24 - 61	>60
Vinyl chloride	>10	>60

Inorganic Chemical Constituents and Physical Characteristics

Chemical quality of ground water is generally affected by several factors: (1) the chemical composition of precipitation that recharges the aquifer; (2) chemical reactions with the soil as the recharge passes through the unsaturated zone; (3) chemical reactions between the aquifer material and ground water in the aquifer; (4) residence time of water within the matrix, and (5) land use above the aquifer.

Chemical analyses of ground-water samples collected during April and September 1990 (table 7) in parts of the unconfined part of the aquifer that are not contaminated by TCE indicate that the quality of ground water in the study area generally meets New York State drinking-water standards. Concentrations of some constituents at some wells slightly exceeded the drinking-water standards, however.

Specific Conductance, pH, and Alkalinity

Specific conductance is a measure of the capacity of water to conduct an electrical current and is related to the type and concentration of ions in solution. Specific conductance is affected by precipitation and by chemical and physical reactions such as adsorption, ion exchange, oxidation, and reduction. Specific conductance of water samples collected during April 1990 ranged from 257 to 1,440 µS/cm, with a median value of 544 µS/cm (table 8A), and values in September 1990 ranged from 288 to 3,850 µS/cm, with a median of 612 µS/cm (table 8B). Median specific conductance values for the April samples did not differ significantly from the September values, nor from the median value of 440 µS/cm for samples collected in 1976 (Buller and others, 1978). Median values for the 1990 sampling from Cortland aquifer seemed to be slightly higher than those for other aquifers in upstate New York, however (Miller and others, 1988).

The pH of a solution is a measure of the effective hydrogen-ion concentration. The primary determinant of pH in ground water is the interaction of soil and rock molecules with gaseous and dissolved carbon dioxide, bicarbonate, and carbonate ions. The pH of ground water in the study area ranged from 7.2 to 8.4 with a median value of 7.6 for the April 1990 sampling, and from 6.9 to 8.9 with a median value of 7.7 for the September 1990 sampling. These median values indicate that the water in the study area is slightly basic.

Alkalinity is a measure of the capacity of water to neutralize an acid by chemical buffering; most alkalinity results from bicarbonate (HCO_3) and carbonate (CO_3) ions. Median values for alkalinity in the study area were 190 mg/L during the April 1990 sampling and 202 mg/L for those collected in the September 1990 sampling. These values are within the range of most ground water in the State.

Chloride and Sodium

Potential sources of chloride and sodium in ground water include road-deicing salts, septic-tank effluents, and sodium-bearing minerals within the aquifer. In some places, elevated concentrations of these ions can result from the discharge of mineralized water in bedrock into sand and gravel aquifers.

Elevated concentrations of chloride were generally found in ground water near major roads that are heavily salted. Median concentrations of chloride for the April and September 1990 samplings were 37 and 39 mg/L, respectively. The chloride concentration of 274 mg/L at the Cortland County office building during April 1990 exceeded the New York State drinking-water standard of 250 mg/L (well 177, pl. 1).

Chloride concentrations in ground water at the City of Cortland well field have been increasing since the early 1940's (Buller and others 1978) (fig. 20). Although still well below the New York State drinking-water standards, chloride concentrations there are significantly higher (at the 95-percent confidence level) than in 1976.

Chloride has migrated downward to some degree throughout the study area. The median concentration of samples from depths greater than 22.5 ft below the

water table was 30 mg/L, and the median concentration of samples from depths less than that was 39 mg/L. The chloride concentration of a sample from well 306, which is 255 ft deep, was 28 mg/L. Chloride concentrations during the April 1990 sampling were generally less than 40 mg/L in the western part of the study area, except at the north end of the municipal airport, where the concentration at well 330 was 80 mg/L. Concentrations in the central part of the aquifer ranged from 40 to 80 mg/L, and those in the eastern part ranged from 40 mg/L to 120 mg/L (fig. 21).

Dissolved sodium concentrations in the study area ranged from 4.8 mg/L to 530 mg/L, with a median value of 28 mg/L. Although no standard has been established for sodium, the USEPA (1976) recommends less than 20 mg/L in drinking water for people on sodium-restricted diets. Of the 30 wells that were sampled during September 1990, 20 had sodium concentrations above the 20-mg/L limit.

Trace Elements (Iron and Manganese)

Trace elements generally occur naturally in ground water in extremely low concentrations, but industrial processes and urbanization tend to increase their abundance within the hydrologic system and thereby can seriously degrade water quality. Except for iron and manganese, trace elements detected in ground water in the study area did not exceed drinking-water standards. Iron and manganese concentrations are generally considered together; State drinking-water standards specify a combined maximum limit of 300 µg/L. Concentrations of iron and manganese exceeded the 300-µg/L limit at 7 of the wells sampled during September 1990; the median concentration of iron and manganese at each was 16 µg/L. Extremely high concentrations of iron and manganese (7,900 µg/L and 3,600 µg/L, respectively) were found in water from well 365 (pl. 1), in the eastern part of the study area. This well is at an abandoned gasoline station on the edge of the TCE plume, and dissolution of old under-

Table 7. Minimum, maximum, mean, median, and interquartile range of concentrations for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during April and September 1990.

[Values are in milligrams per liter, mg/L, unless otherwise noted, µS/cm, microsiemens per centimeter; µg/L, micrograms per liter]

Constituent or property	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
Well depth, in feet	86	14	255	55	47	34	67
Alkalinity (as $CaCO_3$)	101	62	312	191	196	167	220
pH	60	6.9	8.9	7.7	7.7	7.6	7.8
Specific conductance, µS/cm	60	257	3,850	673	592	513	705
Phosphorus, total as PO_4	59	.01	1.29	.44	.43	.12	.68
Nitrate as N	59	<.01	12	4.1	4.3	2.4	5.6
Chloride	69	5.0	270	52	38	28	61
Sodium	89	4.8	530	37	23	15	39
Potassium	40	.2	8.3	1.7	1.4	1.0	2.0
Calcium	30	.1	780	94	79	72	89
Nitrite + nitrate as N	40	.10	9.9	4.4	4.6	3.4	5.6
Magnesium	30	6.0	39	15	14	14	16
Sulfate	30	17	25	22	23	21	24
Silica	30	.55	14	7.2	7.4	6.7	7.9
Barium (µg/L)	30	29	290	77	62	50	74
Berylium (µg/L)	30	.50	1.5	.55	.50	.50	.50
Cadmium (µg/L)	30	< 1	3.0	1.1	< 1	< 1	< 1
Chromium (µg/L)	30	< 5	15	5.3	< 5	< 5	< 5
Cobalt (µg/L)	30	< 3	9	3.3	< 3	< 3	< 3
Copper (µg/L)	30	< 10	50	13	< 10	< 10	< 10
Iron (µg/L)	30	< 3	7,900	334	16	10	38
Lead (µg/L)	30	10	30	11	10	10	10
Manganese (µg/L)	30	< 1	3,600	206	16	4	72

Table 8. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during April 1990 and September 1990.

[Values are in milligrams per liter (mg/L) unless otherwise noted, µS/cm = microseimens per centimeter, ft = feet]

Constituent or property	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
A. April 1990							
Well depth (ft)	43	14	255	55	45	28	67
Depth to water surface (ft)	40	3.3	61.6	15.5	11.5	7.2	18.2
Depth below water table (ft)	32	4.3	247	39.7	27.2	17.6	45.5
Alkalinity (as $CaCO_3$)	59	62	265	182	190	154	212
pH	28	7.2	8.4	7.7	7.6	7.5	7.7
Specific conductance, µS/cm	28	257	1,440	581	544	477	660
Phosphorus, total as P	59	.01	1.3	.44	.43	.12	.68
Nitrate as N	59	.1	12	4.1	4.3	2.4	5.6
Chloride	59	5.0	270	52	37	28	61
Sodium	59	5.0	200	29	22	14	35
Potassium	59	.15	8.3	1.7	1.4	1.02	2.0
B. September 1990							
Well depth (ft)	43	14	217	55	48	34	67
Depth to water surface (ft)	29	5.5	72.8	22.9	17.5	13.1	28.0
Depth below water table (ft)	28	2.5	207.3	33.6	22.4	14.6	35.7
Specific conductance	32	288	3,850	753	612	555	796
pH	32	6.9	8.9	7.7	7.7	7.6	7.8
Alkalinity (as $CaCO_3$)	42	104	312	204	202	187	224
Nitrite + nitrate as N	40	.10	9.9	4.4	4.6	3.4	5.6
Calcium, dissolved	30	13	230	82	79	74	90
Magnesium, dissolved	30	6.0	39	15	14	14	16
Sodium, dissolved	30	4.8	530	54	28	18	47
Chloride, dissolved	10	21	79	47	39	30	70
Sulfate	10	17	25	22	23	21	24
Silica, dissolved	30	.55	14	7	7.4	6.7	7.9
Barium, dissolved (µg/L)	30	29	290	77	62	50	74
Berylium, dissolved (µg/L)	30	.50	1.5	.55	.50	.50	.50
Cadmium, dissolved (µg/L)	30	< 1	3	1.1	< 1	< 1	< 1
Chromium, dissolved (µg/L)	30	< 5	15	5.3	< 5	< 5	< 5
Cobalt, dissolved (µg/L)	30	< 3	9	3.3	< 3	< 3	< 3
Copper, dissolved (µg/L)	30	< 10	50	13	< 10	< 10	< 10
Iron, dissolved (µg/L)	30	< 3	7,900	330	16	10	38
Lead, dissolved (µg/L)	30	10	30	11	10	10	10
Manganese, dissolved (µg/L)	30	< 1	3,600	210	16	4	72

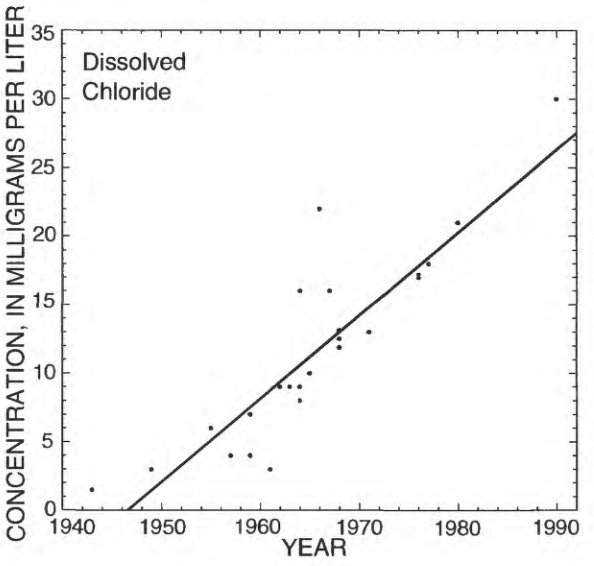


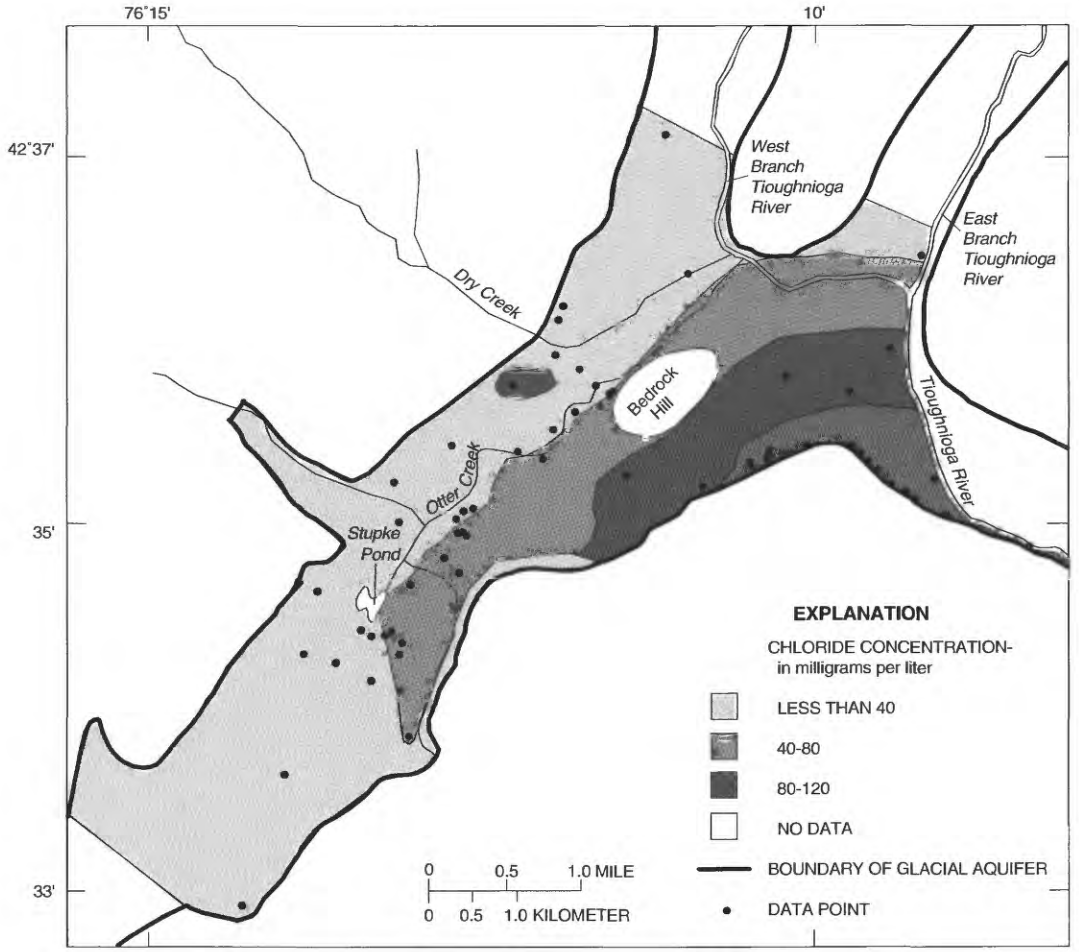
Figure 20. Dissolved chloride concentrations in water from wells at City of Cortland well field, 1943-76, 1980, and 1990. (Modified from Buller and others, 1978, fig. 20.)

ground gasoline-storage tanks may have been the source of the iron and manganese.

Nitrogen

Nitrogen, which constitutes about 80 percent of the atmosphere, generally occurs in nature in combination with other elements and is a common degradation product of organic wastes. Nitrate sources include (1) the decomposition of organic nitrogen that is introduced to the soil by nitrogen-fixing plants and bacteria, (2) human and animal wastes, and (3) organic and inorganic fertilizers.

Total nitrate concentrations (NO_3^- as N) in ground-water samples collected in April 1990 ranged from 0.1 to 12 mg/L, with a median value of 4.3 mg/L. The largest concentrations (12 and 8.6 mg/L) were at wells 304 and 204, respectively, both of which are close to Otter Creek and just downgradient of a large dairy farm.



Base from U.S. Geolocial Survey,
Cortland 1:62,500, 1903

Figure 21. Distribution of chloride concentrations in the unconfined aquifer in Cortland study area, April 1990.

Ground-water samples collected in September 1990 were analyzed for dissolved nitrite plus nitrate ($NO_2^-+NO_3^-$) as N. Nitrate (NO_3^-) is typically the most common nitrogen species in surface water and ground water, whereas nitrite (NO_2^-) is unstable and usually undergoes nitrification or denitrification and typically occurs in concentrations of less than 0.1 mg/L (Behnke, 1974). Concentrations of nitrite plus nitrate ranged from 0.1 to 9.9 mg/L in September 1990 with a median value of 4.6 mg/L. The highest concentrations were 9.9 mg/L and 8.3 mg/L in wells 5 and 207, respectively, both of which are subject to agricultural influences. Wells 304 and 204, which had the highest nitrate concentrations in April 1990, had concentrations of 4.0 and 4.6 mg/L, respectively, in September 1990. Data from several well pairs (a shallow well and a deep well) indicate that the vertical distribution of nitrogen is fairly uniform throughout the upper part of the unconfined aquifer. Nitrate-concentration data from six wells finished in the confined aquifer indicate that nitrogen is present in that aquifer, but in lower concentrations (median value 2.0 mg/L).

Temporal Changes

Data collected in this study (April and September 1990) were compared with data collected in 1978 by Buller and others (1978), and with data collected from November 1979 through January 1981 by Cortland County, to discern trends in water quality in the glacial-aquifer system. Only wells that also had been sampled in the 1978-81 studies were represented in the comparison. Constituents that were compared were alkalinity, nitrite plus nitrate as N, calcium, chloride, and sulfate. Chloride was the only constituent for which concentrations for all four periods were available. Maximum, minimum, mean, median, and interquartile ranges of the constituents that were compared are shown in table 9.

Nonparametric statistical tests were used to discern year-to-year differences in median values. A 0.05 level of significance (95-percent confidence level) was used for all tests to describe the error probability of falsely detecting differences. Simple descriptive statistics such as boxplots and median and interquartile range were used first to examine the distribution of the sample population of each constituent from the three time periods. Because water-quality data typically do not have a normal distribution, the median and interquartile range provide a better measure of the sample-population distribution than do the mean and the standard deviation. For this reason, a Kruskal-Wallis one-way ANOVA (analysis of variance) was done on ranked data to compare the distribution of concentrations by year (Conover and Iman, 1981). Differences among sample populations (by year) indicated by the Kruskal-Wallis test were further defined by Tukey's multiple-comparison test.

Concentrations of chloride, the only constituent with data from all four time periods, were significantly greater during April and September 1990 than in 1976 or 1980. Median values for April and September 1990 were similar (36 and 38 mg/L, respectively), and the median concentration for 1980 (21 mg/L) was slightly greater than for 1976 (18 mg/L). The increase in chloride concentration over the years (fig. 20) is due to increased use of road salt and, to a lesser extent, leakage from aging septic systems.

Median concentrations of alkalinity were greater in September 1990 (210 mg/L) than in April 1990 (191 mg/L), and the September median was significantly greater than that for 1976 (167 mg/L). Median concentrations of calcium for April and September 1990 where nearly equal (80 and 77 mg/L, respectively) but were significantly higher than in 1976 (63 mg/L). Median concentrations of nitrite plus nitrate differed significantly among sampling periods–September 1990 had the highest, and 1976 had the lowest. The trend of increasing nitrogen concentrations may result from increased application of agricultural and lawn fertilizer, as well as leaking septic systems. The significant difference between nitrate concentrations in April 1990 and those in September 1990 may result from three factors: (1) recharge during this period was fairly large; thus, concentrations may have been diluted; (2) ground-water levels in September had declined by an average of 7.4 ft, decreasing the amount of dilution; and (3) nitrogen from fertilizers applied during late spring and summer probably had reached the water table by September. The distribution of concentration data for alkalinity, nitrite plus nitrate, calcium, and chloride in 1976 and the two 1990 sampling periods are shown by year in figure 22A.

Ground-Water Chemistry and Land Use

The available data allow only generalized comparisons between ground-water quality and land use. Because land use in the study area is heterogeneous, the effects of a particular land use on the quality of water at a particular well or group of wells are impossible to isolate. Most of the 52 wells sampled were in

the Cortland municipal area, which contains several land-use categories, including residential, industrial, commercial, recreation, major transportation routes, and other small categories associated with urban areas. The remaining 16 wells were grouped as agricultural. Water from these wells, which were in the southern end of the study area and at its edges, was readily identifiable by characteristics that are associated with agriculture. Thus, ground-water quality was compared simply between two broad categories of land use—urban and agricultural. Six wells that penetrated the confined aquifer were eliminated from the data set prior to analysis of because part of their recharge area is outside the study area.

The distribution of chemical data for the two land-use groups were compared through use of boxplots (fig. 22B). Any statistically significant differences in concentrations reflecting land use were tested with the Kruskal-Wallis one-way ANOVA, which compares the distribution of ranks of concentrations between groups of data to determine whether any of the groups differ significantly from the others. Significance was chosen at 0.05 (95-percent confidence level).

Table 9. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water sampled during three studies in Cortland County, N.Y. study area

[Values are in milligrams per liter unless otherwise noted, µS/cm, microsiemens per centimeter; dashes indicate no data].

Constituent or property	Sampling date[1]	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range	
							25th	75th
Specific conductance (µS/cm)	1976	84	235	700	451	450	405	499
	1980	0	--	--	--	--	--	--
	April 1990	22	236	797	474	470	334	542
	Sept. 1990	6	413	631	545	556	512	584
Alkalinity (as $CaCO_3$)	1976	23	63	231	168	167	152	182
	1980	0	--	--	--	--	--	--
	April 1990	22	62	239	180	191	167	219
	Sept. 1990	12	151	300	209	210	183	224
Nitrate (total as N)	1976	27	1.6	4.9	3.4	3.4	2.8	4.1
	1980	153	.10	5.0	2.4	2.7	1.6	3.3
	April 1990	22	.80	12	4.6	4.6	2.4	6.1
	Sept. 1990	0	--	--	--	--	--	--
Nitrite + nitrate (as N)	1976	84	.55	5.6	3.2	3.4	2.7	4.0
	1980	0	--	--	--	--	--	--
	April 1990	0	--	--	--	--	--	--
	Sept. 1990	12	3.7	9.9	6.0	5.8	4.7	7.3
Calcium	1976	19	31	80	64	63	59	76
	1980	0	--	--	--	--	--	--
	April 1990	22	32	97	78	80	75	87
	Sept. 1990	6	61	87	76	77	72	81
Chloride	1976	85	3.0	78	24	18	12	28
	1980	153	5.0	72	24	21	14	30
	April 1990	22	15	110	45	36	27	61
	Sept. 1990	7	29	79	46	38	30	72
Sulfate (as SO_4)	1976	18	19	26	22	21	20	24
	1980	0	--	--	--	--	--	--
	April 1990	0	--	--	--	--	--	--
	Sept. 1990	7	19	25	23	24	23	25

[1]1976 data from Buller and others (1978). 1980 data provided by Cortland County Department of Health. 1990 data from present study

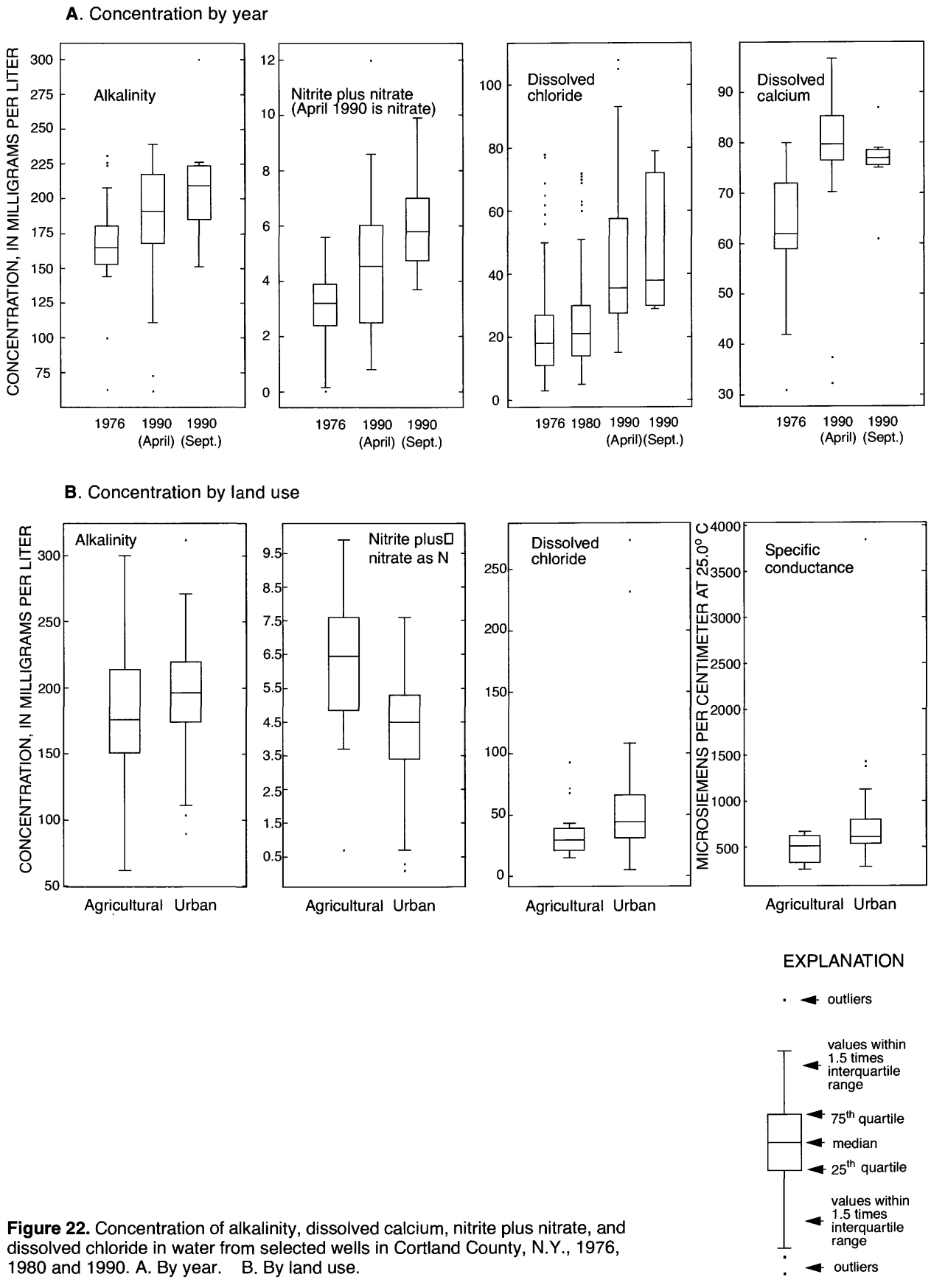


Figure 22. Concentration of alkalinity, dissolved calcium, nitrite plus nitrate, and dissolved chloride in water from selected wells in Cortland County, N.Y., 1976, 1980 and 1990. A. By year. B. By land use.

Only two constituents—specific conductance and chloride—showed a significant difference between the two land-use categories; concentrations of both were significantly higher in the urban area than in the agricultural area. The higher chloride concentrations in the urban area may be attributable to road salt, industrial wastes, and sewage leaked from aging septic and sewer systems, and the significantly greater specific conductance values in the urban area than in the agricultural area are associated with the higher chloride concentrations. The median chloride concentration was 44 mg/L in the urban area and 30 mg/L in the agricultural area, and the median specific conductance values were 610 µS/cm and 516 µS/cm, respectively. Median concentrations of sodium were considerably larger (although not statistically significant) in the urban area than the agricultural area (24 mg/L and 16 mg/L, respectively). Alkalinity was slightly higher in the urban area, and median concentrations of nitrate and calcium were nearly the same in both areas. Concentrations of nitrite plus nitrate were considerably higher in the agricultural area (although not a statistically significant difference) as a result of the agricultural sources of that constituent. Maximum, minimum, median, mean, and interquartile ranges of the selected constituents grouped by land-use categories are in table 10.

SIMULATION OF GROUND-WATER FLOW

A ground-water flow model was constructed to delineate areas that contribute ground water to municipal wells and the flowpaths of ground water migrating from two sources of contamination. Because annual and seasonal fluctuations in the amount of recharge affect flow conditions in the aquifer system, three steady-state ground-water recharge conditions–high, average, and low–were simulated.

Description and Design of Numerical Model

A quasi-three-dimensional, numerical three layer ground-water flow model was constructed to compute hydraulic head and flows in the glacial aquifer system in the study area. Heads in the confining unit were not calculated; instead, resistance to flow in the confining unit is included in terms of vertical conductance between the unconfined and confined aquifers. This approach to simulating flow through a confining layer is called the "quasi-three-dimensional" approach. The model was developed with the computer program MODFLOW (McDonald and Harbaugh, 1988), which is based on block-centered, finite-difference equations that describe the physics of water flowing through a porous medium. The equations relate water levels to geometry and hydraulic properties of the aquifer, such as hydraulic conductivity, and to stresses such as

Table 10. Minimum, maximum, mean, median, and interquartile range of concentrations or values for selected constituents or properties of ground water in Cortland, N.Y. study area, by land use

[Values are in milligrams per liter unless otherwise noted; µS/cm = microsiemens per centimeter, * indicates significant difference at the 95-percent confidence level in constituent concentration between land uses.].

Constituent or property	Land use	Number of observations	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
Alkalinity (as $CaCO_3$)	Agricultural	20	62	300	183	180	154	218
	Urban	76	90	312	197	197	177	221
*Specific conductance (µS/cm)	Agricultural	12	257	668	501	516	351	634
	Urban	43	344	3,850	728	610	546	802
Nitrate (as N)	Agricultural	12	.1	8	4.2	4.2	2.3	6.0
	Urban	45	.1	12	4.2	4.5	2.7	5.5
*Chloride (as Cl)	Agricultural	17	15	93	37	30	21	42
	Urban	50	5	270	58	44	31	67
Sodium (as Na)	Agricultural	14	4.8	51	21	16	11	30
	Urban	70	4.8	530	39	24	16	39
Calcium (as Ca)	Agricultural	14	.10	780	150	78	55	88
	Urban	70	47	240	86	79	73	89
Nitrite + nitrate (as N)	Agricultural	6	.70	9.9	5.9	6.4	3.0	8.7
	Urban	31	.30	7.6	4.3	4.6	3.5	5.4

pumping and recharge. The aquifer system is represented by a three-layer grid in which all characteristics of the system, including geometry, hydraulic properties, and stresses, are defined by values specified at the centers of cells, and the model calculates the head at the center of each cell. The process of representing a continuous system with a specified number of discrete points is called discretization.

In the finite-difference method, the discrete points are located along rows and columns, and each point is associated with a cell. Head and flows are calculated only for "active" cells, which represent the aquifers; "inactive" cells are those outside the aquifer boundary and are ignored in the calculations.

The design of the numerical model is based on the conceptualization of the aquifer system as previously discussed in the hydrogeology section and shown schematically in figure 23. The aquifer system is simulated as a quasi-three-dimensional-flow system with three layers, and horizontal flow in the aquifers and vertical flow through the confining unit is assumed. The unconfined aquifer is divided into two layers (layers 1 and 2) to provide adequate vertical resolution and to simulate flowpaths and particles that could flow beneath cells that simulate streams and wells (such cells are known as "weak sinks" because not all flow into a cell is captured by the cell). The confined aquifer is represented by a single layer (layer 3) except where the confining unit is locally absent along the edges of the valley; in these locations an arbitrary elevation that approximates the elevation of the top of the adjacent confining unit was assigned to the top of the layer. In this quasi-three dimensional approach, the confining unit is represented by the vertical conductance between layers 2 and 3. Heads in the confining unit are not calculated, and vertical flow through it is the product of differences in head between layers 2 and 3 and the vertical conductance of the confining unit.

The geometric and hydraulic values that were used as input to the model were based on available data. The values for areas with little or no data were estimated

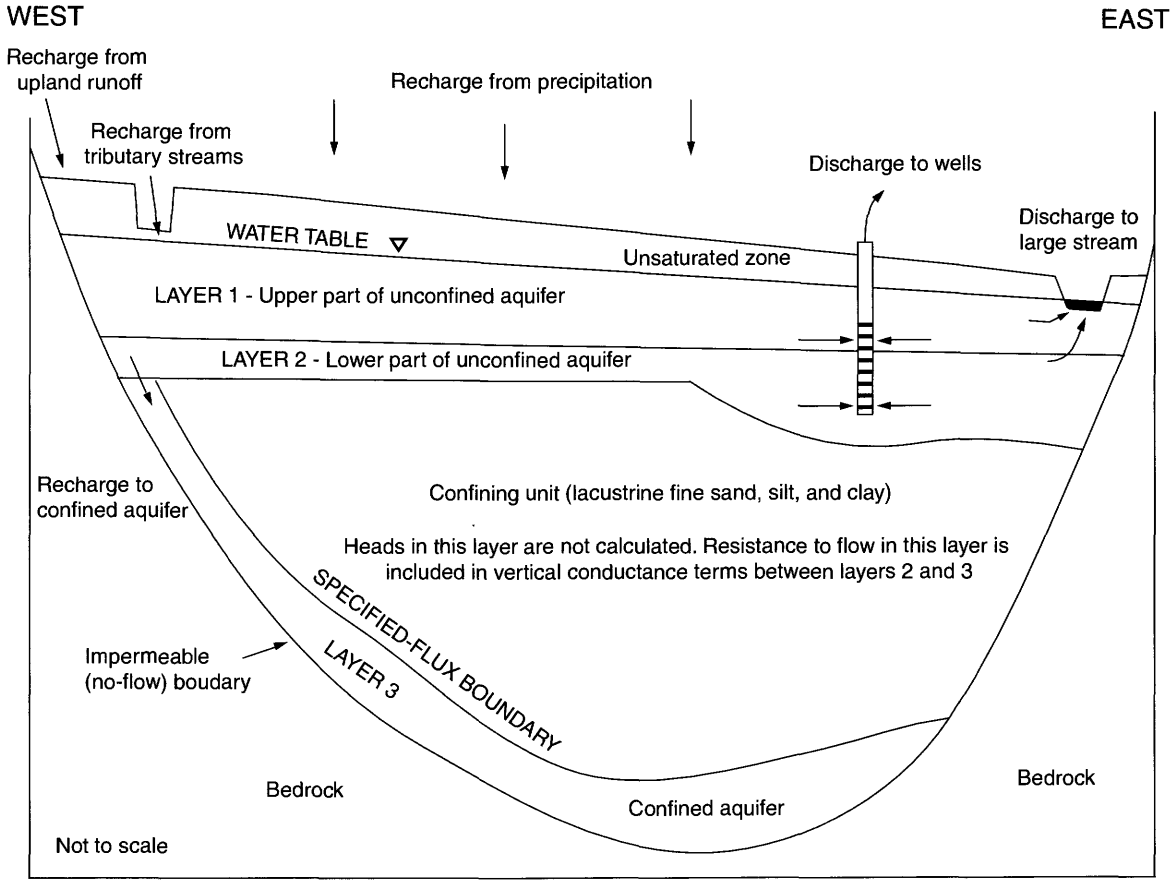


Figure 23. Conceptual model of ground-water flow in glacial-aquifer system in Cortland, N.Y., study area.

and then adjusted, within reasonable limits, during model calibration until the simulated water levels and flows matched the measured values.

Model Grid

A rectangular, finite-difference grid with 66 rows and 119 columns was superimposed on a map of the aquifer system (fig. 24 and pl. 5) to discretize the hydrogeologic conditions of the conceptual model. A uniform cell size of 300 x 300 ft was used because municipal wells, streams, and sources of contamination are distributed throughout the study area. (A grid with cells of uniform size simulates the hydrologic conditions throughout the study area more accurately than a grid with variably sized cells, although the latter provides increased resolution in areas represented by small cells, they may not accurately represent conditions in large-cell areas.

Geometry of Model Layers

A geologic section was drawn for every second row of the model, giving a total of 33 geologic sections. The surface elevations of the bottom of layer 1 and the top and bottom of layers 2 and 3 of the geologic sections were entered as arrays into the model. Corresponding data for intervening rows, for which no geologic sections were constructed, were interpolated, or were determined from records of wells corresponding to those rows. The elevation of the top of layer 1 (water table) was calculated by the model, and the elevation of the bottom of layer 1 (top of layer 2) was arbitrarily assigned to roughly equal to the middle of the unconfined aquifer,

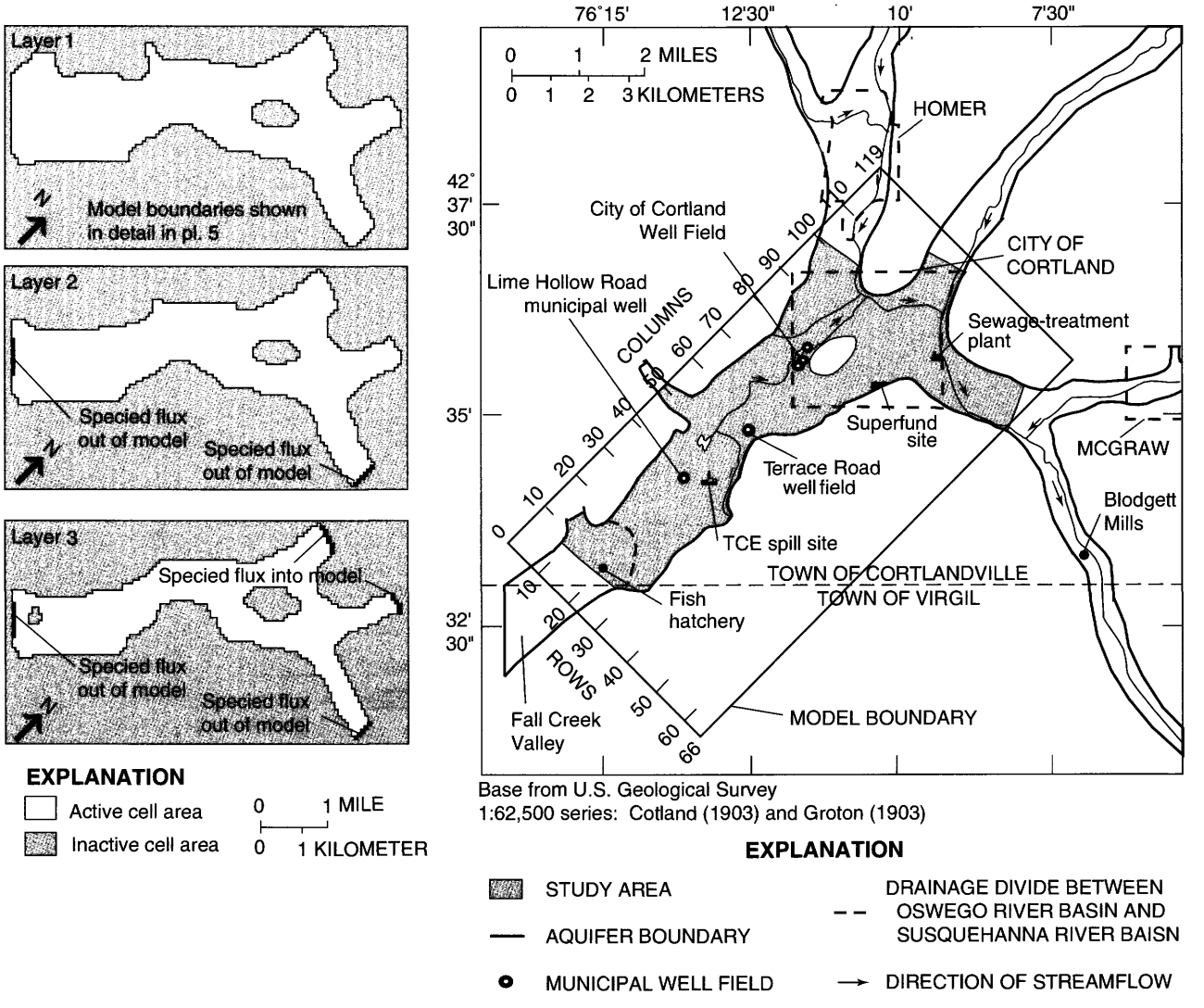


Figure 24. Locations of active and inactive grid boundaries in layers 1, 2, and 3 of the three-dimensional ground-water flow model of Cortland, N.Y. study area.

except along the valley walls, where till or bedrock surface forms the bottom of layer 1. The bottom of layer 2 is either the top surface of the lacustrine confining unit (fig. 12) in the central parts of the valley or the top of layer 3 along some reaches of the valley walls (fig. 23). The top of layer 3 is the bottom of the confining unit or, where the confining unit is absent, the bottom of layer 2. The bottom of layer 3 is the till or bedrock surface in the valley (fig. 23).

Hydraulic Conductivity

Horizontal hydraulic conductivity of the aquifers was estimated to be 10 times the vertical hydraulic conductivity throughout the modeled area (anisotropy 10:1). Vertical hydraulic conductivity of stratified drift tends to be less than horizontal hydraulic conductivity because, at a small scale, the stratified drift consists of many layers of sediment particles, some of which are plate shaped and tend to settle horizontally, thereby impeding the vertical flow of ground water.

Unconfined Aquifer

Horizontal hydraulic conductivity values ranging from 1 to 1,200 ft/d were assigned to layers 1 and 2, on the basis of (1) eight aquifer tests that used large pumping wells, such as municipal and industrial wells (table 2), and (2) several additional hydraulic conductivity measurements made by Blasland, Bouck and Lee Engineers (1992) during slug tests of test wells at the Rosen Superfund site in the southeastern part of the aquifer (pl. 1).

Hydraulic conductivity values of less than 10 ft/d were assigned to the unconfined aquifer on the back (west) side of the Valley Heads moraine in the western part of the study area to represent the poorly sorted, silty sand and gravel and the fine-grained deposits of till and lacustrine fine sand, silt, and clay. Hydraulic conductivity values of 10 to 100 ft/d were assigned to (1) the poorly to moderately sorted silty sand and gravel that form kame deposits at the crest of the Valley Heads moraine, and (2) silty gravel outwash along parts of the valley walls. Blasland, Bouck and Lee Engineers (1992) calculated an average hydraulic conductivity of about 10 ft/d for kame deposits and 30 ft/d for outwash, and a range of 3.4 to 136 ft/d in 20 slug tests of test wells at the Rosen"Superfund" site.

Hydraulic conductivity values ranging from 100 to 300 ft/d were assigned to areas along the edges of the valley, where alluvial inwash and colluvium that consist of silty sand and gravel deposited by upland tributaries and by runoff are mixed with well-sorted outwash sand and gravel along the sides of the valley. This zone is well developed where large tributaries flow onto the aquifer and is weakly developed where small tributaries flow onto the aquifer and where slope erosion has occurred along the valley walls.

Values ranging from 300 to 1,200 ft/d were assigned to areas containing well-sorted outwash sand and gravel in the central parts of the valleys. In general, hydraulic conductivity values northeast of the moraine progressively decrease from more than 1,000 ft/d to less than 400 ft/d to reflect the decreasing grain size of the outwash deposits with increasing distance from the moraine.

Confined Aquifer

Little information is available on hydraulic properties of the confined aquifer (layer 3); therefore, model values were estimated from (1) two aquifer tests in the western part of the study area, (2) six slug tests at the Rosen "Superfund" site, (3) several qualitative estimates of the water-producing capacity of wells installed in the confined aquifer, and (4) distribution of grain size of sediments collected from the confined aquifer during test drilling. The estimated values range from 10 to 150 ft/d and average 60 ft/d.

Stream-Aquifer Interaction

The Streamflow-Routing Package developed by Prudic (1989) was used to simulate the interaction between the water table and the streams and springs in the study area. Streams are divided into reaches and segments; each reach corresponds to an individual cell in the model grid, and a segment consists of a group of connected reaches in downstream order. Streams in the study area are represented by 425 reaches (cells) grouped into 52 segments.

Leakage between the stream and aquifer is subtracted from or added to the amount of streamflow in each reach, depending on the head difference between the stream surface and water table, and is adjusted according to a streambed-conductance term. The amount of leakage is computed by Darcy's Law as follows:

$$Q = C_{str}(H_s - H_a) \quad (4)$$

where Q = leakage to or from the aquifer through the streambed (L^3/T);

H_s = head in stream (L);

H_a = head in aquifer side of streambed (L); and

C_{str} = streambed conductance (L^2/T), defined as the vertical hydraulic conductivity of the streambed, times width of the stream reach times stream length of the stream, divided by the streambed thickness.

Recharge to the aquifer from streams ceases when all streamflow leaks into the aquifer, leaving the stream dry. The stream can flow again in downstream reaches, however, wherever the head in the aquifer is above the streambed elevation.

All streams are in layer 1 of the model, and each stream cell is assigned values for the following: (1) the layer, row, and column number of the cell representing that reach, (2) the average water-surface elevation in the cell, (3) streambed conductance, (4) elevations of bottom and top of the streambed, and (5) stream discharge, in cubic feet per day, for the first reach of each segment. Water-surface and streambed elevations were determined by (1) continuous runs of levels made in the channels of Dry Creek, West Branch Tioughnioga and Tioughnioga Rivers, (2) spot measurements made with levels in the channels of Otter Creek and several other small tributaries, and (3) estimates from 1:24,000-scale USGS topographic maps with 20-ft contour intervals. Water levels and streambed elevations are accurate to several tenths of a foot where levels were run and are accurate to several feet where they were estimated from topographic contours. A streambed thickness of 1.5 ft, which was used in a model of the Cortland aquifer built by Cosner and Harsh (1978), was also used in this model.

Conductance of streambeds within the study area differs from reach to reach. Tributaries that erode fine-grained matrix of till in the uplands transport this material to streams that eventually flow over the aquifer, where they deposit some of it; thus, the streambed in the study area consists of both coarse and fine-grained sediments and has a lower hydraulic conductivity than the aquifer. Estimating the conductance of the streambed entailed adjusting the hydraulic conductivity value in the model until seepage to and from the stream approximated the gains and losses measured at 33 streamflow-measurement sites during each of the low-, average- and high-flow periods. Estimated hydraulic conductivity values ranged from 0.5 to 7.5 ft/d and typically averaged about 3.5 ft/d for streambeds in highly permeable outwash deposits and from 0.1 to 0.5 ft/d for streambeds over less permeable deposits, such as kames. Stream width was measured at the 33 streamflow-measuring sites and was estimated in many other places; the range was from less than 2 ft in small tributaries to 120 ft in the Tioughnioga River.

Boundary Conditions

Several types of boundaries were specified in the model to represent the aquifer system. The types used in layer 1 are indicated on plate 5. Natural boundaries were used where possible, but arbitrary boundaries were used to limit the modeled area because the aquifer system extends many miles beyond the study area. The arbitrary boundaries were placed far enough from municipal well fields and sources of chemical contamination that their effect on model results in these areas of concern would be negligible.

Specified-Flux boundaries refer to those boundaries where a volume of water per unit of time crosses a unit cross-sectional area (such as recharge from precipitation over the aquifer). A specified-flux boundary, represented by recharge wells, was used along the valley walls (pl. 5) to simulate the seepage of surface runoff and ground water from bordering unchanneled uplands into the unconfined aquifer (layer 1). The amount of inflow was determined by the size of the drainage area of the upland bordering the modeled area. Drainage areas of unchanneled uplands were delineated on maps, and their size measured by a digitizer. Then the drainage areas were divided by the number of bordering cells, and each of the resulting areas was multiplied by the recharge rate from uplands (See eq. 2).

A specified-flux boundary also was used to simulate ground-water flow into and out of the confined aquifer (layer 3) along all four major stream valleys (Fall Creek valley, West Branch and East Branch Tioughnioga Rivers, and Tioughnioga River). Ground water in layer 3 flows into the modeled area in the West and East Branches of the Tioughnioga River valleys and flows out of the modeled area in the Fall Creek and Tioughnioga River valleys.

No-flow boundaries represent geologic units or streamlines through which no flux occurs. A stream-

line is a curve that is tangent to the direction of ground-water flow; thus no flow crosses a streamline. A no-flow boundary was applied at the bottom of the confined aquifer (layer 3) to represent the contact between the aquifer and the underlying till or shale along the bottom of the valley because till and shale have extremely low hydraulic conductivity, and any flow across that boundary would be negligible compared to the amount of flow through the sand and gravel aquifer.

Arbitrary streamline (no-flow) boundaries were used where West Branch and East Branch Tioughnioga Rivers and the Tioughnioga River enter the modeled area and flow against the side of a valley; this results in ground-water flow from across the valley to the stream. These streamline boundaries were placed far from pumping wells and chemical plumes to avoid affecting model results.

A *free-surface recharge boundary* was used to represent the water table (top of the unconfined aquifer, layer 1), where recharge from precipitation is applied uniformly. The water table can rise or fall, depending on the balance of stresses in the aquifer system, such as pumping, recharge, and gain or loss of water from streams that flow over the aquifer.

A *specified-vertical leakance boundary* was used to simulate ground-water movement through the lacustrine confining unit between layer 2 and layer 3 (quasi-three-dimensional approach). Resistance to flow through the confining unit is included in the vertical leakance calculations and is defined as the vertical hydraulic conductivity of the confining unit, divided by its thickness. The volume of water that passes through a model cell (vertical conductance) between layers 2 and 3 is equal to the product of vertical leakance and model cell area.

Ground-Water Withdrawals and Recharge Basins

Large amounts of water are pumped from several municipal, industrial, and institutional wells completed in the unconfined aquifer (layers 1 and 2), but no large pumping wells tap the confined aquifer. Ground-water withdrawals by large pumping wells for the three simulated conditions are given in table 5. Withdrawals from pumping wells with a fully penetrating screen (extending from the top of layer 1 to the bottom of layer 2, such as the municipal wells for the City of Cortland) were distributed equally in layers 1 and 2. Withdrawals from wells with short screens (10 to 20 ft long) were assigned to the layer that contained the screen.

Water pumped from the recovery well at the typewriter plant is passed through an air stripper to remove VOCs, then routed through a pipe to the recharge basins in the northern part of the property, where it seeps back into the aquifer. Infiltration of water from the basins to layer 1 was represented by recharge wells in the model.

Model Calibration

The three steady-state models were calibrated to represent high-, average-, and low-recharge conditions. Calibration entailed matching measured and simulated hydraulic heads in the unconfined and confined aquifers, and simulated and measured gains and losses of streamflow along individual reaches of the modeled area. Steady-state conditions were assumed for the three recharge conditions. The water-level measurements used for calibration were made on March 28-29, 1990, during average high-recharge conditions, on May 28-June 4, 1991 during average-recharge conditions, and on October 7-9, 1991, during average low-recharge conditions. The long-term water-level monitoring well (well 102, pl. 1) at the City of Cortland well field and the USGS stream gage on the Tioughnioga River at Cortland (station number 01509000, pl. 2) were used as guides to determine when the three conditions occurred and the time when synoptic ground-water and streamflow measurements were to be made.

The model was calibrated by a trial-and error procedure, whereby the model is first run with the initial input values; if significant differences between measured and simulated water levels and streamflow are noted, the input values are adjusted, and the model is run again. The process is repeated until simulated values are close to measured values. The calibration process resulted in changes of horizontal hydraulic conductivity, vertical conductance of the streambed, and rate of areal recharge.

Calibration was considered satisfactory when: (1) simulated water levels were within 3 ft of the measured water levels, and (2) simulated streamflow displayed the gain-and-loss patterns indicated by measured and estimated values. Differences between simulated and measured ground-water levels are shown in table 11, and differences between simulated and measured streamflow gains and losses are shown

in table 12. The resulting water budgets for each simulated condition are given in table 13.

In all three simulations, the largest source of recharge to the aquifer system (55 to 58 percent of total recharge) is from the uplands–seepage losses from upland streams that flow onto the aquifer plus unchanneled runoff and ground-water inflow from the uplands (table 13A). The second-largest source of recharge is precipitation (33 to 39 percent of total recharge) that directly falls over the aquifer. The largest discharge from the aquifer system (57 to 71 percent of total discharge) is leakage of ground water to streams (table 13B); the second largest (26 to 40 percent of total discharge) is to pumping wells.

Simulated heads in layers 1, 2, and 3 for high-, average-, and low-recharge conditions are shown in figures 25A, B, and C, respectively. Simulated heads in layer 2 are similar to those in layer 1 because both layers represent the same hydrogeologic unit.

Parts of the aquifer that have low hydraulic conductivity, such as the morainal deposits in the western part of the aquifer and kame deposits along the valley edges, have relatively steep hydraulic gradients, and parts that have high hydraulic conductivity, such as outwash deposits, have relatively low hydraulic gradients. Simulated ground-water levels in areas of low hydraulic conductivity differed from measured values more than in other areas, but the differences were less than 3 ft. Simulated water levels in areas with high hydraulic conductivity (outwash deposits) and near perennial streams in the northern and eastern parts of the aquifer were typically within 1 ft of measured ground-water levels.

Simulation of large pumping wells in the study area resulted in losses of streamflow in model stream

Table 11.-- Difference between measured and simulated heads at 49 selected wells in Cortland, N.Y., study area for high-, average-, and low-recharge conditions

[Values are observed head minus simulated head, in feet. Dashes indicate no water-level measurement made during calibration period because well was dry or not yet installed. Well and cell locations shown in pl. 1].

Location			Recharge conditions			Location			Recharge conditions		
Model row	Model column	Well number	High	Average	Low	Model row	Model column	Well number	High	Average	Low
5	91	13	1.7	-0.2	2.7	27	53	203	2.5	1.1	-0.5
5	95	114	0.4	0.3	1.1	28	40	22	-0.6	-0.1	1.9
12	77	404	-0.7	-1.3	0.1	30	11	327	2.5	2.4	0.4
13	67	369	1.3	-0.9	-0.1	30	25	348	1.8	2.0	--
14	53	106	-1.7	0.2	0.0	30	70	11	1.9	1.0	0.4
14	67	330	0.8	1.0	-0.1	31	45	401	--	2.2	2.2
14	96	446	0.1	-0.4	-0.9	31	112	420	1.4	0.8	1.0
16	91	373	0.8	--	0.1	32	45	402	--	2.4	--
18	51	5	0.3	0.4	1.0	32	112	419	1.2	0.5	0.9
20	60	204	1.8	2.0	1.1	36	18	33	3.6	0.2	-5.3
20	70	337	--	-0.1	-0.9	36	77	303	-0.5	-0.9	-1.0
20	74	47	-1.8	-2.0	-2.7	36	103	280	0.3	-0.8	-0.5
21	30	110	-3.1	-3.0	0.5	37	96	365	2.8	0.9	0.0
21	64	358	1.2.	0.9	0.1	37	101	335	--	-0.3	-0.3
21	69	357	0.8	0.4	-0.4	37	105	279	2.3	1.0	1.1
22	49	340	--	-2.0	0.2	38	36	307	1.3	-1.6	-7.5
23	39	306	1.4	-1.3	2.8	38	81	359	4.1	1.8	--
23	43	121	-0.6	-0.5	2.3	38	83	360	-1.0	-1.7	--
23	73	102	0.2	-0.6	-1.8	41	7	108	-4.1	-0.8	-1.0
24	33	320	-1.2	-0.8	4.3	41	95	332	--	-0.6	-0.1
24	47	105	0.4	0.4	1.2	42	87	321	-5.1	-1.4	1.0
24	68	356	-0.5	1.4	-0.6	47	101	281	1.5	0.3	0.5
25	54	368	0.4	0.3	1.8	48	102	282	1.6	0.5	0.6
26	53	4	2.9	2.4	-0.1	50	98	346	-0.8	-1.9	-2.2
27	33	349	-0.2	-0.8	--						
						ROOT MEAN SQUARED			1.92	1.73	1.96

Table 12.-- Measured and simulated streamflow gains and losses, for selected stream reaches during high-, average-, and low-recharge conditions in Cortland, N.Y. study area.

[Values are in cubic feet per second (ft^3/s). Positive numbers indicate gains; negative numbers indicate losses. Dashes indicate no measurement was made in that reach. Reach locations shown in figure 14.]

		Recharge conditions					
		High		Average		Low	
Stream	Reach	Measured March 29, 1990	Simulated	Measured May 30-June 4, 1991	Simulated	Measured October 9, 1991	Simulated
West Branch Tioughnioga River	A	--	9.3	9.2	8.4	5.9	5.4
Tioughnioga River	A	--	3.5	1.9	3.2	3.8	2.5
	B	--	4.1	5.7	4.0	-1.3	2.5
Otter Creek	A	-1.2	-1.7	-0.4	-0.4	Dry	
	B	--	0.0	-0.2	-0.6	Dry	
	C	0.9	0.8	0.1	-0.1	Dry	
	D	-0.8	-0.9	0.0	-0.7	Dry	
	E	1.3	-0.2	0.1	-0.1	Dry	
	F	-1.6	-0.6	-0.3	-0.4	Dry	
	G	0.4	-0.6	-1.2	-0.7	Dry	
Tributary to Otter Creek	A	-1.8	-0.7	-0.2	-0.4	Dry	
Dry Creek	A	-1.0	-0.6	-0.4	-0.4	-0.2	-0.2
	B	-0.6	-0.4	0.0	-0.1	-0.2	-0.1
	C	-0.6	-0.3	-0.4	-0.3	Dry	
	D	-0.6	-0.3	0.0	0.0	Dry	
	E	2.0	0.1	1.0	-0.1	Dry	
Perplexity Creek	A	-0.6	-0.6	-0.2	-0.1	Dry	
Tributary to Perplexity Creek	A	-0.4	-0.3	-0.1	-0.2	-0.05	-0.1
	B	-0.8	-0.1	Dry	-0.1	Dry	

Table 13. Steady-state water budgets for the glacial aquifer system at Cortland, N.Y., for high-, average-, and low-recharge conditions.

[Rates are in cubic feet per second, (ft^3/s)]

	Recharge conditions					
	High March 28-29, 1990		Average May 28-June 4, 1991		Low October 7-9, 1991	
Budget component	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
A. Recharge to the aquifer system						
Precipitation on the aquifer	16.2	39	14.4	38	9.3	33
Upland sources						
Seepage losses from tributary streams	15.2	36	12.2	32	10.4	38
Unchanneled runoff and ground-water inflow from uplands	9.2	22	8.8	23	5.4	19
Ground-water inflow from valleys to model area	1.0	3	.9	3	.5	2
Infiltration at recharge basins	0.0	0	1.7	4	2.2	8
TOTAL	41.6	100	38.0	100	27.8	100
B. Discharge from aquifer system						
Pumping wells	10.7	26	10.7	28	11.0	40
Discharge from aquifer to streams	29.5	71	26.1	69	15.9	57
Ground-water outflow from model area	1.4	3	1.2	3	.9	3
TOTAL	41.6	100	38.0	100	27.8	100

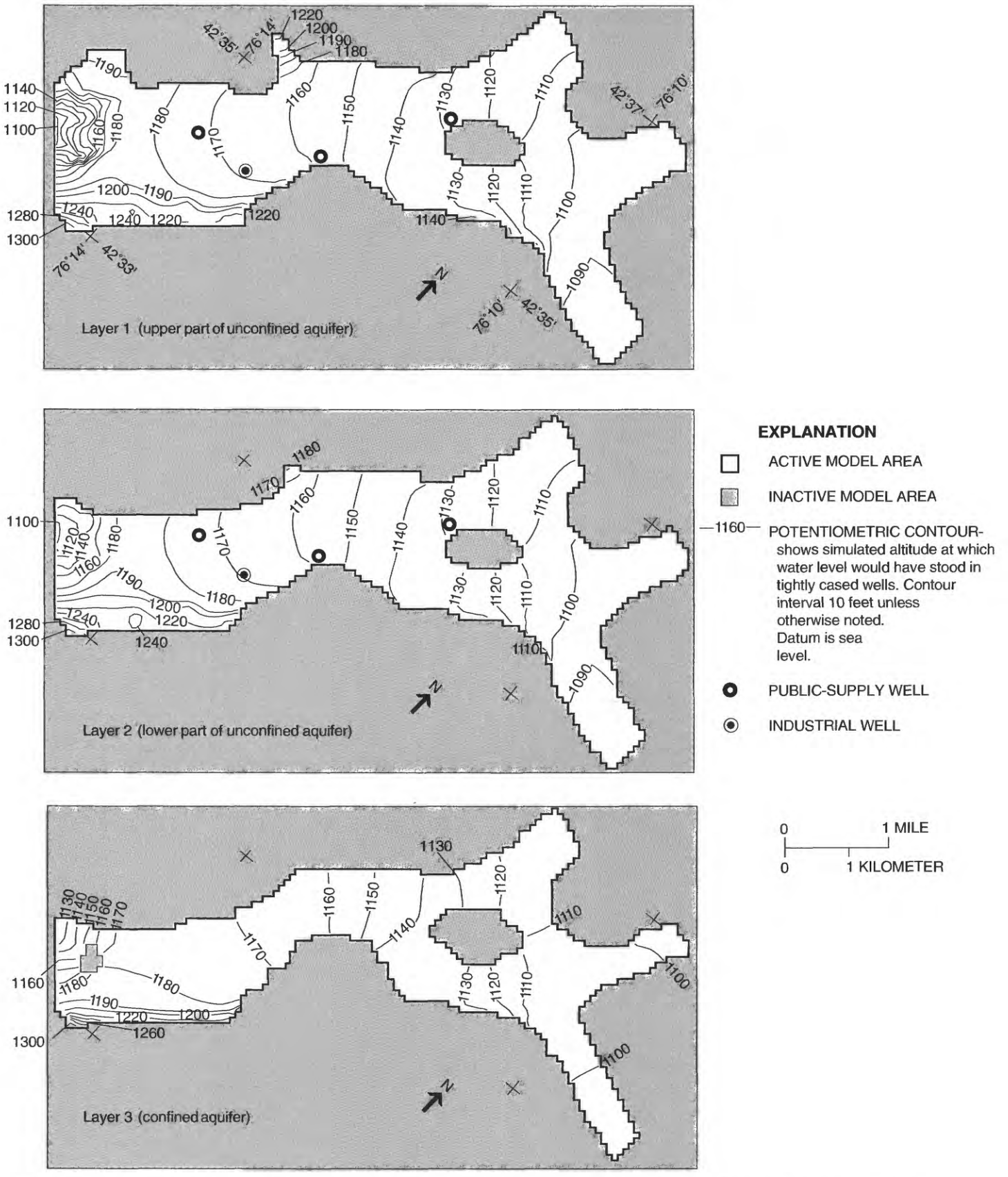


Figure 25A. Simulated head in model layers 1, 2, and 3 during steady-state high-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

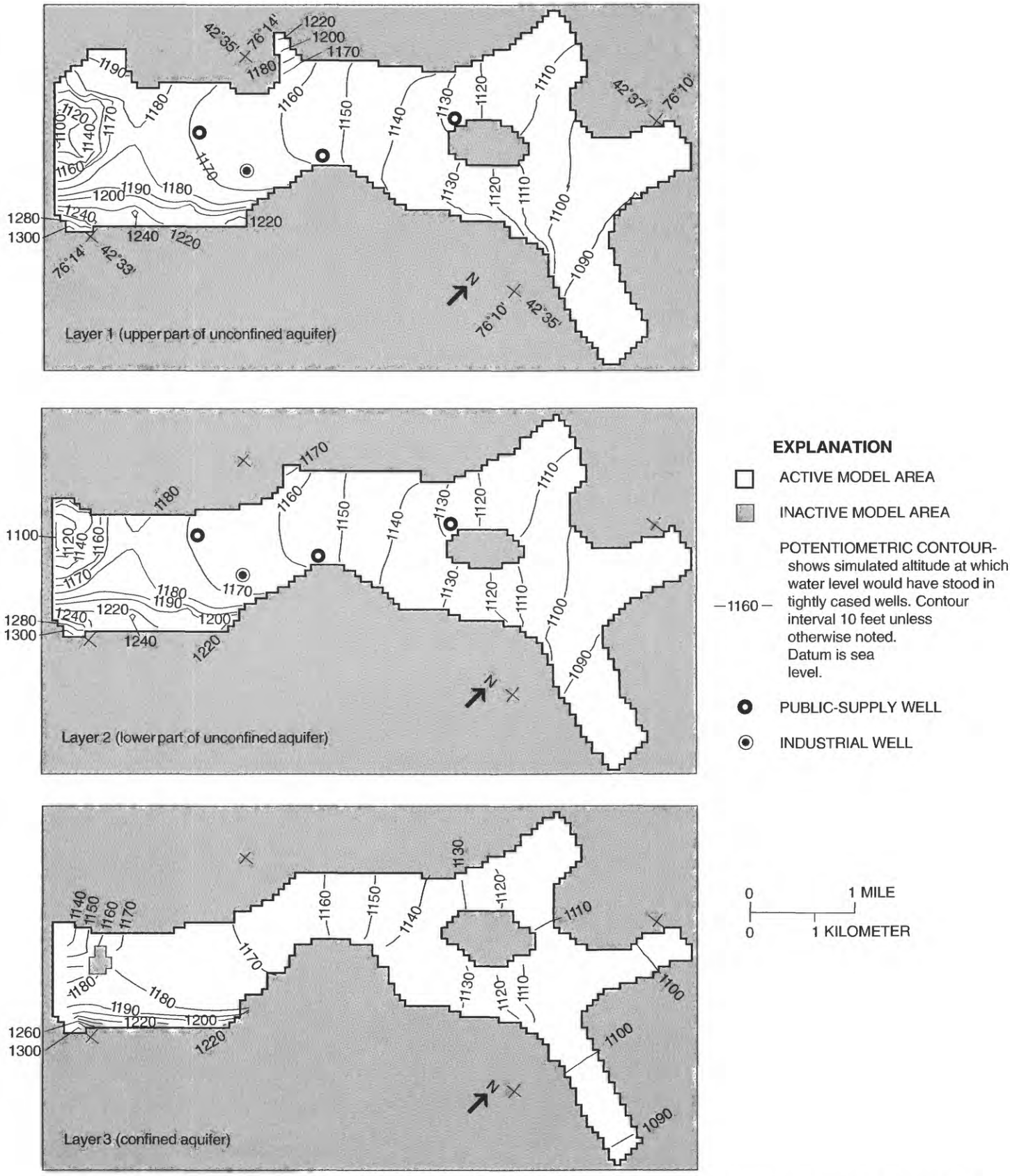


Figure 25B. Simulated head in model layers 1, 2, and 3 during steady-state average-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

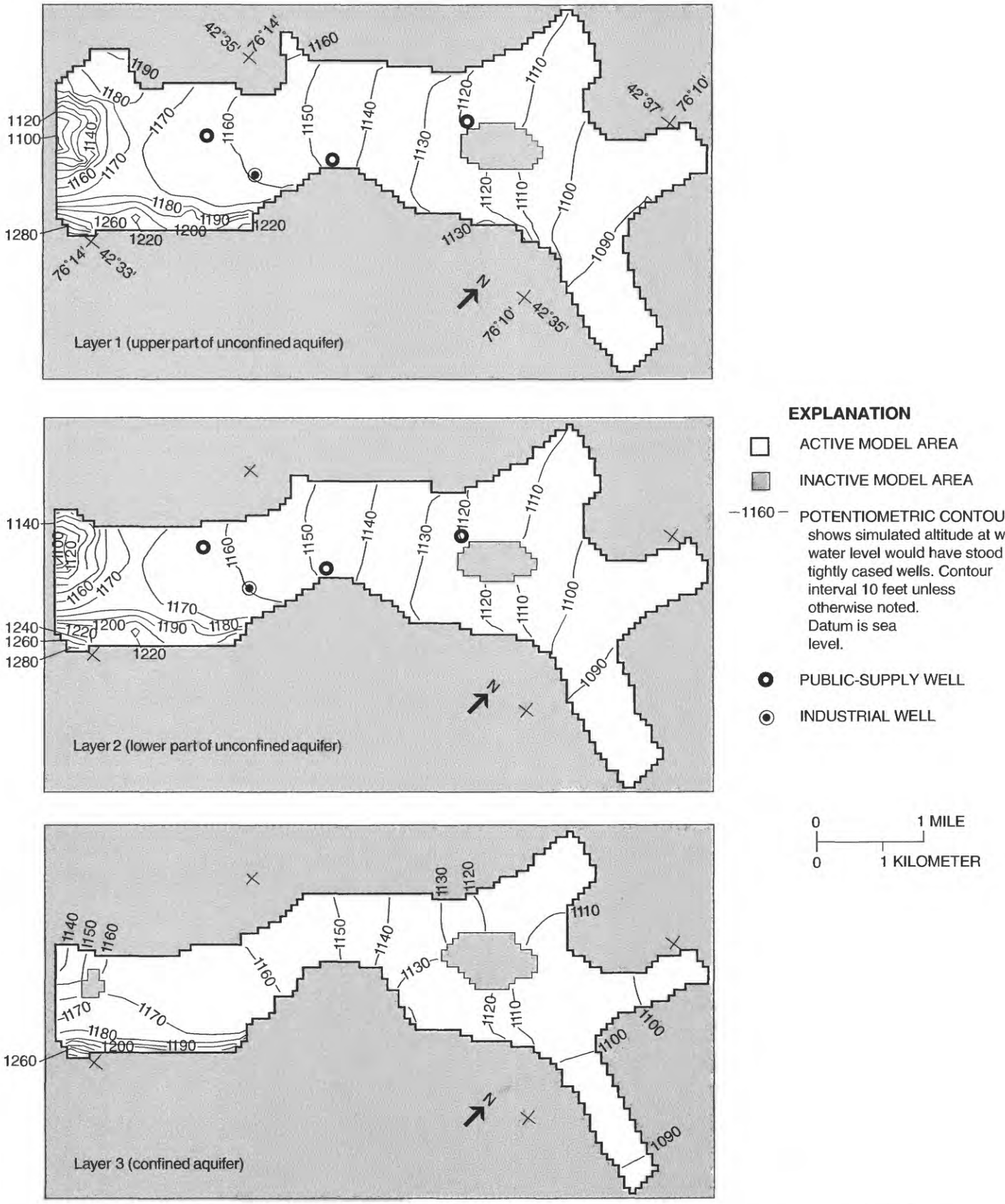


Figure 25C. Simulated head in model layers 1, 2, and 3 during steady-state low-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

reaches that are near the major pumping wells, such as where Otter Creek flows by the City of Cortland well field.

Model Sensitivity

Sensitivity analyses of the model simulating average-recharge conditions were conducted to assess which model parameters resulted in large changes, and which ones resulted in small changes, in the simulated water levels (heads) and in the streamflow gains or losses. Future data-collection efforts can be directed to those aquifer properties to which the model is most sensitive.

Recharge, horizontal hydraulic conductivity of the unconfined aquifer, vertical hydraulic conductivity of the streambed, and conductance between the unconfined aquifer (layer 2) and the confined aquifer (layer 3) were varied one at a time, and the effect on calculated heads (fig. 26) and on gains or losses in streamflow in reaches of the West Branch Tioughnioga River and Tioughnioga River (fig. 27) were noted. The vertical axis in figure 26 shows the root mean square of the difference between the computed and observed heads at 48 observation wells. The root mean square of the difference between calculated and measured head was 1.29 for the final calculated model (multiplication factor equal to 1 in the graph); all sensitivity analyses for multiplication factors other than 1 had root mean squares greater than 1.29.

Results of these analyses indicate that the model is relatively sensitive to recharge and horizontal hydraulic conductivity of the unconfined aquifer, moderately sensitive to vertical hydraulic conductivity of the streambed, and insensitive to vertical conductance between the unconfined and confined aquifers

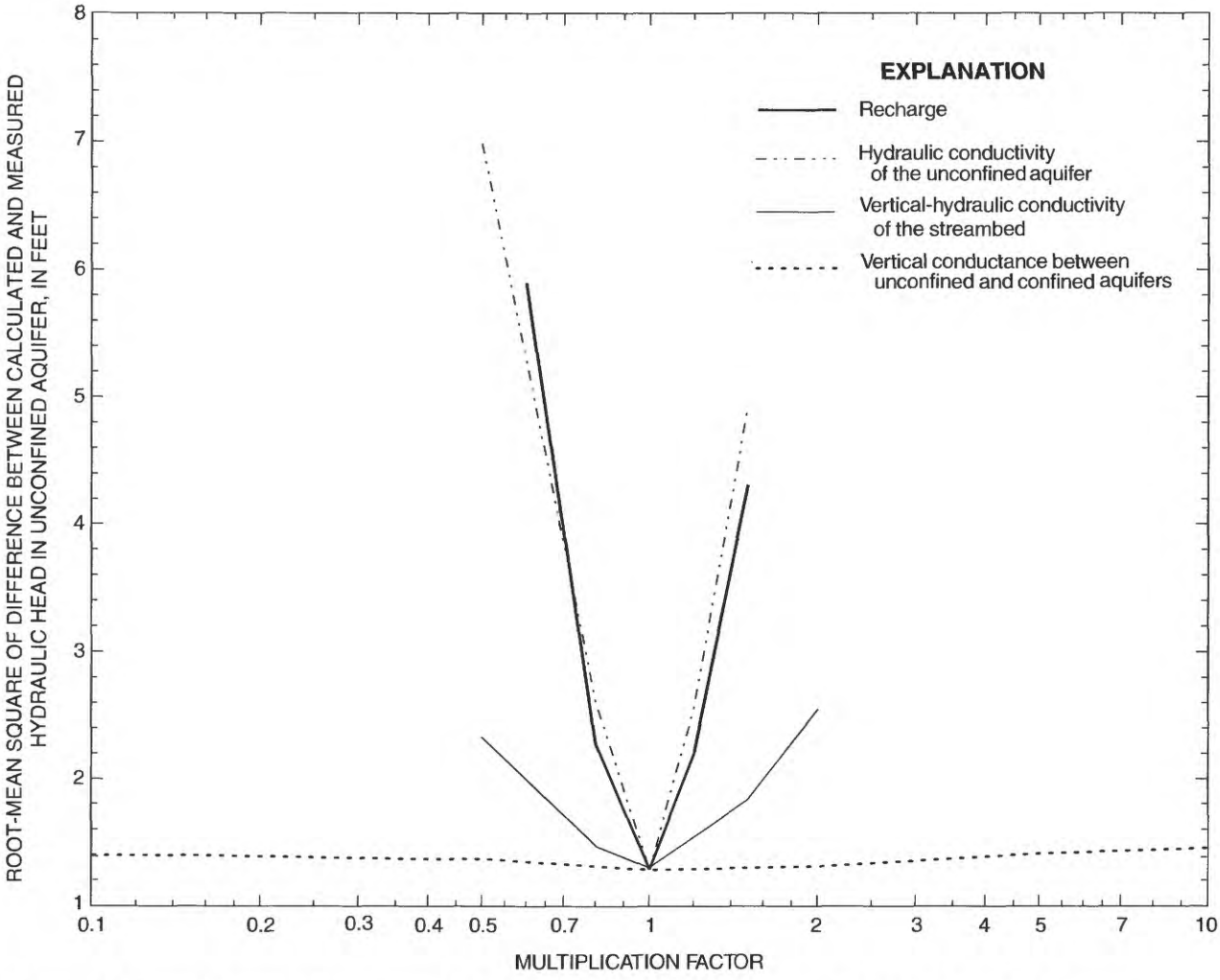


Figure 26. Results of sensitivity analyses for hydraulic head in unconfined aquifer in Cortland, N.Y. study area. (Root-mean squared calculated at 48 model cells containing observation wells.)

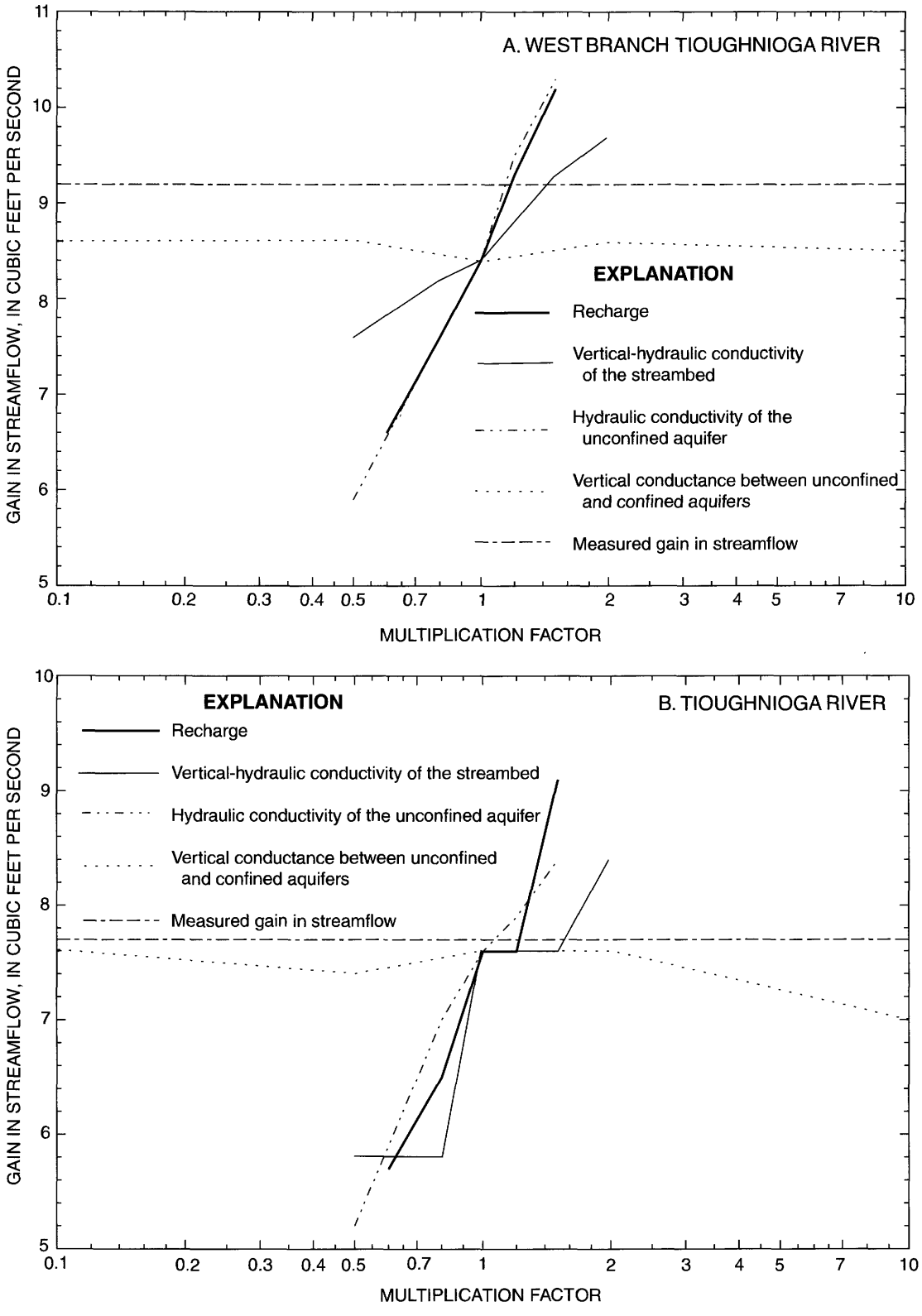


Figure 27. Results of sensitivity analyses for ground-water discharge to major streams during average-recharge conditions in the glacial-drift aquifer in the Cortland, N.Y. study area: A. Reach A of West Branch Tioughnioga River. B. Reaches A and B of Tioughnioga River. (Reach locations are shown in fig. 14.)

(fig. 26). The most sensitive areas in the model are those with low hydraulic conductivity (kame deposits). Neither the vertical hydraulic conductivity of the streambed, nor the vertical leakance between the unconfined and confined aquifers could be measured directly, and both can vary over a wide range of values; therefore, the values of these parameters were tested over a greater range than the others.

Results of the sensitivity analyses for streams (fig. 27) indicated that the ground-water discharge to West Branch Tioughnioga River and to Tioughnioga River was relatively sensitive to changes in recharge, vertical-hydraulic conductivity of the streambed, and horizontal hydraulic conductivity of the unconfined aquifer. The simulated heads and streamflow were relatively insensitive to vertical conductance between the unconfined and confined aquifer.

Model Applications

Delineation of contributing areas to wells by use of numerical flow models has a high potential for accuracy because models can incorporate many of the hydrogeologic factors that affect ground-water flow, such as aquifer geometry, hydraulic conductivity, recharge rate, and pumping rate. Particle tracking provides a simple means of evaluating the advective-transport characteristics of ground-water systems, including computation of the flowpath and traveltimes of the advective phase of contaminants.

Areas Contributing Recharge to Municipal Wells

Pumping large quantities of ground water from an aquifer system causes a drawdown within the aquifer, and the drawdown decreases with increasing distance from the pumping well. The lowering of head that results from pumping causes ground water to flow to the well, and the flowpaths to the well depend on the hydrogeologic characteristics of the flow system, the well location and pumping rate, the system boundaries, and the rate and distribution of recharge to the aquifer system. Factors that affect the areas contributing recharge to wells are described in detail in Reilly and Pollock (1993).

Areas contributing recharge to major pumping wells in the glacial-aquifer system in the study area were delineated for the periods of high, average, and low recharge described previously. The ground-water flowpaths for the three conditions were calculated by the MODPATH program (Pollock, 1989) from the output from MODFLOW (McDonald and Harbaugh, 1988). The simulated areas contributing water to municipal wells and to the recovery well at the typewriter plant are delineated in plates 2, 3, and 4. A porosity of 0.3 for the aquifers and confining unit was used for MODPATH calculations.

The contributing-area analyses indicate that the contributing areas to pumping wells are U-shaped (open end facing upgradient of the well) and extend over most of the unconfined aquifer upgradient from the wells. In general, the contributing areas resulting from the low-recharge simulation were the largest, and those resulting from the high-recharge simulation were the smallest (pl. 2, and 4). The City of Cortland municipal well had the largest contributing area in all three simulations. Recharge from tributaries such as Otter Creek and the unnamed tributary north of Otter Creek were important sources of water to the city well; thus, evaluations of the quality of water pumped by the well need to consider water quality in these two streams. At present, land use in the proximal parts of the contributing area to the city well field is mostly residential and forest, and land use in the distal parts is mostly residential and commercial, with some industry and agriculture. The typewriter plant in the western part of the aquifer was not part of the contributing area to the city well field in any simulations when the purge well at the plant was pumping (pls. 2, 3, and 4), but when the purge well was turned off, the industrial site was part of the contributing area in the high- and average-recharge simulations.

The contributing area to the Town of Cortlandville well field at Terrace Road is relatively small. This well field also receives recharge from a reach of Otter Creek (pls. 2, 3, and 4). Land use within the contributing area is mostly commercial. Chemical spills near the contributing area have come close to contaminating this well field, and, as a result, the Town has installed another municipal well at Lime Hollow Road, which is upgradient of most of the commercial and industrial areas.

The municipal well for the Town of Cortlandville at Lime Hollow Road began pumping in 1991; therefore, the contributing area for this well during high-recharge condition of 1990 was not simulated. The contributing areas for this well under average- and low-recharge conditions extend to the ground-water divide in the southwestern part of the study area and contain several ponds (pls. 3 and 4). Land use within the contributing area is mostly agricultural and forest,

with some residential areas and one industry. This well's contributing area is in the least developed part of the study area and, therefore, should be the least threatened by urban sources of contamination.

Flowpaths to Wells and Streams from Sources of Contamination

The flowpaths and traveltimes of the advective phase of contaminants in the study area were determined through the MODPATH program, which computes paths (tracks) of imaginary "particles" of water moving through a simulated ground-water system and keeps track of their traveltime. Particle tracking provides a simple means of evaluating the advective-transport characteristics of ground-water systems. Advective-flow models cannot be used to compute solute concentrations in ground water because they do not account for the effects of dispersion, adsorption, chemical reactions, or other transport phenomena, but they are useful intermediate step between ground-water flow models and solute-transport models. Chemical dispersion typically cause contaminant plumes to be larger than indicated by advective-flow models. Particles were tracked from the contaminated sites at the typewriter plant in the western part of the study area and at the Superfund site in the southeastern part; and flow velocities were calculated from an average porosity of 0.3.

Typewriter Plant

Movement of particles from the typewriter plant to discharge points was tracked in simulations in which the purge well was pumping to represent conditions during remediation work; the resulting flowpath analyses indicated that the TCE spill is within the contributing area of the purge well. Particles were then tracked in simulations in which the purge well was not pumping, to represent the flowpath of the advective movement of TCE during the several years before the remedial pumping began. Particles were applied to the water table (top face of cell in layer 1) at the cell representing the TCE spill; the resulting flowpaths in the unconfined aquifer during high-, average-, and low-recharge conditions are shown in figures 28A, B, and C. Ground water flows northeastward from the spill area to the center of the aquifer. Flowpaths shifted progressively southward from a northeastward route during high-recharge conditions to more eastward paths during average- and low-recharge conditions, respectively, as a result of differences in the distribution of recharge during those conditions.

The discharge areas of ground water that flows from the TCE spill vary according to recharge conditions. During high- and average-recharge conditions, ground water flows 2.25 mi northeastward, then discharges to the City of Cortland municipal well (fig. 28A, B) and to a small pond near the municipal well. The flowpaths shift slightly to the south during average-recharge conditions, and the traveltime of ground water flowing from the typewriter plant to the municipal well is about 4 years.

Simulated ground-water flowpaths from the TCE spill site shift even farther southward during low-recharge conditions and do not end at the City's municipal well or at the pond, but discharge into the Tioughnioga River (fig. 28C), 3.7 mi northeast of the spill site. Traveltime is about 7 years from the spill site to the Tioughnioga River.

Superfund Site

The movement of particles from the Rosen Superfund site also were tracked from the water table to delineate the flowpath and traveltime of ground water migrating from the site to the discharge area (fig. 28A, B, C). Ground water flows about 1 mi northeastward from the site to the central part of the valley, where it bends to the southeast and discharges into the Tioughnioga River about 1 mi east of the site. Traveltime of ground water from the site to the Tioughnioga River ranges from 3 years during high-recharge conditions to just under 4 years during low-recharge conditions. The flowpaths shift progressively from northeastward paths during high-recharge conditions to more southward traces during average- and low-recharge conditions (figs. 28A, B, C). The particle-tracking analyses indicate that some ground water may also discharge to an industrial well owned by ETL, Inc. on the east side of the river (fig. 28A, B, C). Trichloroethane (TCA) is one of the contaminants found in ground water at, and migrating from, the Superfund site (Blasland, Bouck and Lee, Engineers, 1992); it also was found at the ETL well. A detailed study would be needed to determine whether the TCA at the ETL well comes from the "Superfund" site, the ETL property, or some other source.

Flowpaths that originated in the unconfined aquifer at the Superfund site under the three simulated conditions extended through the model cell that contains USGS test well 332 (local well number 90-

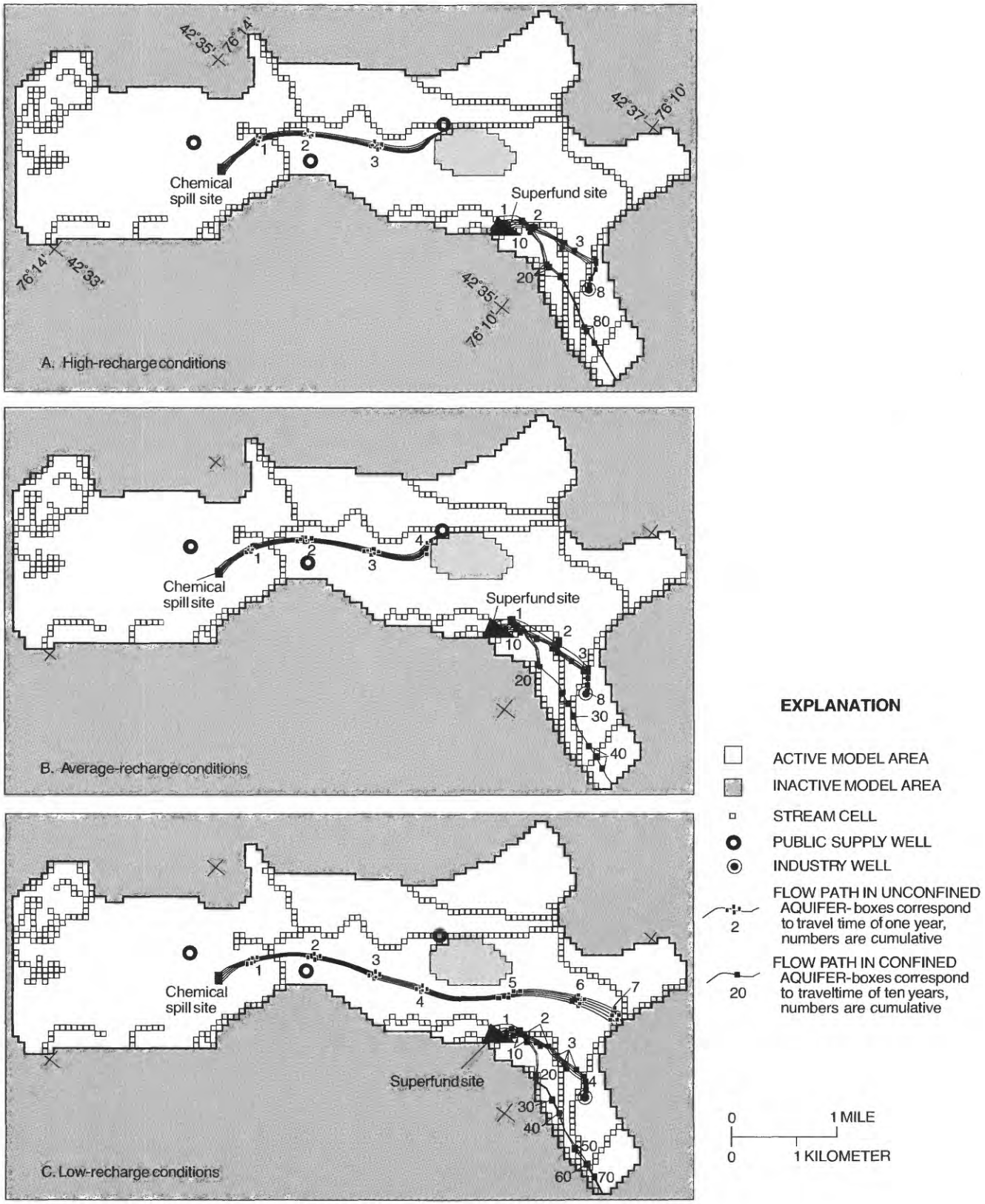


Figure 28. Flowpaths and traveltime of ground water moving from two contaminant sources in Cortland, N.Y. study area: A. Under high-recharge conditions. B. Under average-recharge conditions. C. Under low-recharge conditions. (Location is shown in fig.24.)

1S, pl. 1), in which TCA, TCE, and *trans*-DCE were detected in concentrations of 107, 15.2, and 28.9 µg/L, respectively (appendix 3). Although the particle-tracking analyses indicate that those contaminants have migrated to well 332 and beyond, their origin at the Superfund site is uncertain because the area between well 332 and the Superfund site contains other potential sources of these contaminants.

Particles were then tracked from the bottom of layer 3 at the Superfund site to simulate conditions where the confining layer is absent along the valley wall (layer 3 is in hydraulic connection to layers 1 and 2) and where a DNAPL could readily sink from land surface to the bottom of the layer 3, releasing a dissolved-phase contaminant to ground water. Whether the Superfund site contains a DNAPL is uncertain; therefore this scenario is hypothetical. Particles were not placed in cells of layer 3 where it is confined because contaminants would not move readily through the confining layer. Flowpaths in the confined aquifer initially trend northeastward from the "Superfund" site, then bend to the southeast, where they exit the modeled area as underflow through the Tioughnioga River valley (fig. 28A, B, C). Traveltime from the Superfund site to the eastern edge of the modeled area ranged from 30 years under high-recharge conditions and to more than 70 years under low-recharge conditions.

SUMMARY

Glacial aquifers in the Otter Creek-Dry Creek Valley and in parts of the adjacent West Branch, East Branch, and Tioughnioga River Valleys are the sole source of water for the City of Cortland and surrounding communities. Several parts of the aquifer system have been contaminated by: (1) solvents and degreasers, including trichloroethylene (TCE), trichloroethane (TCA), and dichloroethene (DCE), (2) gasoline from leaking storage tanks at least at two service stations, (3) bacteria from failing septic systems, and (4) leachate from a "Superfund" site. The USGS, in cooperation with the Cortland County Departments of Planning and Health, studied the hydrogeology and water quality of a glacial-aquifer system in Cortland County during 1989-93 and simulated ground-water flow to delineate areas contributing recharge to municipal wells and to the ground-water flowpaths from two chemical-spill sites.

The unconsolidated deposits in the study area were deposited between 10,000 and 23,000 years ago during Late Wisconsinan glaciation. The central parts of the valley contain kames deposits that form a confined aquifer where they are overlain by fine-grained lacustrine sediments. The kame deposits are typically 60 to 170 ft thick in the western and eastern parts of the valley. Kames are overlain by outwash where the confining layer is absent in some places along the edges of the valley.

A large moraine system (Valley Heads Moraine) formed in central and western New York valleys during a major standstill of the ice front 14,000 and 14,900 years ago. The western part of the study area contains a Valley Heads moraine in the Otter Creek-Dry Creek valley; the moraine is a heterogeneous deposit consisting of coarse sand and gravel in the upper part, and till and lacustrine deposits in the lower part.

A proglacial lake formed in valleys of the Tioughnioga River basin during deglaciation. Fine-grained sediments that were deposited within this lake range from 90 ft thick in the eastern part of the study area to 150 ft in the northern and central parts, and to 170 ft in the southwest part. This unit extends throughout the study area except where it pinches out along the edges of the valley.

After the proglacial lake drained from the study area, glacial meltwaters from the Valley Heads ice deposited large amounts of outwash atop the lacustrine unit. The outwash grades from coarse boulder gravel near the ice-front location in the southwestern part of the study area to coarse cobble-and-pebbly sand and gravel in distal reaches in the central and eastern parts.

The glacial-aquifer system consists of 40 to 80 ft of unconfined sand and gravel (mostly outwash) that overlies a confining layer (lacustrine deposits and till), that ranges from 1 to 155 ft thick. This unit, in turn, overlies confined sand and gravel (kame deposit) that ranges from 0 to 170 ft thick. The confining unit impedes ground-water movement between the unconfined and confined aquifers in the middle of the valley, but the two aquifers are hydraulically connected wherever the confining layer is absent along the valley walls.

Hydraulic conductivity of the unconfined aquifer, as determined from aquifer tests at large pumping wells, ranges from 85 to 1,150 ft/d, and hydraulic conductivity of the confined aquifer, as determined from aquifer tests where range from 60 to 65 ft/d at a fish hatchery in the western part of the

study area and from 3 to 140 ft/d at the Superfund site in the eastern part.

Water levels were measured in about 100 wells during three periods–early spring (March 28-29, 1990), late spring and early summer (May 28 through June 4, 1991), and fall (October 7-9, 1991)—to document ground-water levels during high-, average-, and low- recharge periods, respectively. Data from these three periods were used to calibrate the ground-water-flow model. The unconfined aquifer supplies four major pumping centers– (1) the City of Cortland well field in the central part of the study area, (2) the Town of Cortlandville well field at Terrace Road, (3) the Town of Cortlandville municipal well at Lime Hollow Road, and (4) a purge well at a typewriter production plant in the western part. Water in the unconfined aquifer generally moves from the edges of the valley toward the center, then northeastward along the axis of the Otter Creek-Dry Creek valley, where it discharges to pumping wells, West Branch Tioughnioga, and Tioughnioga Rivers. Water in the confined aquifer generally follows the direction of flow in the unconfined aquifer.

The aquifer system receives recharge from three sources under natural (nonpumping) conditions: (1) direct infiltration of precipitation on the aquifer, (2) runoff from unchanneled hillsides that border the aquifer, and (3) seepage from tributary streams that flow over the aquifer. The unconfined aquifer receives additional recharge from two sources under pumping conditions– (1) treated pumped water from the typewriter plant that infiltrates to the aquifer at recharge basins, and (2) induced infiltration from streams and ponds near the major pumping wells. Average annual recharge to the aquifer system from precipitation is 23.0 in.

Most tributary streams in the study area lose water to the aquifer where they flow into the main valley, except for some reaches in Otter Creek. Only part of the streamflow in upland tributaries seeps into the aquifer during high-flow conditions during the spring and during large storms throughout the year, however; the rest flows over the aquifer and discharges into the West Branch Tioughnioga and Tioughnioga Rivers. Most tributary streams lose all their water to the aquifer during low-flow conditions in the summer, fall, and winter, except for Dry Creek, which goes dry only during exceptionally dry periods. Losing streams typically dry up in the upstream direction, whereas gaining streams typically dry up starting at the headwaters.

Ground water discharges from the unconfined aquifer system by (1) seeping into major streams and seasonally into some reaches of Otter Creek; (2) flowing to pumping wells; (3) moving as underflow along the Tioughnioga River valley; and (4) seeping to springs that form the headwaters to the Fall Creek Valley in the western part of the study area. Most water in the unconfined aquifer either discharges into streams or is pumped from municipal wells, and most of the water pumped from municipal wells is eventually treated at the sewage-treatment plant, then discharged into the Tioughnioga River. Ground-water withdrawals from the unconfined aquifer through municipal and industrial wells range from 6.76 to 7.20 Mgal/d. The largest ground-water user is the City of Cortland which, during 1984-92, pumped from 3.9 to 4.3 Mgal/d. The direction of ground-water flow in the confined aquifer generally is similar to that in the unconfined aquifer.

The extent of a TCE plume in the unconfined aquifer was determined for three sampling periods (April 4-5, 1990, September 17-20, 1990, and April 27, 1993); results indicate that TCE has migrated 1.25 mi northeastward from its source at the typewriter plant in the western part of the study area. The extent of the plume was similar during all three sampling periods, indicating that steady-state conditions have been reached. Little or no TCE was detected in the confined aquifer.

TCE concentrations were highest during 1987-88; then decreased slightly from 1989 through mid-1992, and dropped significantly at the end of the 1992, probably in response to removal of contaminated soil and pumping of a recovery well at the source.

The "pump and treat" remedial program at the typewriter plant was expected to significantly lower the TCE concentrations throughout the aquifer by April 1993, but the results of the April 1993 sampling showed the concentrations at most wells in the middle and distal parts of the plume had increased significantly since the preceding fall and were nearly as high as the maximum values in 1987-89. The increase in April 1993 is attributed to desorption of TCE from sediments that had been unsaturated for 10 years, when the water table rose to its highest levels in 10 years in response to above-normal recharge in March and April, 1993.

TCE concentrations at wells within 1,500 ft of the source fluctuated seasonally; they were highest during the spring and lowest during the summer and fall. TCE

concentrations at wells more than 1,500 ft from the source showed little or no seasonal trend.

Detection of a TCE degradation product (*cis*-1,2-DCE) in most wells in the plume indicates biologically mediated reductive dehalogenation. The fate of TCE after biodegradation to *cis*-1,2-DCE is uncertain; other degradation compounds either were not detected (vinyl chloride) or were detected only on rare occasion in trace amounts (1,2-DCA). The end degradation products of TCE are carbon dioxide, water, and chloride.

Ground-water samples were collected from both aquifers during April and September 1990 and analyzed for inorganic and organic chemical constituents; results indicate that the quality of water generally meets New York State drinking-water standards, except for part of the unconfined aquifer that is contaminated by TCE. Elevated concentrations of chloride are generally found in ground water near major roads that are heavily salted. Median concentrations of chloride during the April and September 1990 samplings, were 37 and 39 mg/L, respectively. The trend of increasing chloride concentrations since the early 1940's at the City of Cortland well field, noted by Buller (1978), has continued.

Nitrate concentrations in ground water ranged from 0.1 mg/L to 12.0 mg/L, with a median concentration of 4.3 mg/L. The concentrations were higher in the agricultural areas than elsewhere.

A quasi-three-dimensional, digital ground-water flow model was constructed to simulate hydraulic head, estimate the contributing areas for municipal wells, and delineate the flowpaths of ground water migrating from two sources of contamination. The aquifer system was represented as three layers–the upper two represent the unconfined aquifer, and the third represents the confined aquifer. The resulting areas contributing recharge to wells are U-shaped and extend over most the aquifer upgradient from the pumping wells. The largest contributing areas resulted from low-recharge simulations, and the smallest resulted from high-recharge simulations. The City of Cortland municipal well had the largest contributing area in all three simulations. Otter Creek and an unnamed tributary north of Otter Creek are within the contributing area to the city's wells; thus, their water can affect the municipal ground-water supply.

The contributing area for the Town of Cortlandville well field at Terrace Road is relatively small. The well receives recharge from a reach of Otter Creek. The contributing area for the Town of Cortlandville municipal well on Lime Hollow Road extends to the ground-water divide in the southwestern part of the study area. The contributing area for the well on Lime Hollow Road is in the least developed part of the study area and, therefore, is expected to be only minimally affected by contamination from urban sources.

The flowpaths and traveltimes of ground water moving from two major chemical-spill sites (the typewriter plant in the western part of the study area and the Superfund Site in the southeastern part) were determined through MODPATH, a particle-tracking program. Results indicate that, during high- and average-recharge conditions, ground water from the typewriter plant discharges to the City of Cortland municipal well, 2.25 mi to the northeast. No significant concentrations of TCE (above 5 μg/L) were detected at the municipal well because degradation and volatilization had reduced them below this level within 1.25 mi of their source. Traveltime from the source to the municipal well is about 4 years. During low-recharge conditions, flowpaths shift southward, bypass the municipal well, and end at the Tioughnioga River. Traveltime from the source to the river is about 7 years.

Ground water from the Superfund site flows to the central part of the unconfined aquifer and discharges into the Tioughnioga River about 1 mi to the east. Traveltime from the source to the Tioughnioga River ranged from 3 to 4 years.

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Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area.

[Well locations shown on pl. 1.]

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
3	TH 3	423548	0761155	City of Cortland	08-16-79	1,136	55	--	1,137.67	11.95	08-16-79	75	Test well. 0-25 fine sand, 25-45 gravel, 45-58 sand and gravel, 58-67 ft silty sand and clay.
4	CP 4	423454	0761242	Town of Cortlandville	12-29-75	1,173	63	--	1,173.45	19.50	12-29-75	--	Test well.
5	CP 5	423507	0761309	Town of Cortlandville	03-04-76	1,172	40	--	1,172.64	6.55	03-04-76	--	Well abandoned.
6	TH 6	423545	0761152	City of Cortland	08-29-79	1,136	55	--	1,137.24	11.60	08-29-79	75	Test well.
8	CP 8	423526	0761131	Leonard Barker	1974	1,146	20	--	1,146.2	12.97	02-27-76	--	Test well.
9	CP 9	423527	0761132	Leonard Barker	1976	1,146	20	--	1,146.2	12.13	02-27-76	--	Test well.
10	CP 10	423535	0761140	Curtis	1974	1,149	20	106	1,148.6	14.06	02-27-76	--	--
11	CT 11	423518	0761141	Cortland County	12-04-75	1,154	60	--	1,156.5	20.90	12-15-75	--	0-15 clay and sand, 15-50 pebbly sand, 50-55 sand and gravel, 55-60 gravelly sand, 60-65 clayey sand, 65-75 silty gravel, 75-85 sand and gravel, 85-100 pebbly fine to coarse sand, 100-104 ft gray clay.
13	CP 13	423650	0761140	Cortland County	11-01-73	1,116	25	--	1,116.6	7.80	11-01-73	--	Test well.
15	CP 15	423704	0761108	Cortland County	02-27-76	1,114	--	--	1,114.3	5.57	02-27-76	--	Test well.
20	CT 20	423414	0761428	Cortland County	09-10-76	1,247	160	124	1,247.11	68.20	09-10-76	--	0-11 sand and gravel, 11-16 clay with some gravel, 16-48 sand and gravel, 48-64 clay with some embedded gravel (till?), 64-65 silt and fine sand, 65-72 sand and gravel, 72-85 clay with some gravel, 85-87 sand and gravel, 87-89 clay, 89-94 sand and gravel, 94-97 silty clay with some gravel, 97-118 clay, 118-124 clay with some shale pebbles (till), 124-160 ft shale.
22	CT 22	423429	0761317	Cortland County	09-15-76	1,186	45	--	1,186.38	22.91	09-15-76	--	0-45 ft sand and gravel.
23	CT 23	423346	0761332	Cortland County	09-20-76	1,228	85	--	--	58.30	09-20-76	--	Well destroyed. 0-13 sand and gravel, 13-28 silt with some gravel, 28-85 ft silty sand and gravel.
24	CT 24	423314	0761415	Cortland County	09-28-76	1,270	105	--	--	--	--	--	Well destroyed. 0-100 dirty gravel, 100-105 ft clay. No water encountered during drilling.
33	CP 1	423323	0761403	Monarch Tool Corp.	11-10-75	1,259	209	207	--	58.27	11-10-75	25	0-83 sand and gravel, 83-130 clay and gravel, 130-178 sand and gravel, 178-183 fine sand, 183-187 fine sand and gravel, 187-207 sand and gravel, 207-209 ft shale.
39	CT 1D	423558	0761215	Cortland County	09-29-75	1,155	143	--	1,154.96	17.57	11-24-75	--	--
40	CT 1S	423558	0761215	Cortland County	09-29-75	1,155	44	--	1,155.39	15.06	11-24-75	--	--
47	CT 2D	423548	0761153	Cortland County	10-01-75	1,138	49	--	1,137.38	7.55	10-07-75	--	0-58 sand and gravel, 58-70 ft fine sand and clay.
48	CT 2S	423548	0761153	Cortland County	10-01-75	1,138	25	--	1,137.03	7.15	11-24-75	--	0-25 ft sand and gravel.
102	C-102	423541	0761147	City of Cortland	--	1,137	45	--	1,138.59	7.68	08-30-76	--	USGS water-level observation well.
105	CT 5D	423447	0761306	Gutchess Lumber	10-09-75	1,170	59	--	1,170.89	10.62	12-01-75	--	0-15 sand and gravel, 15-20 clay and gravel (till?), 20-35 sand and gravel, 35-50 sand, 50-65 sand and gravel, 65-75 sandy clay and gravel, 75-80 sand and gravel, 80-82 fine sand, 82 ft clay.
106	CP 6	423522	0761315	Cortland County Airport	1970	1,198	75	--	1,198.43	34.50	02-26-76	--	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
107	CP 7	423528	0761138	Barker, Leonard	1974	1,147	20	--	1,147.0	11.82	02-27-76	--	Test well.
108	CT 8	423251	0761423	Cortland County	10-30-75	1,299	38	--	1,300.77	7.62	12-03-76	--	0-25 clay hardpan, 25-37 fine sandy clayey gravel (no water), 37-40 sand and gravel, 40-67 f sand and gravel, 67-92 silty clay, 92-95 ft sand and gravel.
110	CT 10D	423422	0761409	Cortland County	11-28-75	1,202	99	116	1,201.95	42.16	10-08-91	--	0-20 clayey sand and gravel, 20-25 sand and pebbles, 25-30 fine to medium sand, 30-65 clayey silty sand and gravel (till?), 65-70 fine to medium sand, 70-100 sand and gravel, 100-106 till, 106 ft shale.
112	CT 12D	423518	0761141	Cortland County	12-18-75	1,152	60	--	--	21.30	01-06-76	--	Well destroyed. 0-65 sand and gravel, 65-75 silty sand and gravel, 75-90 sand and gravel, 90-100 pebbly clayey sand, 100-105 sand and gravel, 105-110 silty sand and, 110-115 ft sand and gravel.
113	CT 13	423518	0761141	Cortland County	12-15-75	1,152	63	--	--	18.26	02-04-76	--	Well destroyed.
114	CP-14	423700	0761130	Cortland County	11-01-73	1,120	25	--	1,120.3	10.80	11-01-73	--	--
119	C 19	423539	0761148	City of Cortland	--	1,140	13	--	--	5.97	07-01-67	--	Well destroyed 5-7-76 and replaced by well C-102.
121	CT 21	423440	0761325	Cortland County	09-13-76	1,166	32	--	1,167.38	5.74	09-13-76	--	0-32 ft sand and gravel.
135	--	423305	0761438	Griswold, S.	10-01-65	1,277	254	254	--	96	10-01-65	8	--
138	Well I	423318	0761509	Tunison Fish Hatchery	10-18-62	1,120	52	--	--	6	10-18-62	154	0-43 clay, 43-52 sand and gravel, 52 ft clay.
139	Well R	423318	0761514	Tunison Fish Hatchery	--	1,130	60	--	--	26	09-17-92	--	--
140	Well S	423318	0761516	Tunison Fish Hatchery	10-21-80	1,130	69	--	--	23	11-06-80	100	0-41 clay and gravel, 41-51 sand and gravel, 51-69 sand and gravel, 69-70 ft clay and gravel.
142	Well A	423319	0761459	Tunison Fish Hatchery	05-22-62	1,120	56	--	--	--	--	7	0-6 gravel, 6-16 clay and gravel, 16-20 sandy clay, 20-21 sand and gravel, 21-28 clay, 28-35 fine sand, clay and gravel, 35-56 ft sand and gravel.
143	Well 1	423320	0761459	Tunison Fish Hatchery	05-11-59	1,120	185	--	--	+3.5	05-11-59	--	Well abandoned. 0-35 silt, 35-50 fine to medium sand and silt, 50-70 fine to coarse sand and some gravel, 70-100 fine sand and silt, 100-104 sand and gravel, 104-166 clay, 166-187 fine to coarse sand, 187-200 ft f sand and silt. Pumped 42 gal/min with 7-ft drawdown.
144	Well H	423320	0761509	Tunison Fish Hatchery	10-18-62	1,115	52	181	--	7.5	10-18-72	180	0-12 clay, 12-43 clay and sand, 43-52 sand and gravel, 52-78 clay, 78-108 clay with some gravel (till?), 108-110 clay and gravel, 110-139 clay, 139-142 sand and gravel, 142-181 clay, 181-185 ft shale.
149	Well F	423327	0761457	Tunison Fish Hatchery	1962	1,140	137	--	--	flowing	09-14-62	74	0-20 clay and gravel, 20-30 coarse sand, 30-41 clay and gravel, 41-44 gravel, 44-55 clay and gravel, 55-60 sand and gravel, 60-67 sand, 67-76 gravel, 76-137 ft clay and gravel.
150	Well C	423320	0761517	Tunison Fish Hatchery	1963	1,110	124	--	--	flowing	07-31-62	--	0-5 clay and gravel, 5-30 clay, 30-45 sand, 45-56 sand and gravel, 56-76 gravel with clay, 76-97 sand and gravel, 97-102 clayey gravel, 102-124 ft gravel.
151	Well E	423327	0761458	Tunison Fish Hatchery	1962	1,140	134	--	--	flowing	09-06-62	500	0-30 clay and gravel, 30-32 gravel, 32-52 clay and gravel, 52-62 sand and gravel, 62-66 sand, 66-71 clay and gravel, 71-84 sand and gravel, 84-109 clay and gravel, 109-113 sand and gravel, 113-133 clay and gravel, 133-134 gravel, 134-140 ft clay and gravel. Screen silted up and well was abandoned.
152	--	423329	0761355	Monarch Tool	1966	1,255	79	--	--	--	--	45	--
155	--	423333	0761343	Moser H. F.	1965	1,240	60	--	--	31.8	08-02-67	37	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
163	--	423428	0761452	Armstrong, Roger	1976	1,290	155	30	--	50	1976	4	0-15 gravel, 15-30 till, 30-155 ft bedrock.
167	--	423516	0761152	Abdallah Creamery	1945	1,155	69	--	--	--	--	40	--
168	--	423520	0761115	Lehigh Railroad	1932	1,136	28	--	--	3	--	75	--
170	--	423528	0761130	Mobil Oil	1974	1,147	24	--	--	16.70	07-25-75	--	--
171	--	423533	0760824	Polkville Agway	--	1,096	34	--	--	8	--	35	0-37 ft sand and gravel.
172	PW-4	423542	0761154	City of Cortland	03-01-57	1,138	68	--	--	5	03-01-57	4,500	Public water-supply well. 0-68 sand and gravel, 68-77 ft sand and clay.
173	--	423548	0761015	Brewer Tichener	1944	1,115	155	--	--	8	--	75	--
174	--	423549	0761143	City of Cortland	1917	1,138	16	--	--	9	08-01-65	4,000	Dug well. Former public water-supply well. Currently used for water-level observation well by city of Cortland.
176	--	423602	0761019	Rubbermaid	1923	1,110	185	--	--	3	--	22	Formerly owned by Brockway Motors. 0-35 sand and gravel, 35-130 clay, 130-185 ft sand and gravel.
177	Well 1	423604	0761039	Cortland County	07-09-79	1,117	101	--	1,111.88	15.50	08-16-79	70	0-55 sand and gravel, 55-85 clay, 85-102 ft sand and gravel.
178	--	423606	0761233	Ames, Bob	07-24-77	1,180	158	75	--	34	07-24-77	10	0-5 gravel, 5-15 till, 15-158 ft bedrock.
179	--	423610	0761209	Murray Center	1943	1,150	65	--	--	20.0	04-23-87	150	--
180	--	423610	0761209	Murray Center	1943	1,150	125	75	--	--	--	60	0-75 sand and gravel, 75-125 ft shale.
181	--	423619	0760946	Brewer Tichener	1962	1,105	47	--	--	15.6	02-18-72	310	--
183	--	423631	0761115	Cortland Hospital	05-01-60	1,121	44	--	1,120.84	11	05-01-60	250	--
184	--	423638	0761006	Cortland Ready Mix	08-01-63	1,100	49	--	--	16	08-01-63	100	--
186	--	423657	0761107	Gates, Al	05-01-66	1,115	45	--	--	14	05-01-66	35	--
187	--	423709	0761119	Briggs, Lynn	02-22-66	1,120	195	188	--	--	--	30	0-20 sand and gravel, 20-75 sand and clay, 75-177 clay, 177-188 sand and gravel, 188-195 ft shale.
188	--	423710	0761127	Shultz, Al	1966	1,125	156	148	--	10	--	40	--
203	CP 3	423451	0761244	Town of Cortlandville	02-27-76	1,183	70	--	1,183.44	19.08	02-27-76	--	Test well.
204	CT 4D	423522	0761239	Cortland County	10-07-75	1,149	46.5	--	1,152.15	5.21	10-10-75	--	0-60 sand and gravel, 60-70 pebbly sand, 70-75 ft clay.
205	CT 5S	423447	0761306	Cortland County	10-09-75	1,170	26	--	1,173.14	10.56	12-01-75	--	0-15 sand and gravel, 15-20 clay and gravel (till?), 20-35 ft sand and gravel.
207	CT 7D	423353	0761303	Cortland County	10-24-75	1,232	46	--	1,233.09	26.60	10-08-91	--	0-5 gravel, 5-15 clayey gravel (till?), 15-32 sand and gravel, 32-37 fine sand, 37-41 medium sand, 41-50 fine sand and gravel, 50-54 till.
210	CT 10S	423422	0761407	Cortland County	11-28-75	1,202	42	116	1,201.75	40.5	10-08-91	--	0-20 clayey sand and gravel, 20-25 sand and pebbles, 25-30 fine to medium sand, 30-65 clayey silty sand and gravel (till?), 65-70 fine to medium sand, 70-100 sand and gravel, 100-106 till, 106 ft shale.
214	CT 14	423632	0761051	Cortland County	01-27-76	1,112	24	--	1,114.5	9.23	02-04-76	--	Well removed. 0-7 fill, 7-14 silt, 14-23 sand and gravel, 23-24 ft fine sand.
279	ELM A	423609	0760936	Cortland County	11-09-79	1,100	29	44	1,102.63	10.4	10-08-91	--	0-5 fill, 5-30 sand and gravel, 30-37 medium to coarse sand, 37-44 till, 44-45 ft shale.
280	ELM B	423609	0760942	Cortland County	11-15-79	1,102	34	--	1,103.87	9.4	10-08-91	--	0-45 sand and gravel, 45-50 ft fine to medium sand with some gravel
281	ETL A	423542	0760922	ETL	05-05-80	1,100	45	--	1,102.16	12.3	05-28-91	--	0-5 sand and gravel, 5-47 gravelly medium to coarse sand, 47-60 ft silty clay.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
282	ETL B	423542	0760917	ETL	05-09-80	1,102	50	--	1,105.06	15.6	05-28-91	--	0-15 sand and gravel, 15-52 medium to coarse sand with some gravel, 52-57 silty clayey sand, 57-60 ft silty clay.
291	--	423327	0761458	Tunison Fish Hatchery	1962	1,140	137	--	--	--	--	74	--
303	CT 3S	423518	0761104	Cortland County	10-03-75	1,138	28	--	1,141.03	8.74	12-03-75	--	0-5 fill, 5-30 ft gravel.
304	CT 4S	423522	0761239	Cortland County	10-07-75	1,149	23	--	1,152.22	5.29	12-04-75	--	0-60 ft sand and gravel.
305	Well G	423325	0761456	Tunison Fish Hatchery	10-04-62	1,130	215	197	--	3	10-04-62	25	0-39 clay and gravel, 39-52 clayey gravel, 52-74 clay and gravel, 74-194 clay, 194-197 gravel, 197-215 ft shale.
306	CT 6D	423433	0761333	Cortland County	10-22-75	1,173	255	267	1,173.01	9.51	12-03-75	--	0-100 sandy gravel, 100-105 pebbly sand, 105-130 sand and gravel, 130-150 fine sand, 150-165 sand and gravel, 165-170 clayey sand with pebbles, 170-180 sand and gravel, 180-190 fine sand, 190-267 silty sand and gravel, 267 ft bedrock
307	CT 7S	423353	0761303	Cortland County	10-24-75	1,232	24	--	1,134.72	11.96	12-02-75	--	--
317	PW 3	423551	0761149	City of Cortland	03-21-49	1,137	68	--	--	2.5	03-25-49	3,200	Public water-supply well. 0-68 sand and gravel, 68-77 ft sandy clay.
320	89-1	423350	0761351	Cortland County	11-22-89	1,196	90	--	1,198.43	28.87	12-29-89	--	0-19 sand and gravel, 19-28 pebbly sand, 28-59 sand and gravel, 59-70 sand and gravel, 70-100 ft sand and gravel.
321	--	423527	0761019	Cortland High School	01-05-87	1,200	80	--	1,201.74	72	03-28-90	--	0-80.5 ft silty sand and gravel.
322	--	423438	0761357	Park, David	06-10-81	1,215	273	103	--	--	--	2	0-18 gravel, 18-38 clay, 38-48 dirty gravel, 48-60 hardpan and sand, 60-94 clay and gravel, 94-103 till, 103-273 ft bedrock.
323	--	423244	0761419	McKee, John	10-06-88	1,320	185	75	--	--	10-06-88	7	0-20 hardpan, 20-50 gravel hardpan and clay, 50-53 gravel, 53-75 till, 75-185 ft shale.
324	--	423246	0761420	McKee, John	--	1,315	198	60	--	--	--	--	0-40 hardpan, 40-60 till, 60-198 ft shale.
325	--	423256	0761430	Ostrander, George	11-16-87	1,295	245	191	--	--	--	--	0-10 hardpan gravel, 10-70 cemented hardpan gravel, 70-120 hardpan gravel, 120-155 gravel, 160-191 clay, 191-245 ft shale.
326	90-14B	423416	0761457	USGS	07-02-90	1,240	--	38	--	--	--	--	Test boring. 0-28 coarse cobble gravel with some sand, 28-38 till with silt and clay matrix, 38-40 ft weathered shale.
327	CT 9	423230	0761440	Cortland County	11-17-75	1,242	110	304	1,242.8	63.11	12-03-75	--	0-30 clayey sand and gravel, 30-45 till, 45-130 sand and gravel, 130-300 clay, 300-304 till, 304 ft shale.
328	--	423402	0761457	Kannus	--	1,215	74	--	--	--	--	--	0-40 gravel hardpan, 40-60 sand, 60-74 ft hardpan (probably a dirty gravel since the well was finished at 74 ft).
329	--	423415	0761423	Mueller	--	1,252	150	124	--	--	--	--	0-65 sand and gravel, 65-80 till, 80-100 sand and gravel, 100-124 gravel and hardpan (till? TSM), 124-150 ft shale.
330	89-2S	423548	0761230	Cortland County	11-27-89	1,147	15	--	1,148.10	7.81	12-29-89	--	0-15 ft sand and gravel.
331	89-2D	423548	0761230	Cortland County	11-27-89	1,147	96	114	1,149.72	7.62	12-29-89	--	0-23 sand and gravel, 23-30 pebbly sand, 30-43 sand and gravel, 43-55 silt, 55-75 very fine sand, 75-91 silt and clay, 91-114 sand and gravel, 114-116 ft gray shale.
332	90-1S	423542	0760957	Cortland County	06-12-90	1,114	34	--	1,117.25	17.3	09-27-90	--	0-34 ft sand and gravel.
333	90-11	423526	0761228	City of Cortland	06-29-90	1,148	55	--	1,150.09	12.78	09-27-90	--	0-83.5 sand and gravel, 83.5-84 ft silt and clay.
334	90-1D	423542	0760957	City of Cortland	06-12-90	1,114	98	--	1,117.00	17.2	09-27-90	--	0-64 sand and gravel, 64-107 ft varved silt and clay.
335	90-2	423603	0760946	City of Cortland	06-13-90	1,102	34	66	1,102.03	8.40	09-27-90	--	0-46 sand and gravel, 46-50 f. sand and silt, 50-56 varved silt and clay, 56-66.5 till, bedrock at 66.5 ft.
336	90-10	423524	0761219	City of Cortland	06-28-90	1,158	37	--	1,160.33	23	09-27-90	--	0-39 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
337	90-9S	423531	0761207	City of Cortland	06-28-90	1,138	42	--	1,140.41	8.22	09-27-90	--	0-44 ft sand and gravel.
338	90-9D	423531	0761207	City of Cortland	07-17-90	1,138	217	220	1,141.29	9.7	09-27-90	--	0-52 sand and gravel, 52-203 silt and clay, 203-219 sand and gravel, 219-220 till, 220-222 ft shale.
339	90-3	423623	0761116	City of Cortland	06-14-90	1,118	35	--	1,118.15	9.46	09-27-90	--	0-67 sand and gravel, 67-100 ft varved silt and clay.
340	90-6S	423457	0761305	Cortland County SPCA	06-26-90	1,165	35	--	1,166.28	13.70	09-27-90	--	0-4 silty gravel, 4-12 till, 12-18 sand and gravel, 18-34 medium to very coarse sand, 34-35 ft sand and gravel
341	90-6D	423457	0761305	Cortland County SPCA	07-19-90	1,164	137	--	1,168.14	17.2	09-27-90	--	0-5 topsoil, 5-12 till, 12-37 sand and gravel, 37-60 medium to coarse sand, 60-83 very fine sand and gravel lenses, 83-108 silt and very fine sand, 108-137 ft sand and gravel.
342	90-5	423517	0761157	Cortland County	06-21-90	1,160	52	--	1162.56	28.8	09-27-90	--	0-50 sand and gravel, 50-75 very coarse sand and fine gravel, 75-82 ft sand and gravel.
343	90-7	423440	0761336	Stupke	06-27-90	1,169	24	--	1,171.35	12.3	09-19-90	--	0-25 sand and gravel, 25-30 ft till.
344	90-13	423446	0761239	Cortland County	07-02-90	1,185	31	31	1,187.57	26.6	09-27-90	--	0-7 topsoil and debris, 7-12 silt and gravel, 12-31 silt and gravel, 31 ft gray shale.
345	90-4B	423441	0761309	USGS	06-19-90	1,185	93	--	--	17.9	06-19-90	--	Test boring. 0-18 cobbles, 18-44 till, 44-86 sand and gravel, 86-93 ft fine sand and silt.
346	Kellogg	423528	0760921	Cortland County	07-09-80	1,096	24	--	1,095.94	5.52	09-27-90	--	0-10 clay soil, 10-15 silty gravel, 15-25 sand and gravel, sand with some clay, 35-43 medium to coarse sand with some clay, 43-99 ft varved silt and clay.
347	SPCA	423457	0761303	Cortland County SPCA	--	1,168	--	--	1,167.68	--	--	--	Dug well.
348	MW-1	423352	0761400	Gunzenhauser	07-24-87	1,235	73	--	1,237.37	70.25	09-27-90	--	0-45 sand and gravel, 45-50 fine to coarse sand with some silt, 50-76 ft sand and gravel.
349	MW-2	423413	0761340	Gunzenhauser	07-29-87	1,223	65	--	1,225.64	61.56	09-27-90	--	0-66 ft sand and gravel.
350	--	423430	0761319	Danglier	--	1,185	57	--	--	--	--	30	--
351	--	423429	0761319	Pace	05-12-62	1,185	55	--	--	--	--	30	--
352	--	423430	0761315	Fitts	--	1,185	--	--	--	--	--	--	--
353	--	423450	0761251	Pauldine	--	1,155	--	--	--	--	--	--	--
354	T-103	423452	0761240	Town of Cortlandville	01-13-59	1,184	72	--	--	27	01-13-59	440	0-20 clayey sand and gravel, 20-36 clayey sand, 36-37 gravel, 37-45 coarse sand, 45-55 gravel and clay, 55-72 sand and gravel, 72-76 ft gravel and clay.
355	T-103	423454	0761240	Town of Cortlandville	08-21-75	1,177	63	--	--	29.7	09-11-75	660	0-30 sand and boulders, 30-63 coarse sand and gravel, 63-65 sand and gravel with clay, 65-70 ft gravel hardpan.
356	MW-3D	423528	0761205	City of Cortland	12-11-86	1,143	58	--	1,145.03	4.52	03-28-90	--	0-60 silty sand and gravel, 60.5-61 ft silt.
357	MW-1	423538	0761204	City of Cortland	12-11-86	1,141	48	--	1,142.84	5.34	03-28-90	--	0-48 ft sand and gravel.
358	MW-2	423528	0761223	City of Cortland	12-16-86	1,143	36	--	1,144.99	1.96	03-28-90	--	0-47 ft sand and gravel.
359	Dowzer 1	423523	0761047	Dowzer Corp.	--	1,140	23	--	1,142.3	10.8	05-25-90	--	--
360	Dowzer 2	423524	0761042	Dowzer Corp.	--	1,136	23	--	1,138.9	7.3	05-25-90	--	0-3 fill, 3-7 silt and clay, 7-23 ft fine to coarse sand with some gravel.
361	MW-3S	423527	0761206	City of Cortland	12-18-86	1,142	25	--	1,143.81	5.3	03-28-90	--	0-45 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
362	--	423507	0761251	Pall Trinity Corp.	12-20-86	1,167	67	--	1,169.00	--	--	--	0-67 sand and gravel, 67 ft fine sand. Screened intervals 60-67 ft.
363	Well 1	423502	0761249	Pall Trinity Corp.	12-15-83	1,165	63	--	1,167.69	12	12-15-83	170	0-20 gravel, 20-32 silty gravel, 32-63 ft gravel.
364	Substa	423501	0761253	Pall Trinity Corp.	--	1,168	35	--	1,169.68	12.7	03-13-91	--	--
365	Hess 1	423554	0761003	--	1982	1,130	13	--	1,107.47	9.5	03-28-90	--	--
366	--	423554	0761032	--	--	1,135	--	--	--	--	--	--	--
367	--	423432	0761327	Stupke	--	1,173	--	--	--	--	--	--	--
368	Ames	423458	0761245	--	1986	1,168	24	--	1,170.31	20.3	09-19-89	--	Test well for gasoline spill.
369	--	423551	0761235	Turner Veterinarian	--	1,163	55	--	1,167.67	22.17	03-28-90	--	0-55 ft sand and gravel.
370	MW-4	423613	0761207	Murray Center	02-25-87	1,154	42	42	1,156.64	25.5	02-25-87	--	0-42 sand and gravel, 42 ft shale.
371	--	423602	0761225	Wright	--	1,170	65	25	--	--	--	--	0-25 gravel hardpan, 25-65 ft shale.
372	--	423617	0761254	Hart	--	1,220	195	108	--	--	--	--	0-25 gravel hardpan, 25-38 coarse gravel, 38-68 gravel hardpan, 68-108 gray hardpan, till?, 108-195 ft gray shale.
373	--	423632	0761116	Cortland Hospital	09-07-78	1,121	42	--	1,120.84	10.27	03-28-90	556	0-42 ft sand and gravel.
375	--	423434	0761433	Petrella	--	1,260	115	15	--	--	--	--	0-15 sand and gravel, 15-115 ft shale.
376	--	423411	0761408	Space	--	1,230	52	--	--	--	--	--	0-30 sand and gravel, 30-49 clay and sand, 49-52 ft gravel.
377	--	423512	0761407	Miller	--	1,245	76	21	--	--	--	--	0-15 hardpan gravel, 15-21 gray hardpan gravel (till?), 21-76 ft shale.
378	NW-5D	423423	0761328	Smith Corona Corp.	12-11-86	1,176	69	--	1,179.07	13.8	12-11-86	--	0-78 sand and gravel, 78-80 ft fine sand with little silt.
379	MW-4D	423424	0761313	Smith Corona Corp.	11-21-86	1,208	102	--	1,211.01	47.3	12-03-86	--	0-102 ft sand and gravel.
380	92-1A	423426	0761319	Cortland County	09-26-92	1,192	54	--	1,194.93	27.37	10-06-92	100	0-54 ft sand and gravel.
381	92-1B	423426	0761319	Cortland County	09-26-92	1,192	212	245	1,193.40	27.6	10-06-92	--	0-106 sand and gravel, 106-110 till, 110-175 varved silt and clay, 175-216 sand and gravel, 216-220 silt and clay, 220-245 sand and gravel, 245 ft bedrock (siltstone).
382	--	423232	0761412	Jacobs	--	1,410	100	22	--	--	--	--	0-15 till, 15-22 till and weathered shale, 22-100 ft shale.
383	--	423302	0761436	Williams	09-03-87	1,290	74	--	--	--	--	10	0-16 gravel, 16-48 sand and gravel, 48-72 dry gravel, 72-75 ft gravel.
384	--	423507	0761207	Tutino	--	1,160	45	--	--	--	--	--	0-20 gravel, 20-30 gravel and sand, 30-45 ft gravel.
385	--	423343	0761453	Baker, J.	--	1,190	75	75	--	7	03-31-60	--	0-75 sand and gravel, 75 ft shale.
386	--	423537	0760912	ETL Corp.	07-29-80	1,102	40	--	--	--	--	--	0-20 sand and gravel, 20-25 fine to medium sand, 25-45 sand and gravel, 45-47 fine to coarse sand, 47-56 sand and gravel, 56-106 ft silt, tr clay, very fine sand.
387	--	423439	0761447	Shedd	--	1,360	205	21	--	--	--	--	0-21 till, 21-205 ft shale.
388	--	423441	0761409	Space	--	1,215	330	59	--	--	--	--	0-25 gravel, 25-30 hardpan-gravel, 30-49 clay and sand, 49-52 gravel, 52-59?, 59-330 ft shale.
389	91-2	423524	0761409	Cortland County	05-14-91	1,250	22	33	1,251.95	14.3	05-14-91	--	0-28 sand and gravel, 28-33 till, 33 ft shale.
390	--	423512	0761326	--	--	1,205	198	--	--	53	05-15-86	--	--
391	--	423510	0761323	--	--	1,205	67	--	--	47	06-01-86	--	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
392	Well 2	423417	0761321	Smith Corona Corp.	12-15-74	1,212	100	--	--	42.1	12-31-74	1,060	0-70 sand and gravel, 70-100 coarse sand, 100-102 ft clay and gravel.
393	B-1	423520	0761302	Town of Cortlandville	07-01-86	1,158	72	--	--	8.5	07-01-86	--	Test boring. 0-71.5 ft sand and gravel.
394	--	423530	0761253	Cummins	--	1,260	32	--	--	--	--	--	0-32 ft sand and gravel.
395	--	423338	0761302	Bliss	--	1,275	44	29	--	--	--	--	0-5 Topsoil, 5-14 till, 14-28 fine sand, 28-29 sand and gravel, water bearing, 29-44 ft shale.
396	MW-3	423404	0761327	Smith Corona Corp.	1986	1,226	83	--	1,228.06	56.2	12-09-86	--	--
397	--	423520	0760840	Cortland County	07-08-80	1,094	19	--	1,097.45	9	07-08-80	--	0-25 sand and gravel, 25-28 fine to medium sand, 28-47 medium to very coarse sand with gravel, 47-50 clay and gravel, 50-99 ft varved silt and clay.
398	MW-13	423421	0761320	Smith Corona Corp.	09-23-92	1,210	124	--	--	--	--	--	0-104 sand and gravel, 104-107 pebbly sand, 107-110 silty gravel or till, 110-112 silty gravel, 112-116?, 116-120 silt and sand, 120-124 pebbles, 125 ft till.
399	C-15	423611	0761030	Beaudry Wall Paper	--	1,110	82	--	--	--	--	275	--
400	--	423424	0761303	Walmart	--	1,201	75	--	1,202.98	35.23	05-29-91	--	Well destroyed. Former Exxon well.
401	MW-2	423427	0761256	Walmart	02-26-91	1,199	40	--	1,201.23	34.77	05-29-91	--	0-46 ft sand and gravel.
402	MW-1	423428	0761250	Walmart	02-25-91	1,199	37	--	1,201.86	28.5	02-26-91	--	0-40 ft sand and gravel.
403	CT-3D	423518	0761104	Cortland County	10-03-75	1,138	54	--	1,139.37	8.79	12-03-75	--	0-5 fill, 5-30 gravel, 30-35 silty gravel, 35-40 pebbly sand, 40-50 sand and gravel, 50-55 medium to coarse sand, 55-60 sand and gravel, 60-70 fine sand and clay.
404	MW-1	423612	0761208	Murray Center	03-09-87	1,155	34	--	1,156.18	24.9	03-09-87	--	0-34 sand and gravel, 34-37 ft silt and fine sand.
406	CT-6S	423433	0761333	Cortland County	10-22-75	1,173	26	--	1,172.82	10.54	12-03-75	--	--
407	--	423716	0760922	Yellow Lantern	04-06-72	1,105	30	--	--	5	04-26-72	--	0-10 topsoil, 10-22 sandy clay and gravel, 22-25 cemented gravel, 25-30 sand and gravel, 30 ft clay.
408	--	423726	0760925	Sun Pipe Line	04-21-69	1,140	39	--	--	20	04-21-69	--	0-10 gravel, 10-39 ft sand and gravel.
410	91-6S	423528	0761102	Cortland County	10-01-91	1,134	30	--	1,136.64	15.6	10-01-91	--	0-44 ft sand and gravel.
411	--	423709	0761142	--	--	1,150	61	--	--	--	--	--	Finished in sand and gravel.
412	--	423709	0761139	--	--	1,145	121	--	--	--	--	--	Finished in confined sand and gravel aquifer.
413	--	423711	0761137	Edlund	06-09-69	1,138	136	--	--	--	--	--	100-136 ft sand and gravel.
414	C-17	423536	0761024	Cobaco Baking Co.	--	1,122	103	--	--	--	--	--	0-35 sand and gravel, 35-96 silty sand, 96-103 ft hardpan or gravel.
415	--	423504	0761016	Wilcox	--	1,285	75	43	--	--	--	--	43-75 ft shale.
416	--	423635	0760959	--	--	1,102	112	--	--	--	--	--	Test boring. 0-54 sand and gravel, 54-93 silt, 93-108 fine sand and silt, 108-112 ft silt with some sand and gravel.
417	--	423634	0760958	--	--	1,102	112	--	--	--	--	--	Test boring. 0-53 sand and gravel, 53-83 silt, 83-97 sand, with some gravel, 97-102 sand and silt, 102-108 sand, 108-112 ft silt and sand.
418	--	423631	0760944	--	--	1,090	43	--	--	--	--	--	Test boring. 0-18 sand and gravel, 18-28 fine to coarse sand, 28-43 ft sand and gravel.
419	Yaman A	423635	0760926	Cortland County	07-10-80	1,100	24	33	1,101.22	9.84	06-28-90	--	0-10 gravel, 10-11 clay, 11-13 gravel, 13-18 coarse sand and fine gravel, 18-25 clayey sand and gravel, 25-27 medium sand, 27-33 till, 33 ft shale.
420	Yaman B	423636	0760929	Cortland County	07-11-80	1,105	28	--	1,106.64	8.2	05-28-91	--	0-28 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
421	Well D	423320	0761512	Tunison Fish Hatchery	08-10-62	1,110	126	--	--	-3.0	08-10-62	--	0-20 clay and gravel, 20-27 coarse sand, 27-29 clay and gravel, 29-32 coarse sand, 32-44 fine sand, 44-60 clay, 60-70 clay and gravel, 70-73 gravel, 73-103 clay and gravel, 103-127 sand and gravel, 127-130 ft clay and gravel.
422	W-9	423534	0761021	Blasland & Bouck	02-20-91	1,122	73	--	1,123.57	12.0	05-10-91	--	0-3 fill, 3-17 medium to coarse sand with some gravel, 17-32 sand and gravel, 32-42 fine sand with some silt and gravel, 42-49 sand and gravel, 96-98 ft medium to coarse sand with some gravel.
423	W-15	423534	0761029	Blasland & Bouck	12-30-91	1,123	90	--	1,125.02	13.7	02-10-92	--	0-10 fill, 10-15 sand and gravel, 15-44 fine to coarse sand with little gravel, 44-58 sand and gravel, 58-77 fine sand and silt, 77-90 ft fine to coarse sand with some silt.
424	W-12	423533	0761035	Blasland & Bouck	02-06-91	1,126	50	--	1,127.63	13.3	05-10-91	--	0-35 medium to coarse sand with some gravel, 35-38 sand and gravel, 38-48 medium sand with some gravel, 48-60 ft fine sand.
425	W-11	423534	0761029	Blasland & Bouck	02-04-91	1,123	52	--	1,124.47	11.7	05-22-92	--	0-16 fine to coarse sand with some gravel, 16-30 sand and gravel, 30-50 fine to coarse sand with little gravel, 50-56 silt and sand, 56-58 ft fine sand.
426	W-14	423529	0761037	Blasland & Bouck	02-27-91	1,131	69	--	1,132.19	6.7	02-27-91	--	0-4 fill, 4-6 silt, 6-24 fine to coarse sand with some gravel, 24-29 gravelly silt, 29-39 sand and gravel, 39-70 medium to coarse sand with some gravel, 70-74 sand and gravel, 74-84 ft medium to coarse sand with some gravel.
427	B-5	423531	0761026	Blasland & Bouck	01-30-91	1,126	95	--	--	8.0	01-30-91	--	0-3 fill, 3-8 gravelly silt, 8-28 medium to coarse sand with some gravel, 28-42 sand and gravel, 42-80 medium sand with some gravel, 80-88 sand and gravel, 88-95 ft till.
428	TH-1	423551	0761149	City of Cortland	08-14-79	1,132	55	100	1,134.18	2.8	03-28-90	--	0-60 sand and gravel, 60-100 silt, 100 ft bedrock.
429	91-6D	423528	0761102	Cortland County	10-01-91	1,134	198	270	1,136.99	14.25	10-01-91	--	0-44 sand and gravel, 44-58 silty very fine sand, 58-65 silt and clay, 65-115 silt and very fine sand, 115-150 clay and silt, 150-182 very fine sand, 182-254 sand and gravel, 254-270 till, 270 ft shale.
430	91-1	423542	0760957	Cortland County	01-10-91	1,114	313	313	1,117.22	14.6	01-10-91	--	0-64 sand and gravel, 64-138 silt and clay, 138-149 sand and gravel, 149-180 sand, 180-227 sand and gravel, 227-234 silt and sand, 234-280 pebbly sand, 280-313 gravel, 313 ft bedrock.
431	B-2	423510	0761257	Town of Cortlandville	07-08-86	1,158	96	--	--	8.5	07-08-86	--	0-80 sand and gravel, 80-85 fine to medium sand, 85-90 silt and sand, 90-96 ft fine to medium sand.
432	C-104	423351	0761352	Town of Cortlandville	02-16-88	1,197	90	--	1,198.11	31	05-18-88	1,330	Public water-supply well. 0-90 ft sand and gravel.
434		423420	0761320	Smith Corona Corp.	10-20-89	1,208	92	--	--	--	--	975	Recovery well for TCE. 0-92 ft sand and gravel.
435		423424	0761404	Monarch Tool Corp.	--	1,259	87	--	--	46	08-02-67	150	Drawdown = 29 ft.
446	W2	423647	0761103	Cortland County Highway Department	05-12-86	1,114	14	--	1,115.84	6.7	05-30-91	--	Oil in well
447	28-29b	423738	0761039	N.Y. State Dept.. of Transportation.	--	1,116				--	--		0-40 sand and gravel, 40-52 silt, 52-61 till, 61-68 ft shale.
448	MW-7	423419	0761319	Smith Corona Corp.	12-09-86	1,212	57		1,213.51	47.04	06-11-87	--	0-57 ft sand and gravel
449		423432	0761332	Jebbet		1,172	--	--	--	--	--	--	

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area

[--, no data available; <, less than. All values are in milligrams per liter unless otherwise noted; µS/cm, microsiemens per centimeter. Well locations shown on pl. 1].

A. APRIL 1990 (analyses by Chemistry Department at State University of New York at Cortland)

Well no.	Well depth (feet)	Date (m/d)	Alkalinity	pH, field (units)	Specific conductance, field (µS/cm)	Phosphorus, total	Nitrate, total	Chloride, total	Sodium, total	Potassium, total	Magnesium, total	Calcium, total	Total recoverable (µg/L) Lead	Iron	Copper	Manganese	Zinc
5	36	04/04	185	7.78	513	0.06	6.0	21	12	1.0	13	78	<500	4400	<50	70	40
11	81	04/05	229	7.53	842	0.53	6.0	108	48	2.2	19	97	<500	6100	<50	70	30
22	45	04/03	173	7.45	610	0.03	4.5	69	34	1.9	12	76	<500	600	<50	<30	0
39	143	04/04	111	8.43	258	0.68	0.80	17	8	0.9	24	80	<500	28,500	<50	800	9,500
40	44	04/04	62	8.00	257	0.18	2.2	30	16	1.4	4.2	32	<500	900	<50	<30	80
47	49	04/05	190	7.76	470	1.29	6.3	27	13	0.9	14	80	<500	<200	<50	<30	60
48	25	04/05	194	7.50	514	0.82	6.6	37	19	0.9	13	82	<500	<200	<50	<30	40
105	59	04/05	168	--	--	0.84	4.6	43	17	1.4	14	77	<500	<200	<50	<30	60
106	75	04/03	139	--	--	0.06	5.7	30	8	1.6	9.4	63	<500	37,300	<50	600	800
108	38	04/03	174	7.50	330	0.02	3.0	29	12	1.2	16	72	<500	<200	<50	<30	1,300
110	100	04/03	239	7.56	623	0.02	2.6	35	12	0.8	25	87	<500	<200	<50	<30	2,000
114	--	04/05	216	7.68	539	0.01	2.4	36	16	1.3	16	87	<500	3400	<50	<30	40
121	32	04/04	219	7.61	673	0.82	5.7	56	27	1.8	17	92	<500	2400	<50	<30	40
170	--	04/03	131	--	--	0.13	4.1	50	26	2.6	24	89	<500	16,900	<50	1,000	50
172	69	04/05	196	--	--	0.43	4.8	28	17	1.0	15	79	<500	<200	<50	<30	50
177	92	04/06	190	7.74	1,440	0.65	4.8	274	204	1.8	16	89	<500	1400	70	<30	70
204	42	04/04	192	7.70	513	1.03	8.6	26	14	0.9	15	73	<500	<200	<50	<30	80
205	26	04/05	231	--	--	0.57	3.9	59	31	2.1	16	89	<500	<200	<50	<30	100
210	45	04/03	220	7.64	518	0.05	3.7	15	6	0.8	18	82	2,300	23,000	70	200	9,200
280	34	04/06	222	7.69	802	0.15	4.6	104	45	2.6	22	110	<500	21,400	<50	300	30
303	28	04/06	164	7.30	668	0.65	4.6	93	46	2.5	11	78	<500	16,500	<50	<30	1,300
304	23	04/04	196	7.68	550	0.55	12.0	31	15	1.1	15	79	<500	<200	<50	<30	20
306	255	04/04	168	8.10	412	0.30	1.4	28	6	1.0	25	80	<500	19,100	<50	300	9,800
307	32	04/03	73	7.44	323	0.04	1.8	43	23	2.0	5.8	38	<500	500	<50	<30	3,300
317	68	04/05	184	--	--	0.56	5.3	31	16	1.0	13	73	<500	<200	<50	<30	20
320	90	04/03	129	7.93	344	0.02	0.76	11	5	0.6	12	49	<500	600	<50	<30	20
330	15	04/05	247	7.25	787	1.14	5.9	80	39	2.7	14	105	<500	<200	<50	<30	30

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N. Y. study area (continued)

A. April 1990 (continued)

Well no.	Well depth (feet)	Date (m/d)	Alkalinity	pH, field (units)	Specific conductance, field (µS/cm)	Phosphorus, total	Nitrate, total	Chloride, total	Sodium, total	Potassium, total	Magnesium, total	Calcium, total	Total recoverable (µg/L) Lead	Iron	Copper	Manganese	Zinc
343	--	04/05	195	--	--	0.65	5.6	37	16	1.1	14	76	<500	<200	<50	<30	0
346	24	04/06	253	7.60	814	1.26	2.2	61	46	3.1	41	241	1,400	46,500	150	3,400	200
347	--	04/05	157	--	--	0.71	0.	34	22	1.5	13	52	<500	1,100	<50	<30	200
348	73	04/03	176	--	--	0.15	8.1	19	28	8.3	124	780	<500	2,200	<50	5,700	100
349	65	04/04	210	--	--	0.64	7.4	24	15	2.9	138	572	<500	21,400	<00	4,,100	200
351	55	04/04	146	--	--	0.28	1.5	61	28	1.9	13	63	<500	2,100	70	90	400
352	55	04/03	154	--	--	0.33	2.5	107	37	1.7	12	70	<500	400	<50	<30	100
353	--	04/06	186	--	--	0.33	4.0	38	23	1.2	14	72	<500	8,200	<50	<30	500
354	--	04/06	160	--	--	0.56	3.4	48	26	1.4	11	68	<500	<200	<50	<30	20
355	63	04/03	163	--	--	0.01	2.8	45	27	1.4	10	69	<500	<200	<50	<30	0
356	57	04/05	196	7.63	589	0.48	4.5	44	29	1.3	15	72	<500	<200	<50	<30	20
357	48	04/05	196	7.57	533	0.12	5.1	26	13	0.90	15	79	<500	<200	<50	<30	0
358	35	04/05	203	--	--	0.40	4.5	31	17	1.1	14	79	<500	<200	<50	<30	50
359	23	04/03	122	--	--	0.05	3.2	66	39	1.9	7.8	53	<500	25,700	70	400	4,400
360	--	04/03	90	--	--	0.08	0.26	5	7	1.3	3.2	47	1,200	60,500	70	1,000	3,200
361	25	04/05	194	7.61	608	0.92	4.1	49	32	1.3	13	78	<500	<200	<50	<30	10
362	67	04/05	203	--	--	1.09	4.3	36	22	1.3	15	81	<500	2200	80	<30	400
363	63	04/03	198	--	--	0.85	5.3	56	24	1.6	15	75	<500	<200	<50	<30	40
364	35	04/04	152	--	--	0.44	0.24	42	20	1.5	14	74	<500	3600	<50	<30	10
365	14	04/03	248	--	--	0.12	0.44	90	46	2.7	26	122	<500	29,200	130	400	300
366	--	04/05	227	--	--	0.68	5.1	101	46	1.6	15	88	<500	<200	<50	<30	20
368	--	04/03	265	--	--	0.09	3.2	232	144	4.7	25	141	<500	19,400	80	500	200
375	--	04/05	187	--	--	0.47	7.2	23	11	0.90	12	79	<500	<200	<50	<30	20
376	--	04/03	137	--	--	0.50	0.	19	51	0.15	1.8	0.1	<500	<200	<50	<30	0
403	54	04/06	192	7.71	638	0.29	4.9	68	35	2.6	11	83	<500	<200	<50	<30	300
406	26	04/03	128	7.66	498	0.05	2.3	19	10	1.0	20	70	<500	6,800	100	1,000	7,800
420	--	04/06	238	7.55	616	0.18	5.5	33	16	1.3	16	91	<500	5,100	<50	<30	20
449	--	04/04	152	--	--	0.56	3.7	16	7	0.70	13	61	<500	<200	<50	<30	30
450	--	04/03	139	--	--	0.40	1.8	61	48	2.1	14	64	<500	19,500	<50	1,000	100

Appendix 2.--Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, New York study area, September 1990.

[--, indicates no data available; <, less than; all values are in milligrams per liter unless otherwise noted; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; well locations shown on pl. 1].

B. SEPTEMBER 1990 (Analyses by the U.S. Geological Survey National Water Quality Laboratory)

					Dissolved, in milligrams per liter										
Well number	Well depth (feet)	Date m/d	Specific conduct-ance (µS/cm)	pH (units)	Alkalinity	Nitrite plus nitrate as N	Phos-phorus, ortho as P	Cyanide	Calcium	Magne-sium	Sodium	Chloride	Sulfate	Fluoride	Silica
5	40	09/19	--	--	224	9.9	<0.01	--	--	--	--	40	19	0.1	--
11	81	09/19	--	--	223	5.0	<0.01	--	--	--	--	79	24	0.1	--
22	45	09/20	631	7.8	189	7.6	<0.01	--	79	13	34	--	--	--	6.3
48	25	09/17	568	7.5	220	6.4	<0.01	<0.01	87	14	16	--	--	--	7.4
105	59	09/17	554	7.8	175	4.9	<0.01	--	76	14	18	--	--	--	7.3
106	75	09/19	--	--	166	6.9	<0.01	--	--	--	--	21	17	0.1	--
108	38	09/17	--	--	300	6.0	<0.01	--	--	--	--	38	25	0.1	--
121	32	09/20	546	7.7	181	5.9	<0.01	--	75	14	20	--	--	--	7.2
172	69	09/18	559	7.6	206	5.3	<0.01	--	79	15	14	--	--	--	7.4
177	92	09/19	1,390	7.8	200	4.1	<0.01	--	74	14	170	--	--	--	7.5
204	46	09/17	--	--	197	4.6	<0.01	--	--	--	--	30	24	0.1	--
207	53	09/17	--	--	151	8.3	<0.01	--	--	--	--	29	23	0.1	--
210	45	09/17	413	7.7	--	--	--	--	61	14	4.8	--	--	--	7.5
280	34	09/19	807	7.7	204	4.7	<0.01	--	87	17	56	--	--	--	7.8
303	28	09/17	--	--	214	3.7	<0.01	--	--	--	--	72	25	0.1	--
304	23	09/17	--	--	226	4.0	<0.01	--	--	--	--	34	23	0.1	--
317	68	09/18	558	7.6	205	5.7	<0.01	--	78	15	14	--	--	--	7.6
320	90	09/20	363	8.0	140	1.7	<0.01	--	53	13	4.8	--	--	--	8.7
321	80	09/17	3,850	7.2	271	3.0	<0.01	--	230	39	530	--	--	--	10
330	15	09/17	651	7.4	218	6.5	<0.01	<0.01	89	12	31	--	--	--	6.8

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N. Y. study area (continued)

B. SEPTEMBER 1990 continued.

Well number	Dissolved, in micrograms per liter																
	Arsenic	Barium	Beryl-ium	Cadm-ium	Chrom-ium	Cobalt	Copper	Iron	lead	Mang-anese	Molyb-denum	Nickel	Silver	Stron-tium	Vanad-ium	Zinc	Lithium
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22	--	58	<0.5	<1	<5	<3	<10	33	<10	17	<10	<10	<1	110	<6	4	7
48	<1	29	<0.5	<1	<5	<3	<10	6	<10	1	<10	<10	<1	110	<6	24	7
105	--	49	<0.5	<1	<5	<3	<10	3	<10	2	<10	<10	<1	110	<6	62	8
106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
108	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
121	--	66	<0.5	<1	<5	<3	<10	13	<10	12	<10	<10	<1	120	<6	15	13
172	--	61	0.8	<1	<5	<3	<10	23	<10	15	<10	<10	<1	110	<6	36	9
177	--	57	<0.5	<1	<5	<3	20	12	<10	6	<10	<10	<1	140	<6	35	14
204	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
210	--	73	<0.5	<1	<5	<3	<10	12	<10	42	<10	<10	<1	92	<6	430	7
280	--	87	<0.5	<1	<5	<3	<10	37	<10	2	<10	<10	<1	140	<6	7	10
303	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
304	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
317	--	63	<0.5	<1	<5	<3	50	14	<10	11	<10	<10	<1	100	<6	4	9
320	--	71	<0.5	<1	<5	<3	<10	4	<10	4	<10	<10	<1	91	<6	5	10
321	--	290	2.0	3	15	9	30	11	30	4	30	30	4	400	18	9	23
330	<1	35	<0.5	<1	<5	<3	<10	10	<10	2	<10	<10	<1	120	<6	28	6

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area (continued).

B. SEPTEMBER 1990 continued.

					Dissolved, in milligrams per liter										
Well number	Well depth (feet)	Date mo/d	Specific conduct-ance (µs/cm)	pH (units)	Alkalinity	Nitrite plus nitrate as N	Phor-phous, ortho as P	Cyanide	Calcium	Magne-sium.	Sodium	Chloride	Sulfate	Fluoride	Silica
332	34	09/18	815	7.7	230	0.7	<0.01	--	100	18	35	--	--	--	8.3
333	55	09/18	565	7.7	211	4.2	<0.01	--	77	16	16	--	--	--	7.8
335	34	09/18	854	7.7	255	5.1	<0.01	--	91	18	59	--	--	--	8.5
337	42	09/19	533	7.6	201	6.5	<0.01	<0.01	81	14	11	--	--	--	7.4
338	217	09/19	288	8.9	104	0.1	<0.01	--	13	6	42	--	--	--	0.55
339	35	09/18	584	7.7	200	5.4	<0.01	--	83	14	20	--	--	--	6.5
340	35	09/19	763	7.8	224	3.6	<0.01	--	98	17	34	--	--	--	8.7
341	137	09/19	716	8.0	111	0.1	<0.01	--	32	14	86	--	--	--	1.4
342	52	09/17	610	7.8	176	3.7	0.02	--	72	14	33	--	--	--	7.6
343	24	09/20	662	7.8	252	0.7	<0.01	<0.01	89	19	22	--	--	--	7.8
346	24	09/19	823	7.5	225	1.6	<0.01	--	92	16	52	--	--	--	8.5
347	--	09/20	--	--	193	2.8	<0.01	--	--	--	--	--	--	--	--
348	73	09/18	492	7.9	174	--	--	--	--	--	--	--	--	--	--
349	65	09/18	571	7.7	211	--	--	--	--	--	--	--	--	--	--
351	55	09/20	594	7.8	--	--	--	--	77	13	23	--	--	--	6.4
352	55	09/20	613	7.9	--	--	--	--	56	13	44	--	--	--	3.9
355	63	09/19	505	7.9	158	3.3	<0.01	--	61	10	24	--	--	--	5.7
356	58	09/18	--	--	199	4.0	<0.01	--	--	--	--	--	--	--	--
357	48	09/18	--	--	197	5.3	<0.01	--	--	--	--	--	--	--	--
358	35	09/18	--	--	231	4.4	<0.01	--	--	--	--	--	--	--	--
362	67	09/20	614	7.6	--	--	--	--	79	15	21	--	--	--	7.3
363	63	09/20	--	--	194	4.6	<0.01	--	--	--	--	57	23	0.1	--
364	35	09/20	633	7.7	199	4.7	<0.01	--	83	16	23	--	--	--	7.2
365	14	09/17	820	6.9	312	0.3	<0.01	--	110	17	45	--	--	--	14
366	----	09/20	--	--	209	3.5	<0.01	--	--	--	--	70	22	0.1	--
367	----	09/20	--	--	200	5.5	<0.01	--	--	--	--	--	--	--	--
368	----	09/17	1130	7.2	--	--	--	--	100	14	110	--	--	--	6.9

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area (continued).

B. SEPTEMBER 1990, continued.

	Dissolved, in micrograms per liter																
Well number	Arsenic	Barium	Beryl-ium	Cadm-ium	Chrom-ium	Cobalt	Copper	Iron	lead	Mang-anese	Molyb-denum	Nickel	Silver	Stron-tium	Vanad-ium	Zinc	Lithium
332	--	75	<0.5	<1	<5	<3	<10	10	<10	790	<10	<10	<1	200	<6	9	16
333	--	50	<0.5	<1	<5	<3	<10	32	<10	250	<10	<10	<1	110	<6	3	9
335	--	69	<0.5	<1	<5	<3	<10	95	<10	270	<10	<10	<1	170	<6	13	11
337	<1	53	<0.5	<1	<5	<3	<10	19	<10	26	<10	<10	<1	110	<6	3	7
338	--	120	<0.5	<1	<5	<3	<10	41	<10	33	<10	<10	<1	400	<6	5	29
339	--	38	<0.5	<1	<5	<3	<10	15	<10	12	<10	<10	<1	120	<6	6	5
340	--	72	<0.5	<1	<5	<3	<10	9	<10	64	<10	<10	<1	150	<6	7	10
341	--	210	<0.5	<1	<5	<3	<10	62	<10	65	<10	<10	<1	390	<6	9	240
342	--	42	<0.5	<1	<5	<3	<10	280	<10	200	<10	<10	<1	110	<6	15	9
343	<1	62	<0.5	<1	<5	<3	<10	5	<10	580	<10	<10	<1	150	<6	16	8
346	--	87	<0.5	<1	<5	<3	<10	17	<10	94	<10	<10	<1	130	<6	8	10
347	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
348	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
349	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
351	--	51	<0.5	<1	<5	<3	<10	6	<10	3	<10	<10	<1	110	<6	72	8
352	--	47	0.6	<1	<5	<3	<10	18	<10	27	<10	<10	<1	100	<6	91	8
355	--	43	<0.5	<1	<5	<3	<10	7	<10	1	<10	<10	<1	85	<6	11	7
356	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
357	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
358	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
362	--	59	<0.5	<1	<5	<3	<10	580	<10	14	<10	<10	<1	110	<6	120	11
363	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
364	--	61	<0.5	<1	<5	<3	<10	730	<10	20	<10	<10	<1	120	<6	4	9
365	--	150	<0.5	<1	<5	<5	40	7900	30	3600	<10	<10	<1	190	<6	210	12
366	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
367	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
368	--	71	0.5	2	<5	<3	<10	17	<10	4	<10	<10	<1	150	<6	8	9

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area.

[Analyses by the U.S. Geological Survey National Water Quality Laboratory; --, no data available; <, less than; Well locations shown on pl 1]

				Concentration (total), in micrograms per liter										
Well number	Well depth (feet)	Sample date yr/mo/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
1	--	90/04/05	--	--	--	0.25	--	--	--	--	--	--	--	--
11	81.0	90/04/05	--	<0.20	0.40	2.0	<0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--
		90/09/19	--	--	0.04	1.4	--	--	--	--	--	--	--	--
22	45.0	90/04/03	--	<0.20	11.0	0.20	<0.20	<0.2	<0.2	<0.2	<0.2	<0.2	5.9	--
		90/09/20	--	--	14.6	0.05	--	--	--	--	--	--	--	3.50
		93/04/27	--	--	6.2	--	--	--	--	--	--	--	--	--
105	59.0	90/04/05	--	--	82.8	--	--	--	--	--	--	--	--	23.8
		90/09/17	--	--	53.9	--	--	--	--	--	--	--	--	16.8
		93/04/27	--	--	54.0	0.01	--	--	--	--	--	--	--	25.0
121	32.0	90/04/04	--	--	101	--	--	--	--	--	--	--	--	34.5
		90/09/20	--	--	66.8	0.20	--	--	--	--	--	--	--	21.0
		93/04/27	--	--	75.0	0.60	--	--	--	--	--	--	--	32.0
172	77.0	90/04/05	--	--	0.02	1.2	0.10	--	--	--	--	--	--	0.20
		90/10/02	--	--	--	0.60	--	--	--	--	--	--	--	--
		90/10/15	--	--	11.4	--	--	--	--	--	--	--	--	0.60
177	92.5	90/04/06	--	0.25	--	--	--	--	0.2	--	--	--	0.3	--
204	46.5	90/04/04	--	--	2.30	0.40	--	--	--	--	--	--	--	1.10
		90/09/17	--	--	1.90	0.30	--	--	--	--	--	--	--	0.80
		93/04/27	--	--	3.4	0.60	--	--	--	--	--	--	--	2.10
205	26.0	90/04/05	--	--	7.00	--	--	--	--	--	--	--	--	1.80
		90/09/17	--	--	24.2	--	--	--	--	--	--	--	--	10.0
		93/04/27	--	--	4.80	0.06	--	--	--	--	--	--	--	1.00
280	34.0	90/04/06	--	--	--	1.6	0.20	0.4	--	--	--	--	--	0.10
		90/09/19	--	--	--	1.5	--	--	--	--	--	--	--	--
304	23.0	90/04/04	--	--	2.70	0.20	--	--	--	--	--	--	--	0.40
		90/09/17	--	--	2.60	1.0	--	--	--	--	--	--	0.2	0.50
		93/04/27	--	--	2.3	0.40	--	--	--	--	--	--	--	0.50
317	68.0	93/04/27	--	--	0.40	0.30	--	--	--	--	--	--	--	0.95
320	90.0	90/09/20	--	--	0.10	--	--	--	--	--	--	--	--	1.20
330	15.0	90/04/05	--	--	--	0.10	2.4	--	0.8	--	--	--	1.0	--
		90/04/05	--	--	--	0.10	2.4	--	0.8	--	--	--	1.0	--
332	34.0	90/09/18	--	--	15.2	107	--	--	--	--	--	--	28.9	--

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Concentration (total), in micrograms per liter										
				Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
333	55.0	90/09/18	--	--	1.10	2.4	--	--	--	--	--	--	--	2.10
335	34.0	90/09/18	--	--	0.10	2.7	--	--	--	--	--	--	--	--
336	37.0	90/09/18	--	--	0.06	0.4	--	--	--	--	--	--	0.3	0.04
340	35.0	90/09/19	--	--	40.2	0.35	--	--	--	--	--	--	--	10.1
		93/04/27	--	--	21.0	0.20	--	--	--	--	--	--	--	5.40
341	137.0	90/07/19	17	0.07	15.9	--	4.0	--	--	--	--	--	--	--
		90/07/19	27	--	35.0	--	10.30	--	--	--	--	--	--	--
		90/07/19	37	--	31.3	--	6.30	--	--	--	--	--	--	--
		90/07/19	47	--	19.6	--	3.30	--	--	--	--	--	--	--
		90/07/19	57	--	13.8	--	3.10	--	--	--	--	--	--	--
		90/07/19	67	--	0.50	--	0.20	--	--	--	--	--	--	--
		90/09/19	--	--	0.04	--	--	--	--	--	--	--	--	0.04
		93/04/27	--	--	0.10	--	--	--	--	--	--	--	--	--
342	52.0	90/09/17	--	--	0.06	1.40	--	--	--	--	--	--	0.3	--
343	24.0	90/09/20	--	--	0.40	--	--	--	--	--	--	--	--	--
346	24.0	90/04/03	--	--	--	6.20	0.50	--	--	--	--	--	--	--
		90/04/06	--	--	--	11.5	1.10	1.4	0.2	--	--	--	--	--
		90/09/19	--	--	--	13.8	--	--	--	--	--	--	0.6	--
347	--	90/04/05	--	--	65.1	--	0.15	--	--	--	--	--	--	12.6
		90/09/20	--	--	30.5	0.10	--	--	--	--	--	--	--	6.90
		90/10/15	--	--	62.8	0.04	--	--	--	--	--	--	--	16.0
		90/11/24	--	--	63.2	--	--	--	--	--	--	--	--	11.3
		90/12/12	--	--	44.2	0.20	--	--	--	--	--	--	--	12.0
		93/04/27	--	--	57.0	0.50	--	--	--	--	--	--	--	20.0
		93/04/29	--	--	59.0	0.40	--	--	--	--	--	--	--	24.0
348	73.0	90/09/18	--	--	--	0.04	--	--	--	--	--	--	0.2	--
351	55.0	90/04/05	--	--	101	--	0.20	--	--	--	--	--	0.2	62.2
		90/09/20	--	--	53.0	0.20	--	--	--	--	--	--	--	35.0
		90/10/15	--	--	59.0	0.15	--	--	--	--	--	--	--	36.0
		90/11/24	--	--	62.0	--	--	--	--	--	--	--	--	33.0
		90/12/12	--	--	61.5	--	--	--	--	--	--	--	--	39.0
		93/04/27	--	--	36	0.20	--	--	--	--	--	--	--	4.80

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

				Concentration (total), in micrograms per liter										
Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
352	55.0	90/04/04	--	--	15.6	--	--	--	--	--	--	--	--	0.54
		90/09/20	--	--	9.50	0.05	--	--	--	--	--	--	--	0.40
352	55.0	93/04/27	--	--	12	0.06	--	--	--	--	--	--	--	0.90
353	--	90/04/05	--	--	17.2	3.20	1.10	--	--	--	--	--	--	8.50
		90/10/17	--	--	6.90	1.20	--	--	--	--	--	--	--	5.10
355	63.0	90/04/03	--	--	--	0.15	--	--	--	--	--	--	--	--
		90/09/19	--	--	0.20	--	--	--	--	--	--	--	0.3	0.40
356	57.6	90/04/05	--	--	--	6.50	0.60	--	--	--	--	--	--	0.40
		90/09/18	--	--	0.60	3.20	--	--	--	--	--	--	--	0.30
357	48.0	90/04/05	--	--	0.03	0.40	0.20	--	--	--	--	--	--	0.20
		90/09/18	--	--	0.04	0.50	--	--	--	--	--	--	--	0.03
358	35.5	90/04/05	--	--	0.95	1.50	0.20	--	--	--	--	--	--	0.22
		90/09/18	--	--	0.90	0.80	--	--	--	--	--	--	--	0.30
362	67.0	90/04/05	--	2.50	49.1	3.10	--	--	--	--	--	--	--	14.9
		90/09/20	--	3.10	43.2	6.50	--	--	--	--	--	--	--	12.50
		90/10/15	--	--	37.4	6.30	--	--	--	--	--	--	--	10.9
		90/11/26	--	1.00	38.0	2.20	--	--	--	--	--	--	--	13.9
		90/12/12	--	2.90	39.8	4.20	--	--	--	--	--	--	--	11.0
		93/04/29	--	--	36.0	2.40	--	--	--	--	--	--	--	14.0
363	63.0	90/04/05	--	--	45.9	--	--	--	--	--	--	--	--	18.2
		90/09/20	--	--	25.3	0.20	--	--	--	--	--	--	--	10.4
		90/10/15	--	--	30.6	0.50	--	--	--	--	--	--	--	11.0
		90/11/26	--	--	31.5	--	--	--	--	--	--	--	--	9.90
		90/12/12	--	--	31.3	0.60	--	--	--	--	--	--	--	11.5
364	63.0	93/04/29	--	--	26.0	0.40	--	--	--	--	--	--	--	13.0
		90/04/05	--	0.30	53.8	--	--	--	--	--	--	--	--	17.3
		90/09/20	--	--	37.3	0.20	--	--	--	--	--	--	--	15.4
		90/10/15	--	--	49.6	0.40	--	--	--	--	--	--	--	15.4
		90/11/26	--	--	45.0	--	--	--	--	--	--	--	--	12.6
		90/12/12	--	--	44.6	0.30	--	--	--	--	--	--	--	15.4

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

				Concentration (total), in micrograms per liter											
Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
365	14.0	90/04/03	--	--	--	0.50	0.30	0.2	4.5	2.0	--	--	--	--
		90/09/17	--	--	0.10	0.30	--	--	--	--	--	--	0.4	0.06
		90/10/17	--	--	--	--	--	2.1	42.5	5.3	--	--	--	--
366	--	90/09/20	--	0.50	0.80	0.40	--	--	--	--	--	--	--	--
367	--	90/04/04	--	--	50.3	--	--	--	--	--	--	--	--	6.90
		90/09/20	--	--	19.5	--	--	--	--	--	--	--	--	2.30
367	--	90/10/15	--	--	25.3	--	--	--	--	--	--	--	--	3.10
		90/11/24	--	--	27.4	--	--	--	--	--	--	--	--	--
		90/12/12	--	--	31.7	--	--	--	--	--	--	--	--	4.70
		93/04/28	--	--	31.0	--	--	--	--	--	--	--	--	3.90
368	24.0	90/04/03	--	--	--	--	--	--	0.4	--	--	--	--	--
		90/09/17	--	--	0.06	0.02	--	--	--	--	--	--	0.2	0.20
380	54.0	93/04/27	--	--	17.0	0.08	--	--	--	--	--	--	--	1.90
406	26.0	90/04/03	--	--	0.10	--	--	--	--	--	--	--	--	--
		93/04/27	--	--	4.80	0.06	--	--	--	--	--	--	--	10.0

Appendix 4 – Hydrogeology and Simulation of Groundwater Flow in a Glacial Aquifer System at Cortland County, New York (USGS, 2004)

USGS
science for a changing world

In Cooperation with Cortland County Soil and Water Conservation District

Hydrogeology and Simulation of Ground-Water Flow in a Glacial-Aquifer System at Cortland County, New York

The City of Cortland and surrounding communities obtain water from a highly productive glacial-aquifer system that underlies the western part of Cortland County (figs. 1 and 2). The study area encompasses about 12 square miles and includes the Otter Creek-Dry Creek valley and parts of the West Branch, East Branch, and Tioughnioga River valley and surrounds the bedrock hill (figs. 1 and 2) in Cortland upon which the State College campus stands.

This aquifer system has been designated as a "Primary Aquifer" by the New York State Department of Environmental Conservation and as a "Sole Source Aquifer" by the U.S. Environmental Protection Agency (EPA). The upper (unconfined) aquifer is highly permeable and close to land surface, which makes it highly susceptible to contamination. Potential sources of contamination include leaking petroleum-product storage tanks, leachate from landfills and septic systems, road-deicing salts, agricultural pesticides and fertilizers, and chemical spills (such as solvents and degreasers) at commercial and industrial facilities. Protection of this aquifer system from contamination is critical to ensure a safe drinking-water supply for the area.

In 1989, the U.S. Geological Survey (USGS), in cooperation with Cortland County Departments of Health and Planning, began a 3 1/2-year study to define the hydrogeology of the glacial aquifer. The results of the study were published in Miller and others (1998). This Fact Sheet summarizes the results of that study and depicts the stratigraphy and model-generated areas that contribute ground water to wells.

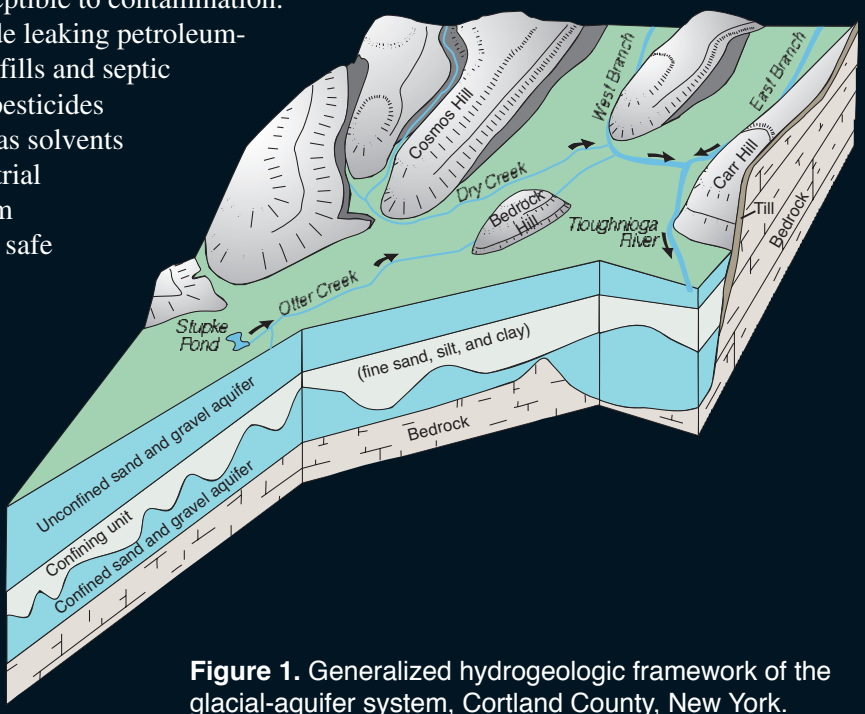

Figure 1. Generalized hydrogeologic framework of the glacial-aquifer system, Cortland County, New York.

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U.S. Department of the Interior
U.S. Geological Survey

Fact Sheet FS 054-03
April 2004

HYDROGEOLOGY OF THE GLACIAL-AQUIFER SYSTEM

The **glacial-aquifer**[1] system in the Cortland area is bounded laterally by **till**-covered bedrock hills and beneath by the bedrock valley floor (figs. 1 and 3). It consists of an **unconfined** sand and gravel **aquifer** 40 to 80 feet thick that overlies a **lacustrine confining layer** 1 to 155 feet thick that, in turn, overlies a **confined** sand and gravel **aquifer** that ranges from 1 to 170 feet thick (figs. 1 and 3). The **confining unit** impedes vertical movement of ground water between the upper and lower aquifers in the middle of the valley, but the two aquifers are connected in many places along the valley walls where the confining layer is absent (fig. 3).

[1]Boldface terms are explained in glossary



A supply well in Cortland aquifer

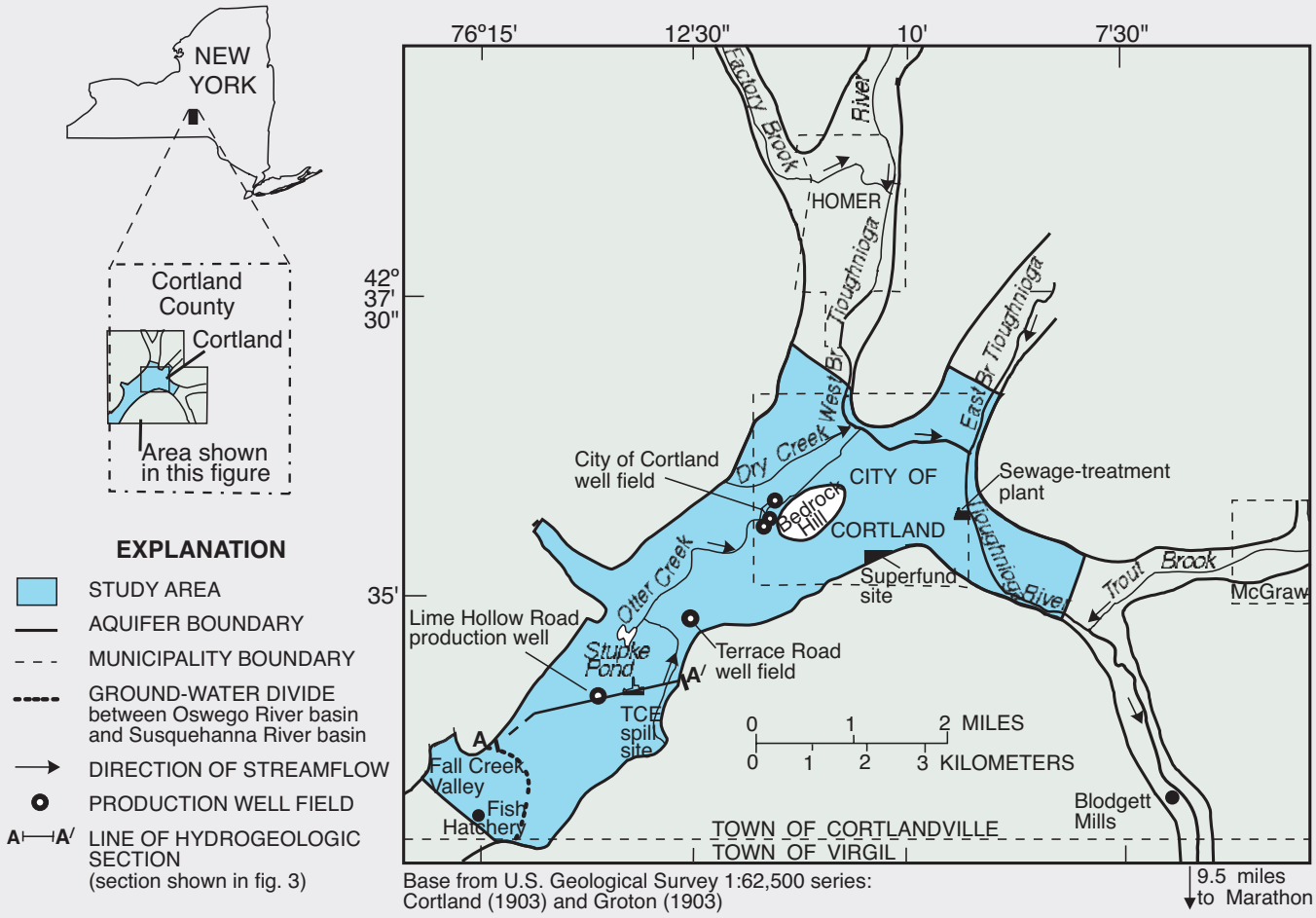


Figure 2. Location and principal features of study area, Cortland County, New York.

GLACIAL HISTORY

Glaciers covered central New York several times during the Ice Age, or Pleistocene Epoch, which began around 1.6 million years ago and ended when the ice left the New York area about 10,000 years ago. A major readvance (Valley Heads readvance) and standstill of the ice in central New York between 14,000 and 14,900 years ago resulted in the deposition of large amounts of sediment at the ice front. This material formed several types of deposits, one of which was a series of hummocky ridges that blocked several north-south-trending valleys. These ridges form a complex that extends across central New York and is known as the Valley Heads **Moraine**. Segments of the Valley Heads Moraine are found in the western part of the study area and in valleys to the north (fig. 4). The upper part of these segments consists of unsorted sediments, mainly coarse sand and gravel; the lower part consists of mostly fine-grained material such as till and lacustrine sand, silt, and clay (fig. 3).

The Valley Heads Moraine formed plugs in the major valleys; these plugs blocked the natural drainage and resulted in the formation of lakes. One such lake formed in the valleys of the Tioughnioga River basin. Upland streams and meltwaters from the glacier transported large amounts of sediment into the lake; the coarse-grained sediments (sand and gravel) settled near the water's edge, whereas the fine-grained sediments (very fine sand, silt, and clay particles) were carried farther out into the lake, where they settled to form lacustrine (lake-bottom) deposits. These lacustrine deposits typically range from 90 to 155 feet thick in the central parts of the valleys and pinch out along the valley edges (fig. 3). The lacustrine unit forms the bottom of the surficial (unconfined aquifer) and the top boundary of the confined basal aquifer in the study area (figs. 1 and 3).

The outlet of the lake (at Messengerville, fig. 4) was gradually lowered by erosion, and this lowering eventually allowed the lake to drain. Subsequent meltwater from the retreating ice developed a braided-stream system within the valleys, and large amounts of outwash sand and gravel (fig. 4) were deposited on top of the former lakebed (fig. 3). This outwash forms a wedge-shaped deposit that is more than 100 ft thick in the western part of the study area and thins eastward to the Tioughnioga River, where it is 35 to 45 feet thick. The outwash and morainal sediments form the highly permeable unconfined surficial aquifer in the Cortland area.

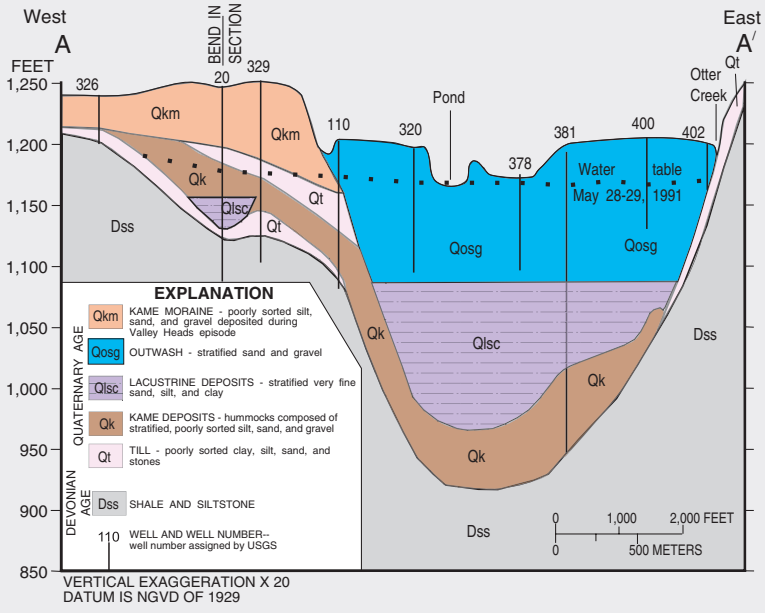


Figure 3. Hydrogeologic section A-A′ (Line of section shown in fig. 2).

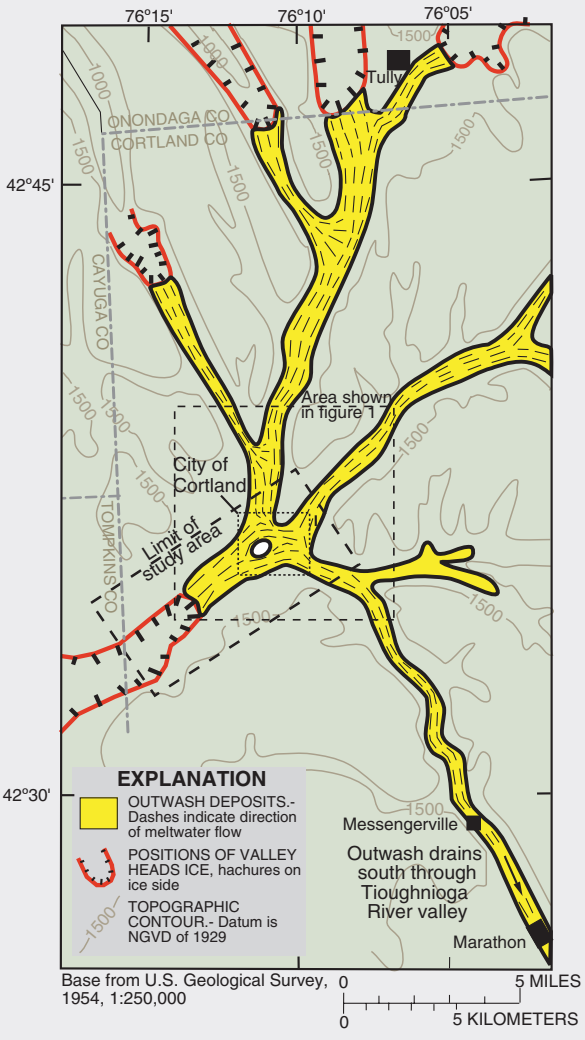


Figure 4. Positions of Valley Heads ice and of outwash deposits in the Tioughnioga River basin, Cortland County, New York.

AQUIFER RECHARGE AND DISCHARGE

The unconfined aquifer receives **recharge** from three sources under natural (nonpumping) conditions—(1) infiltration of precipitation that falls directly on the aquifer, (2) upland sources, such as **runoff** from unchanneled hillsides and seepage from bedrock slopes that border the aquifer, and (3) seepage from tributaries that flow onto the aquifer (fig. 5). The aquifer receives additional recharge from (1) infiltration beneath recharge basins at an industrial site in the western part of the aquifer (fig. 6), and (2) induced infiltration from streams and ponds near the major pumping wells. The confined aquifer is recharged along the edges of the valley (fig. 5).

Water in the unconfined aquifer **discharges** (1) into the West Branch and main stem of the Tioughnioga River and, during seasonally high water-level conditions, to the lower reaches of Otter Creek, (2) to pumping wells, and (3) to springs that are the headwaters of Fall Creek valley in the western part of the study area (fig. 2). The study area contains four major pumping centers— the City of Cortland well field, the well field for the Town of Cortlandville on Terrace Road, a well for the Town of Cortlandville on Lime Hollow Road, and a purge well at the former typewriter plant in the western part of the study area (fig. 6). Most of the water pumped from the production wells is eventually routed to the sewage-treatment plant as wastewater (fig. 2), where it is treated and discharged into the Tioughnioga River.

SIMULATION OF GROUND- WATER FLOW

A numerical ground-water flow model was constructed through the computer program MODFLOW to calculate hydraulic heads (water-table elevations) in the aquifer system and to derive water budgets. The directions of ground-water flow can be inferred from the hydraulic heads calculated by the model. Ground water moves from areas of high head to areas of low head, and the direction of flow is controlled by local factors such as aquifer geometry, distribution of recharge, and location of discharge areas (streams, ponds, and pumping wells), all of which are represented in the model. Model simulations indicate that water in the unconfined aquifer moves laterally from the edges of the valley toward the center, then flows northeastward along the axis of the Otter Creek-Dry Creek valley, where it discharges to pumping wells, the West Branch Tioughnioga River, and the main stem of the Tioughnioga River.

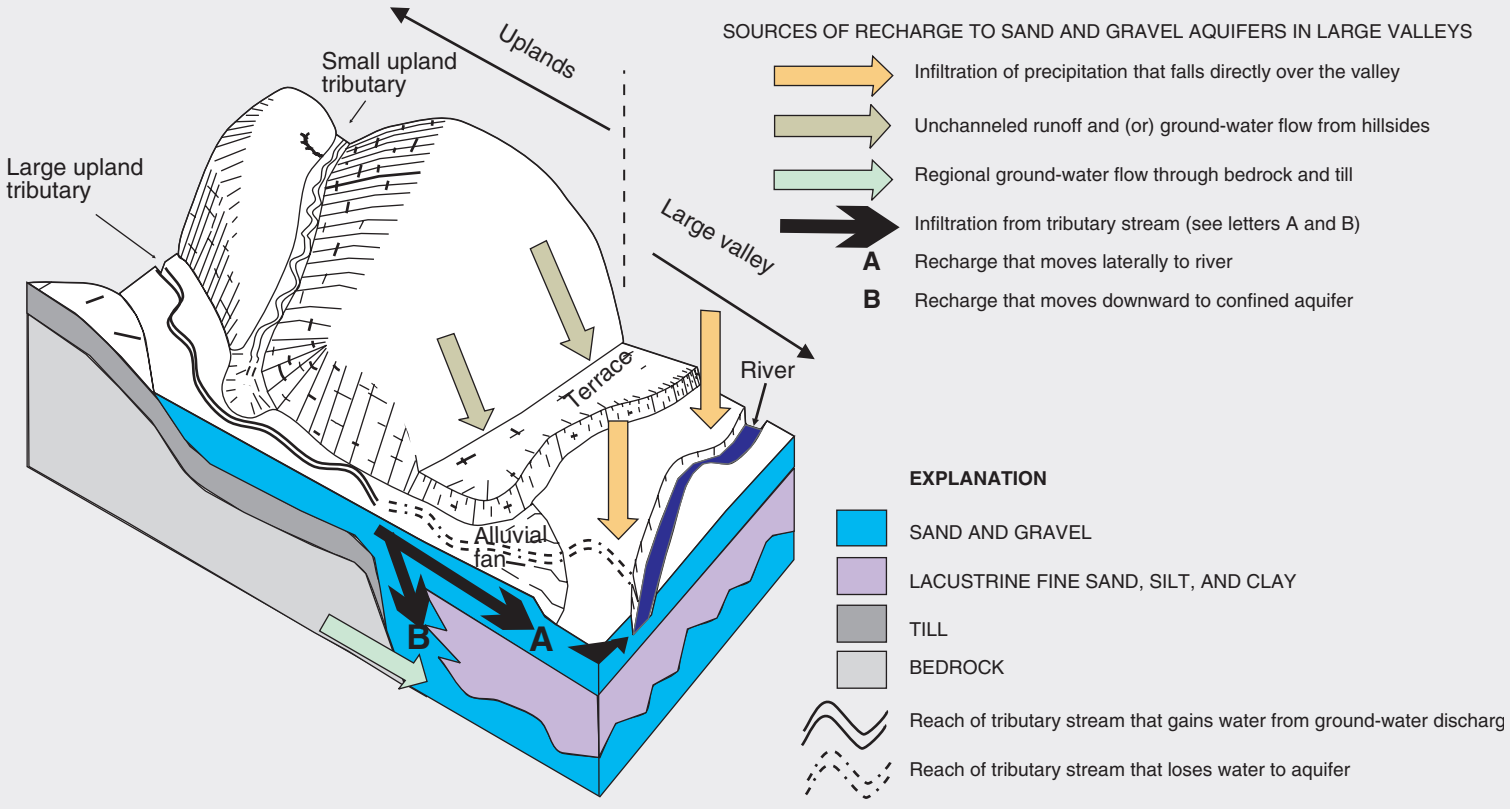


Figure 5. Sources of recharge to the glacial-aquifer system at Cortland County, NewYork.

RECHARGE AND DISCHARGE

Water from the uplands is the largest source of aquifer recharge under average-recharge conditions and provides 55 percent of total recharge; this includes seepage from upland streams that flow onto the aquifer (32 percent of total recharge) plus unchanneled runoff and ground-water inflow from uplands (23 percent, table 1). The second-largest source is precipitation that falls directly onto the aquifer (38 percent of total recharge). The greatest discharge from the aquifer occurs as leakage to streams (69 percent of total discharge, table 1); the second largest is to pumping wells (28 percent of total discharge).

AREAS CONTRIBUTING RECHARGE TO LARGE PUMPING WELLS

Contributing areas to major pumping wells were calculated through the computer program MODPATH, which computes hypothetical paths of imaginary "particles" of water moving through a simulated ground-water-flow system and their traveltimes (fig. 6). Pumping large quantities of water from an aquifer system causes a drawdown of water levels within the aquifer, and the **drawdown** decreases with increasing distance from the pumping well. The lowering of the water level by pumping causes ground water to flow to the well. The **flowpaths**, and the size and extent of the well's contributing area depend on the hydraulic characteristics of the flow system, such as aquifer geometry, recharge rate, discharge rate, **permeability** of aquifer material, and type of well construction, including location, pumping rate, and position and length of the screen.

Contributing-area analyses were done for low-, average-, and high-recharge conditions. The analysis for low-recharge conditions (fig. 6) resulted in the largest contributing areas. The model-generated contributing areas are U-shaped, with the open end facing upgradient from the well, and extend over most of the unconfined-aquifer area upgradient from the wells (fig. 6). The City of Cortland municipal well had the largest contributing area of all wells simulated. Recharge from tributaries such as Otter Creek and the unnamed tributary north of Otter Creek were indicated to be sources of water to the city well; thus, evaluations of the quality of water pumped by the city well need to consider the water quality of these two streams.

The largest contributing areas resulted from the low-recharge condition; therefore, the low-recharge condition defines the "worst case" (largest area) that water managers will need to consider when evaluating potential sources of contaminants that may threaten the water supply.

GLOSSARY

Aquifer - A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to springs and wells.

Confined aquifer (artesian aquifer) - An aquifer that is completely filled with water under pressure and that is overlain by material that restricts the movement of water.

Confining layer (confining unit) - A body of impermeable or distinctly less permeable (see permeability) material stratigraphically adjacent to one or more aquifers that restricts the movement of water into and out of the aquifers.

Contributing area - The area in a drainage basin that contributes water to streamflow or recharge to an aquifer.

Discharge - The volume of fluid passing a point per unit of time, commonly expressed in cubic feet per second, million gallons per day, gallons per minute, or seconds per minute per day.

Discharge area (ground water) - Area where subsurface water is discharged to the land surface, to surface water, or to the atmosphere.

Drawdown - The difference between the water level in a well before pumping and the water level in the well during pumping. Also, for flowing wells, the reduction of the pressure head as a result of the discharge of water.

Flowpath - An underground route for ground-water movement, extending from a recharge (intake) zone to a discharge (output) zone such as a pumping well or shallow stream.

Glacial - Of or relating to the presence and activities of ice or glaciers.

Lacustrine - Pertaining to, produced by, or formed in a lake.

Moraine - A mound, ridge, or other distinct accumulation of glacial drift, deposited chiefly by direct action of glacier ice.

Permeability - The capacity for transmitting a fluid; a measure of the relative ease with which a porous medium such as unconsolidated sediment can transmit a liquid.

Recharge (ground water) - The process involved in the absorption and addition of water to the zone of saturation.

Recharge area (ground water) - An area within which water infiltrates the ground and reaches the zone of saturation.

Runoff - That part of precipitation or snowmelt that appears in streams or surface-water bodies.

Till - Predominantly unsorted and unstratified drift, deposited directly by and underneath a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, and boulders.

Unconfined aquifer - An aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure.

Upgradient - Of or pertaining to the place(s) from which ground water originated or traveled through before reaching a given point in an aquifer.

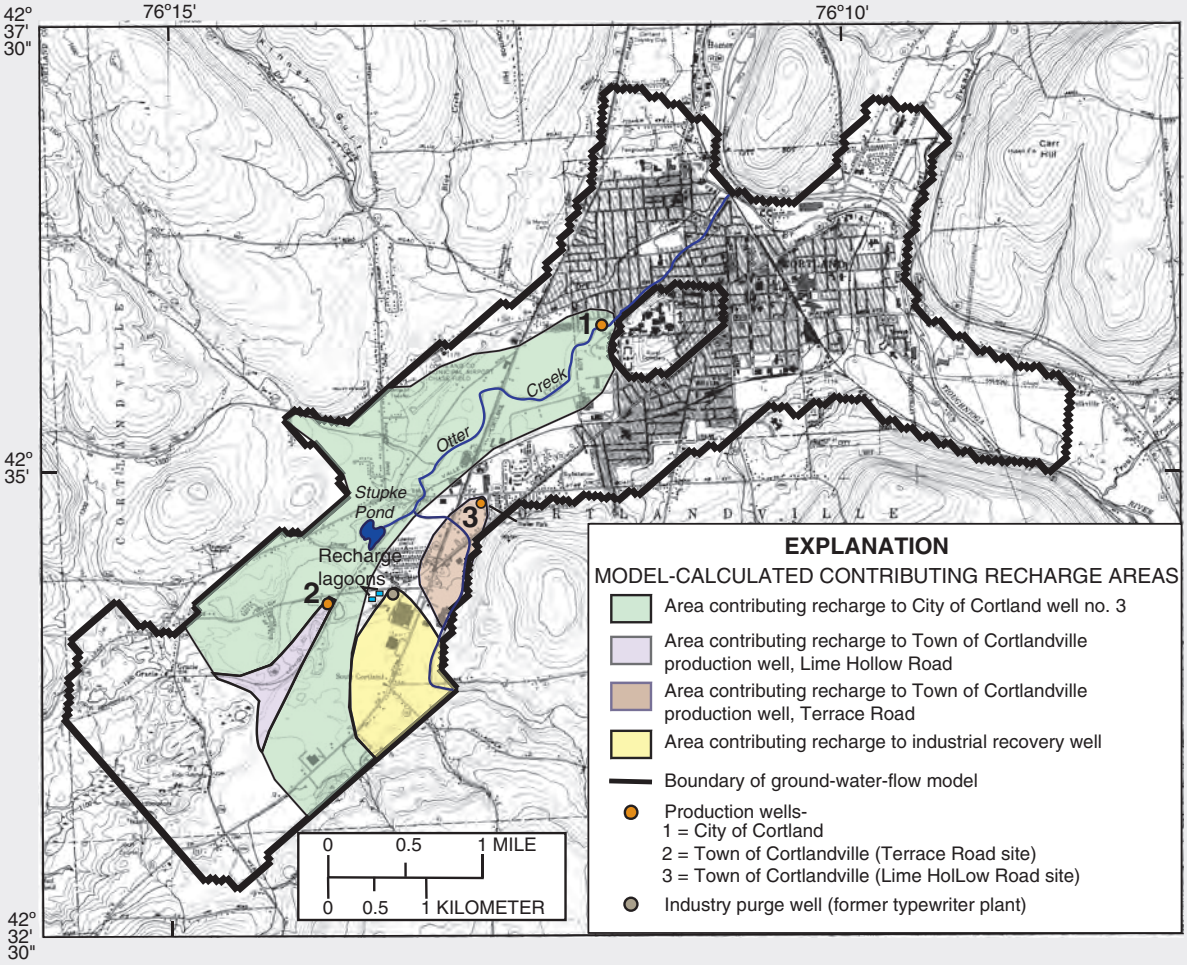


Figure 6. Model-calculated contributing recharge areas for major production wells during low-recharge conditions, in the unconfined aquifer, Cortland County, New York.

Table 1. Steady-state water budget for glacial aquifer at Cortland, N.Y., for average-recharge conditions, May 28 through June 4, 1991.

[ft ^{3} /s, cubic feet per second]

Budget component	Amount (ft^3/s)	Percent of total
A. Recharge to the aquifer system		
Precipitation on the aquifer	14.4	38
Upland sources		
Seepage losses from tributary streams	12.2	32
Unchanneled runoff and ground-water inflow from uplands	8.8	23
Ground-water inflow from valleys to model area	.9	3
Infiltration at recharge basins	1.7	4
TOTAL	38.0	100
B. Discharge from aquifer system		
Pumping wells	10.7	28
Discharge from aquifer to streams	26.1	69
Ground-water outflow from model area	1.2	3
TOTAL	38.0	100

REFERENCE CITED

Miller, T.S., Sherwood, D.A., Jeffers, P.M., and Mueller, Nancy, 1998, Hydrogeology, water quality, and simulation of ground-water flow in a glacial-aquifer system, Cortland County, New York: U.S. Geological Survey Water-Resources Investigations Report 96-4255, 84 p.

by Todd S. Miller

FOR MORE INFORMATION:
Subdistrict Chief
U.S. Geological Survey
30 Brown Rd
Ithaca, N.Y. 14850

This fact sheet and related information can be found on the world wide web at http://ny.usgs.gov

Appendix 1.G: 2021 Response to Public Comments (H2H Geoscience Engineering, PLLC)

H2H GEOSCIENCE ENGINEERING

179 River Street, Troy, New York 12180

Environmental Professionals
Geologic Consultants
Construction Services

(518) 270-1620/Fax (518) 270-1672

April 16, 2021

Elizabeth Tracy
Regional Permit Administrator
NYSDEC - Region 7
615 Erie Boulevard West, Room 206
Syracuse, NY 13204-2400

Subject: Cortlandville Sand & Gravel – Response to Public Comments
DEC #7-1122-00043, MLR #70436
Town of Cortlandville, Cortland County, New York

Dear Mrs. Tracy:

The purpose of this submission is to provide our response to public comments received by the New York State Department of Environmental Conservation (Department) in regards to the Notice of Complete Application and the Type I Negative Declaration issued on January 20, 2021. The four comment letters received were provided to H2H Geoscience Engineering (H2H) on March 29, 2021. A list of documents prepared by H2H in response to the received comment letters is provided below:

- H2H response to January 29, 2021 Letter from Paul Heider, Cortland County Legislator, Tom Williams, Town Supervisor, Town of Cortlandville, Mike Ryan, Director of Environmental Health, Cortland County Health Department, and Amanda Barber, District Manager, Cortland County Soil and Water District
- H2H response to February 8, 2021 Letter from Glenn Reisweber of the Lime Hollow Nature Center
- H2H response to March 19, 2021 letter from Town of Cortlandville, the Cortland County Soil and Water Conservation District, and the Cortland County Health Department.
- H2H did not provide responses to the comment letter provide by Susan Fitts.

In addition, a revised Mine Plan Map (Figure 2) and Reclamation Plan Map (Figure 4) are attached showing the incorporation of the "Vehicle/Equipment Area" into the proposed area of lateral expansion.

If you have any questions regarding this information, please contact me at 518.270.1620 ext. 102, or by email mpolacco@h2hg-e.com

Sincerely,

H2H Geoscience Engineering, PLLC

Michael Polacco

Michael Polacco
Project Geologist

c Attachments as noted

Cynthia Hill, Region 7, NYSDEC, *Via email w/attach*
Thomas Rigley, Region 7, NYSDEC, *Via email w/attach*
Chris Henry, Rt. 13 Rocks, LLC., *Via email w/attach*
Kevin Bernstein, BSK, Attorney of Applicant, *Via email w/attach*
Richard A. Hisert, Ph.D. P.G, H2H w/ attach
File

Technical Response to State and County Comments

Following are Applicant's responses to the comments letter dated January 29, 2021, that was collectively signed by the Town of Cortlandville, the Cortland County SWCD, the Cortland County Health Department, and the Cortland County Legislature. Applicant's responses are numbered to facilitate referencing.

1.) **The municipalities of the Town of Cortlandville and City of Cortland have long been concerned regarding the proposal to mine for gravel deep into the Cortland Aquifer. Because this proposal if permitted would threaten the only source of drinking water for these municipalities long into the future, these municipalities oppose granting the modified permit to allow deep mining into the aquifer. The Cortland County Department of Health and the Cortland County Soil and Water Conservation join in opposing this proposed mining. The agencies undersigned oppose this activity for the following reasons:**

2.) The applicant has disregarded the Town of Cortlandville's wellhead protection areas, codified in the Town of Cortlandville Aquifer Protection Ordinance. A wellhead protection area as the surface and subsurface area through which contaminants are likely to pass before reaching a well or group of wells used for public water supplies. Wellhead protection, therefore, means protection of the land area around a well that significantly influences its source of water. These areas are based on an extensive study (attached) of the entire aquifer and were a collaborative effort of USGS, County Health Department, Cortland County SWCD, the Town of Cortlandville, and the City of Cortland. They are based on the best available information and technological tools. This study clearly demonstrates that the Cortlandville Sand and Gravel Mine is within the wellhead protection zone of the Cortlandville Lime Hollow Public Water Supply and the City of Cortland Public Water Supply. To disregard and dispute the findings of this work would require far more evidence than was provided by the applicant. By allowing this permit modification to be approved as presented, the applicant is denying the validity of the Town's measures to protect the aquifer and drinking water supply for the Town of Cortlandville and City of Cortland.

Response –

1. *Applicant performed an objective independent third-party hydrogeological study at the Cortlandville Sand and Gravel Co. mine site and* ***based the findings on the collected data and information.***
2. *Based on the findings, Applicant* ***disagrees that the proposed mine area will "significantly influence the source of water"****. Any effect on the source of water for the Town wells would be minor. The hydrogeological investigation was based on a scope of work that was vetted by the DEC and SWCD. Applicant collected data over a one-year period and based findings on that data and other available information. Applicant analyzed every data point and shared data and findings with SWCD in a timely manner. Conversely, SWCD did not share its Wellhead Protection Area (WPA) report of 2002 or its Water Supply Assessment report of 2013. Applicant shared its reports and welcomed the opportunity to provide clarifications and answers to questions. Applicant received no comments or questions from SWCD on the wrap-up report submitted on March 31, 2020 at the end of the one-year study.*
3. *Applicant's conclusions regarding the potential effect of the proposed mine lake on the Town's*

water supply are presented in the Response to Town and County's comments dated March 19, 2021 comments.

3.) a.) The current mine is an industrial activity that includes use of various chemicals, presenting a real but unknown risk to the Lime Hollow water supply well immediately downgradient, but more importantly to the entire aquifer. This aquifer is the critical water supply for the Town of Cortlandville and the City of Cortland. Under the current permit, an 8-foot separation is required between the mine floor and the seasonal high water table with the specific purpose of providing protection to the underlying aquifer.

Response -

See the Response to Comments for the March 19, 2021 County/Town comment letter.

b.) Under the original 1980s permit, because mining was limited to 8' above the water table, the mine was required to establish the elevation of the seasonal high water table and therefore also the elevation of the mine floor, below which mining could not occur. After 30 years, the permittee has still not met this requirement. In addition, there is strong evidence that mining below the water table has already occurred. The permittee was required by NYSDEC to mitigate for this unauthorized mining. The willingness of the permittee to adhere to permit requirements is questionable.

Response –

1. *The seasonal high water table was estimated based on the continuous automated water level data collected over a one-year period from February 5, 2019 to February 6, 2020, and the incomplete monthly water level data set collected since 1989. The season with the highest average water level in both MW-1 and MW-2 is Spring as shown in Table 1. Using the average Spring water level elevations from MW-1 and MW-2, H2H determined the seasonal high hydraulic gradients through the proposed mine lake when the hydraulic gradients are highest. Figure 6 was developed to show the separation between existing topography (active face locations updated 2020) and the seasonally high water table. Figure 6 shows the site is in compliance with maintaining 8 ft. separation between existing topography and the seasonal high water table. The only area within the 8 ft. buffer is a 5ft X 5 ft. test pit excavated to monitor the water level in the floor of the quarry. The area is labeled "G.W. Monitoring Test Pit" on Figure 6.*

Table 1: Seasonal Water Level Elevation

MW-1				***MW-2***			
Summer	***Fall***	***Winter***	***Spring***	***Summer***	***Fall***	***Winter***	***Spring***
1172.4	*1168.8*	*1172.9*	*1175.3*	*1169.1*	*1166.9*	*1169.7*	*1170.3*

2. *Mining below the 8-foot undisturbed material separation from the seasonal high groundwater elevation as well as mining outside the Life of Mine area was observed by the NYSDEC on November 21, 2013 while the site was being operated by Cortlandville Gravel Mining Inc. (previous owners.) The NYSDEC issued a consent order (Case No. R7-201140828-125) on*

September 29, 2014 outlining the actions required to rectify the MLR Permit Condition violations, and requiring a civil penalty be paid. No MLR Permit violations have been identified by the NYSDEC since the applicant / permittee took over ownership of the mine.

4.) Mining below the water table presents an increased risk to the aquifer for three reasons. First, the current 8-foot separation distance provides a sand and gravel layer buffer that could delay and mitigate contaminant migration to the aquifer. Second, the absence of a buffer zone provides a more direct pathway for contamination to reach the aquifer. Finally, permitting mining below the water table will increase the life of the mine by decades. This increases the potential for an accidental release of contaminants that could affect the water supply for the Town and City.

Response -

1. *Comment noted.*
2. *The mining of aquifer material below the water table would **increase the dilution factor** of any releases by approximately a factor of three, which would mitigate, although not eliminate, contaminant migration to the sand and gravel aquifer.*
3. *Applicant **disagrees** that releases would affect the water supply for the City because of its distance from the proposed mine lake. The potential impact is higher for the Lime Hollow well field but is considered negligible for the reasons stated in the RTCs for the March 19 comments.*

5.) a.) We continue to believe that mining 100' deep into the aquifer to create a 78-acre open-water pit upgradient of the Town and City drinking water wells and immediately upgradient of the primary drinking water supply well for the Town of Cortlandville represents a significant risk to this essential water supply. The proposed changes in the permit for the mine will allow for significant changes in mine operation and the scope of permitted mining and will drastically increase the risk of contamination to the Cortland aquifer and therefore the only public drinking water supply for these municipalities. Contamination of ground water is extremely difficult and costly to remediate.

Response –

See RTCs for the March 19 comments.

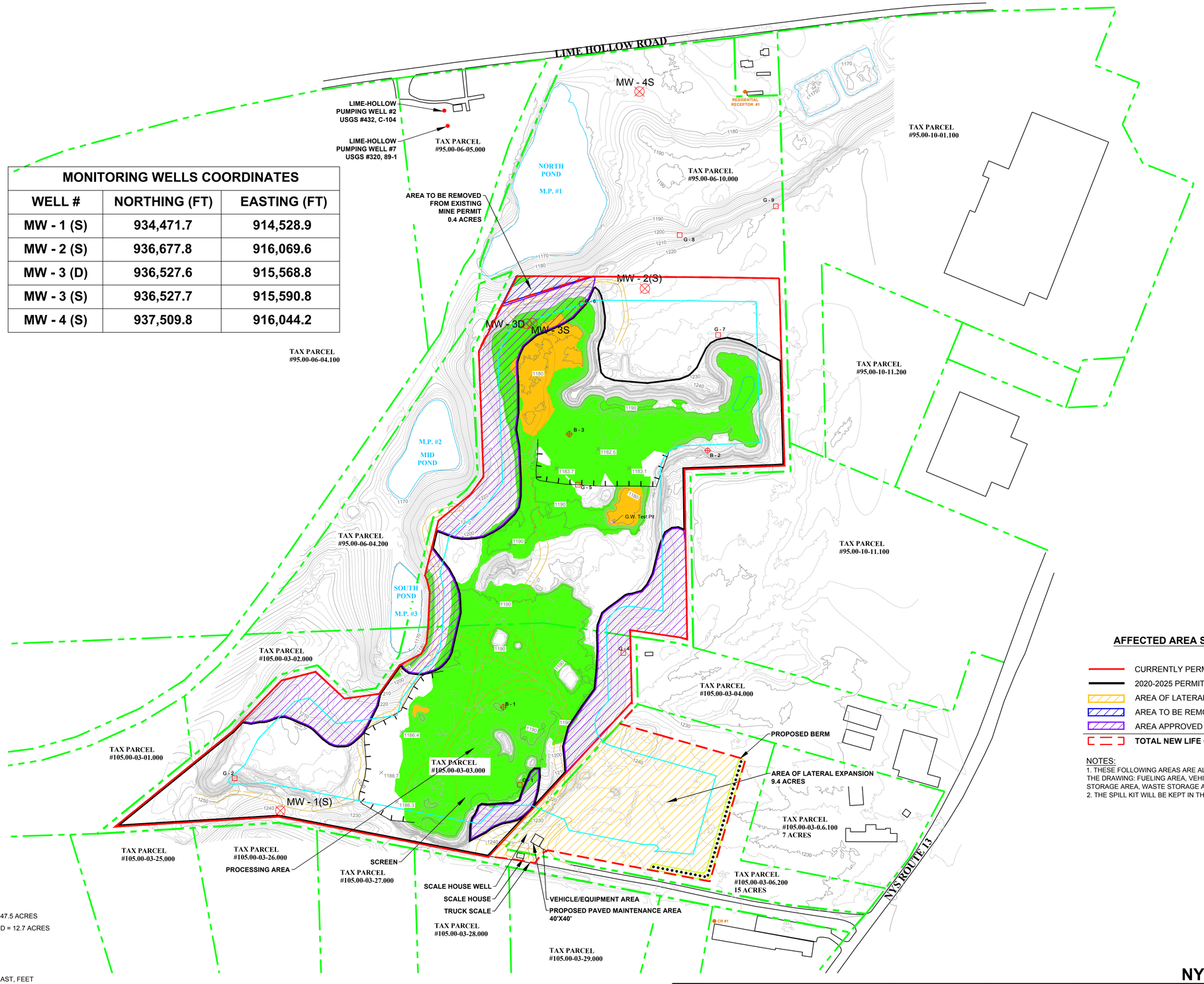
b.) The 2001 Source Water Assessment Plan for Cortlandville that designated both the inner and outer well zones of critical concern (that included the mining area) was a NYSDOH funded and approved effort to ensure protection to potable drinking water. To approve a change in the designation of the protected source area for a NYSDOH regulated water supply with a third-party engineering evaluation that was not properly vetted with either the water supply or the NYSDOH is fundamentally wrong. As a public health department, we feel it is critical that a complete reversal of the designation of a water supply's contamination zones warrants a thorough and collaborative investigation. This is a designated Sole Source aquifer by the USEPA because it cannot be replaced to meet the community's drinking water needs. If it is determined that the activity can proceed without impacting the water supply by consultation with impacted parties, including the NYSDOH, then it could be approved with good conscience. Without this critical step it would be a mistake for the NYSDEC or the Town of Cortlandville to issue a mining

permit for a new use that entails dredging 100 feet below the water table 800 feet from a community water source well.

Response –

1. *See RTCs for the March 19 comments.*
2. *Applicant is not proposing that the delineation of the wellhead protection area be changed or completely reversed. The presence of the proposed freshwater mine lake is* ***not an unreasonable use*** *of the land within the existing delineated protection zone and would allow the extraction of sand and gravel resources that would otherwise be permanently lost to the local community.*
3. *Additional isolation of the wells' capture zone could be achieved by* ***re-shaping the northwestern corner*** *of the proposed mine lake to coincide with the northeasterly groundwater flow direction. This may reduce reserves but may expedite permit approvals.*
4. *As stated previously, Applicant* ***worked cooperatively with the Soil Water Conservation District*** *to develop the scope of work, share data and findings in a timely manner, and raise and discuss technical questions as the study progressed. Applicant shared its reports with the identified stakeholder agencies and provided clarifications and answered questions.*
5. *Applicant disagrees that the expanded mine would adversely impact the water supply for the reasons presented above. The proposed mine pond is located closer to* ***880 feet from the nearest community well****. The 800-foot value does not take into account reclaimed land along the shoreline.*

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1 (S)	934,471.7	914,528.9
MW - 2 (S)	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2



LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY 66.8 Acres
- ACTIVE FACES UPDATED 6/17/2020
- BELOW WATER OPERATIONS BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- TEST PIT
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- SPOT SHOT ELEVATIONS (×1190)

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.
8. ACTIVE FACE LOCATIONS UPDATED ON 6/17/2020.

SCALE IN FEET
0 100 200 400

N

AFFECTED AREA SUMMARY:

- CURRENTLY PERMITTED LIFE OF MINE = 66.8 ACRES
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA OF LATERAL EXPANSION = 10.1 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- **TOTAL NEW LIFE OF MINE = 76.5 ACRES**

NOTES:

1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

June. 2020 Existing Topography vs Avg. High Ground Water Surface			
No.	Min. Thickness (Ft.)	Max. Thickness (Ft.	Color
1	3.00	6.00	
2	6.00	8.00	
3	8.00	10.00	
4	10.00	20.00	
5	20.00	<	NOT SHOWN

DATE		REVISIONS RECORD/DESCRIPTION
04/14/21	1	REVISED LOM BOUNDARY 4/14/21
	2	
	3	
	4	
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	04-08-2021

NYSDEC MLF# 70436

ISOPACH MAP

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H GEOSCIENCE ENGINEERING
179 RIVER ST.
TROY, NY 12180
(518) 270-1620
WWW.H2HG-E.COM

FIGURE 6

SHEET 1 OF 1

Technical Response to Lime Hollow Nature Center's Comments

Following are Applicant's responses to the Lime Hollow Nature Center's comments letter dated February 8, 2021 signed by the executive Director of the Lime Hollow Nature Center. Applicant's responses are in italic and in blue.

General: The recent request to expand the Route 13 Rocks LLC (formerly Cortlandville Sand and Gravel) mining operation raises serious concerns by our nature center and our 38,000+ annual visitors. Cortland County is one of only two counties in New York State that does not have a state park. The Lime Hollow Nature Center provides our local citizens with the same qualities of life opportunities as a New York State Park minus camping and fishing offerings. Our nature center, which encompasses 594 acres of woodlands and wetlands with13 miles of trails, recreational areas and open space is directly adjacent to the gravel mine. Given this close proximity and illegal mining activities by the former Cortlandville Sand and Gravel identified in 2013, our organization has always been concerned about further encroachments from gravel operations that could alter or jeopardize the natural beauty of our preserve and the area as known as "Lime Hollow."

Response - No lateral expansion of the existing western mine boundary is proposed. 0.4 acres of undisturbed area are proposed to be removed along the northwestern mine boundary (Figure 2.) The Life of Mine (LOM) Boundary is clearly marked in the field to prevent any excavation past the LOM Boundary.

This unique environmental area is well documented in the following reports and excerpts.

I. <u>2016 NYS DEC Open Space Plan, Region 7 Supplemental Project, Page A-166:</u>

Fall Creek Fens and Forests - Town of Cortlandville, Cortland County, Towns of Dryden and Groton and Village of Freeville, Tompkins County. Expansion of efforts for the protection of the exceptional grouping of ecological communities and geological features along Fall Creek and its tributaries, and along Beaver Brook and its tributaries including the acquisition of lands adjacent to the Lime Hollow Nature Center for use in educational activities and to buffer existing lands.

Response – Comment Noted

II. **<u>Marl Pond Significance</u>**:

a. The marl ponds along the Cortland County Linear Park (aka Lehigh Valley Trail) are designated as a significant natural community by the NYS DEC and are classified as "marl pond shore" wetlands. They have a State Conservation Rank of S1, which means that there are very few occurrences or remaining individual examples in NY and/or the wetland is especially vulnerable (Edinger et al., 2014, Ecological Communities of New York). They have Global Conservation Rank of G3-G4, which means that they are quite rare worldwide and/or are locally restricted.

b. The unusual flora of these marl ponds was first noted by Dudley in 1883 (The Cayuga Flora) and again by Weigand and Eames in 1926 (The Flora of the Cayuga Lake Basin) and confirm their historical significance to biologists in addition to their high ecological value.
c. The importance of these marl ponds is such that they are specifically named by Edinger et al. as the type example of this ecological community for all of New York State as part of the NY Natural Heritage Program (https://guides.nynhp.org/marl-pond/).
d. Of particular importance for preservation and protection are the following Marl Ponds owned by the Town of Cortlandville and leased to the Lime Hollow Nature Center located adjacent to the Route 13 Rocks gravel operation:
    1. Parcel # 95.00-06-04.200 (11.7 acres)
    2. Parcel # 105.00-03-02.000 (4.7 acres)
e. The potential impact of the mine expansion, specifically mining below the water table, on the marl ponds must be fully assessed.

Response -

The marl ponds referenced above are shown on Figure 2 as M.P. #2 Mid Pond and M.P. #3 South Pound. The marl ponds typically range in water level elevation from a maximum of ~1174 ft. amsl in the spring to dry in mid-September through mid-November.

The average seasonal water table on site was determined based on the continues water level data collected from February 5, 2019 to February 6, 2020, and the partial monthly recorded water level data collected since 1989. The average water table on site ranges from 1175.3 in the Spring to 1169.7 in the winter (Table 1.) Upon completion of mining as shown on the proposed Reclamation Plan (Figure 4) the lake elevation will equilibrate to the currently observed median groundwater elevation of MW-1 and MW-2 (Table 2.)

Table 1: Seasonal Water Level Elevation

MW-1				*MW-2*			
Summer	*Fall*	*Winter*	*Spring*	*Summer*	*Fall*	*Winter*	*Spring*
1172.4	*1168.8*	*1172.9*	*1175.3*	*1169.1*	*1166.9*	*1169.7*	*1170.3*

Table 2: Seasonal Quarry lake Elevation

Quarry Lake			
Summer	*Fall*	*Winter*	*Spring*
1170.8	*1167.9*	*1171.3*	*1172.8*

Based on the collected groundwater data the groundwater level around each Marl Pond was calculated based on the hydraulic gradient from MW-1 to MW-2 (Table 3.) The largest difference between the anticipated quarry lake elevation and the calculated groundwater level is approximately one foot occurring in the spring for the middle pond. The quarry lake would be approximately one foot higher. Due to the south pond being located close to the center of the quarry lake very little difference between quarry lake level and groundwater is anticipated.

Table 3: Seasonal Groundwater Level at Marl Ponds

South Pond				*Mid-Pond*			
Summer	*Fall*	*Winter*	*Spring*	*Summer*	*Fall*	*Winter*	*Spring*
1170.9	*1168.0*	*1171.5*	*1173.0*	*1170.0*	*1167.5*	*1170.6*	*1171.7*

The anticipated difference between the quarry lake level and the groundwater level around each Marl Pond is anticipated to be well below any seasonal fluctuation in water level, and each pond will still be dry during normal precipitation years between mid-September through mid-November. Seasonal fluctuation of groundwater levels ranges from 8 to 14 feet onsite. No potential significant environmental impact to the south Marl Pond or Mid-Marl Pond is anticipated by mining the proposed quarry lake as shown on Figure 4 due to the factors listed above.

III. **Lime Hollow: A Natural Preserve Summary and Plan dated August 1978:** The Cortland County Environment Management Council along with Cortland County Planning produced this comprehensive planning document which outlined the importance of preserving and protecting this natural area.

a. Watershed Protection: "By affording protection, preservation, and proper management of Lime Hollow and its surrounding watershed, the negative impacts of erosion due to flooding, storm water runoff, construction in natural drainage-ways, concentration of contaminants, and increased future governmental costs for costs from environmental degradation of groundwater can be avoided."

b. Unique Natural Features: "Lime Hollow exhibits a number of ecological functions and unique botanical sites in an area of varied glacial topography and typical upland forest, as modified by the presence of both acidic and alkaline areas" (the Chicago Bog and Marl Ponds, respectively).

c. Given that the Chicago Bog is classified as a classic kettle hole bog, pursuant to the definitions contained in Part 664: Freshwater Wetlands Maps and Classification (Statutory authority: Environmental Conservation Law §3-0301 and §24-1301) found at https://govt.westlaw.com/nycrr/Document/I4ece2eaecd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default) Lime Hollow Nature Center has requested that the Chicago Bog unique area be reclassified from its current Class II identification to Class I.

d. The Chicago Bog unique environmental area is located approximately 1050 feet from the boundary western most boundary of the Route 13 Rocks gravel operation.

Response – Comment Noted.

IV. **Town of Cortlandville NYS DEC Water Quality Improvement Project Source Water Protection grant award.** In December 2019, New York State awarded the Town of Cortlandville $175,000 to acquire land meant for protecting the town's drinking water supply wells near Lime

Hollow Road. The parcel, comprising 106 acres of land and a series of marl ponds, sits astride the Cortland County Linear Park (aka Lehigh Valley Trail) and was one of the last remaining contiguous sections of woodlands and unique wetlands of the original 1978 concept plan for the Lime Hollow Nature Preserve. In a collaborative leasing arrangement with the Town of Cortlandville, Lime Hollow has agreed to steward, patrol, and over-watch this parcel as well as the two marl ponds adjacent to the gravel mine mentioned above in item II (d). This land is adjacent to the western boundary of the Route 13 Rocks sand and gravel mine.

Response – Comment Noted.

MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1 (S)	934,471.7	914,528.9
MW - 2 (S)	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
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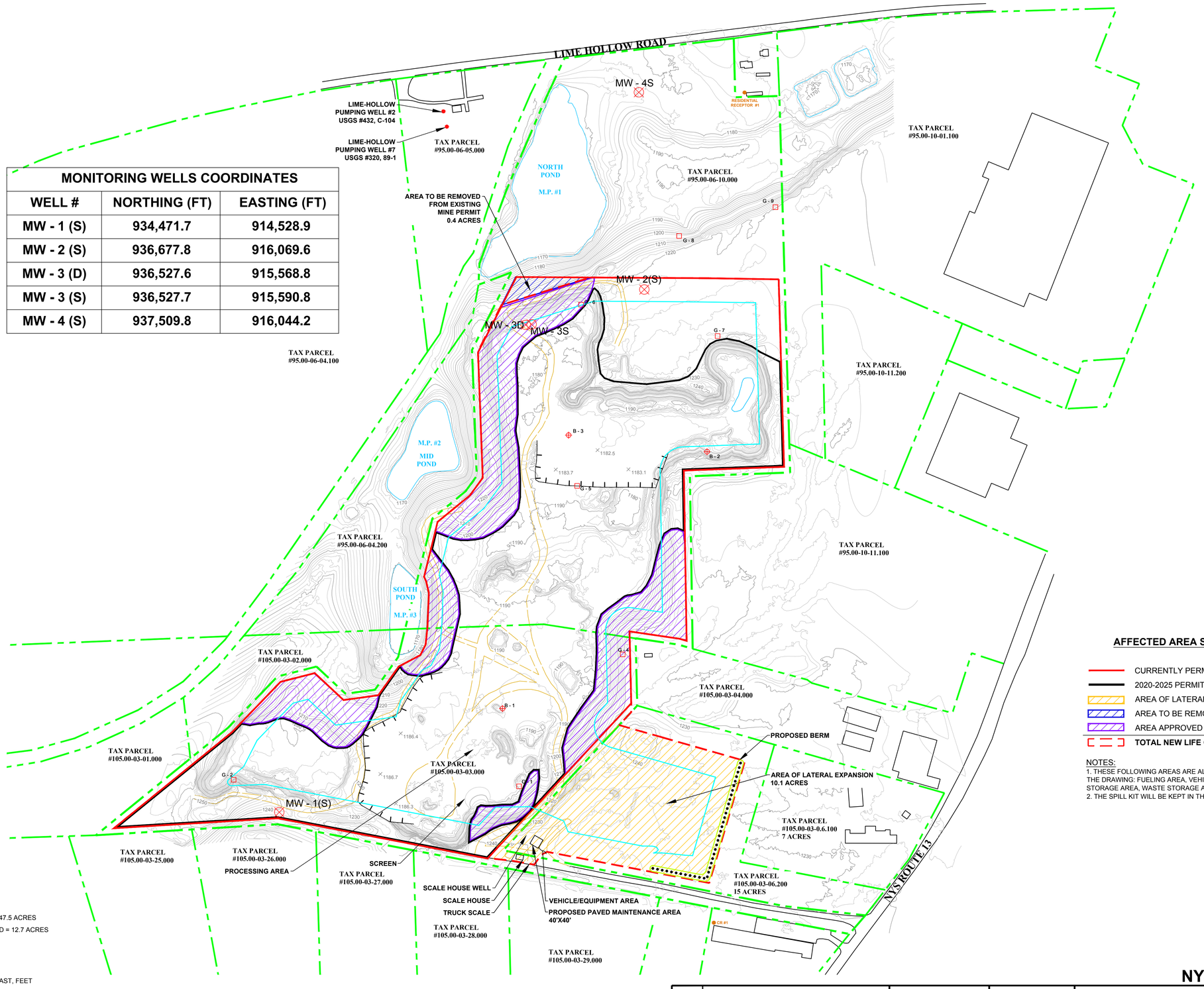

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY 66.8 Acres
- ACTIVE FACES UPDATED 6/17/2020
- BELOW WATER OPERATIONS BOUNDARY
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- MONITORING WELL
- TEST PIT
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- SPOT SHOT ELEVATIONS (×1190)

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.
8. ACTIVE FACE LOCATIONS UPDATED ON 6/17/2020.

AFFECTED AREA SUMMARY:

- CURRENTLY PERMITTED LIFE OF MINE = 66.8 ACRES
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA OF LATERAL EXPANSION = 10.1 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- **TOTAL NEW LIFE OF MINE = 76.5 ACRES**

NOTES:

1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

SCALE IN FEET: 0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
10/22/20	4	REVISED ACERAGES ON 10/22/2020
04/14/21	5	REVISED LOM BOUNDARY 04/14/2021
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

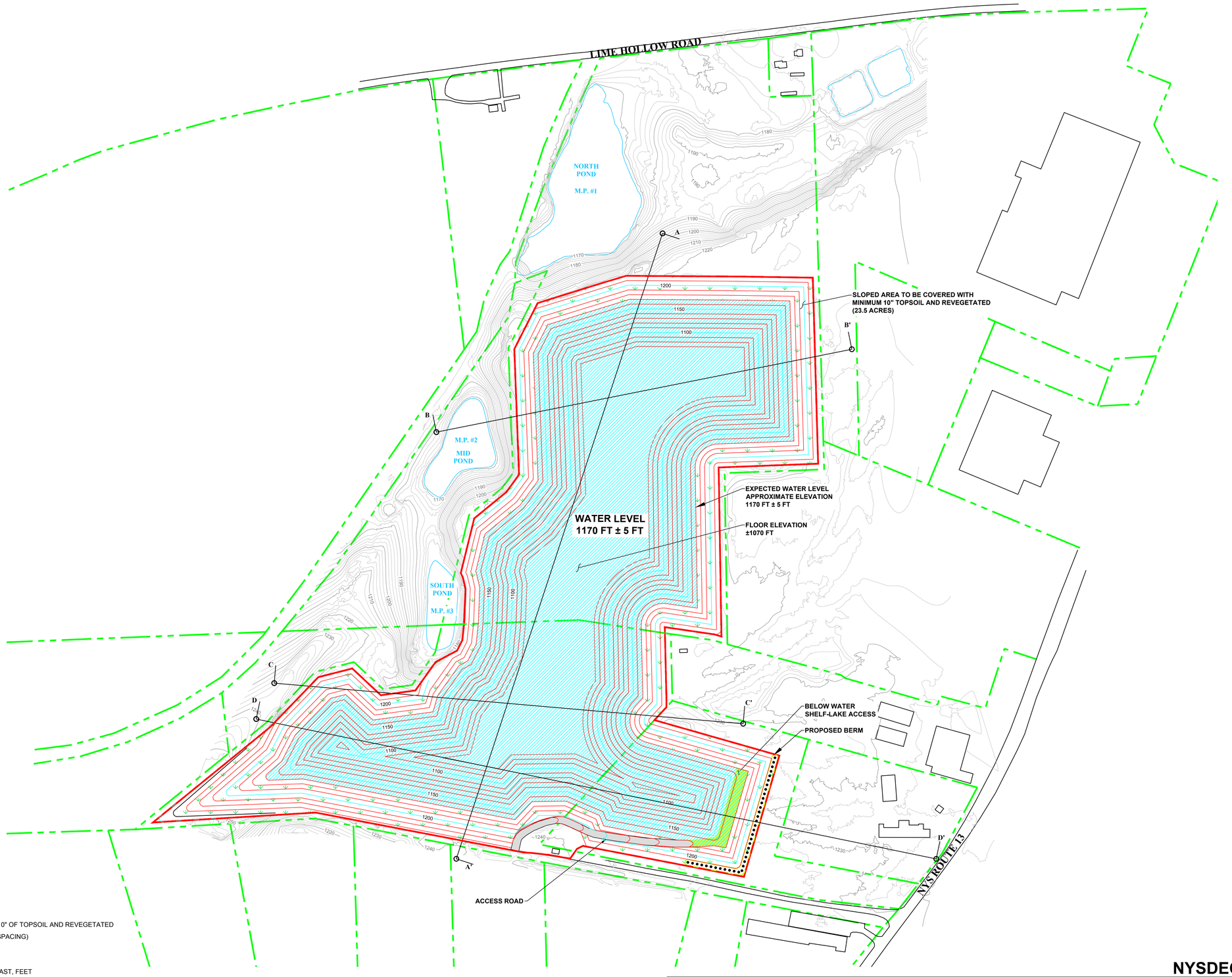
MINE PLAN MAP

TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

H2H GEOSCIENCE ENGINEERING
179 RIVER ST, TROY, NY 12180
(518) 270-1620
WWW.H2HG-E.COM

FIGURE 2

SHEET 1 OF 1



LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- ROAD
- BUILDING/LARGE MISC. OBJECT
- AREAS TO BE COVERED WITH MINIMUM OF 10" OF TOPSOIL AND REVEGETATED
- TREES (TO BE PLANTED WHITE PINE AT 20' SPACING)

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
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6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

N

SCALE IN FEET
0 100 200 400

DATE		REVISIONS RECORD/DESCRIPTION
12/22/17	1	ADDED SECTION D-D' WITH TERRACE INCLUDED
3/06/18	2	COMMENTS FROM NYSDEC NOIA 11/10/2017
10/22/20	3	REVISED RECLAMATION GRADES TO NORTH ON 10/22/20
04/14/21	4	REVISED LOM BOUNDARY 04/14/2021
	5	
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

PROPOSED RECLAMATION PLAN

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 4

SHEET 1 OF 2

Re: **RESPONSE TO COMMENTS, dated March 19, 2021 from Town of Cortlandville, Cortland County Health Department and Cortland County SWCD**

Negative Declaration and Notice of Complete Application DEC ID# 7-1122-00043; MLR # 70436
Modification of Mined Land Reclamation Pe1mit Cortlandville Sand and Gravel Mine
Town of Co1ilandville, Cortland County

Dear Dr. Hill:

On behalf of Applicant, Cortland Sand and Gravel Inc. H2H Geoscience Engineering PLLC (H2H) has prepared these responses to the referenced comments submitted on behalf of the Town of Cortlandville (the "Town") and the Cortland County Soil and Water Conservation District (the "SWCD"). The comment letter responds to the New York State Department of Environmental Conservation's Notice of Complete Application and the Type I Negative Declaration issued by the Department on January 20, 2021 regarding the reference Mined Land Reclamation ("MLR") Pe1mit application for modification submitted by Route 13 Rocks LLC (the "Application").

H2H has included the background information provided in the comments and has numbered the comments to facilitate review. The c*omments are reproduced in bold font, with phrases that were in bold in the original comment letter underlined. H2H Responses are italicized. We refer to the proposed future open-water excavation as a "mine lake" rather than a "pond" to avoid confusion with the marl ponds.*

BACKGROUND

The mine ("Mine") is located on the west side of New York State Route 13 in the southwestern portion of the Town of Cortlandville. The Applicant seeks to expand the existing 66.8 acre sand and gravel mine laterally by a total of 9.4 acres and to allow mining to expand ve1iically up to 100 feet within the water table. Currently under the existing MLR permit, mining operations are limited to a depth of not more than eight (8) feet above the water table.

As you well know from past correspondence submitted to your office and to Commissioner Seggos and from personal discussions you have had with our staff, it is this ve1iical expansion into the water table that particularly alarms the Town, the County SWCD, and the Cortland County Department of Health Services. These concerns were repeatedly expressed to your office (primarily to Joseph Dlugolenski, former Deputy Regional Permit Administrator).

The Mine is located above the Otter-Dry Creek Aquifer (the "Aquifer"). Because water from the Aquifer is the primary source of drinking water in both the City of Cortland and the Town of Cortlandville, it has been designated a "Sole Source Aquifer" by the United States Environmental Protection Agency ("USEPA") pursuant to Section 1424(e) of the Safe Drinking Water Act, 42 USC § 300f, *et seq.* (the "SWDA"). The "sole source" designation is made when an aquifer is the sole or principal drinking water source for a community and if contaminated, would create a significant hazard to public health. The federal government through the United States Geological Survey ("USGS") has played a major role in investigating the Aquifer over the years and in assisting the state and local government agencies in developing protections for the public supply wells within the Aquifer. Those protections include the

designation of Wellhead Protection Areas ("WPAs") for public water supply wells within the Aquifer.

The Aquifer is also designated a "Primary Aquifer" under New York State law. Primary Aquifers are defined in NYSDEC's Division of Water Technical & Operational Guidance Series (TOGS) 2.1.3 as "highly productive aquifers presently utilized as sources of water supply by major municipal water systems". They receive protection from various industrial contaminant sources under State law.

The Aquifer is highly productive in the immediate vicinity of the Mine and can sustain well yields of 2 million gallons per day (MGD) or more. The town has three public water supply wells that draw water from the Aquifer. The town's two Lime Hollow wells are located approximately 800 feet north/northwest of the Mine. See attached aerial Photo (Exhibit 1). The third well is located on Terrace Road, approximately 3,500 feet northeast of the north end of the Mine. The Town provides drinking water from these wells to approximately 5,000 residents and numerous businesses that rely on the clean and plentiful supply. The City of Cortland water supply wells are also located in this aquifer system. Those wells provide water to approximately 20,000 residents and numerous businesses. Based upon growing demand, the Town is currently studying other potential sites in the Aquifer that could support a high producing well. However, a 2013 County SWCD study found that there are likely to be limited options in other parts of the Town due to some combination of lower aquifer yield, high development, and known contamination zones. **The Lime Hollow area is considered the last, best area in the Town for water supply purposes due to the highly productive aquifer combined with relatively sparse development.** Therefore, the Town and County SWCD are very concerned about the proposed vertical expansion of the Mine's permit into the water table.

The SWDA establishes a federal program to protect the quality of groundwater used in public water supply systems known as the "Wellhead Protection Program". Pursuant to the SDWA, wellhead protection areas are defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." 42 USC § 300h-7(e). That program is administered by the states. In New York, the Wellhead Protection Program is administered by the New York State Department of Health ("NYSDOH"). According to NYSDOH's Wellhead Protection Program website:

> [t]he goal of that program is to protect the ground water sources and wellhead areas that supply public drinking water from contamination. New York's approach to wellhead protection recognizes and includes the existing federal, state and county programs that protect groundwater and complements these programs through a combination of activities and efforts using existing public and private agencies and organizations at all levels.

Wellhead Protection Areas are regulated in Article I A of the Town of Cortlandville Code. Three "Wellhead Protection Zones" were established by the Town based upon a report prepared by County SWCD entitled *"Delineation of Wellhead Protection Areas, Town of Cortlandville and City of Cortland, New York* - May 2002". The wellhead protection areas presented in the report were developed by the County SWCD, with the assistance of the County Health Department and the USGS. **The Mine is located directly within the Wellhead Protection Area for both Lime Hollow Wells.** This zone has been designated wellhead protection zone 1a. That zone is described as follows in the Town Code: "Zone la represents the zone that possesses **the most immediate threat to the public health, safety, and general welfare if the area were to become contaminated with**

pollutants." Town Code § 178-2.1 B (1) (emphasis added). Zone la is the most protective level under the Town's wellhead protection regime.

TECHNICAL COMMENTS ON THE H2H APPLICATION

1. **There are two primary concerns regarding this application to vertically expand the Applicant's mining operation 100 feet below the water table. The first is whether the proposed activity will present an increased risk of contamination to the aquifer. The second is whether the mine, which is located in a wellhead protection area, is within the capture zone of the Town's Lime Hollow supply wells, thereby presenting a significant threat to those wells**.

Response:
*Risk is based on exposure <u>and</u> the effect of that exposure. With adequate precautions taken, the proposed mine lake water would consist of once-through groundwater from the same aquifer that recharges the onsite North Marl Pond and the Lime Hollow wells. Just because the proposed mine lake is located within the mapped WPA does not automatically mean that it poses a significant water quality risk to the wells. Mine lake depth would be **shallower nearshore** owing to the natural angle of repose of sand and gravel and the shoreline reclamation grades.*

2. **H2H prepared and submitted certain reports and assessments to NYSDEC in support of the Application to mine below the water table. These included a hydrogeologic assessment, a spill prevention plan, an archeologic investigation, and reports of water quality monitoring. The undersigned government agencies believe that these documents have significant flaws, they conflict with long-standing and more rigorously attained government assessments relating to these issues, they are based upon insufficient information, and were prepared on behalf of an interested party (i.e., are much more susceptible to bias than the conflicting government reports)**.

Response:
The submitted documents summarize site-specific data, results, findings, and conclusions developed based on a carefully thought-out scope of work executed over a one-year period of site investigation.

3. **<u>Because of the ramifications of an erroneous decision to approve this Application, significant further assessment of these issues is required in the context of a Draft Environmental Impact Statement ("DEIS") undertaken pursuant to the State Environmental Quality Review Act ("SEQRA") before the Applicant should be permitted to mine below the water table.</u>**

Response:
The available information and supporting documents (e.g. Spill Prevention Plan, Operations, Monitoring and Maintenance Plan) are sufficient to support an affirmative permit decision.

<u>Mining Operations and the Risk of Aquifer Contamination</u>

4. **The Mine is an industrial activity that uses various contaminants in its operation including: petroleum product storage and dispensing; hydraulic fluid in mining equipment; wastewater from vehicle and equipment washing; and chemical compounds used to reduce dust on the Mine's entrance drive. These activities present a material risk to the Aquifer and to the Lime Hollow water supply wells immediately downgradient when combined with the large open surface water source that will result from mining in the**

water table.

Response:
Following reclamation of fringe areas, the proposed mine pond would be located approximately 880 feet southeast of the Town wells. Reasonable precautions can be taken to prevent or contain releases of potential contaminants associated with the mining operations. See documents listed in ***Response #3***

Petroleum product storage and dispensing and vehicle and equipment light maintenance activity are located at the south end of the Property 3.000 feet from the Town wells. Dust suppression is achieved only through application of water. Potential risks to the wells' water supply from potential contaminants in the proposed mine lake are immaterial when the precautions, small amount of reasonably likely sources, distances, exposure pathways, attenuation processes, and relative recharge amounts are taken into account.

5. **The large open water body that will be created has the potential to introduce pathogens not normally present in groundwater such as waste from geese or other birds gathered on the pond. The estimated travel time for groundwater to flow from the mine to the Lime Hollow wells is about three months. Some of these pathogens can survive longer than three months in groundwater. Expensive filtration requirements would likely be needed to protect the potable water supply in the event it becomes clear that it is "under the influence" of the surface water body created at the Mine. The expense associated with filtration would likely preclude the existing wells from continuing to be used as a viable, affordable source of public water. Exhibit 2 is a study regarding the risk of groundwater contamination by pathogens, this one from the University of Vienna, entitled: "Pathogenic microorganisms and viruses in groundwater". It describes a variety of risks posed by pathogens entering aquifers and drinking water sources, and discusses transport and attenuation and survival and potential growth of those pathogens even if through unsaturated soil and sediments (which will not be present where there is deep mining into the aquifer). It also discusses sources and mechanisms of entry for those microorganisms.**

Response:
a. <u>Pathogens</u> - *The potential relative risk associated with pathogens must be weighed with the potential risk posed by the existing North Marl Pond which serves as a Town well recharge source. The risk is not uncommon, for example, surface water is withdrawn directly and unfiltered from municipal reservoirs such as the New York City Catskill and Delaware Watershed reservoir systems. The need for filtration is not necessarily automatic, especially considering the plus 880-foot naturally-filtered groundwater flow pathway from the proposed mine lake to the Town well field. This distance affords a considerably greater length of filtration than the minimum distances specified by NYS DOH for protection of water supplies and classification of groundwater under the influence of surface water. While this does not eliminate the potential for bacteria and virus migration, the high factor of safety substantially decreases risk.*

b. <u>Typical Contaminant Sources</u> - *The proposed mine lake is not associated with typical water contaminant sources, such as wastewater discharges, manure spreading, livestock, compost, urban stormwater runoff, road salt, agricultural chemicals, septic fields, sewers, cooling tower blowdown, river flood infiltration, and land disposal of industrial wastes (****Krause and Griebler, 2011****). Nutrient (nitrate, phosphorus) levels are exceptionally low in the groundwater which should minimize any risk of harmful algal blooms in the lake water itself. Applicant knows of no surface sand and gravel mine ponds or lakes in New York State that have adversely affected water quality at nearby water wells.*

c. *Transport Distance - Transport distance of pathogens in porous aquifers is typically much less than just the product of survival time and flow velocity because of physical, chemical, microbial antagonism, and biological attenuation mechanisms* ***(Krause and Griebler, 2011****). The low organic content, near-zero nutrient levels, and aerobic conditions of the groundwater do not prevent pathogen survival, but along with UV light exposure at the proposed mine lake water surface substantially minimize risk.*

d. *Travel Time - The estimated "three-month travel time" presumes that groundwater flow from the mine lake to the Town well intake is a continuous uninterrupted linear flow path. This is not normally the case as the wells cycle on and off. When the wells are cycled off the groundwater resumes its ambient northeasterly flow path away from the well field. Each pumping cycle the groundwater migrating from the proposed mine lake toward the wells would "re-start" at the mine lake edge. The saw-tooth groundwater flow path that results may never reach the well or its screened intake. The length and ultimate travel time of this flow path would be longer than the straight-line distance from the mine lake to the well. The greater the travel distance the lower the risk.*

e. *Relative Recharge - Any mine lake water that does reach the well intakes would comprise only a fraction of the groundwater that recharges the well. Wells induce inflow from a radial 360 degrees. The arc subtended by potential mine lake recharge is estimated to be approximately 35 degrees, or only ten percent of the available recharge and this conservatively assumes that shallow water would be able to migrate downward to the well intake against the predominant horizontal flow field.*

f. *Well Sanitary Seal - Another factor that needs to be considered in evaluating potential threats to Town well water quality is the NYSDOH-required 50-foot minimum well casing length. The purpose of the well casing is to isolate the well water intake from shallow groundwater where most (not all) anthropogenic pollutants could be expected. The well water is drawn in horizontally from the lower part of the aquifer.*

It is likely that seepage from the north end of the proposed mine lake would tend to occur in shallower water where wave-action would winnow fine-grained sediments from the lake bottom and preserve the naturally high hydraulic conductivity of the sand and gravel aquifer. This shallow zone is the part of the aquifer that is cased off at the wells. Over time, the hydraulic conductivity of the deeper lake bottom would likely be reduced by the settling out of fine particles in the sediment below wave base. The deeper zone corresponds with the depth of the well intakes. Most groundwater seepage from the mine lake would be discharged in a northeasterly direction coincident with the predominant groundwater flow direction, although as described below some seepage would flow toward the well field especially when the well pumps are operating during the low water table season when the North Marl Pond is dry.

In sum, the potential for virus or pathogenic contamination from the mine pond to the well field is exceedingly low.

6. The eight-foot separation between the mine floor and the seasonal high water table which is a condition of the existing permit provides a necessary protective buffer as various physical, chemical and biological processes can act to reduce contamination as it percolates downward through the ground to the water table below. The absence of any buffer to the Aquifer provides a potential direct pathway for contamination to reach the

Aquifer.

Response:

a. Comment noted.

*b. The excavator would be situated on land that maintains the eight-foot separation distance. See **Response #8**.*

c. Petroleum-based drips, leaks or spills may be easier to detect, contain (e.g. booms and absorbents), and address in a water body subject to vigilant inspections. An adequately isolated surface water body comprised of high-quality groundwater has a lower potential for environmental release of fertilizers, pesticides, septic field leachate, stormwater runoff than other potential land uses.

*d. A protected mine lake could be considered as a potential low-cost future surface water supply reservoir for potable use, that is, a third alternate water source as described in the Soil and Water Conservation District's 2013 report **(Cortland Co. SWCD, 2013)**. For this reason, the Town should consider an appropriate level of protection for the entire watershed. A summary table of water quality results for the 4 – quarter hydrogeologic investigation is attached as Table 5.*

7. In addition, if the Application is granted and mining is permitted below the water table, it will increase the permitted life of mine by decades. This alone would extend the time during which accidental releases of contaminants could occur and affect the water quality in the Aquifer and the Lime Hollow wells. It will also create a permanent surface water body that will not only be susceptible to contamination from natural and industrial sources, it will cause permanent changes to hydrology in the area. Such changes to hydrology are not sufficiently understood and were not adequately addressed in the Application materials.

Response:

*The potential for contamination is already addressed above. The probable changes to local hydrology from the fully built-out mine lake are addressed in **Responses #18-20** including greater detail than provided in the prior Application materials.*

8. In its Spill Prevention Plan (SPP), H2H describes various chemicals that will be on the site and how they will be handled. These include gasoline, diesel, hydraulic fluid to name a few. Table 1 of the SPP shows the purported water solubility of chemicals used at the site. Most are described by H2H as "insoluble". This, however, is inaccurate. For example, gasoline consists of many components, some of which are relatively soluble. Benzene is a constituent of gasoline and has a solubility of 1,780 parts per million (ppm). Benzene is also a known carcinogen and has a drinking water standard of 0.001 ppm. As such, the solubility of benzene is more than one million times greater than the water quality standard. Similar conditions occur for other chemicals that are reported by H2H as insoluble.

Response:

*a. This comment was addressed in full previously in the **July 23, 2019 Response to Comments**. To provide further clarification, Table 1 in the Spill Prevention Plan was focused on identification of and response to spills. It was not developed for a Human Health Risk Assessment. The relative solubility classes were taken from the published Safety Data Sheets included with the SPP and were defined based on relative, not absolute, solubility values.*

b. *Gasoline use would be limited to service vehicles. It will not be used a source of fuel for the mine excavation equipment. Its use would be limited to vehicles parked in the paved area at the south end of the Property.*

c. *Benzene content in gasoline varies but averages around 0.6%. The benzene content in diesel fuel is about two orders of magnitude lower. Drinking water standards are based on lifetime exposures, not possible exposure from a single isolated spill. Benzene's fate and transport are characterized by its volatility and chemical degradation by photooxidation and biodegradation especially under aerobic conditions such as would occur in the mine lake. These factors need to be considered when assessing risk.*

d. *As described in* ***Response #3****, measures will be taken to prevent and minimize any releases of pollutants. Onsite storage of fuels, lubricants, hydraulic fluids, etc. are minimal. Storage and use of solvents such as volatile organic compounds are de minimis and any that may be incidentally present would be at the office area at the south end of the mine. Releases should be negligible.*

e. *The Spill Prevention Plan that was submitted to DEC, SWCD, and the Town at the start of the hydrogeologic investigation addresses potential sources and quantities of contaminants, operational procedures, equipment preventive maintenance requirements, use of alternative "environmentally friendly" fluids where practicable, spill response preparedness, spill response supplies and equipment, employee training, periodic inspections, water level and quality monitoring, recordkeeping, and reporting. It is three years old needs to be updated now that the investigation is complete and additional comments received.*

f. *The SPP and Table 1 (****submitted October 2018****) need to be updated and revised to provide clarification and corrections*[1]*. The SPP should include reference to a worst-case scenario whereby the potential for potential Town well contamination would be greatest. These conditions may include: low groundwater level (September-November), hot summer to lower water viscosity, spill at northwest corner of the built-out mine lake, spill detection delayed if it occurs before a weekend or holiday, wind from the southeast to push lake water to northwest corner, and Town wells pumping continually to restore water level in storage tanks after a heavy water demand period.*

g. *The updated SPP should include a description of how the mining is expected to proceed. A land-based long-arm excavator will start mining the lake at the north end of the site. The excavator would be situated on unexcavated sand and gravel that is nominally eight feet above the seasonal high water level. With the bucket on the north side of the rig, the excavator will move west-east back and forth and gradually work its way to the south. Initially, the lake level will be the same as the ambient groundwater level but as the lake lengthens the variance between surface water and groundwater level at the north and south ends of the lake will gradually increase. Any drips, leaks or spoils at the excavator would be observed and cleaned up but if they are missed, the sand and gravel beneath the excavator will be eventually excavated and removed thereby eliminating risk of groundwater contamination. As the lake expands to the south the excavator action will be located farther and farther away from the well field thereby further reducing risk. At least initially, the excavator would be moved to a location farther east or south every night and carefully diesel-fueled away from the northwest corner. Gasoline-fueled pickup trucks would be present part-time. Risk would be controlled and minimized at time goes on.*

[1] T*he location of monitoring well MW-2 was inaccurately plotted on SPP Figures 1 and 2*

9. **The SPP also indicates that some of the chemicals are lighter than water and would float, and therefore, H2H concludes that accidental spills would not affect the Lime Hollow wells because the well screen intakes are deep within the Aquifer. This is not only overly simplistic, it is inaccurate. The drawdown caused by well pumping pulls water vertically downward. While this is more pronounced closer to the well, contamination in the upper Aquifer would clearly be drawn downward as it approaches the well. Additionally, dispersion tends to cause contamination to spread both vertically and horizontally. As dissolved contamination migrates, some will move downward due to dispersion, and will be more likely to be drawn into the town's water supply.**

Response:
*This comment was previously addressed in the **Response to Comments of July 12, 2019**. As made clear in the hydrogeologic reports, groundwater flow in this aquifer is predominantly horizontal. This is supported by the available data (water levels in MW-3S/MW-3D) and USGS's aquifer characterization (**Miller et al, 1998**). Precipitation tends to drive water at the water table deeper along the flow path. The 10:1 horizontal : vertical hydraulic conductivity ratio minimizes the extent of this downward migration. There is a distinction between downward vertical flow and a downward vertical component of flow. For downward vertical flow to occur, the equipotential lines need to be horizontal. This will not occur except possibly immediately adjacent to the well casings.*

*The pumping level at the Town wells does not intersect the well screen even under low water level conditions or during a prolonged drought. A minimum of seven feet of solid casing will remain below the pumping water level and above the well screen under low groundwater conditions (**Cortland Co. SWCD, 2013**). This will prevent shallow groundwater from entering the well intake. It is unlikely the shallow water will displace the deeper horizontally flowing groundwater. Any shallow groundwater that encroached upon the well would tend to flow in a circular vortex-like pattern around the pumping well while the deeper groundwater enters the intake. This is the purpose of the long surface casing. Just because the radius of influence reaches a surface water body such as the North Marl Pond does not necessarily mean that the captured water will enter the well intake.*

10. **Vehicle and equipment washing at the mine also present a significant pollutant potential. The proposed equipment washing station for the mine does not even as robust as the wastewater recycling and oil/water separators required at typical car washes even though the potential for leaks in heavy mining equipment is much more likely than is associated with the personal vehicles that use car washes. It appears likely that wastewater from washing this equipment will simply be allowed to run-off to the ground and to infiltrate to the Aquifer.**

Response:
Vehicle and equipment washing is a potential source of stormwater pollutants that needs to be minimized, contained, controlled, and treated. Washing of support vehicles and equipment would be in a paved area at the south end of the Property. Wash water would be contained and treated by an oil-water separator.

Is the Mine located Within the Capture Zone for the Lime Hollow Wells?

11. **Both H2H and NYSDEC have ignored the considerable body of research clearly indicating that the Mine is within the recharge area and the WPAs for the Lime Hollow wells. The Department's negative declaration states:**
The USGS study of the regional aquifer shows the direction of groundwater flow on a

<u>regional scale</u>. The new data, specific to the smaller geographic area where the mine is located, indicate that groundwater beneath the mine does not move toward the municipal wells. That conclusion has been accepted by Department based on submitted data and analyses by qualified geologists (emphasis added).

Response:

a. *The referenced statement pertains to current conditions and needs to be qualified for future conditions. Anticipated future conditions are described in* ***Response #18****.*

b. *The WPA delineation was known but did not factor into the findings because it did not directly bear on the investigation design or execution. The hydrogeologic investigation findings and conclusions focused on data collected on the mine Property. The investigation was independent of that delineation.*

c. *For perspective,* ***Krause and Griebler (2011****) report that the typical nominal size of the inner WPA zone is 50 meters (164 feet) internationally. H2H cites this statistic only for general reference and recognizes that WPA size should be determined on a site-specific basis and extra precautions need to be taken for a Primary and Sole Source Aquifer.*

12. The "qualified geologists" identified in the negative declaration are apparently only of the Applicant's paid consultant and NYSDEC's mineral resources staff whose focus is on mining, not identifying or protecting Primary Aquifers. They claim that the MODFLOW model used to establish the recharge area and define the boundaries of the WPAs is a "regional" that is less accurate than the one year of data obtained by H2H from only five onsite wells. In addition, H2H's work has ignored the fact that USGS's modeling actually underestimates the extent of the Mine's influence on the Lime Hollow wells because Lime Hollow pumping rates were considerably lower during model development. In actuality, the 2002 WPA delineation modeling represents a much more accurate estimate of current and future influence of the Mine on these wells. Further, H2H did not even address the effects of deep mining and establishment of a surface water reservoir at the mine on groundwater flow, its potential connection to the adjacent Marl pond and its effects on the Lime Hollow wells. Additional information is provided below.

Response:

a. *Site-specific data are more reliable than a model to characterize current conditions. The collected data consisted of automated water level and groundwater temperature measurements made at one-minute to 30-minute intervals with accuracy down to less than 0.1 feet. These measurements were made in five wells including a well pair that covered the full thickness of the aquifer including the horizon coinciding with Town Well No. 7's intake screen.*

b. *A numeric model may be a useful planning tool best applied to simulate different scenarios or complex future conditions that cannot otherwise be reliably inferred. To our knowledge the USGS and SWCD models did not incorporate an excavated mine pond or the hydrologic effect of the North Marl Pond. The models were not calibrated for site-specific data from the additional new monitoring wells. It is unclear from the available documentation to what degree the WPA delineation was based on modeling by USGS or SWCD and how well the findings compared. H2H has not seen the calculations used to develop the WPA. Regardless, H2H is not criticizing the WPA delineation or proposing that it be changed.*

c. *Both model report and the site data collected by H2H were reviewed by an outside expert, who has provided his comments (Attachment A). The Comments are based on the 1996 USGS modelling.*

H2H did not have descriptive details regarding the 2002 SDWA modeling that was used for the WPA. The arguments described in the report and its conclusions are still representative of comparing site data collected by H2H to MODFLOW models.

d. *The SWCD water supply assessment report (**Cortland Co. SWCD, 2013**) recommends that the Lime Hollow well pumping rate should not exceed 1 million gallons per day (mgd) (694 gpm). The report states that the sustainable yield is 1 mgd, and that higher withdrawal rates might result in seasonal drawdown problems. Excessively high rates would be inefficient and lead to increased energy usage. Accordingly, the NYSDEC Water Withdrawal permit is reportedly for 1 mgd. In contrast, the earlier report on the WPA delineation (**Cortland Co. SWCD, 2012**) assumed a continuous high pumping rate of 1.5 mgd which was based on a 20-year projection to 2022 to address potential future production (SWCD, 2002). Average production in 2020 was 0.785 mgd (Town of Cortlandville, 2021). Overstressing a well may not be sustainable.*

e. *Should a pumping rate greater than 1 mgd be contemplated by the Town in the future, the potential beneficial effect of mine lake recharge to the Town wells should be considered.*

f. *The effect of establishing a surface water reservoir (mine lake) was addressed in previous submittals of **October 17, 2018, July 12, 2019, and January 23, 2020. Response #18** provides additional descriptive detail regarding potential connection of the proposed mine lake with the North Marl Pond and Lime Hollow wells.*

13. Todd Miller is a retired hydrologist who worked for over 36 years for the USGS. He conducted numerous hydrologic investigations, ranging from site-specific contaminant studies, to assessments of over 30 "Primary and Principal Aquifers" in central and western New York. His specialty was conducting groundwater resource assessments in valley-fill settings. His other areas of expe1tise include: surficial geologic mapping, analysis of GIS data for use in regional water-resource evaluation, surface geophysical techniques, various drilling techniques, groundwater age dating, and especially pe1tinent here, the use of groundwater flow models for aquifer investigations.

Response:

Comment noted. Most or all of Mr. Miller's comments were abstracted from emails and it is unclear sometimes which submittal he is commenting on and thus context is not always apparent. Aquifer understanding evolved with time.

14. Mr. Miller was also the principal author and developer of the USGS MODFLOW model that was used to delineate the Wellhead Protection Areas (WPAs) for the town's supply well. Hundreds of groundwater and surface water measurements were obtained to calibrate and verify the accuracy of the MODFLOW model. Average, high, and low recharge conditions were simulated. U.S. EPA states on its website that numerical models, such as MODFLOW, are the most accurate method to determine WHPAs. See https://www.epa.gov/sourcewaterprotection/delineate-source-water- protection-area. Compare that with the narrow scope of H2H's token assessment.

Response:

a. *Comment noted.*

b. *The USGS model is useful but has imperfections. It is uncertain if these issues rolled over into the SWCD's 2002 model or affected its conclusions. It is noted in the USGS report (**Miller et al, 1998**) that the critical "Low Recharge" scenario did not use water level data from onsite monitoring wells*

MW-1 and MW-2. These two onsite wells were used for the "Average" and "High Recharge" scenarios. The numerical water level value indicated for the Town wells, 1156.75 feet, differs from the interpolated values on the "Low Recharge" scenario map by more than two feet. Client-measured groundwater levels at the commonly used monitoring wells, MW-1 and MW-2, revealed higher groundwater levels than in the USGS "high recharge" model and lower groundwater levels than shown in the "low recharge" model and fell outside the one-year duration 10-year recurrence range used for the USGS model.

c. *The H2H data included over 40,000 measurements each for water level and groundwater temperatures for five monitoring wells onsite, including a well pair, with water level resolutions better than 0.1 feet. The investigation included measurement of marl pond water levels.*

15. In correspondence with the County SWCD, Mr. Miller states:

> **I take issue with the consultant's statement that "MODFLOW is a regional model and is not accurate at local scales." The Cortland model is not a regional model. Regional model areas are much larger than that of Cortland's study area. In the DEC's own words, the Primary and Principal Aquifer studies conducted by the USGS for the DEC are "detailed studies" (not Regional studies). On the DEC website, it states--Beginning in 1980 and continuing through today, the USGS has partnered with DEC and other entities to produce nearly 70 detailed hydrogeologic map reports for selected aquifers at the 1:24,000 scale. The above statement is not even for where numerical GW model studies were conducted for the aquifers, therefore modelled studied areas are even more detailed than the reports cited in the above statement. Regional GW model studies typically encompass areas much larger (tens or hundreds of mi2) than the Cortland study area (6 mi2). Numerical GW flow models are the Cadillac of tools in hydrogeologic studies because they can account for the complexities of aquifer characteristics that determine GW flow conditions. Other studies, such as that as the consultant's do not (emphasis added).**
>
> ***Response:***
> *Comment noted.*

16. After thorough MODFLOW model development by Mr. Miller, based upon multiple years of data collection, model calibration and validation, the Town of Cortlandville's WPAs were delineated by the County SWCD using Mr. Miller's MODFLOW model. The additional modeling and WPA development were a collaborative effort by USGS, County Health Department, County SWCD, the Town of Cortlandville, and the City of Cortland. Contrary to H2H's suggestion in their January 3, 2020 letter to the County SWCD that Cortlandville's WPA's were based on factors other than accurate hydrogeologic modeling and that "many factors and assumptions contribute to delineation of a wellhead protection area: political, economic, town planning, environmental and technical considerations", the WPA delineations were based upon the best available information and technological tools. Based on this study, there is no doubt that the Mine is located within the Zone IA wellhead protection area for the Lime Hollow wells. Zone IA is the most critical part of the capture zone for the wells. The Town uses these WPAs as a zoning overlay to regulate land use in order to protect the Aquifer that is the source of its drinking water.

Response:
Comment noted.

17. Although Mr. Miller is retired, he has expressed a number of additional comments and concerns recently in his communications with County SWCD staff regarding the H2H report as relied upon by NYSDEC:

> **[t]here have been several model scenarios done for delineating the contributing area to the Town of Cortlandville wells, including those done by the USGS (1998 and 2004), and by the Cortland County Soil and Water Conservation District (SWCD, 2002). Very different pumping rates were used in these scenarios based on the pumping conditions at those times. The scenario with the smallest pumpage at the Town of Cortlandville wells was simulated in the 1998 USGS report when the towns wells were little used because of pumping pressure issues at that time. This very low pumping rate had to be used in 1998 because that was when the model was calibrated to real-world measured in-field values of groundwater levels, stream seepage measurements, and pumping rates at that time. In the USGS 2004 simulation, the Town wells were used part time on an intermittent basis which was much below the full-time capacity of the wells. The SWCD 2002 simulation, that was the basis to develop the Aquifer Protection Zoning law, used the largest pumping rate of 1.5 MGD that simulated expected future demand with all water for the town withdrawn from the Lime Hollow site. Arguably, the SWCD scenario should be used because it is used as the basis for the local zoning law and intended for long-term planning purposes. The SWCD scenario shows that the contributing area extends below the [sand and gravel] mine with the scenario simulating expected future pumping by the town wells.**

Response:

a. *Comment noted. See* ***Response #12.***

b. *The 2002 report (**Cortland Co. SWCD, 2012**) that was forwarded to H2H was a general overview and did not include details such as the modeled output, effect of the marl ponds, groundwater levels, aquifer saturated thickness, aquifer transmissivity and hydraulic conductivity, which well was used for the simulation, drawdown at the pumping well, criteria for defining the WPA limit, the possible use of particle tracking, the effect of the sloping water table (regional northeasterly groundwater flow), seasonal precipitation recharge, etc.*

18. Additionally, Mr. Miller reviewed and provided the following further comments on H2H's reports:

> **The three main points are I) the consultant report oversimplifies the flow directions at the site because they ignored the effects that the ponds have on the groundwater system, 2) incorrect conclusions were made on the groundwater level data, and 3) the report neglected to address the effect of a large dredged pond would have on the groundwater flow system (including that in the vicinity of the municipal wells), a gross oversight in my opinion.**

Response:

H2H did not neglect the effect of the mine pond on local groundwater levels. We provide additional discussion on this important topic in ***Response #19*** *below.*

19. The scope of this report mostly describes the present [groundwater] flow direction based on existing conditions in which the floor of the [sand and gravel] pit is generally greater

than 8 ft above the water table. Presently, there is no direct hydraulic connection between the pit and groundwater. However, the main concern of this proposed project (and that which this report ignores) should be: <u>What would be the effects of an enlarged [sand and gravel] mining operation that dredges gravel far below the water table on the Cortland Aquifer, including effects on the Town of Cortlandville municipal wells on Lime Hollow Rd. and on the several ponds that border the pit on the northwest and north perimeters. The scope of this feasibility investigation should [have] focused on the major changes to the aquifer system by the future changes to be expected by this dredging proposal, not on current site operations and conditions [bold as in original].</u>

Response:

a. *<u>Well Interception of Ambient Flow Field</u> – The water table southwest of the Town well field generally slopes toward the well field. The well field is thus well-situated to capture or intercept the northeasterly-flowing groundwater in addition to inducing radial inward flow (**USGS, 2004**).*

*The quantity of potentially intercepted flow can be estimated using the modified Darcy equations: Q=TiL, where "Q" is the well discharge or 154,011 ft3/day (800 gallons per minute (gpm)), "T" is the aquifer transmissivity (hydraulic conductivity times aquifer thickness) or 69,080 ft2/day (880 ft/day x 78.5 feet) for average conditions, "i" is the hydraulic gradient which can be estimated from the USGS groundwater contour maps, and "L" is the width of the intercepted flow measured perpendicular to the groundwater flow direction. The 800-gpm pumping rate (1.16 mgd) is used for the estimate because it is the highest production rate that H2H is aware of for the Lime Hollow wells although the average rate was around 0.785 mgd (545 gpm) in 2020 (Town of Cortlandville, 2021). The hydraulic conductivity of 880 ft/day is based on a previous pumping test at the Lime Hollow wells (**Miller et al, 1998**).*

Review of the USGS groundwater contour maps reveals that the modeled hydraulic gradient is higher on the west side of the wetland/marl pond complex than on the east side where the proposed mine lake is located. This lower gradient at the mine lake area is consistent with H2H measurements.

*The width of the intercepted flow path under existing conditions can be estimated for three water level scenarios using the USGS model. The water levels represent modeled one-year duration groundwater conditions with a 10-year recurrence interval (**Miller et al, 1998**).*

***Average groundwater conditions**: the hydraulic gradient from the USGS map for average conditions is scaled off at 0.0030. The resulting width of the flow path is 743 feet, or about 372 feet on either side of the near well. The eastern edge of the intercept zone is slightly east of the western edge of the North Marl Pond and thus it is likely that the Pond provides some recharge to the well. For reference, the distance from the Town well to the west edge of the approximately 225-foot wide North Marl Pond is approximately 345 feet.*

***High recharge conditions:** the hydraulic gradient from the USGS map for high recharge conditions is scaled off at 0.0037 and the transmissivity is adjusted upwards for the increased aquifer thickness to 71,104 ft2/day. The resulting width of the flow path is 585 feet, or about 293 feet on either side of the near well. The eastern edge of the intercept zone is west of (short of) the western edge of the North Marl Pond and thus the relatively higher water table and gradient are sufficient to recharge the well without interaction with the North Marl Pond.*

Low recharge conditions: *the hydraulic gradient from the USGS map for low recharge conditions is scaled off at 0.0022 and the transmissivity is adjusted downwards for the decreased aquifer thickness to 55,792 ft2/day. The resulting width of the flow path is 1,255 ft2/day, or about 627 feet on either side of the near well. For this scenario the North Marl Pond would likely be dry and the flow intercept width would reach the eastern side of the North Marl Pond. As stated in H2H's submittal of* ***January 23, 2020****, evidence of drawdown from the Town wells was observed in monitoring well MW-3S which is located approximately 170 feet southeast of the North Marl Pond. This occurred over a 14-day period in October-November 2019 when the water table was seasonally low and the North Marl Pond was dry. The maximum observed drawdown of 3 inches was observed for a one-hour period Sunday morning, October 27, which H2H surmises may have been caused by an unusually high well pumping rate associated with replenishment of the Town water tank storage following increased water usage that weekend day of the World Series.*

The proposed mine lake would be approximately 125 feet farther southwest of MW-3S and 210 feet farther southwest of the North Marl Pond. It is unlikely that the Town well's radius of influence would reach the proposed mine pond under current conditions.

As indicated by the three recharge scenarios, lower groundwater levels are associated with a reduced-thickness saturated zone, lower transmissivity, lower hydraulic gradient, lower groundwater flow rate and volume, and a wider capture zone for a given well production rate.

b. <u>Future Conditions</u> *- These scenarios need to be adjusted for future conditions. As stated in the hydrogeologic submittals on* ***October 17, 2018****,* ***July 12, 2019****, and* ***January 23, 2020****, the built-out mine lake would equilibrate groundwater levels over its length (actually there would be a very slight slope toward the northeast). For the initial excavations, the mine lake water level would be essentially the same as the groundwater level. As the excavation grows in a north-south direction and the mine lake expands, the mine lake level would be approximately the average of groundwater elevations at the upstream (south) and downgradient (north) ends of the lake.*

At full build-out the unchanged water level at the hinge line would be in the vicinity of the south and mid marl ponds which thus would experience only minor changes in water level, if any. Mine lake levels would be lower than ambient groundwater levels at the south end of the fully-built out mine lake and higher than ambient groundwater levels at the north end. The magnitude of the variance would vary seasonally. Based on data collected during the one-year hydrogeologic investigation, the change in water levels at the mine lake ends would range from approximately 1.7 feet (November 2019) to 3.9 feet (one week in February 219), and would average approximately 2 feet. More specifically, during the high-water level spring period the lake elevations would average 2.2 feet above the ambient water table. During the seasonal low groundwater levels in fall, the average lake-level rise would average 1.3 feet with a peak of 2.2 feet. These changes to the local groundwater levels are relatively small in relation to the 10-15-foot annual seasonal variation in water levels.

The relatively higher lake levels at the northwest corner of the mine lake would increase the hydraulic gradient toward the Town wells. The North Marl Pond would probably buffer this hydraulic gradient when there is water in the Pond, which should occur during average and high water level periods. But in periods of low groundwater when the North Marl Pond is dry, it is likely that groundwater seepage from the northwest part of the mine lake would flow directly toward the wells, especially when they are pumping. See ***Response #5****. The relative*

contribution to well recharge would be minor. H2H estimates the contribution on the order of only ten percent based on the proximate relative length of the recharge arc around the Town wells.

Marl Ponds - Based on our observations the marl ponds are closed kettle-like depression whose water levels are, in general, surface manifestations of the water table. They are subject to precipitation recharge and evaporation. Pond levels vary with fluctuating groundwater levels but may exhibit slightly higher water levels (less than one foot) than the water table owing to the low-permeability pond bottom that may result in a small amount of perched water from precipitation. This slightly higher water level might cause the North Marl Pond to act as a hydrologic buffer between the proposed mine lake and Town well field. The Pond surface water body provides approximately three times greater water storage volume per square foot than the aquifer (owing to porosity) and therefore relatively attenuates lateral expansion of the well's cone of depression. See Response #27.

When the water table falls below the pond bottoms, the ponds' effect on local groundwater gradients can be ignored. When the water table rises the pond water level will equilibrate the differing groundwater levels at the upgradient (south) and downgradient (north) sides in a manner similar to the proposed mine lake.

The North Marl Pond water levels may be affected by both the pumping wells and the fully built out proposed mine lake. Depending upon water level, the North Marl Pond may serve as a recharge source for the Town wells. Town well pumping would contribute to lowering the surface water level and contributing to the Pond drying up. The proposed mine lake may raise the water level in the North Marl Pond or reduce its frequency of drying up if the lake effect reaches the 210-foot distance to the North Marl Pond. The magnitude of change is difficult to quantify. When the North Marl Pond is dry, water seeping from the mine lake may flow directly toward the pumping Town wells.

c. *Ambient Groundwater Flow Directions – Based on sketch maps of the anticipated water level contours, the flow direction changes would be relatively more pronounced at the south end of the mine pond, especially under low groundwater level conditions. The hydraulic gradient toward the mine lake in that area would be slightly steeper and foreshortened as a result of groundwater recharge flowing from the southwest.*

The relatively higher mine lake level in the north would "obstruct" the ambient northeasterly-flowing groundwater and lead to a rise of the water table adjacent to the northwest side of the mine pond. This may contribute to a slightly higher water level in the North Marl Pond area and increase the available water storage in this part of the aquifer, which would be available to the Town wells under low water table conditions.

20. Specifically, a new dredged pond is the major and the most significant new feature of this proposed project that will have the significant potential impact on the hydrology in this area. Dredging into the aquifer will create a direct hydraulic connection not only to mining operations, but also between [groundwater] and a newly created surface-water body. The new dredged pond will change the configuration of the local [groundwater] flow system. Instead of a sloping water- table surface that is presently at the site, there will be a constant-head conditions (sic) at the pond (the water table and pond water surface will be at the elevation in the mine pit).

Response:
See ***Response #19.***

21. Mr. Miller also describes certain "[i]mportant points missing or not mentioned clearly in Section 2.1.5 of the H2H report":

> **The abnormally high seasonal fluctuation of temp in MW-4S, which coincides perfectly with ambient seasonal air temp, is mainly due to [surface water-groundwater] interactions. Specifically, [surface water] flowing out from the north end of North Pond that is colder than [groundwater] during the winter, and warmer during late spring thru summer, flows toward MW-4S during non-pumping conditions. Trends of [groundwater] temps do not normally coincide with ambient air temp unless under the influence of [surface water] or some anthropogenetic causes (injection of fluids).**

Response:
Comment noted. This interesting observation is reported most notably in H2H's submittals of ***March 12, 2019*** *and* ***March 31, 2020****. The temperature anomalies reflect the northeasterly groundwater flow directions from the North Marl Pond. Monitoring well MW-4S is located approximately 750 feet directly downgradient from the North Marl Pond and the water in the North Marl Pond generally reflects a window into the water table. Temperature variations act as a groundwater flow tracer.*

22. Pumping of [Town of] Cortlandville wells that greatly affects the temp in MW-4S, indicates that during pumping conditions, the wells change the flow regime in the vicinity of the ponds and the [sand and gravel] pit. During pumping, the contributing area of the wells extend south [sic] to at least the ponds and probably extends beneath the pit, especially during periods when the ponds are dry.

Response:
These groundwater temperature variations are consistent with the current conceptual site model. The pumping wells capture groundwater that would otherwise flow to and beyond the North Marl Pond in a northeasterly flow direction. When pumping stops, the northeasterly flow resumes. The net result is that monitoring well MW-4S "sees" different groundwater that is either affected by the seasonal air and North Marl Pond temperatures or by the ambient groundwater temperature.

The temperatures in MW-4S reflect intermittent groundwater recharge from the North Marl Pond. The intermittency is related to pump cycling that temporarily interrupts groundwater flow to the North Marl Pond. The abrupt cycling on and off of the pumps creates a disturbance in the water table that is propagated outward in all directions but especially downgradient to the northeast. The well's capture zone does not extend downgradient to MW-4S or to the proposed mine lake area as Mr. Miller suggests. MW-4S is located approximately 750 feet downgradient of the Town wells and over 1,000 feet north of the proposed mine lake. The pump cycling disturbs the ambient groundwater flow and this disturbance propagates most efficiently in a downgradient direction.

23. It should be mentioned that when the [Town's] municipal wells pump, the temp in MW-4S rises during the winter . . . and falls during late spring and summer . . . , another indication that the pumping wells are altering the flow pattern in the north part of the pit and perhaps in the main part of the pit, also.

Response:

a. *The abrupt and frequent temperature variations for downgradient MW-4S **(Figure 2)** reflect the effect of pump cycling on the North Marl Pond and have nothing to do with the proposed mine lake located more than 1,000 feet to the south.*

b. *The temperature variability ceases shortly following a heavy precipitation events in mid-July. Precipitation recharge dominates at that time. Eventually the pump-cycling induced temperature variations return in early September and gradually attenuate, with occasional precipitation recharge interruptions, when the aquifer water level is lowest and temperatures at the north end equilibrate in MW-3S, MW-3D and MW-4S. The variability also ceases later when the North Marl Pond dries up in October-November. These surface water-groundwater interactions demonstrate the northeasterly flow from the North Marl Pond through MW-4S and the effect of pump cycling on groundwater flow to the North Marl Pond. These observations are not observed at MW-3S which is approximately the same distance (less than 10% farther away) from the Town wells as MW-4S and near the southeast corner of the North Marl Pond.*

24. Since in a unconfined glacial aquifer system, there commonly are [surface water - groundwater] interactions, the creation of a dredged pond (where there presently is none), will alter the hydrologic system - specifically a part of the aquifer with a sloping water table gradient will be changed into an area of constant head at the newly created dredged pond. This will modify flow conditions and create new conditions such as, the pond will become a groundwater sink at the south end (upgradient in [groundwater] flow) where [groundwater] flow paths will be into the pond, and at the hinge line, water will flow out of the pond at the north end and re- enter the aquifer.

Response:
*Comment noted. See **Responses #5 and #19**.*

25. Mr. Miller also points out certain disagreements with H2H's conclusions in its "SECTION 3.0 CONCLUSIONS":

I disagree with the statement "the available data indicate that the proposed mine pond would have minimal and inconsequential hydraulic interaction with and effect on the water quality and quantity at the Town's two Lime Hollow Road wells." Not only are the conclusions about the effect of current conditions are (sic) inaccurate and wrong ... , such as the role of the three ponds and the effects of present pumping on the [groundwater water levels] and on the direction of [groundwater] flow are inaccurate, this report fails to address the most important issue concerning this proposed project, which is <u>what will be the effects of a dredged pond on the aquifer and ecological systems, especially the effects on the Town of Cortlandville water supply system. Nothing at all was mentioned about the proposed dredged pond!</u> [bold as in original].

Response:
*Comment noted. See **Responses #5 and #19**. The last sentence in the comment is inaccurate.*

*It is probable that the proposed mine pond will be beneficial to Town well recharge quantity under seasonal low groundwater levels during a drought period. Potential adverse effects of the proposed mine lake on Town well water quality are negligible for the reasons presented above. See **Responses #1, 4, 5, 6, 8, 9, 10.***

26. I disagree with [H2H's] last sentence, also [H2H's statement: *"The potential for significant adverse impacts to the municipal well would be negligible. This conclusion is based on multiple lines of evidence indicating that groundwater flow at the proposed mine pond is northeasterly and away from the Town wells apparent capture zone."* The data clearly indicates that the [groundwater] flow directions in this site are more complex than that described in this report. Specifically, the data shows that the ponds are hydraulically connected to the groundwater system and have significant impacts on the local [groundwater] flow regime as well as the pumping at Lime Hollow Rd. In addition, the temp and water level data indicate that the T. of Cortlandville wells clearly effects (sic) the [groundwater] regime in a complex manner, specifically, [groundwater] flow directions are significantly altered during pumping conditions as evidenced by the temp data. <u>The water level data definitely shows that most of the [sand and gravel] mining site is within the area of influence</u> of the town wells, and possibly even within the zone of contribution under short-term pumping conditions (7-10 hrs intervals), but this second postulation is unknown because the USGS groundwater flow model uses units uses (sic) of daily average pumpage, so high-pumpage conditions for partial days are not fully represented by the model. Lastly, there is recent available data by the Cortland County SWCD on the contributing area to the town wells which shows that, in the scenario used for estimated future need for water, the [sand and gravel] pit is within the contributing area to the municipal pumping wells [<u>bold as in original</u>].

Response:

a. *Groundwater flow is northeasterly under current conditions and will continue thus in the general area in the future when the proposed mine lake is initially excavated. Current conditions provide a foundation for projecting probable future conditions.*

b. *As the north-south length of the proposed mine lake increases the presence of the mine lake would locally change groundwater flow directions along the eastern side of the mine lake where the lake is gaining (south) and losing (north). At full build-out mine lake levels would differ from ambient groundwater levels by no more than 3.9 feet and more typically on the order of 2 feet on an annual average or 1.3 feet when the North Marl Pond is dry. Considering the seasonal groundwater fluctuation of 10-15 feet, these changes would be minor.*

c. *Groundwater seepage from the northwest part of the mine lake would flow northwesterly, especially when the Town wells are pumping. This groundwater seepage would flow to and recharge the Town wells especially when groundwater levels are low and the North Marl Pond is dry. This contribution would be on the order of 10 percent of the well recharge.*

d. *H2H disagrees with the assertion that "The water level data definitely shows that most of the [sand and gravel] mining site is within the area of influence of the town wells". The available data do not support this statement.*

e. *H2H is unaware of any conflicting data that supports the contention "Lastly, there is recent available data by the Cortland County SWCD on the contributing area to the town wells which shows that, in the scenario used for estimated future need for water, the [sand and gravel] pit is within the contributing area to the municipal pumping wells [bold as in original]." The available data do not support the assertion. See* ***Response #12.***

27. Finally, Mr. Miller has observed that the H2H report provides a graphic (Figure 5) showing groundwater flow direction from a single date (8/31/2019) but does not report water levels from the ponds for this date. Mr. Miller states:

> **Additional insights as to the flow directions and hydraulic connections to nearby surface-water bodies (ponds) can be gleaned from the Feb 5, 2019 and May 20, 2019 [water level] measurements made in the monitoring wells and in the ponds (Tables 3 and 4, Baseline report, July 2019). The [water level] elevation relationships indicate that [groundwater] in the [northwest] part of the pit (in the vicinity of MW- 3S) flows north-northeast and probably discharges into the south end of North Pond. Lakes and wetlands in glacial terrain underlain by highly permeable deposits commonly have ground-water seepage into one side and seepage to groundwater on the other side. This relation is relatively stable because the water-table gradient between surface-water bodies in this type of setting is relatively constant. The boundary between inflow to the lake or wetland and outflow from it, termed the hinge-line ... can move up and down along the shoreline.**

Response:

a. *The groundwater levels for 8/31/2021 and inferred flow directions represent mean conditions as stated on the figure. Flow directions were calculated for approximately 365 combinations of daily mean data measured over the full year of monitoring. This selected date just happened to be one for which the flow directions matched the mean.*

b. *One of the unplanned modifications to the scope of work was the omission of staff gauges at the marl ponds as originally proposed. Available data indicate that the pond water surfaces generally reflect levels slightly above the average spatially equilibrated groundwater levels at those locations based on MW-3S and MW-4S. Just as the proposed mine pond will reflect an average of groundwater levels at the upgradient and downgradient ends, the marl ponds will reflect such averages albeit over shorter distances. The marl ponds were observed dry during the site visit on November 20, 2019. Groundwater levels in that area ranged from approximately 1161.5 to 1163.0 feet amsl.*

c. *As stated in H2H's submittal of **January 23, 2020**, groundwater from the northwest corner of the mine pond would likely flow into the south end of the North Marl Pond when the groundwater level is above the marl pond bottom (dry conditions) or surface water level (flooded conditions). Under average groundwater level conditions, the Town well's capture zone would likely expand 345 feet to the east and reach the hinge line area of the North Marl Pond. See **Response #19.***

d. *The coincidence of the water table and marl pond water level may involve a slight lag owing to the probable low permeability of the pond bottoms. Marl is a mixture of clay and lime which should have lower permeability than sand and gravel. This condition may be enhanced by accumulation of low-permeability organic material on the pond bottom. When the water table is dropping some surface water may remain perched in the ponds until the residual surface water seeps and drains out. During a rising water table, the low-permeability marl pond bottoms may retard flooding of the ponds.*

Other Town and County SWCD Comments on Deficiencies in H2H's Reporting

28. H2H in its scope of work, proposed to research available hydrogeologic data. The only two documents they describe as having evaluated are two USGS documents. The 2002 Wellhead Delineation Report, prepared by County SWCD for the Town of Co1ilandville, was provided to the DEC Mining Division. If H2H had access to this report, they did not make use of it in their reporting.

Response:
H2H did not have access to the Cortland County's SWCD 2002 report at the time of report preparation. The report was made available to H2H with the first set of multi-agency comments on 1/29/2021. H2H also did not have access to the Cortland County SWCD's 2013 water supply assessment report. The reports would have facilitated the development of H2H report, but would not have changed the stated conclusions based on the data we had available.

29. H2H proposed installing staff gages in three existing ponds to obtain accurate water level measurements in the ponds. They failed to do this. Instead, they used a GPS unit to measure the water level in one pond and estimated water levels in the other ponds by interpolation using data from groundwater monitoring wells. Availability of accurate pond water level data is crucial to understanding ground water flow. The limited, and questionable pond level data obtained as part of this investigation is not sufficient to fully understand groundwater flow.

Response:
True, the staff gauges were not installed as proposed. If they had been installed, they would have been used to measure water levels at the time of quarterly site visits. The marl ponds are closed basins whose water levels are groundwater controlled. The GPS-measured pond elevations are in close agreement (slightly lower, 0.30 to 0.91 feet, than actual measurements) with the interpolated values obtained from the transducer measurements, which was sufficient for the purposes of the investigation. Staff gauges are subject to vandalism and frost heave and could lead to erroneous data. The staff gauges were omitted for that reason.

30. Assessing groundwater flow should have more carefully considered Lime Hollow well pumping. Field measurements should have been coordinated with times that the LW well(s) were actually pumping. Water levels from one or more of the town monitoring wells located near the Lime Hollow supply wells and/or construction of a new monitoring well located west of the northernmost pond should been obtained. The supply well water levels provided by the Town are approximate and are not sufficiently accurate to be used in this investigation. Because of the critical ramifications this evaluation has on the community's water supply, rigorous follow-up should be demanded.

Response:
*a. Comment noted. Automated water level recorders (transducers) were installed in all monitoring wells. Water levels and temperature measurements were made at intervals of one minute early on, and at every 30 minutes afterwards. Measurement precision and accuracy were less than 0.1 feet. This measurement frequency and resolution were ample to identify pumping cycling effects if the wells were located within a detectable range. That was a primary objective of using the transducers. As it turned out, pumping cycles could be detected only indirectly by the effect on groundwater temperatures at monitoring well MW-4S (**Responses #21-23**). The effect could also be detected in monitoring wells MW-2, MW-3, MW-4S as a low amplitude wavelet probably caused by the water table disturbance resulting from the Town well pumps turning on and off abruptly. The amplitudes were 0.09 feet in MW-2 and MW3 and 0.35 feet in MW-4S. The effect was higher in MW-4S because of advective groundwater flow in a downgradient direction (**March 31, 2020 submittal**).*

b. *Reliable static and pumping water levels at the Town wells were not available. Installing transducers in the Town wells was considered but was not part of the scope of work. This would be a good idea for the Town to do for future operational and maintenance-related purposes independent of the mine permit application.*

c. *H2H was not advised of any Town monitoring wells in the area that would have potentially been useful for the investigation. H2H learned of a monitoring well located near Town Well No. 2, when we recently reviewed the SWCD 2013 report. Reliable data from that well may have been useful for assessing Town well efficiency and drawdown.*

d. *H2H agrees that it would be worthwhile to develop a fuller understanding of the aquifer at the well field. The Town should consider installation of a monitoring wells southwest and east of the Lime Hollow wells.*

NYSDEC's Issuance of a Negative Declaration

31. The undersigned government agencies strongly object to the negative declaration issued by Department staff. As you well know, the negative declaration was issued after the Planning Board's authority to act as lead agency was taken away from it by NYSDEC following a lead agency dispute initiated by the Department. In doing so, the Department contended that it would be in a better position to study these important issues. In hindsight, that was not the case. The Town and County SWCD believe the negative declaration should not have been issued, for both legal and scientific reasons, and it should be rescinded pursuant to 6 NYCRR § 617.7(f)(l).

***Response**:*
Comment noted.

32. The determination was made after the Town of Cortlandville was assured by Commissioner Seggos in his decision to grant lead agency status to the Department that the Department would undertake a full review of the anticipated impacts of the action upon the Aquifer and supply wells. Instead, it appears staff's negative declaration was solely calculated to foster and encourage mining rather than to fully assess the risk to a crucial environmental resource. It is clear from the negative declaration that the Department merely accepted the technical arguments made by the Applicant's paid consultant H2H without any scrutiny or input from either a NYSDEC hydrogeologist or more importantly, NYSDOH hydrogeologists or officials[2] (the agency with the most direct responsibility to protect this Primary Aquifer). As described above, H2H's technical studies were based upon short-term and incomplete scientific studies and assumptions that conflicted with longstanding data and modeling designed and accepted by the federal, state and local government agencies with primary responsibility to protect the Aquifer and public water supply that this vertical expansion threatens.

Response:
H2H collected site-specific hydrogeologic data over a one-year period. Groundwater level and

[2] **1 We can find no indication that NYSDOH was ever treated as an involved agency by NYSDEC despite its role in protecting the WPA**.

*temperature measurements were collected at an interval of 1- to 30 minutes across five monitoring wells and comprise a database of over 40,000 measurements. Mean groundwater flow directions were calculated for each date (**submittal of March 31, 2020)**. By use of actual site data the need for assumptions was minimized. The hydrogeologic data are sufficient. Conclusions are based on the data and are augmented in the Responses to Comments to provide additional clarification.*

33. Although as lead agency, the Department may accept competing technical studies, it's decision to rely on the positions of the Applicant's paid consultants rather than on unbiased reports long relied upon by government agencies is most discouraging to the involved agencies. NYSDEC accepted the Applicant's premise that mining below the water table and thereby creating a large standing body of water adjacent to an industrial activity located within the Wellhead Protection Area for the Lime Hollow supply wells would not threaten those wells. It did so without even requiring a DEIS to objectively vet that controversial contention in a more public process.

***Response**:*
If you can identify any bias in the hydrogeologic investigation, its data, results, findings, conclusions and recommendations, please bring the specifics to our attention.

34. As you know, the proposal to expand the current mining operations horizontally and beneath the water table is a Type I action which "is more likely to have a significant adverse impact on the environment than other actions or classes of actions" such as unlisted actions. NYSDEC SEQR Handbook, pg. 15. As such, that action is presumed to require a positive declaration in absence of definitive information demonstrating the absence of significant environmental concerns. The Court of Appeals has recognized that the Environmental Impact Statement ("EIS") process is "the heart of SEQRA". *Jackson v. NYS Urban Dev. Corp.,* 67 NY2d 400,425 (1986). It is that EIS process and not a conclusory review during the application process that should objectively assess the clear concerns which are evident in this matter. Courts have long described the threshold for requiring the preparation of an environmental impact statement to be "relatively low". *See, e.g., H O.ME.S. v. NYS Urban Dev. Corp.*, 69 AD2d 222,232 [4th Dept 1979]. A positive declaration must be issued if the action "may include the potential for at least one significant adverse environmental impact." 6 NYCRR § 617.7(a)(l) (emphasis added); see, also, *Jackson, supra.* On the other hand, to issue a negative declaration, the lead agency "must determine either that there will be no adverse environmental impacts or that the identified adverse environmental impacts will not be significant. 6 NYCRR § 617.7(a)(2) (emphasis added).

Response:
Response provided by Applicant attorney under separate cover.

35. The potential impacts to the Lime Hollow water supply wells were not adequately assessed by H2H and NYSDEC during its SEQRA review of the proposed action, notwithstanding the conclusory assertions in the Negative Declaration that "[t]here would be no loss or significant adverse impacts to either the quality or quantity of ground or surface waters from mining at this site . . . [and that] [t]here have been no issues raised, nor investigations, evidence, tests or other analysis that would lead the Department to conclude that any significant water quality or quantity problems could result from sand and gravel mining above or below the water table" (emphasis added). In fact, significant issues were raised

by the Town and County SWCD and the Department is well aware of the existing studies identified in this letter (and others) concerning the direction of groundwater flow and the location of the Town's Wellhead Protection Areas.

Response:
Comment Noted.

36. Commissioner Seggos in his Decision of September 5, 2017 (awarding lead agency status to NYSDEC rather than the Cortlandville Planning Board) said the following: "impacts to groundwater including the sole source aquifer and to the federal designated wetland bog habitat are of regional concern ... [and] DEC as a state agency, is in a better position than the Planning Board to investigate and address impacts of regional significance." Additionally, the Commissioner expressly stated:

"[w]hile designating DEC as lead agency, I must remind it to remain aware of all potential impacts that have been identified during this lead agency dispute, or which may be identified during the course of environmental review" (emphasis added).

Response:
Comment Noted.

37. Substantive issues and concerns regarding the impacts of the Application were raised by the Town of Cortlandville, County SWCD, and Department Staff during the lead agency dispute and the Department's SEQRA review. Relevant correspondence includes but is not limited to the following:

In a May 8, 2017 letter from Town Attorney John B. Folmer to Joseph Dlugolenski of Region 7 (relating to the Department's intention to contest the Town's status as lead agency), Mr. Folmer expressed concern that the Applicant appeared to be unaware of the Mine's location near one of the Town's Primary drinking water supply wells;

Response*:*
Comment Noted.

38. In his letter of May 17, 2017 to Commissioner Seggos regarding the lead agency dispute, Joseph Dlugolenski, DEC's then Deputy Regional Permit Administrator, identified the following four potential adverse environmental impacts from the proposed mine expansion: impacts to the groundwater/aquifer due to proposed mining below the water table; potential impact to the nearby Town water supply well; hydrologic impact to nearby federally designated wetland bog habitat within the Lime Hollow Nature Center; and an increase in truck traffic on the mine access road's connection to NYS Route 13;

Response:
The EAF does not mention the wetland, bog, marl ponds or include the Environmental Mapper report and should be revised proactively. A technical response showing no potentially significant environmental impacts to the Marl ponds, and wetland bog habitat is included in H2H's "Technical Response to Lime Hollow Nature Center's Comments" response to comments document. Additional comments on groundwater/aquifer impacts, and truck traffic have been addressed.

39. In a letter of May 25, 2017 to Commissioner Seggos, Mr. Folmer confirmed the four impacts identified by Mr. Dlugolenski in the May 17 letter, and further emphasized the Town's additional concerns regarding: the possible impact of the action upon wildlife at the adjacent Lime Hollow Nature Center; the fact that the project is located within 750 feet of a municipal well and other sources of water supply within the Aquifer; and the fact that the Aquifer provides water to almost 50% of the population of Cortland County, including the Town of Cortlandville and the City of Cortland;

***Response**:*
Comment noted.

40. June 20, 2018 letter from Town of Cortlandville Supervisor Richard Tupper to Commissioner Seggos copying Mr. Dlugolenski and other state and county officials, regarding: the conflicting mission of NYSDEC to foster and promote mining while protecting the citizens from irreversible harm; the fact the sole source Aquifer is required to provide clean water to thousands of residents of the County; that the Town places stringent controls over projects that would have a deleterious impact on the Aquifer; and the fact that there is no way to mitigate the potential damage to the Aquifer from the project if the permit is issued;

***Response**:*
Comment noted.

41. Letter of August 7, 2018 from NYSDEC Regional Director Matthew Marko to Supervisor Tupper, confirming: the "significant natural resources in the area"; the fact "the Town water supply well is located approximately 800 feet from the existing edge of the life of mine"; the fact that the "mine is within the wellhead protection area for the Cortlandville Lime Hollow supply well; the fact the adjacent "Lime Hollow Nature Center is a 430 acre nature preserve that includes an unusual assemblage of marl ponds, a peat bog, and kame-and-kettle topography"; that a Notice of Incomplete Application was sent to the Applicant "which requested additional information about the sole source aquifer, potential groundwater and surface water impacts, information about the lime hollow well, noise, equipment refueling and potential spill best management practices and where these activities will take place";

***Response**:*
Comment noted.

42. County SWCD's September 13, 2018 letter to Supervisor Tupper, copying Joseph Dlugolenski, NYSDEC Deputy Regional Permit Administrator, regarding the Applicant's proposed permit modification: the mine is located approximately 730 feet from the Lime Hollow Road water supply well and is within Zone IA of the Town's wellhead protection area, the most critical zone for protection of the water supply; the Aquifer beneath the mine provides drinking water for the City as well as the Town; mining below the water table may affect water quality and quantity of the Aquifer with potential effects on temperature, recharge and water table elevation; mining below the water table increases the risk of contamination from external sources during and beyond the life of the mine; and the quality and quantity of drinking water is at greater risk if mining beneath the water table is approved than it would be if the current 8' separation buffer is maintained. In addition, while County SWCD recognized the benefits that mining can provide in the appropriate areas, not all locations are appropriate and at some locations

other priorities should take precedence. County SWCD recommended certain monitoring and mitigation measures (but only if mining is approved by NYSDEC); and

Response:
Comment noted.

43. County SWCD's December 3, 2018 letter to Supervisor Tupper, copying NYSDEC Deputy Regional Permit Administrator Joseph Dlugolenski, critiquing H2H's Scope of Work for its Hydrogeologic Assessment and H2H's prior point by point response to County SWCD's September 13, 2018 comments to Supervisor Tupper, identifying numerous concerns with H2H's theories: the mine pond is unlikely to be a significant recharge boundary (preventing contaminants to migrate to the well) for several reasons, including a prior analysis by Clough Harbour Associates showing that drawdown is negligible at a distance of 300' from the well; gasoline and diesel fuel which will be used in mining equipment have a much higher solubility in water than H2H's Spill Prevention and Response Plan indicates; the Town's well screen located at the bottom of the well casing does not protect the water supply from dissolved contaminants, and does not protect the water supply from contaminants introduced at the surface, and a supply well drawing water at depth can induce or increase a downward vertical gradient (thereby drawing contaminants toward the water supply well).

Response:
The scope of work was submitted to SWCD and DEC for comments before the work began and there was ample opportunity and willingness to make any changes deemed appropriate. All of the raised comments were previously addressed in H2H's responses to comments. The reference to the Clough Harbour Associates report was anecdotal based on information provided in a comment letter by SWCD. H2H does not know the context of the reference to the 300-foot distance or what drawdown threshold was used to make that conjecture. Very often a drawdown threshold on one foot is used, but our measurements had resolution more than an order of magnitude ore precise. H2H requested a copy of the CHA report and never received it. The reference to the statement about gasoline and diesel solubility was never intended as a precise description of material properties and was subsequently clarified in the response to comment, and again in ***Response 8. a.*** *of this document.*

44. Additionally, in his letter of May 17, 2017 from Mr. Dlugolenski to Commissioner Seggos, regarding the lead agency dispute, Mr. Dlugolenski identified the following potential impacts from the proposal to mine below the water table: impacts to groundwater and the aquifer due to the proposal to mine below the water table; potential impacts to the nearby Town water supply well; the hydrogeologic impact to the nearby federally designated wetland bog habitat within the Lime Hollow Nature Center; among other potential impacts.

***Response*:**
Comment Noted.

45. All of these concerns indicated that the Mine expansion may cause a significant adverse environmental impact. <u>Therefore, these concerns should have been thoroughly assessed in the context of a DEIS, not dispensed with in conclusory fashion as you did in your negative declaration.</u>

Response:

All concerns listed above have been addressed in this response document, or by previously submitted reports.

CONCLUSION

46. NYSDEC's decision to issue a negative declaration and its apparent intention to issue the Applicant a permit modification to allow it to mine up to 100 feet below the water table has the potential to have permanent adverse consequences to the primary drinking water supply in the Town of Cortlandville and the City of Cortland. In doing so, it ignored the prior modeling that has been accepted by all relevant agencies (federal, state and local) over the years and creates the terrible precedent of essentially ignoring the Town's WPAs and allowing industrial activities with direct connection to the water table within a WPA without rigorous assessment. The undersigned believe that such a determination violates SEQRA.

***Response**:*
Response provided by Applicant attorney under separate cover.

47. Department Staff's intention to approve this Application without adequate scientific review is most disappointing as it is made by the very agency tasked with protecting the water quality in this state. Further, it demonstrates a clear conflict of interest between the Department's obligation to protect such resources and the State's "Declaration of Policy" in ECL 23-2703 "to foster and encourage the development of an economically sound and stable mining industry .. .."

Response:

Comment noted.

48. The Town and the County SWCD assert that encouragement of the mining industry can be accommodated while still taking the required "hard look" at potential impacts that SEQRA requires. Additionally, the Applicant is still permitted to unde1take mining in its existing Life of Mine above the water table, and the Town and County SWCD are not opposed to a horizontal expansion, provided that the existing 8' buffer area to the top of the water table is maintained and delineated.

Response:
Comment noted.

REFERENCES Cited in the Responses to Comments

1. Cortland County Soil and Water Conservation District, May 2002, FINAL, Delineation of Wellhead Protection Areas, Town of Cortlandville and City of Cortland, New York.

2. Cortland County Soil and Water Conservation District, October 2013, Water Supply Assessment, Town of Cortlandville.

3. H2H Associates, LLC, October 17, 2018, Letter Response to NYSDEC and SWCD Comments, Sept. 2018, addressed to Joe Dlugolenski, Deputy Permit Administrator,

NYSDEC, Region 7.

4. H2H Associates, LLC, October 2018, Spill Prevention and Response Plan, Cortlandville Sand & Gravel Mine, Mining Permit Modification MLR#70436.

5. H2H Associates, LLC, July 2019, Baseline – Quarters 1 & 2, Hydrogeologic Investigation Report, Cortlandville Sand and Gravel Mine, In Support of NOIA for NYSDEC Mine Permit Modification, NYSDEC Mine Permit #7-1122-00043/00008.

6. H2H Associates, LLC, July 23, 2019, Letter Response to SWCD Comments addressed to Water Quality Specialist Kathleen McGrath, Cortland County Soil and Water Conservation District.

7. H2H Geoscience Engineering, PLLC, January 23, 2020, Letter Response to SWCD's Response to Hydrogeologic Investigation Submittals, Proposed Mine Permit Modification, addressed to Water Quality Specialist Kathleen McGrath, SWCD.

8. H2H Geoscience Engineering, PLLC, 31 March 2020, Letter Addendum to the Baseline – Quarters 1 & 2 Hydrogeologic Investigation Report, Route 13 Rocks. LLC, Cortlandville Sand & Gravel Mine, NYSDEC Mine Permit #7-1122-00043/00008.

9. Krause, Dr. Steffen and Dr. Christian Griebler, January 2011, Pathogenic Microorganisms and Viruses in Groundwater, University of Vienna, article in ResearchGate, https://www.researchgate.net/pubkication/285864145.

10. Miller, Todd S., Donald A. Sherwood, Peter M. Jefffers, and Nancy Mueller, 1998, Hydrology, Water-Quality, and Simulation of Ground-Water Flow in a Glacial Aquifer System, Cortland County, New York, U.S. Geological Survey Water-Resources Investigations Report 96-4255.

11. Town of Cortlandville, 2021, Annual Water Quality Report, Water Department.

12. United States Geological Survey, April 2004, Hydrogeology and Simulation of Ground-Water Flow in a Glacial-Aquifer System at Cortland County, New York, prepared in cooperation with Cortland County Soil and Water Conservation District, Fact Sheet FS 54-03.

TABLE 5

TABLE 5
Water Quality Data -
Quarters 1, 2, 3, 4
Cortlandville Sand Gravel

1st, 2nd, 3rd, 4th Quarters 2019-2020			MW-1	MW-2	MW-3S				MW-3D				MW-4S	BLIND DUP - MW-3D	Field Blank			Trip Blank			
Analyte	**Units**	**Ambient Groundwater Standard - Class GA**	**5/21/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**8/19/2019**	**11/20/2019**	**3/13/2019**	**5/21/2019**	**8/19/2019**	**11/20/2019**	**3/13/2019**	**3/13/2019**	**3/13/2019**	**5/21/2019**	**8/19/2019**	**3/13/2019**	**5/21/2019**	**8/19/2019**	**11/19/2019**
FIELD PARAMETERS																					
Temperature, ºC	ºC	none	13.9	9.6	7.2	9.8	13.9	12.6	8.4	10.3	15.4	10.0	3.0	8.4	na	na	na	na	na	na	na
Temperature, ºF	ºF	none	57.0	49.3	45.0	49.7	57.0	54.7	47.1	50.5	59.8	50.0	37.4	47.1	na	na	na	na	na	na	na
pH	s.u.	6.5-8.5	8.14	7.48	7.20	7.53	7.49	9.09	7.25	8.06	7.94	9.41	7.54	7.25	na	na	na	na	na	na	na
Dissolved Oxygen (DO)	% Saturation	none	27.4	90.1	67.5	26	66.43	77.5	45.2	0	42.47	29.4	91.5	45.2	na	na	na	na	na	na	na
Oxidation-Reduction Potential (ORP)	mV	none	136	58	95	153	103.07	142	89	126	231.33	122	93	89	na	na	na	na	na	na	na
Turbidity (field / lab)	NTU	no adverse	90.2	18.8	5.4	0.0	0.0	4.0	0.0	0.0	0.0	1.0	2.0	0.0	na	na	na	na	na	na	na
Estimated Total Dissolved Solids (Field)	mg/L	500	305	335	361	355	393	256	292	298	305	264	326	292	na	na	na	na	na	na	na
Specific Conductance	uS/cm, 25º C	none	469	523	654	555	608	400	450	458	473	412	509	450	na	na	na	na	na	na	na
VOCs																					
Chloroform	µg/L	7	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0.34 J	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
1,1,1-Trichloroethane	µg/L	5	<0.20	<0.20	0.32 J	0.27 J	0.57 J	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
METALS																					
Arsenic	mg/L	0.025	<0.0080	<0.0080	0.0084	<0.0080	<0.0095	<0.0095	<0.0080	<0.0080	<0.0095	<0.0095	0.0088	<0.0080	na	na	na	na	na	na	na
Barium	mg/L	1	0.053	0.040	0.045	0.041	0.065	0.037	0.054	0.048	0.060	0.055	0.029	0.054	na	na	na	na	na	na	na
Chromium	mg/L	0.05	<0.0061	<0.0061	<0.0061	<0.0061	0.0042	<0.0023	<0.0061	<0.0061	<0.0023	<0.0023	<0.0061	<0.0061	na	na	na	na	na	na	na
Iron	mg/L	0.3	<0.040	<0.040	<0.040	<0.040	0.13	<0.043	<0.040	1.9	<0.043	0.11	<0.040	<0.040	na	na	na	na	na	na	na
Lead	mg/L	0.025	<0.0044	<0.0044	<0.0044	<0.0044	<0.0060	<0.0060	<0.0044	<0.0044	<0.0060	<0.0060	<0.0044	<0.0044	na	na	na	na	na	na	na
Mercury	mg/L	0.0007	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	<0.000034	na	na	na	na	na	na	na
Sodium	mg/L	20	14	28	21	22	23	18	13	18	14	14	20	13	na	na	na	na	na	na	na
Zinc	mg/L	2	<0.0052	<0.0052	<0.0052	<0.0052	0.03	<0.0051	<0.0052	0.0069	0.0055	<0.0051	<0.0052	<0.0052	na	na	na	na	na	na	na
Hardness	mg/L	None	220	240	260	250	270	210	230	230	230	220	250	230	na	na	na	na	na	na	na
GENERAL ANALYTES																					
Alkalinity	mg/L	None	170	220	230	210	200	170	160	160	170	160	180	180	na	na	na	na	na	na	na
Ammonia as N	mg/L	2	<0.30	<0.30	0.081	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	na	na	na	na	na	na	na
Chloride	mg/L	250	42	48	52	51	63	35	40	51	40	40	54	40	na	na	na	na	na	na	na
Nitrate as N	mg/L	10	1.64	2.9	2.7	1.92	1.6	1.5	1.8	2.78	1.9	1.7	1.8	2.1	na	na	na	na	na	na	na
Phosphorus, Total	mg/L	None	<0.049	<0.061	0.081	<0.049	<0.049	<0.049	<0.061	<0.049	<0.049	<0.049	<0.061	0.074	na	na	na	na	na	na	na
Sulfate	mg/L	250	19	10	9.8	10	9.8	7.4	17	9.5	21	22	8.8	19	na	na	na	na	na	na	na
Total Dissolved Solids	mg/L	500	270	250	232*	330	230	250	230	280	160	260	242*	224*	na	na	na	na	na	na	na
Total Organic Carbon	mg/L	None	<0.73	<0.73	<0.073	<0.073	<0.73	<0.73	<0.73	<0.73	<0.73	<0.73	<0.73	<0.73	na	na	na	na	na	na	na

MW-1 was not sampled 3/13/2019 because well damage prevented insertion of sampling equipment. It was sampled on 5/21/2019 after repairs.
All analyses are for unfiltered samples. This likely explains the high iron in MW-3D on 5/21/2019.
For VOCs, SVOCs, Pesticides and Herbicides - only detected analytes are listed
* Samples re-analyzed because the initial results were obviously not representative of acutal water quality.

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ATTACHMENT A

W+E Innovate
Resource-Balanced Solutions

W+E Innovate, LLC
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April 6, 2021

Rich Hisert
H2H Geoscience Engineering
179 River Street, Troy, NY 12180

Subject: **Cortlandville Sand & Gravel Mine**
Numerical Modeling vs. Site Data

Dear Mr. Hisert:

I have reviewed the documents provided regarding the collection of site-specific data in and around the Cortlandville mine as well as the USGS model report from 1996 (Hydrology, Water-Quality, and Simulation of Ground-Water Flow in a Glacial Aquifer System, Cortland County, New York. USGS WRIR 96-4255), correspondence with the DEC, and input from other stakeholders. From this, I understand that the mine is seeking a permit modification so that their operations can extend below the water table and to some extent laterally.

As requested, I have written a high-level overview comparison between the utility and applicability of site-specific data versus modeled or model-derived data.

1996 USGS Model:

1. Discretization – The performance of a groundwater model in terms of predicting hydraulic heads at any location within the model boundaries is highly dependent on the size of the model cells. Predicted gradients and groundwater flow velocities are both calculated from the modeled heads.

   The discretization is important because within each cell of the model the aquifer properties are held constant (the REV concept). This is because to solve the groundwater flow equation using the finite difference technique employed in MODFLOW, the equations are mathematically differentiated, piecewise, along each row, column, and by layer. The cells represent a volume-averaging of known or assumed aquifer properties, such as hydraulic conductivity, porosity, and permeability. Inherent to this averaging is potentially large uncertainty that can be carried through to the results.

   For example, if a cell contains both gravel (high K) and silt (low K), the model can represent only some average of the K's. In the field, given the many orders of magnitude difference in K typically found for these materials, groundwater flow through a particular volume of aquifer (or cell in the model) would predominantly occur via the gravels. This physical situation cannot be explicitly represented in the model because the cells are too large.

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2. Hydrostratigraphy – The hydrostratigraphy is the result of a modeler's choice of how to either combine or separate the geologic materials within the model boundaries such that they can be represented in the model. Often, geologic structures or layers or similar conductivity will be grouped together. In this instance, the 1996 MODFLOW model a 3-layer conceptual model to develop the numerical model. The topmost layer (1) was taken to be from the land surface down to about the middle elevation of the unconfined aquifer (sand and gravel). Layer 2 was defined from that elevation downward to the top of the lake sediments (confined) or the top of Layer 3. Layer 3 basically extended from the bottom of Layer 2, where present, down to the till or bedrock in the valley. The hydrostratigraphy was therefore represented in the model as three numerical layers; two layers in the unconfined aquifer and one layer of lake sediments. This choice of model layers was made to allow the variation in the water table elevation to be more accurately simulated than by using a single layer for the unconfined material.

3. Boundary Conditions – Water enters this valley-fill aquifer from stream infiltration and diffuse recharge from precipitation. This is typical of the geologic setting in that the aquifer is not laterally extensive and therefore will not have recharge from 10's or 100's of kms distant. In the model as shown in the Table 13 below (red outline), for the low recharge scenario Upland Sources dominate the recharge budget. Each of the components of the recharge budget have a degree of inherent uncertainty. Precipitation(measured) must be converted to calculated recharge, for example. Seepage losses from tributary streams and other parts of the Upland Sources are derived from the calibration process (though based on streamflow measurements).

Table 13. Steady-state water budgets for the glacial aquifer system at Cortland, N.Y., for high-, average-, and low-recharge conditions.

[Rates are in cubic feet per second, (ft^3/s)]

Budget component	Recharge conditions: High March 28-29, 1990 Amount	High Percent of total	Average May 28-June 4, 1991 Amount	Average Percent of total	Low October 7-9, 1991 Amount	Low Percent of total
A. Recharge to the aquifer system						
Precipitation on the aquifer	16.2	39	14.4	38	9.3	33
Upland sources						
Seepage losses from tributary streams	15.2	36	12.2	32	10.4	38
Unchanneled runoff and ground-water inflow from uplands	9.2	22	8.8	23	5.4	19
Ground-water inflow from valleys to model area	1.0	3	.9	3	.5	2
Infiltration at recharge basins	0.0	0	1.7	4	2.2	8
TOTAL	41.6	100	38.0	100	27.8	100
B. Discharge from aquifer system						
Pumping wells	10.7	26	10.7	28	11.0	40
Discharge from aquifer to streams	29.5	71	26.1	69	15.9	57
Ground-water outflow from model area	1.4	3	1.2	3	.9	3
TOTAL	41.6	100	38.0	100	27.8	100

4. Non-Uniqueness and Parameters – Numerical models suffer from non-unique solutions[1]. This occurs because there does not exist a single, unique solution to the groundwater flow equation, given that there are various assumed and assigned parameters included (such as K, leakance, T, streambed conductance, etc.) in a model. The final model result is left to the modeler's experience and judgment as to the viability of a solution; in this case the prediction of hydraulic heads in a three-layer system.

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As an example, consider the recharge conditions imposed on the steady state low-recharge scenario. Most of the recharge to the system comes from precipitation and seepage losses from streams, as stated in the report. However, given that both parameters are adjusted during calibration, the values of either could be different for a given solution and at the same time provide the same calibration results in terms of heads at wells. Thus, the problem of non-uniqueness.

Another example is the value of K assigned to the bottom layer (lake deposits or kames) versus the K used for the unconfined aquifer (sands and gravels). To make the model calibrate better, the K values are adjusted. This leads sometimes to K values that overlap in range between two different materials, such as the gravels and lake sediments. In this case, K ranged from 1 to 1200 ft/d within layers 1 and 2 (unconfined aquifer) and values of K estimated for layer 3 (confined) ranged from 10 to 150 ft/d, which fully overlaps the K's used in layers 1 and 2. These were further adjusted during calibration to match model heads to measured heads. Many combinations of different K values could have produced a reasonably well-calibrated model.

5. The MODFLOW software was originally developed as a regional water resource assessment tool. Like all numerical models, it has limitations as a tool used to make predictions about the heads in groundwater systems. In summary:
   - The size of the model cells directly limits the resolution with which model features can be represented. Cell sizes should be appropriate to the features that one seeks to represent in the model. Larger cells homogenize properties within the cell volume and therefore introduce uncertainty into the solution.
   - The layers one chooses in the model to represent the hydrostratigraphy and other hydrology are also scale dependent. Features such as buried river channels may be captured by a cell 100m on a side, while this scale may be entirely inappropriate for incorporating a small wetland into the model.
   - Solutions to the groundwater equation (heads) are not unique, given the many parameters in the model and many combinations in which they may be represented.
   - Boundary conditions are another source of uncertainty and may become calibration parameters.
   - If time-varying processes exist, such as variable-rate pumping, seasonal changes in groundwater levels, or similar, the use of steady state models will not reveal time variant complexity in the system. This is because in the steady-state groundwater flow equation, the time varying term is zero. This is the equation[2] solved:

$$\frac{\partial}{\partial x}[K_{xx}]\frac{\partial h}{\partial x}+\frac{\partial}{\partial y}[K_{yy}]\frac{\partial h}{\partial y}+\frac{\partial}{\partial z}[K_{zz}]\frac{\partial h}{\partial z}-W=S_s\frac{\partial h}{\partial t}$$

     In the steady state problems in the report, the "W" term (generalized sources and sinks) is allowed to vary over time, but the right-hand side of the equation strictly is taken as equal or equivalent to zero. This means that even though pumping and recharge may be input as time-varying, the solved variable (h) is steady state.

Limitations such as these do not make a groundwater model inapplicable to this problem. Models should however be built to suit the problem at hand, as rarely do models strictly apply to multiple problems over the same domain.

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Site Specific Data:

In contrast to groundwater modeling, site specific data is a direct measure of the behavior of an aquifer, ideally over a period of time. Groundwater levels vary with time due to many natural factors (atmospheric pressure changes, earth tides, seismic activity, seasonality), but anthropogenic influences (pumping, injection, blasting) are easily detected by pressure transducers. Data collected in or near an area of interest, such as a stream, lake, or well field is not a representation of the aquifer behavior, but a measure. If the frequency of data sampling is daily or even hourly, an excellent view of the subsurface environment is provided.

Heads or pressures are the most measured parameters in wells, although temperature and other "water quality" parameters can also be measured directly. At this site, both heads and temperature were logged. When done together, this approach can yield insight to the correlation (if any) between temperature and hydraulic heads. If rainfall is gauged nearby, additional correlations may be investigated.

If there are more than one aquifer, wells can be either nested or simply screened into the respective aquifers. In that case, one can measure directly and at the same time the parameters (heads, temps) in both aquifers. From this, various components (x, y, z) of the hydraulic gradient can be calculated and connectivity between the aquifers quantified as well as flow directions at different times.

For the shallow (S) wells -2, -3, and-4 the analysis of the heads, gradients, and flow direction over a year of time given in the H2H letter report (Addendum to the Baseline – Quarters 1 & 2 Hydrogeologic Investigation Report, Cortlandville Sand & Gravel Mine), it is clearly demonstrated that groundwater flow is generally and consistently to the northeast.

Conclusions:

1. Site specific data from the wells between the mine property and the town's supply wells provide a year-long record of aquifer conditions that could not be reproduced with the cited model without refinement.
2. While groundwater flow (ambient conditions) is to the NNE, the supply wells are located NW of the gravel pit and proposed mining depth extension. Unless the supply wells significantly increase their extraction rates or pump the wells for extended periods of time, it is unlikely that the mining operations and pit lake water will be captured as the primary source for the wells.
3. The nature of the glacial geology and the deposition of the gravels as well as the entrenchment of the valley itself, all point toward a much greater risk to the supply wells from recharge areas to the south (more or less) in alignment with the valley, rather than from the gravel operation, which is not in alignment with the valley trend, groundwater flow, nor the likely anisotropy of the gravels.

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References

[1]Tian-chyi J. Yeh, De-qiang Mao, Yuan-yuan Zha, Jet-chau Wen, Li Wan, Kuo-chin Hsu, Cheng-haw Lee, Uniqueness, scale, and resolution issues in groundwater model parameter identification, Water Science and Engineering, Volume 8, Issue 3, 2015, Pages 175-194, ISSN 1674-2370, https://doi.org/10.1016/j.wse.2015.08.002.

[2]A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model, U.S. Geological Survey, Techniques of Water-Resources Investigations, Book 6, Chapter A1, by Michael G. McDonald and Arlen W. Harbaugh, 1988.

Appendix 1.G.A: 2021 Response to Public Comments - All Exhibits

Exhibit A - Public Comments

January 29, 2021

Ms. Elizabeth Tracy, Regional Permit Administrator
Region 7, NYSDEC
615 Erie Boulevard West
Syracuse, NY 13204-2400

Re: Cortlandville Sand & Gravel Mine
NYSDEC Permit # 7-1122-00043/00008

Dear Ms. Tracy:

The municipalities of the Town of Cortlandville and City of Cortland have long been concerned regarding the proposal to mine for gravel deep into the Cortland Aquifer. Because this proposal if permitted would threaten the only source of drinking water for these municipalities long into the future, these municipalities oppose granting the modified permit to allow deep mining into the aquifer. The Cortland County Department of Health and the Cortland County Soil and Water Conservation join in opposing this proposed mining.

The agencies undersigned oppose this activity for the following reasons:

1) The applicant has disregarded the Town of Cortlandville's wellhead protection areas, codified in the Town of Cortlandville Aquifer Protection Ordinance. A wellhead protection area as the surface and subsurface area through which contaminants are likely to pass before reaching a well or group of wells used for public water supplies. Wellhead protection, therefore, means protection of the land area around a well that significantly influences its source of water. These areas are based on an extensive study (attached) of the entire aquifer and were a collaborative effort of USGS, County Health Department, Cortland County SWCD, the Town of Cortlandville, and the City of Cortland. They are based on the best available information and technological tools. This study clearly demonstrates that the Cortlandville Sand and Gravel Mine is within the wellhead protection zone of the Cortlandville Lime Hollow Public Water Supply and the City of Cortland Public Water Supply. To disregard and dispute the findings of this work would require far more evidence than was provided by the applicant. By allowing this permit modification to be approved as presented, the applicant is denying the validity of the Town's measures to protect the aquifer and drinking water supply for the Town of Cortlandville and City of Cortland.

2) The current mine is an industrial activity that includes use of various chemicals, presenting a real but unknown risk to the Lime Hollow water supply well immediately downgradient, but more importantly to the entire aquifer. This aquifer is the critical water supply for the Town of Cortlandville and the City of Cortland. Under the current permit, an 8-foot separation is required

between the mine floor and the seasonal high water table with the specific purpose of providing protection to the underlying aquifer.

Under the original 1980s permit, because mining was limited to 8' above the water table, the mine was required to establish the elevation of the seasonal high water table and therefore also the elevation of the mine floor, below which mining could not occur. After 30 years, the permittee has still not met this requirement. In addition, there is strong evidence that mining below the water table has already occurred. The permittee was required by NYSDEC to mitigate for this unauthorized mining. The willingness of the permittee to adhere to permit requirements is questionable.

3) Mining below the water table presents an increased risk to the aquifer for three reasons. First, the current 8-foot separation distance provides a sand and gravel layer buffer that could delay and mitigate contaminant migration to the aquifer. Second, the absence of a buffer zone provides a more direct pathway for contamination to reach the aquifer. Finally, permitting mining below the water table will increase the life of the mine by decades. This increases the potential for an accidental release of contaminants that could affect the water supply for the Town and City.

4) We continue to believe that mining 100' deep into the aquifer to create a 78-acre open-water pit upgradient of the all Town and City drinking water wells and immediately upgradient of the primary drinking water supply well for the Town of Cortlandville represents a significant risk to this essential water supply. The proposed changes in the permit for the mine will allow for significant changes in mine operation and the scope of permitted mining, and will drastically increase the risk of contamination to the Cortland aquifer and therefore the only public drinking water supply for these municipalities. Contamination of ground water is extremely difficult and costly to remediate.

5) The 2001 Source Water Assessment Plan for Cortlandville that designated both the inner and outer well zones of critical concern (that included the mining area) was a NYSDOH funded and approved effort to ensure protection to potable drinking water. To approve a change in the designation of the protected source area for a NYSDOH regulated water supply with a third party engineering evaluation that was not properly vetted with either the water supply or the NYSDOH is fundamentally wrong. As a public health department, we feel it is critical that a complete reversal of the designation of a water supply's contamination zones warrants a thorough and collaborative investigation. This is a designated Sole Source aquifer by the USEPA because it cannot be replaced to meet the community's drinking water needs. If it is determined that the activity can proceed without impacting the water supply by consultation with impacted parties, including the NYSDOH, then it could be approved with good conscience. Without this critical step it would be a mistake for the NYSDEC or the Town of Cortlandville to issue a mining permit for a new use that entails dredging 100 feet below the water table 800 feet from a community water source well.

For these reasons and in conclusion, we oppose granting a permit modification to the above-referenced permit to allow for deep mining into the Cortland Aquifer.

Sincerely,

Paul Heider, Chairman
Cortland County Legislature
60 Central Ave.
Cortland, NY 13045

Tom Williams, Town Supervisor
Town of Cortlandville
Raymond G. Thorpe Municipal Building
3577 Terrace Road
Cortland, NY 13045

Mike Ryan, Director of Environmental Health
Cortland County Health Department
County Office Building
60 Central Avenue



Amanda Barber, District Manager
Cortland County SWCD
100 Grange Place
Cortland, NY 13045



Cc: Thomas Rigley, NYSDEC
Cynthia Hill, NYSDEC
Matt Marko, NYSDEC
Elizabeth Tracy, NYSDEC

Lime Hollow Nature Center

February 8, 2021

Subject: Route 13 Rocks LLC Gravel Mine Expansion Concerns

General: The recent request to expand the Route 13 Rocks LLC (formerly Cortlandville Sand and Gravel) mining operation raises serious concerns by our nature center and our 38,000+ annual visitors. Cortland County is one of only two counties in New York State that does not have a state park. The Lime Hollow Nature Center provides our local citizens with the same qualities of life opportunities as a New York State Park minus camping and fishing offerings. Our nature center, which encompasses 594 acres of woodlands and wetlands with13 miles of trails, recreational areas and open space is directly adjacent to the gravel mine. Given this close proximity and illegal mining activities by the former Cortlandville Sand and Gravel identified in 2013, our organization has always been concerned about further encroachments from gravel operations that could alter or jeopardize the natural beauty of our preserve and the area as known as "Lime Hollow."

This unique environmental area is well documented in the following reports and excerpts.

I. <u>2016 NYS DEC Open Space Plan, Region 7 Supplemental Project, Page A-166:</u>

Fall Creek Fens and Forests - Town of Cortlandville, Cortland County, Towns of Dryden and Groton and Village of Freeville, Tompkins County. Expansion of efforts for the protection of the exceptional grouping of ecological communities and geological features along Fall Creek and its tributaries, and along Beaver Brook and its tributaries including the acquisition of lands adjacent to the Lime Hollow Nature Center for use in educational activities and to buffer existing lands.

II. **<u>Marl Pond Significance</u>**:

a. The marl ponds along the Cortland County Linear Park (aka Lehigh Valley Trail) are designated as a significant natural community by the NYS DEC and are classified as "marl pond shore" wetlands. They have a State Conservation Rank of S1, which means that there are very few occurrences or remaining individual examples in NY and/or the wetland is especially vulnerable (Edinger et al., 2014, Ecological Communities of New York). They have Global Conservation Rank of G3-G4, which means that they are quite rare worldwide and/or are locally restricted.

b. The unusual flora of these marl ponds was first noted by Dudley in 1883 (The Cayuga Flora) and again by Weigand and Eames in 1926 (The Flora of the Cayuga Lake Basin) and confirm their historical significance to biologists in addition to their high ecological value.

c. The importance of these marl ponds is such that they are specifically named by Edinger et al. as the type example of this ecological community for all of New York State as part of the NY Natural Heritage Program (https://guides.nynhp.org/marl-pond/).

d. Of particular importance for preservation and protection are the following Marl Ponds owned by the Town of Cortlandville and leased to the Lime Hollow Nature Center located adjacent to the Route 13 Rocks gravel operation:

    1. Parcel # 95.00-06-04.200 (11.7 acres)
    2. Parcel # 105.00-03-02.000 (4.7 acres)

e. The potential impact of the mine expansion, specifically mining below the water table, on the marl ponds must be fully assessed.

III. **Lime Hollow: A Natural Preserve Summary and Plan dated August 1978:** The Cortland County Environment Management Council along with Cortland County Planning produced this comprehensive planning document which outlined the importance of preserving and protecting this natural area.

a. Watershed Protection: "By affording protection, preservation, and proper management of Lime Hollow and its surrounding watershed, the negative impacts of erosion due to flooding, storm water runoff, construction in natural drainage-ways, concentration of contaminants, and increased future governmental costs for costs from environmental degradation of groundwater can be avoided."

b. Unique Natural Features: "Lime Hollow exhibits a number of ecological functions and unique botanical sites in an area of varied glacial topography and typical upland forest, as modified by the presence of both acidic and alkaline areas" (the Chicago Bog and Marl Ponds, respectively).

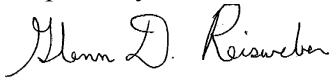
c. Given that the Chicago Bog is classified as a classic kettle hole bog, pursuant to the definitions contained in Part 664: Freshwater Wetlands Maps and Classification (Statutory authority: Environmental Conservation Law §3-0301 and §24-1301) found at https://govt.westlaw.com/nycrr/Document/I4ece2eaecd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default) Lime Hollow Nature Center has requested that the Chicago Bog unique area be reclassified from its current Class II identification to Class I.

d. The Chicago Bog unique environmental area is located approximately 1050 feet from the boundary western most boundary of the Route 13 Rocks gravel operation.

IV. **Town of Cortlandville NYS DEC Water Quality Improvement Project Source Water Protection grant award.** In December 2019, New York State awarded the Town of Cortlandville $175,000 to acquire land meant for protecting the town's drinking water supply wells near Lime Hollow Road. The parcel, comprising 106 acres of land and a series of marl ponds, sits astride the Cortland County Linear Park (aka Lehigh Valley Trail) and was one of the last remaining contiguous sections of woodlands and unique wetlands of the original 1978 concept plan for the Lime Hollow Nature Preserve. In a collaborative leasing arrangement with the Town of Cortlandville, Lime Hollow has agreed to steward, patrol, and over-watch this parcel as well as the two marl ponds adjacent to the gravel mine mentioned above in item II (d). This land is adjacent to the western boundary of the Route 13 Rocks sand and gravel mine.

On behalf of our Board of Directors, our 38,000+ annual visitors and the citizens of Central New York, we urge NYSDEC to rescind its SEQRA negative declaration and to require the applicant to examine these and other important issues in a Draft Environmental Impact Statement. Decision makers should reexamine any decision to authorize expansion of the existing gravel mining operation, either laterally or below the water table, and must more forcibly consider the clear negative impacts on the natural beauty and character of this "exceptional grouping of ecological communities and geological features."

Respectfully,



Glenn D. Reisweber
Executive Director

NYS DEC
Region 7 Syracuse
FEB 24 2021
Environmental
Permits

February 23, 2021

Ms. Cynthia Hill:

I spoke with you recently concerning the permit for the Cortland Sand and Gravel on Route 13 in Cortlandville.

After consideration of our conversation, I am still against allowing any more digging and the land they would like to purchase. We have many gravel pits here already; this one is much too close to the well that was drilled after the Smith Corona pollution (TEC) was discovered prompting the town to drill a new well in a safter place.

When that catastrophe was discovered and exposed, the DEC was responsible to monitor industries like Smith Corona and others. Those companies were supposed to be managing the toxic chemicals they were using responsibly. Unfortunately, the DEC did not monitor them nor did anyone else. It was discovered that Smith Corona put their toxic waste into a tanker truck and sprayed it all around their building at night, in an area directly over the aquifer. The aquifer that supplied well water to my neighborhood. The well water that my children drank. My son and many other people in the neighborhood had cancer. Another neighbor had a miscarriage. Over time the people here have developed an array of health issues. Coincidence? There's a valid argument to be had. Take no more chances for us!

Do you have any idea what it is like to have to walk down the street to get jugs of water to complete daily routines to live? I had to move my home-based business into the city where I rented space to work. An expense that I had to incur. It was a huge imposition to have my lawn completely dug up. I even provided a right of way for $1.00 so the water could be hooked to a neighborhood behind me. No one even said thank you. It wasn't long after that when my totally stressed-out dog had a seizure and had to be put down. Was it a seizure? Or, was it the water he was drinking?

We asked if there was a danger of vapors making their way into the basement, the answer was no. However, when the citizens formed a Clean Water Committee and started to officially inquire, the story changed.

No, I think it was insane after that to have allowed the gravel pit to continue. Does the DEC really monitor anything? I'd like to know more about what you are doing and where you are doing it because, honestly, I don't trust the DEC to do its job. Like taking bonified precautions in a matter such as the Cortland Sand and Gravel permit request regardless of how unlikely a spill might occur. My cousin worked for the DEC. He's been retired for quite a while but still remembers questionable practices in your agency using chemicals in the field. He too has had cancer, heart disease and injuries from the work he had to do while working there.

Point of interest: There are nature preserves in areas near the proposed digging site.

Too darn bad if New York State wants gravel pits! Find undeveloped areas that are not 1000 feet from a town and city's water source. Shame on all of you! I shouldn't have to write this letter!

Do not allow the gravel pit to continue any further. Enough is enough, please do your job better than those before you. I don't believe or trust any of the agencies that are meant to protect us, because in past they have not done so.

You wanted input, and now you have mine.

Sincerely,

Susan J. Fitts

Susan J. Fitts
811 Pheasant Run
Cortland, NY 13045
607 753-9542

TOWN OF CORTLANDVILLE
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Peter Alteri, Jr.
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March 19, 2021

Dr. Cynthia Hill
NYSDEC Syracuse Office
615 Erie Blvd.
Syracuse, NY 13204

Re: Negative Declaration and Notice of Complete Application
DEC ID# 7-1122-00043; MLR # 70436
Modification of Mined Land Reclamation Permit
Cortlandville Sand and Gravel Mine
Town of Cortlandville, Cortland County

Dear Dr. Hill:

These comments are submitted on behalf of the Town of Cortlandville (the "Town") and the Cortland County Soil and Water Conservation District (the "SWCD"). This letter responds to the New York State Department of Environmental Conservation's Notice of Complete Application and the Type I Negative Declaration issued by the Department on January 20, 2021 regarding the reference Mined Land Reclamation ("MLR") Permit application for modification submitted by Route 13 Rocks LLC (the "Application").

BACKGROUND

The mine ("Mine") is located on the west side of New York State Route 13 in the southwestern portion of the Town of Cortlandville. The Applicant seeks to expand the existing 66.8 acre sand and gravel mine laterally by a total of 9.4 acres and to allow mining to expand vertically up to 100 feet within the water table. Currently under the existing MLR permit, mining operations are limited to a depth of not more than eight (8) feet above the water table.

As you well know from past correspondence submitted to your office and to Commissioner Seggos and from personal discussions you have had with our staff, it is this vertical expansion into the water table that particularly alarms the Town, the County SWCD, and the Cortland County Department of Health Services. These concerns were repeatedly expressed to your office (primarily to Joseph Dlugolenski, former Deputy Regional Permit Administrator).

The Mine is located above the Otter-Dry Creek Aquifer (the "Aquifer"). Because water from the Aquifer is the primary source of drinking water in both the City of Cortland and the Town of Cortlandville, it has been designated a "Sole Source Aquifer" by the United States Environmental Protection Agency ("USEPA") pursuant to Section 1424(e) of the Safe Drinking Water Act, 42 USC § 300f, *et seq*. (the "SWDA"). The "sole source" designation is made when an aquifer is the sole or principal drinking water source for a community and if contaminated, would create a significant hazard to public health. The federal government through the United States Geological Survey ("USGS") has played a major role in investigating the Aquifer over the years and in assisting the

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state and local government agencies in developing protections for the public supply wells within the Aquifer. Those protections include the designation of Wellhead Protection Areas ("WPAs") for public water supply wells within the Aquifer.

The Aquifer is also designated a "Primary Aquifer" under New York State law. Primary Aquifers are defined in NYSDEC's Division of Water Technical & Operational Guidance Series (TOGS) 2.1.3 as "highly productive aquifers presently utilized as sources of water supply by major municipal water systems". They receive protection from various industrial contaminant sources under State law.

The Aquifer is highly productive in the immediate vicinity of the Mine and can sustain well yields of 2 million gallons per day (MGD) or more. The town has three public water supply wells that draw water from the Aquifer. The town's two Lime Hollow wells are located approximately 800 feet north/northwest of the Mine. See attached aerial Photo (Exhibit 1). The third well is located on Terrace Road, approximately 3,500 feet northeast of the north end of the Mine. The Town provides drinking water from these wells to approximately 5,000 residents and numerous businesses that rely on the clean and plentiful supply. The City of Cortland water supply wells are also located in this aquifer system. Those wells provide water to approximately 20,000 residents and numerous businesses. Based upon growing demand, the Town is currently studying other potential sites in the Aquifer that could support a high producing well. However, a 2013 County SWCD study found that there are likely to be limited options in other parts of the Town due to some combination of lower aquifer yield, high development, and known contamination zones. **The Lime Hollow area is considered the last, best area in the Town for water supply purposes due to the highly productive aquifer combined with relatively sparse development**. Therefore, the Town and County SWCD are very concerned about the proposed vertical expansion of the Mine's permit into the water table.

The SWDA establishes a federal program to protect the quality of groundwater used in public water supply systems known as the "Wellhead Protection Program". Pursuant to the SDWA, wellhead protection areas are defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." 42 USC § 300h-7(e). That program is administered by the states. In New York, the Wellhead Protection Program is administered by the New York State Department of Health ("NYSDOH"). According to NYSDOH's Wellhead Protection Program website:

> [t]he goal of that program is to protect the ground water sources and wellhead areas that supply public drinking water from contamination. New York's approach to wellhead protection recognizes and includes the existing federal, state and county programs that protect groundwater and complements these programs through a combination of activities and efforts using existing public and private agencies and organizations at all levels.

Wellhead Protection Areas are regulated in Article I A of the Town of Cortlandville Code. Three "Wellhead Protection Zones" were established by the Town based upon a report prepared by County SWCD entitled "*Delineation of Wellhead Protection Areas, Town of Cortlandville and City of Cortland, New York* – May 2002". The wellhead protection areas presented in the report were developed by the County SWCD, with the assistance of the County Health Department and the USGS.

The Mine is located directly within the Wellhead Protection Area for both Lime Hollow Wells. This zone has been designated wellhead protection zone 1a. That zone is described as follows in the Town Code: "Zone 1a represents the zone that possesses **the most immediate threat to the public health, safety, and general welfare if the area were to become contaminated with pollutants.**" Town Code, § 178-2.1 B (1) (emphasis added). Zone 1a is the most protective level under the Town's wellhead protection regime.

TECHNICAL COMMENTS ON THE H2H APPLICATION

There are two primary concerns regarding this application to vertically expand the Applicant's mining operation 100 feet below the water table. The first is whether the proposed activity will present an increased risk of contamination to the aquifer. The second is whether the mine, which is located in a wellhead protection area, is within the capture zone of the Town's Lime Hollow supply wells, thereby presenting a significant threat to those wells.

H2H prepared and submitted certain reports and assessments to NYSDEC in support of the Application to mine below the water table. These included a hydrogeologic assessment, a spill prevention plan, an archeologic investigation, and reports of water quality monitoring. The undersigned government agencies believe that these documents have significant flaws, they conflict with long-standing and more rigorously attained government assessments relating to these issues, they are based upon insufficient information, and were prepared on behalf of an interested party (i.e., are much more susceptible to bias than the conflicting government reports).

Because of the ramifications of an erroneous decision to approve this Application, significant further assessment of these issues is required in the context of a Draft Environmental Impact Statement ("DEIS") undertaken pursuant to the State Environmental Quality Review Act ("SEQRA") before the Applicant should be permitted to mine below the water table.

Mining Operations and the Risk of Aquifer Contamination

The Mine is an industrial activity that uses various contaminants in its operation including: petroleum product storage and dispensing; hydraulic fluid in mining equipment; wastewater from vehicle and equipment washing; and chemical compounds used to reduce dust on the Mine's entrance drive. These activities present a material risk to the Aquifer and to the Lime Hollow water supply wells immediately downgradient when combined with the large open surface water source that will result from mining in the water table.

The large open water body that will be created has the potential to introduce pathogens not normally present in groundwater such as waste from geese or other birds gathered on the pond. The estimated travel time for groundwater to flow from the mine to the Lime Hollow wells is about three months. Some of these pathogens can survive longer than three months in groundwater. Expensive filtration requirements would likely be needed to protect the potable water supply in the event it becomes clear that it is "under the influence" of the surface water body created at the Mine. The expense associated with filtration would likely preclude the existing wells from continuing to be used as a viable, affordable source of public water. Exhibit 2 is a study regarding the risk of groundwater contamination by pathogens, this one from the University of Vienna, entitled: "Pathogenic microorganisms and viruses in groundwater". It describes a variety of risks posed by pathogens entering aquifers and drinking water sources, and discusses transport and attenuation and survival and potential growth of those pathogens even if through unsaturated soil and sediments (which will

not be present where there is deep mining into the aquifer). It also discusses sources and mechanisms of entry for those microorganisms.

The eight foot separation between the mine floor and the seasonal high water table which is a condition of the existing permit provides a necessary protective buffer as various physical, chemical and biological processes can act to reduce contamination as it percolates downward through the ground to the water table below. The absence of any buffer to the Aquifer provides a potential direct pathway for contamination to reach the Aquifer.

In addition, if the Application is granted and mining is permitted below the water table, it will increase the permitted life of mine by decades. This alone would extend the time during which accidental releases of contaminants could occur and affect the water quality in the Aquifer and the Lime Hollow wells. It will also create a permanent surface water body that will not only be susceptible to contamination from natural and industrial sources, it will cause permanent changes to hydrology in the area. Such changes to hydrology are not sufficiently understood and were not adequately addressed in the Application materials.

In its Spill Prevention Plan (SPP), H2H describes various chemicals that will be on the site and how they will be handled. These include gasoline, diesel, hydraulic fluid to name a few. Table 1 of the SPP shows the purported water solubility of chemicals used at the site. Most are described by H2H as "insoluble". This, however, is inaccurate. For example, gasoline consists of many components, some of which are relatively soluble. Benzene is a constituent of gasoline and has a solubility of 1,780 parts per million (ppm). Benzene is also a known carcinogen and has a drinking water standard of 0.001 ppm. As such, the solubility of benzene is more than one million times greater than the water quality standard. Similar conditions occur for other chemicals that are reported by H2H as insoluble.

The SPP also indicates that some of the chemicals are lighter than water and would float, and therefore, H2H concludes that accidental spills would not affect the Lime Hollow wells because the well screen intakes are deep within the Aquifer. This is not only overly simplistic, it is inaccurate. The drawdown caused by well pumping pulls water vertically downward. While this is more pronounced closer to the well, contamination in the upper Aquifer would clearly be drawn downward as it approaches the well. Additionally, dispersion tends to cause contamination to spread both vertically and horizontally. As dissolved contamination migrates, some will move downward due to dispersion, and will be more likely to be drawn into the town's water supply.

Vehicle and equipment washing at the mine also present a significant pollutant potential. The proposed equipment washing station for the mine does not even as robust as the wastewater recycling and oil/water separators required at typical car washes even though the potential for leaks in heavy mining equipment is much more likely than is associated with the personal vehicles that use car washes. It appears likely that wastewater from washing this equipment will simply be allowed to run-off to the ground and to infiltrate to the Aquifer.

Is the Mine located Within the Capture Zone for the Lime Hollow Wells?

Both H2H and NYSDEC have ignored the considerable body of research clearly indicating that the Mine is within the recharge area and the WPAs for the Lime Hollow wells. The Department's negative declaration states:

> The USGS study of the regional aquifer **shows the direction of groundwater flow on a regional scale**. The new data, specific to the smaller geographic area where the mine is located, indicate that groundwater beneath the mine does not move toward the municipal wells. That conclusion has been accepted by Department based on submitted data and analyses by qualified geologists (emphasis added).

The "qualified geologists" identified in the negative declaration are apparently only of the Applicant's paid consultant and NYSDEC's mineral resources staff whose focus is on mining, not identifying or protecting Primary Aquifers. They claim that the MODFLOW model used to establish the recharge area and define the boundaries of the WPAs is a "regional" that is less accurate than the one year of data obtained by H2H from only five onsite wells. In addition, H2H's work has ignored the fact that USGS's modeling actually underestimates the extent of the Mine's influence on the Lime Hollow wells because Lime Hollow pumping rates were considerably lower during model development. In actuality, the 2002 WPA delineation modeling represents a much more accurate estimate of current and future influence of the Mine on these wells. Further, H2H did not even address the effects of deep mining and establishment of a surface water reservoir at the mine on groundwater flow, its potential connection to the adjacent Marl pond and its effects on the Lime Hollow wells. Additional information is provided below.

Todd Miller is a retired hydrologist who worked for over 36 years for the USGS. He conducted numerous hydrologic investigations, ranging from site-specific contaminant studies, to assessments of over 30 "Primary and Principal Aquifers" in central and western New York. His specialty was conducting groundwater resource assessments in valley-fill settings. His other areas of expertise include: surficial geologic mapping, analysis of GIS data for use in regional water-resource evaluation, surface geophysical techniques, various drilling techniques, groundwater age dating, and especially pertinent here, the **use of groundwater flow models for aquifer investigations**.

Mr. Miller was also the principal author and developer of the USGS MODFLOW model that was used to delineate the Wellhead Protection Areas (WPAs) for the town's supply well. Hundreds of groundwater and surface water measurements were obtained to calibrate and verify the accuracy of the MODFLOW model. Average, high, and low recharge conditions were simulated. **U.S. EPA states on its website that numerical models, such as MODFLOW, are the most accurate method to determine WHPAs**. *See* https://www.epa.gov/sourcewaterprotection/delineate-source-water-protection-area. Compare that with the narrow scope of H2H's token assessment.

In correspondence with the County SWCD, Mr. Miller states:

> I take issue with the consultant's statement that "MODFLOW is a regional model and is not accurate at local scales." The Cortland model is not a regional model. Regional model areas are much larger than that of Cortland's study area. In the DEC's own words, the Primary and Principal Aquifer studies conducted by the USGS for the DEC are **"detailed studies"** (not Regional studies). On the DEC website, it states--Beginning in 1980 and continuing through today, the USGS has partnered with DEC and other entities
> to produce nearly 70 detailed hydrogeologic map reports for selected aquifers at the 1:24,000 scale. The above statement is not even for where numerical GW model studies were conducted for the aquifers, therefore modelled studied areas are even more detailed than the reports cited in the above statement. Regional GW model studies typically encompass areas much larger (tens or hundreds of mi2) than the Cortland study area (6 mi2). **Numerical GW flow models are the Cadillac of tools in hydrogeologic studies because they can account for the complexities of**

> **aquifer characteristics that determine GW flow conditions**. Other studies, such as that as the consultant's do not (emphasis added).

After thorough MODFLOW model development by Mr. Miller, based upon multiple years of data collection, model calibration and validation, the Town of Cortlandville's WPAs were delineated by the County SWCD using Mr. Miller's MODFLOW model. The additional modeling and WPA development were a collaborative effort by USGS, County Health Department, County SWCD, the Town of Cortlandville, and the City of Cortland. Contrary to H2H's suggestion in their January 3, 2020 letter to the County SWCD that Cortlandville's WPA's were based on factors other than accurate hydrogeologic modeling and that "many factors and assumptions contribute to delineation of a wellhead protection area: political, economic, town planning, environmental and technical considerations", the WPA delineations were based upon the best available information and technological tools. Based on this study, there is no doubt that the Mine is located within the Zone 1A wellhead protection area for the Lime Hollow wells. Zone 1A is the most critical part of the capture zone for the wells. The Town uses these WPAs as a zoning overlay to regulate land use in order to protect the Aquifer that is the source of its drinking water.

Although Mr. Miller is retired, he has expressed a number of additional comments and concerns recently in his communications with County SWCD staff regarding the H2H reports relied upon by NYSDEC:

> [t]here have been several model scenarios done for delineating the contributing area to the Town of Cortlandville wells, including those done by the USGS (1998 and 2004), and by the Cortland County Soil and Water Conservation District (SWCD, 2002). Very different pumping rates were used in these scenarios based on the pumping conditions at those times. The scenario with the smallest pumpage at the Town of Cortlandville wells was simulated in the 1998 USGS report when the towns wells were little used because of pumping pressure issues at that time. This very low pumping rate had to be used in 1998 because that was when the model was calibrated to real-world measured in-field values of groundwater levels, stream seepage measurements, and pumping rates at that time. In the USGS 2004 simulation, the Town wells were used part time on an intermittent basis which was much below the full-time capacity of the wells. The SWCD 2002 simulation, that was the basis to develop the Aquifer Protection Zoning law, used the largest pumping rate of 1.5 MGD that simulated expected future demand with all water for the town withdrawn from the Lime Hollow site. Arguably, the SWCD scenario should be used because it is used as the basis for the local zoning law and intended for long-term planning purposes. The SWCD scenario shows that the contributing area extends below the [sand and gravel] mine with the scenario simulating expected future pumping by the town wells.

Additionally, Mr. Miller reviewed and provided the following further comments on H2H's reports:

> The three main points are 1) the consultant report oversimplifies the flow directions at the site because they ignored the effects that the ponds have on the groundwater system, 2) incorrect conclusions were made on the groundwater level data, and 3) the report neglected to address the effect of a large dredged pond would have on the groundwater flow system (including that in the vicinity of the municipal wells), a gross oversight in my opinion.

> The scope of this report mostly describes the present [groundwater] flow direction based on existing conditions in which the floor of the [sand and gravel] pit is generally greater than 8 ft above the water table. Presently, there is no direct hydraulic connection between the pit and groundwater. However, the main concern of this proposed project (and that which this report ignores) should be: **What would be the effects of an enlarged [sand and gravel] mining operation that dredges gravel far below the water table on the Cortland Aquifer, including effects on the Town of Cortlandville municipal wells on Lime Hollow Rd. and on the several ponds that border the pit on the northwest and north perimeters. The scope of this feasibility investigation should [have] focused on the major changes to the aquifer system by the future changes to be expected by this dredging proposal, not on current site operations and conditions [bold as in original].**
>
> Specifically, a new dredged pond is the major and the most significant new feature of this proposed project that will have the significant potential impact on the hydrology in this area. Dredging into the aquifer will create a direct hydraulic connection not only to mining operations, but also between [groundwater] and a newly created surface-water body. The new dredged pond will change the configuration of the local [groundwater] flow system. Instead of a sloping water-table surface that is presently at the site, there will be a constant-head conditions (sic) at the pond (the water table and pond water surface will be at the elevation in the mine pit).

Mr. Miller also describes certain "[i]mportant points missing or not mentioned clearly in Section 2.1.5 of the H2H report":

> The abnormally high seasonal fluctuation of temp in MW-4S, which coincides perfectly with ambient seasonal air temp, is mainly due to [surface water-groundwater] interactions. Specifically, [surface water] flowing out from the north end of North Pond that is colder than [groundwater] during the winter, and warmer during late spring thru summer, flows toward MW-4S during non-pumping conditions. Trends of [groundwater] temps do not normally coincide with ambient air temp unless under the influence of [surface water] or some anthropogenetic causes (injection of fluids).
>
> Pumping of [Town of] Cortlandville wells that greatly affects the temp in MW-4S, indicates that during pumping conditions, the wells change the flow regime in the vicinity of the ponds and the [sand and gravel] pit. During pumping, the contributing area of the wells extend south to at least the ponds and probably extends beneath the pit, especially during periods when the ponds are dry.
>
> It should be mentioned that when the [Town's] municipal wells pump, the temp in MW-4S rises during the winter . . . and falls during late spring and summer . . . , another indication that the pumping wells are altering the flow pattern in the north part of the pit and perhaps in the main part of the pit, also.
>
> Since in a unconfined glacial aquifer system, there commonly are [surface water – groundwater] interactions, the creation of a dredged pond (where there presently is none), will alter the hydrologic system - specifically a part of the aquifer with a sloping water table gradient will be changed into an area of constant head at the

> newly created dredged pond. This will modify flow conditions and create new conditions such as, the pond will become a groundwater sink at the south end (upgradient in [groundwater] flow) where [groundwater] flowpaths will be into the pond, and at the hinge line, water will flow out of the pond at the north end and re-enter the aquifer.

Mr. Miller also points out certain disagreements with H2H's conclusions in its "SECTION 3.0 CONCLUSIONS":

> I disagree with the statement "the available data indicate that the proposed mine pond would have minimal and inconsequential hydraulic interaction with and effect on the water quality and quantity at the Town's two Lime Hollow Road wells." Not only are the conclusions about the effect of current conditions are (sic) inaccurate and wrong . . . , such as the role of the three ponds and the effects of present pumping on the [groundwater water levels] and on the direction of [groundwater] flow are inaccurate, this report fails to address the most important issue concerning this proposed project, which is **what will be the effects of a dredged pond on the aquifer and ecological systems, especially the effects on the Town of Cortlandville water supply system. Nothing at all was mentioned about the proposed dredged pond! [bold as in original].**
>
> I disagree with [H2H's] last sentence, also [H2H's statement: "*The potential for significant adverse impacts to the municipal well would be negligible. This conclusion is based on multiple lines of evidence indicating that groundwater flow at the proposed mine pond is northeasterly and away from the Town wells apparent capture zone.*" The data clearly indicates that the [groundwater] flow directions in this site are more complex than that described in this report. Specifically, the data shows that the ponds are hydraulically connected to the groundwater system and have significant impacts on the local [groundwater] flow regime as well as the pumping at Lime Hollow Rd. In addition, the temp and water level data indicate that the T. of Cortlandville wells clearly effects (sic) the [groundwater] regime in a complex manner, specifically, [groundwater] flow directions are significantly altered during pumping conditions as evidenced by the temp data. **The water level data definitely shows that most of the [sand and gravel] mining site is within the area of influence** of the town wells, and possibly even within the zone of contribution under short-term pumping conditions (7-10 hrs intervals), but this second postulation is unknown because the USGS groundwater flow model uses units uses (sic) of daily average pumpage, so high-pumpage conditions for partial days are not fully represented by the model. Lastly, there is recent available data by the Cortland County SWCD on the contributing area to the town wells which shows that, in the scenario used for estimated future need for water, the [sand and gravel] pit is within the contributing area to the municipal pumping wells **[bold as in original]**.

Finally, Mr. Miller has observed that the H2H report provides a graphic (Figure 5) showing groundwater flow direction from a single date (8/31/2019) but does not report water levels from the ponds for this date. Mr. Miller states:

> Additional insights as to the flow directions and hydraulic connections to nearby surface-water bodies (ponds) can be gleaned from the Feb 5, 2019 and May 20, 2019 [water level] measurements made in the monitoring wells and in the ponds (Tables

> 3 and 4, Baseline report, July 2019). The [water level] elevation relationships indicate that [groundwater] in the [northwest] part of the pit (in the vicinity of MW-3S) flows north-northeast and probably discharges into the south end of North Pond. Lakes and wetlands in glacial terrain underlain by highly permeable deposits commonly have ground-water seepage into one side and seepage to groundwater on the other side. This relation is relatively stable because the water-table gradient between surface-water bodies in this type of setting is relatively constant. The boundary between inflow to the lake or wetland and outflow from it, termed the hinge-line . . . can move up and down along the shoreline.

Other Town and County SWCD Comments on Deficiencies in H2H's Reporting

H2H in its scope of work, proposed to research available hydrogeologic data. The only two documents they describe as having evaluated are two USGS documents. The 2002 Wellhead Delineation Report, prepared by County SWCD for the Town of Cortlandville, was provided to the DEC Mining Division. If H2H had access to this report, they did not make use of it in their reporting.

H2H proposed installing staff gages in three existing ponds to obtain accurate water level measurements in the ponds. They failed to do this. Instead, they used a GPS unit to measure the water level in one pond and estimated water levels in the other ponds by interpolation using data from groundwater monitoring wells. Availability of accurate pond water level data is crucial to understanding ground water flow. The limited, and questionable pond level data obtained as part of this investigation is not sufficient to fully understand groundwater flow.

Assessing groundwater flow should have more carefully considered Lime Hollow well pumping. Field measurements should have been coordinated with times that the LW well(s) were actually pumping. Water levels from one or more of the town monitoring wells located near the Lime Hollow supply wells and/or construction of a new monitoring well located west of the northernmost pond should been obtained. The supply well water levels provided by the Town are approximate and are not sufficiently accurate to be used in this investigation. Because of the critical ramifications this evaluation has on the community's water supply, rigorous follow-up should be demanded.

NYSDEC's Issuance of a Negative Declaration

The undersigned government agencies strongly object to the negative declaration issued by Department staff. As you well know, the negative declaration was issued after the Planning Board's authority to act as lead agency was taken away from it by NYSDEC following a lead agency dispute initiated by the Department. In doing so, the Department contended that it would be in a better position to study these important issues. In hindsight, that was not the case. The Town and County SWCD believe the negative declaration should not have been issued, for both legal and scientific reasons, and it should be rescinded pursuant to 6 NYCRR § 617.7(f)(1).

The determination was made after the Town of Cortlandville was assured by Commissioner Seggos in his decision to grant lead agency status to the Department that the Department would undertake a full review of the anticipated impacts of the action upon the Aquifer and supply wells. Instead, it appears staff's negative declaration was solely calculated to foster and encourage mining rather than to fully assess the risk to a crucial environmental resource. It is clear from the negative declaration that the Department merely accepted the technical arguments made by the Applicant's paid consultant H2H without any scrutiny or input from either a NYSDEC hydrogeologist or more

importantly, NYSDOH hydrogeologists or officials[1] (the agency with the most direct responsibility to protect this Primary Aquifer). As described above, H2H's technical studies were based upon short-term and incomplete scientific studies and assumptions that conflicted with longstanding data and modeling designed and accepted by the federal, state and local government agencies with primary responsibility to protect the Aquifer and public water supply that this vertical expansion threatens.

Although as lead agency, the Department may accept competing technical studies, it's decision to rely on the positions of the Applicant's paid consultants rather than on unbiased reports long relied upon by government agencies is most discouraging to the involved agencies. NYSDEC accepted the Applicant's premise that mining below the water table and thereby creating a large standing body of water adjacent to an industrial activity located **within the Wellhead Protection Area for the Lime Hollow supply wells** would not threaten those wells. It did so without even requiring a DEIS to objectively vet that controversial contention in a more public process.

As you know, the proposal to expand the current mining operations horizontally and beneath the water table is a Type I action which "is more likely to have a significant adverse impact on the environment than other actions or classes of actions" such as unlisted actions. NYSDEC SEQR Handbook, pg. 15. As such, that action is **presumed** to require a positive declaration in absence of definitive information demonstrating the absence of significant environmental concerns. The Court of Appeals has recognized that the Environmental Impact Statement ("EIS") process is "the heart of SEQRA". *Jackson v. NYS Urban Dev. Corp.*, 67 NY2d 400, 425 (1986). It is that EIS process and not a conclusory review during the application process that should objectively assess the clear concerns which are evident in this matter. Courts have long described the threshold for requiring the preparation of an environmental impact statement to be "relatively low". *See, e.g., H.O.M.E.S. v. NYS Urban Dev. Corp.*, 69 AD2d 222, 232 [4th Dept 1979]. A positive declaration must be issued if the action "may include the potential for at least one significant adverse environmental impact." 6 NYCRR § 617.7(a)(1) (emphasis added); see, also, *Jackson, supra*. On the other hand, to issue a negative declaration, the lead agency "must determine either that there will be no adverse environmental impacts or that the identified adverse environmental impacts will not be significant. 6 NYCRR § 617.7(a)(2) (emphasis added).

The potential impacts to the Lime Hollow water supply wells were not adequately assessed by H2H and NYSDEC during its SEQRA review of the proposed action, notwithstanding the conclusory assertions in the Negative Declaration that "[t]here would be no loss or significant adverse impacts to either the quality or quantity of ground or surface waters from mining at this site . . . [and that] [t]here have been no issues raised, nor investigations, evidence, tests or other analysis that would lead the Department to conclude that any significant water quality or quantity problems could result from sand and gravel mining above or below the water table" (emphasis added). In fact, significant issues were raised by the Town and County SWCD and the Department is well aware of the existing studies identified in this letter (and others) concerning the direction of groundwater flow and the location of the Town's Wellhead Protection Areas.

Commissioner Seggos in his Decision of September 5, 2017 (awarding lead agency status to NYSDEC rather than the Cortlandville Planning Board) said the following: "impacts to groundwater including the sole source aquifer and to the federal designated wetland bog habitat are of regional concern . . . [and] DEC as a state agency, is in a better position than the Planning Board to investigate and address impacts of regional significance." Additionally, the Commissioner expressly stated:

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[1] We can find no indication that NYSDOH was ever treated as an involved agency by NYSDEC despite its role in protecting the WPA.

"[w]hile designating DEC as lead agency, I must remind it to remain aware of all potential impacts that have been identified during this lead agency dispute, or which may be identified during the course of environmental review" (emphasis added).

Substantive issues and concerns regarding the impacts of the Application were raised by the Town of Cortlandville, County SWCD, and Department Staff during the lead agency dispute and the Department's SEQRA review. Relevant correspondence includes but is not limited to the following:

- In a May 8, 2017 letter from Town Attorney John B. Folmer to Joseph Dlugolenski of Region 7 (relating to the Department's intention to contest the Town's status as lead agency), Mr. Folmer expressed concern that the Applicant appeared to be unaware of the Mine's location near one of the Town's Primary drinking water supply wells;

- In his letter of May 17, 2017 to Commissioner Seggos regarding the lead agency dispute, Joseph Dlugolenski, DEC's then Deputy Regional Permit Administrator, identified the following four potential adverse environmental impacts from the proposed mine expansion: impacts to the groundwater/aquifer due to proposed mining below the water table; potential impact to the nearby Town water supply well; hydrologic impact to nearby federally designated wetland bog habitat within the Lime Hollow Nature Center; and an increase in truck traffic on the mine access road's connection to NYS Route 13;

- In a letter of May 25, 2017 to Commissioner Seggos, Mr. Folmer confirmed the four impacts identified by Mr. Dlugolenski in the May 17 letter, and further emphasized the Town's additional concerns regarding: the possible impact of the action upon wildlife at the adjacent Lime Hollow Nature Center; the fact that the project is located within 750 feet of a municipal well and other sources of water supply within the Aquifer; and the fact that the Aquifer provides water to almost 50% of the population of Cortland County, including the Town of Cortlandville and the City of Cortland;

- June 20, 2018 letter from Town of Cortlandville Supervisor Richard Tupper to Commissioner Seggos copying Mr. Dlugolenski and other state and county officials, regarding: the conflicting mission of NYSDEC to foster and promote mining while protecting the citizens from irreversible harm; the fact the sole source Aquifer is required to provide clean water to thousands of residents of the County; that the Town places stringent controls over projects that would have a deleterious impact on the Aquifer; and the fact that there is no way to mitigate the potential damage to the Aquifer from the project if the permit is issued;

- Letter of August 7, 2018 from NYSDEC Regional Director Matthew Marko to Supervisor Tupper, confirming: the "significant natural resources in the area"; the fact "the Town water supply well is located approximately 800 feet from the existing edge of the life of mine"; the fact that the "mine is within the wellhead protection area for the Cortlandville Lime Hollow supply well; the fact the adjacent "Lime Hollow Nature Center is a 430 acre nature preserve that includes an unusual assemblage of marl ponds, a peat bog, and kame-and-kettle topography"; that a Notice of Incomplete Application was sent to the Applicant "which requested additional information about the sole source aquifer, potential groundwater and surface water impacts, information about the lime hollow well, noise, equipment refueling and potential spill best management practices and where these activities will take place";

- County SWCD's September 13, 2018 letter to Supervisor Tupper, copying Joseph Dlugolenski, NYSDEC Deputy Regional Permit Administrator, regarding the Applicant's

proposed permit modification: the mine is located approximately 730 feet from the Lime Hollow Road water supply well and is within Zone 1A of the Town's wellhead protection area, the most critical zone for protection of the water supply; the Aquifer beneath the mine provides drinking water for the City as well as the Town; mining below the water table may affect water quality and quantity of the Aquifer with potential effects on temperature, recharge and water table elevation; mining below the water table increases the risk of contamination from external sources during and beyond the life of the mine; and the quality and quantity of drinking water is at greater risk if mining beneath the water table is approved than it would be if the current 8' separation buffer is maintained. In addition, while County SWCD recognized the benefits that mining can provide in the appropriate areas, not all locations are appropriate and at some locations other priorities should take precedence. County SWCD recommended certain monitoring and mitigation measures (but only if mining is approved by NYSDEC); and

- County SWCD's December 3, 2018 letter to Supervisor Tupper, copying NYSDEC Deputy Regional Permit Administrator Joseph Dlugolenski, critiquing H2H's Scope of Work for its Hydrogeologic Assessment and H2H's prior point by point response to County SWCD's September 13, 2018 comments to Supervisor Tupper, identifying numerous concerns with H2H's theories: the mine pond is unlikely to be a significant recharge boundary (preventing contaminants to migrate to the well) for several reasons, including a prior analysis by Clough Harbour Associates showing that drawdown is negligible at a distance of 300' from the well; gasoline and diesel fuel which will be used in mining equipment have a much higher solubility in water than H2H's Spill Prevention and Response Plan indicates; the Town's well screen located at the bottom of the well casing does not protect the water supply from dissolved contaminants, and does not protect the water supply from contaminants introduced at the surface, and a supply well drawing water at depth can induce or increase a downward vertical gradient (thereby drawing contaminants toward the water supply well).

Additionally, in his letter of May 17, 2017 from Mr. Dlugolenski to Commissioner Seggos, regarding the lead agency dispute, Mr. Dlugolenski identified the following potential impacts from the proposal to mine below the water table: impacts to groundwater and the aquifer due to the proposal to mine below the water table; potential impacts to the nearby Town water supply well; the hydrogeologic impact to the nearby federally designated wetland bog habitat within the Lime Hollow Nature Center; among other potential impacts.

All of these concerns indicated that the Mine expansion may cause a significant adverse environmental impact. **Therefore, these concerns should have been thoroughly assessed in the context of a DEIS, not dispensed with in conclusory fashion as you did in your negative declaration.**

CONCLUSION

NYSDEC's decision to issue a negative declaration and its apparent intention to issue the Applicant a permit modification to allow it to mine up to 100 feet below the water table has the potential to have permanent adverse consequences to the primary drinking water supply in the Town of Cortlandville and the City of Cortland. In doing so, it ignored the prior modeling that has been accepted by all relevant agencies (federal, state and local) over the years and creates the terrible precedent of essentially ignoring the Town's WPAs and allowing industrial activities with direct connection to the water table within a WPA without rigorous assessment. The undersigned believe that such a determination violates SEQRA.

Department Staff's intention to approve this Application without adequate scientific review is most disappointing as it is made by the very agency tasked with protecting the water quality in this state. Further, it demonstrates a clear conflict of interest between the Department's obligation to protect such resources and the State's "Declaration of Policy" in ECL 23-2703 "to foster and encourage the development of an economically sound and stable mining industry...."

The Town and the County SWCD assert that encouragement of the mining industry can be accommodated while still taking the required "hard look" at potential impacts that SEQRA requires. Additionally, the Applicant is still permitted to undertake mining in its existing Life Of Mine above the water table, and the Town and County SWCD are not opposed to a horizontal expansion, provided that the existing 8' buffer area to the top of the water table is maintained and delineated.

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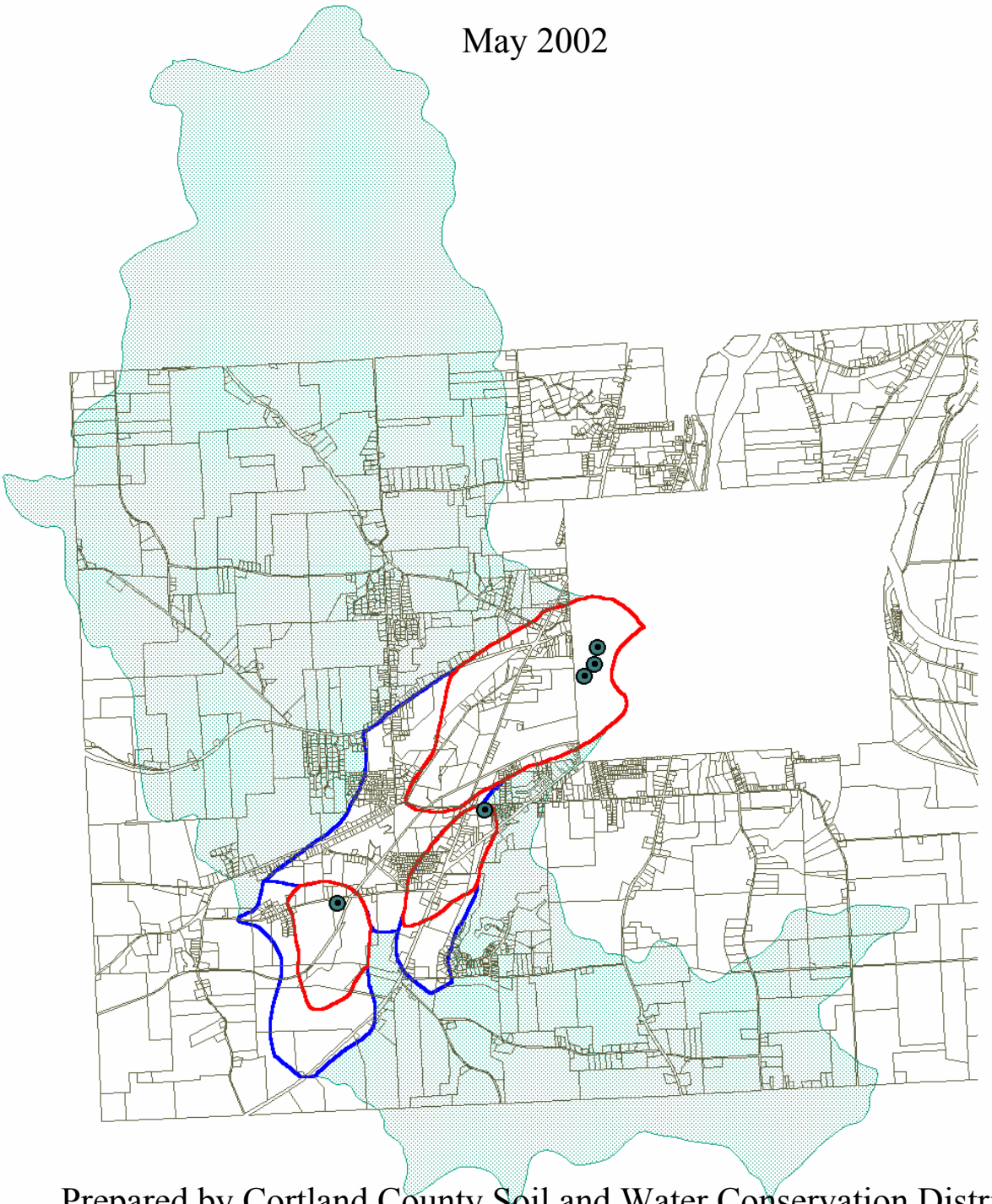
cc: Hon. Basil Seggos, Commissioner
Matt Marko, Regional Director
Margaret Sheen, Acting Regional Attorney

Exhibit B - Referenced Documents

FINAL
Delineation of Wellhead Protection Areas
Town of Cortlandville and City of Cortland, New York

May 2002



Prepared by Cortland County Soil and Water Conservation District

Final Report
Delineation of Wellhead Protection Areas
Town of Cortlandville and City of Cortland, NY

Contents

		Page
1.	Introduction	1
2.	Regulatory Framework	1
3.	Hydrogeologic Setting	2
4.	Municipal Supply Wells	4
5.	Wellhead Protection Criteria	4
6.	Zone 1A and Zone 1B Delineations	7
7.	Zone 2 (Watershed Recharge Area)	12
8.	Stream Loss Impacts to Supply Wells	12
9.	Mapping	12
10.	References	13

Figures

1	Aquifer Boundary	3
2	Municipal Supply Wells	5
3	Recharge Conditions	8
4	Zones 1A and 1B	14
5	Zone 2 (Watershed Recharge Area)	15
6	Wellhead Protection Areas for the Terrace Rd. Well	16
7	Wellhead Protection Areas for the Lime Hollow Well	17

Tables

1	Municipal Supply Well Data	6
2	Non-municipal Pumping Wells	10

1. Introduction

Groundwater in the Otter-Dry Creek aquifer supplies drinking water to the Town of Cortlandville and the City of Cortland. A large percentage of the recharge area to the aquifer is located within the Town of Cortlandville. The Town recognizes the importance of protecting this valuable resource, and plans to establish wellhead protection areas for the public supply wells, and consider zoning regulations to help preserve water quality in the aquifer.

The wellhead protection areas presented in this report were developed by Cortland County Soil and Water Conservation District (SWCD), with the assistance of the Cortland County Health Department (CCHD) and the United States Geological Survey (USGS). Protection areas were delineated using a computer model developed by the USGS. USGS provided technical review of the modeling results.

Various assumptions on hydrologic conditions, pumping rates , and delineation criteria were required to delineate the protection areas. These assumptions were developed jointly by the Town of Cortlandville, the Cortland Water Board, SWCD, CCHD, USGS, and Clough Harbor & Associates (CHA).

2. Regulatory Framework

The 1986 Amendments to the Safe Drinking Water Act (SWDA) established a federal program to protect the quality of groundwater used in public water supply systems (Trautmann et al.). This program, called the Wellhead Protection Program, is designed to protect groundwater used as a source for drinking water.

The Safe Drinking Water Act defines a wellhead protection area as the surface and subsurface area through which contaminants are likely to pass before reaching a well or group of wells used for public water supplies. Wellhead protection, therefore, means protection of the land area around a well that significantly influences its source of water. The goal of the federal program is to delineate the wellhead protection area for each public water supply well, identify sources of contaminants within these areas, and develop management strategies to prevent well water contamination.

The federal program requires that each state develop its own wellhead protection program. In New York, The State Department of Health (NYSDOH) implements the federal program, and strongly encourages wellhead protection for every source. At the county level, CCHD implements the state requirements.

NYSDOH has completed a program plan called the Source Water Assessment Program (SWAP) that outlines the state's approach to source water protection (NYSDOH, 1999). The elements of this program plan were drawn on in developing the wellhead protection plan for the Town of Cortlandville.

3. Hydrogeologic Setting

Much is known about the Otter-Dry Creek aquifer. USGS and others have conducted extensive investigations of the aquifer system, and USGS has developed a 3-dimensional numerical model to simulate groundwater flow based on this data. A detailed description of the aquifer and the groundwater model is documented in a separate report (USGS, 1996). A brief description of the Otter-Dry Creek aquifer is presented below. Further information can be found in the USGS report.

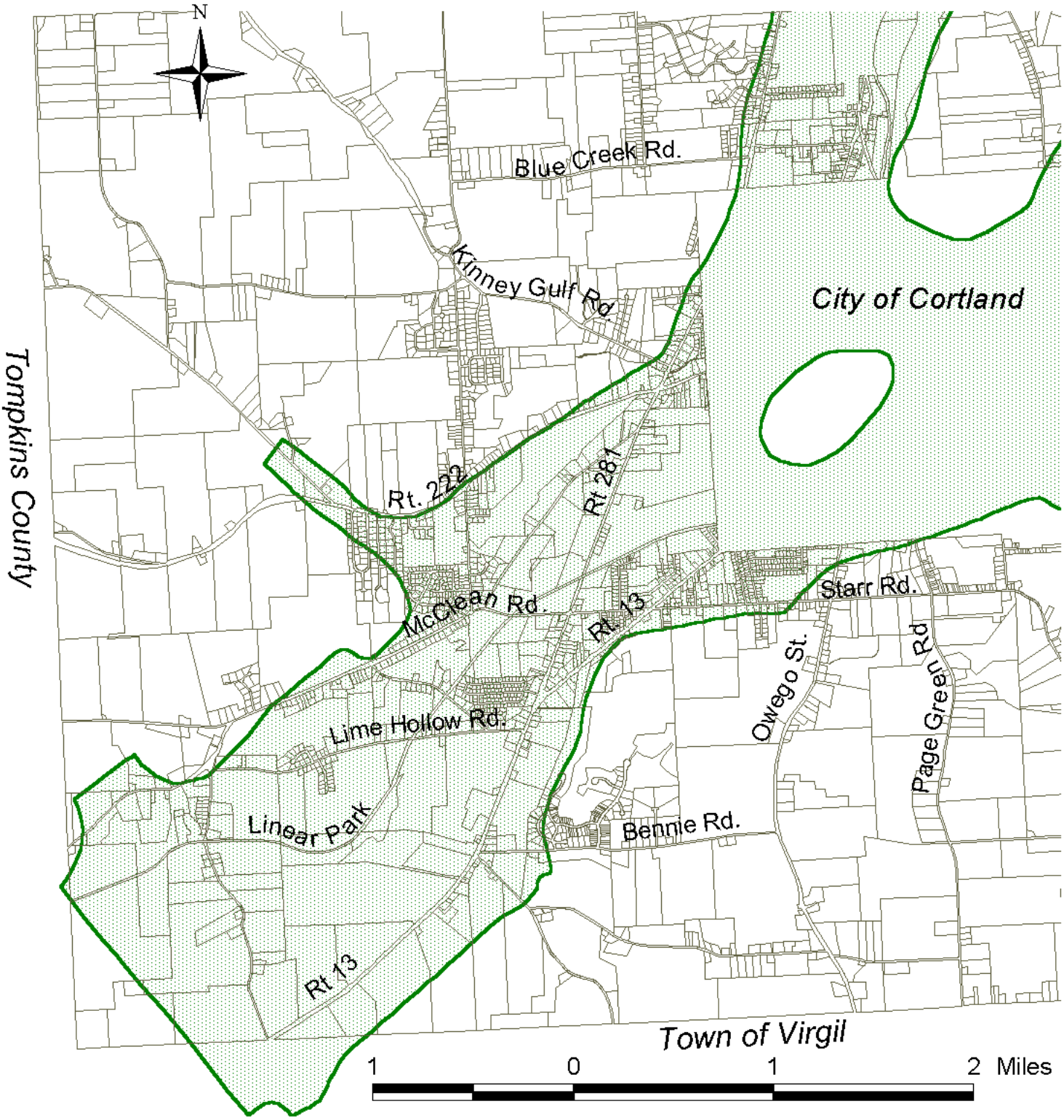
The Otter-Dry Creek aquifer (hereafter called the aquifer) extends northeast-southwest along the valley portion of southwest Cortlandville, generally following the alignment of Otter Creek. The aquifer is about one to two miles wide and about six miles long. Figure 1 shows the boundary of the aquifer.

Groundwater flow in the aquifer is generally to the northeast. Most water from the aquifer eventually discharges to the West Branch Tioughnioga River and the Tioughnioga River. During high groundwater conditions, the aquifer can discharge to Otter Creek and Dry Creek as well. Under lower groundwater conditions, these two streams may lose water to the aquifer. Water withdrawn for water supply is mainly discharged to a sanitary sewer system, and reaches the Tioughnioga River as discharge from the City of Cortland wastewater treatment plant located just downstream from the Port Watson Street bridge.

The topmost layer of glacial deposits in the Otter Creek valley consist of outwash sand and gravel to a maximum depth of about 100 feet. A lacustrine layer of very fine sand, silt and clay lies beneath the outwash. The lacustrine layer is over 100 feet thick in some locations. Kame deposits, consisting of stratified or poorly sorted silt, sand and clay, lie beneath the lacustrine layer. The kame deposits vary in thickness, and may be very thin or absent in some locations. These deposits are underlain by shale bedrock.

The outwash sand and gravel forms a highly productive, unconfined, shallow aquifer. All the municipal supply wells draw water from this unconfined aquifer. The lacustrine layer is relatively impermeable, and is unsuitable for water supply because of the limited quantities of water that can be obtained. The kame deposits form a moderately productive, confined aquifer. A few commercial wells tap the confined aquifer, but most water withdrawals are from the unconfined aquifer. The shale that underlies the glacial deposits does not readily transmit water, and is generally only used for private wells in upland areas.

Recharge to the aquifer occurs mainly as 1) infiltration of precipitation that falls directly over the aquifer, 2) losses from streams , and 3) groundwater and unchanneled runoff from the uplands. USGS (1996) estimates that, on average, about 38 percent of all recharge is from direct precipitation over the aquifer. About 32 percent of recharge is from stream losses, and about 23 percent from runoff and groundwater from the uplands. Since much of stream flow originates in the uplands, as much as 50 percent of all recharge to the aquifer may be from upland areas, outside the actual aquifer area.



Aquifer Boundary

Tax Parcel

Figure 1.
Aquifer Boundary

Wellhead Protection Delineations
Town of Cortlandville

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4. Municipal Supply Wells

The Town of Cortlandville operates two supply wells: the Terrace Road well and the Lime Hollow well. Either well can supply the entire current demand for the Town. The City of Cortland has three supply wells located in the City Water Works on Broadway Street. All of these municipal wells draw water from the shallow, unconfined aquifer. Figure 2 shows the locations of the municipal wells. Table 1 presents data for each well.

5. Wellhead Protection Criteria

The criteria used to delineate wellhead protection areas depend on the type of aquifer and the degree of protection desired (Trautmann et al.). Criteria commonly used include:

1. distance from the well
2. drawdown of the water table
3. flow boundaries
4. time of travel
5. assimilative capacity

Given the availability of a sophisticated numerical groundwater model, a time of travel approach was selected. Flow boundaries were also used in cases where the travel-time capture zone reached the aquifer boundary. The extensive understanding of the aquifer system, combined with the numerical model, allows for a relatively high degree of accuracy in delineating a protection area compared to other delineation techniques. With this approach, wellhead areas can be delineated that provide adequate protection without relying on overly restrictive management strategies.

A multi-zone approach was taken for Town and City wells. This is a commonly-used approach that designates different zones based on different levels of risk to water quality. Zones with higher risk typically receive greater protection. Three zones were delineated for the supply wells:

Zone 1A (2-year Travel Time) - Within this zone of the aquifer, it takes groundwater two years or less to reach the well. This zone represents the highest risk of contamination, and should receive the highest degree of protection.

Zone 1B (5-year Travel Time) - Within this zone of the aquifer, it takes groundwater five years or less to reach the well. This zone represents a significant risk of contamination to the well, but not as high as Zone 1A because any potential contamination may undergo increased effects of dilution, degradation, and other physical, chemical or biological processes that reduce its ultimate affect on water quality at the well.

Zone 2 (Watershed Recharge Area) - This zone includes all land area outside Zones 1A and 1B that is a potential source of water to the well. It can include both land over the aquifer, and land from upland areas that provide recharge to the aquifer.

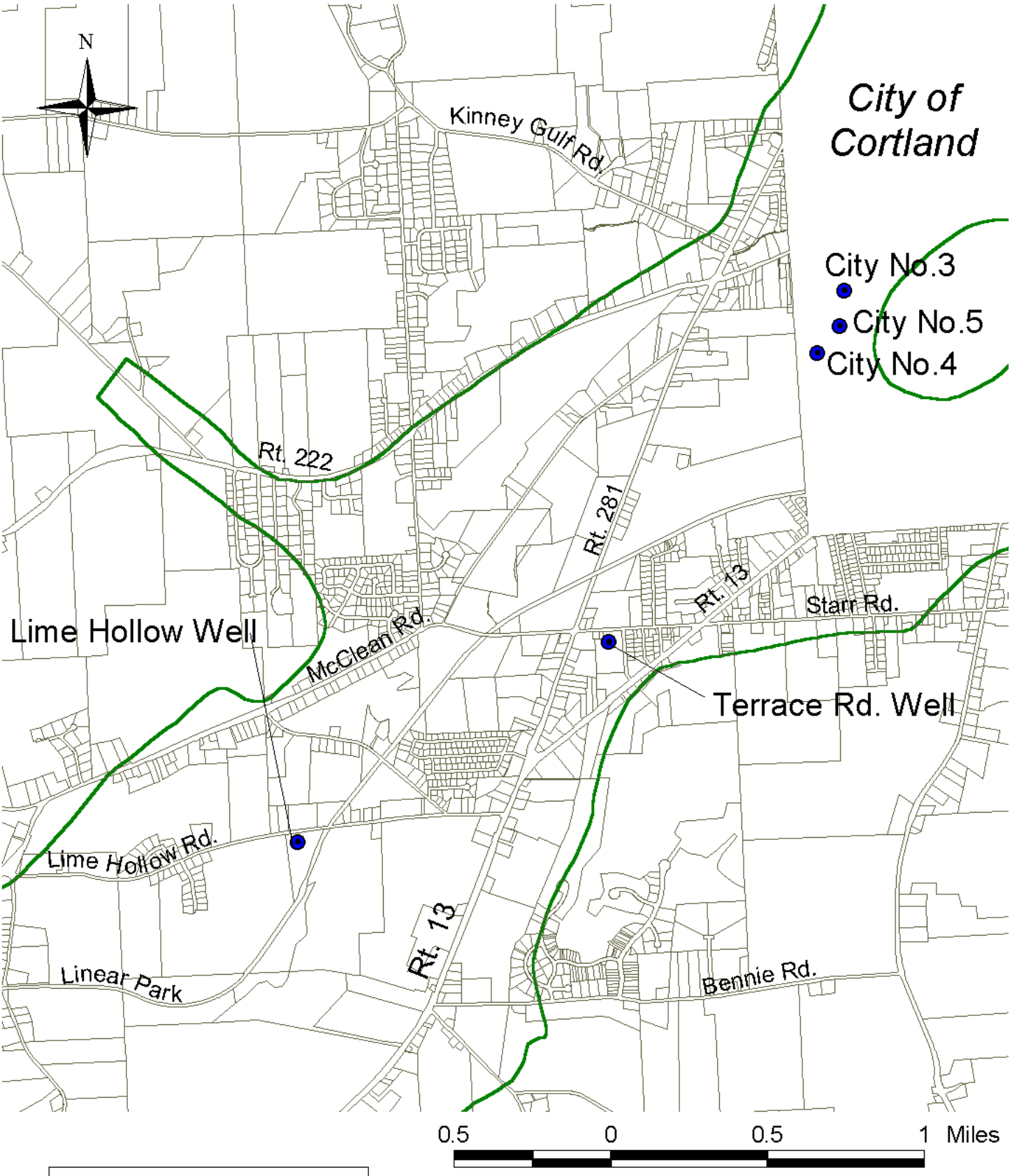

Figure 2.
Municipal Well Locations

Wellhead Protection Delineations
Town of Cortlandville

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Table 1
Municipal Well Data
Wellhead Protection Area Delineations
Town of Corlandville

Well	Depth (ft)	Screen Length (ft)	Casing Diameter (inches)	Existing Capacity (gpm)	Date Installed
Town of Cortlandville					
Terrace Road	64	15	12	700	NA
Lime Hollow	92	22	12	1,330	1989
City of Cortland					
No. 3	77	32	26	3,000	1949
No. 4	77	52	32	4,000	1957
No. 5	50	20	24	3,500	1981

6. Zone 1A and Zone 1B Delineations

Zones 1 A and B were delineated using the USGS numerical model. The following subsections describe the model and the assumptions used for the simulations.

6.1 USGS Model

USGS developed a steady-state groundwater flow model of the aquifer using MODFLOW. MODFLOW is a 3-dimensional numerical model that simulates groundwater flow within an aquifer using a block-centered, finite difference approach. MODFLOW can simulate confined and unconfined layers of an aquifer. It can also simulate external stresses such as pumping wells, recharge, evapotranspiration, and streamflow.

MODPATH is a particle tracking program that computes 3-dimensional groundwater pathlines using output from MODFLOW. MODPATH can be used to track groundwater flow lines to one or more wells. Flow lines can be used to identify a well's "capture zone", representing the portion of the aquifer that contributes water to the well. MODFLOW and MODPATH were used to delineate the wellhead protection areas for the municipal water supplies of Cortlandville and Cortland.

USGS calibrated the MODFLOW model to three different hydrologic conditions: 1) average recharge, 2) low recharge and 3) high recharge. In simple terms, each represents a specific groundwater level distribution in the aquifer, and flow condition in surface waters. USGS made numerous groundwater level and streamflow measurements to establish each hydrologic condition. As average recharge condition implies, this condition occurs on a frequent basis. Statistically, both low and high recharge represent a condition with a 10-year recurrence interval for a one-year duration, but this condition occurs more frequently for shorter durations. Figure 3 shows the average, low and high recharge condition at a single well in the aquifer compared to 26 years of groundwater level data for that well. The well (C-102) is located in the Cortland Water Works, and is part of the USGS monitoring well network. For more information on the development and calibration of the MODFLOW model, refer to USGS (1996).

6.2 Hydrologic Conditions

High and low recharge conditions were selected to simulate Zone 1A and 1B wellhead protections areas. USGS had previously delineated capture zones for the municipal wells in the aquifer for average, high and low recharge conditions. These results showed that no single recharge condition completely characterized the capture zone to the supply wells. Refer to USGS (1996) for more information on the these recharge conditions.

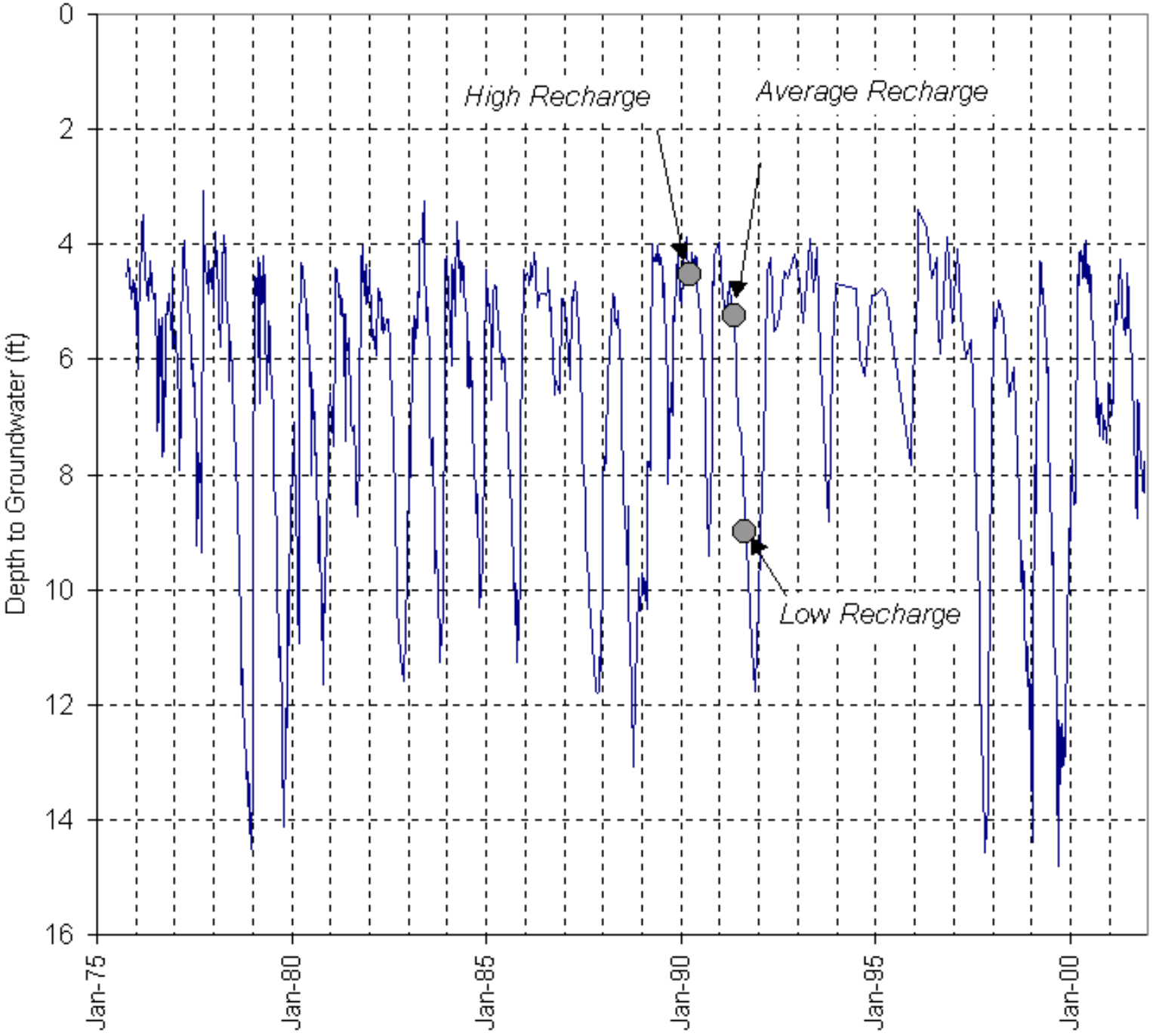
The high and low recharge conditions were selected for this analysis because together they most fully characterize the capture zones for the wells. To delineate wellhead protection areas, a separate model simulation was conducted for the high and low recharge conditions. The capture zones that resulted from each run were then combined to form the final capture zones.

Figure 3.

Average , High and Low Recharge Conditions Compared to 26-Year History of Aquifer Level

Wellhead Protection Area Delineations

Town of Cortlandville



Note: Depth to Groundwater at USGS Well C-102 at City of Cortland Waterworks

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6.3 Pumping Rates

Municipal Pumping Rates

The pumping rates selected for the municipal supply wells were developed by CCHD following discussions with the Town, the City, and others. Since one aspect of wellhead protection is to preserve water quality into the future, expected future demand was taken into account.

A 20-year projection for future demand was selected. CCHD considered such issues as population growth, industrial/commercial growth, reactivation of large water demands by existing facilities (e.g., Buckbee Mears), expansion of the system to include neighboring communities (e.g., Village of McGraw), and long-term rates of increase in demand based on historical pumping records.

Current water supply demand for the Town of Cortlandville averages about 0.7 million gallons per day (MGD). For the City of Cortland, current average demand is about 4.0 MGD. To account for expected future demand, the pumping rates used to delineate wellhead protection areas were 1.1 MGD for the Terrace Rd. well, 1.5 MGD for the Lime Hollow well, and 6.0 MGD for the City of Cortland. For all model simulations, the City of Cortland well was assumed to be pumping at 6.0 MGD. When simulating the Terrace Rd. well, the Lime Hollow well was assumed to be off line, and vice versa.

Other Withdrawals from the Aquifer

Five significant non-municipal withdrawals were identified in the aquifer. The owner or operator of each well was contacted to determine current pumping rates and any expected changes in the future. A reliable estimate of changes in future demand could not be determined for any of the wells, so the current usage was used for this analysis. For each of these wells, an average annual pumping rate was used if rates varied during the year. See Table 2 for a list of the non-municipal wells and average annual pumping rates.

The groundwater recovery well for the former Smith-Corona facility (listed on Table 2) merits further discussion. First, water withdrawn from this well is passed through an air stripper to remove contamination, and is then discharged to two infiltration lagoons. These lagoons are included in the MODFLOW model as recharge wells (rather than withdrawal wells), to account for the return of water to the aquifer. An analysis of potential evaporation from the lagoons indicates that losses to the atmosphere would be negligible, and the recharge rate for the lagoons was set equal to the current withdrawal rate from the recovery well.

Secondly, it is likely that clean-up goals at the former Smith-Corona site will some day be met, and the recovery well will be taken off line. Simulations of this scenario were evaluated to determine how it might affect the wellhead protection delineations. The results of these simulations indicated a negligible change, likely due to the fact that the water withdrawn from the recovery well is almost immediately returned to the aquifer. Final simulations to delineate the wellhead protection areas assume that the recovery well is pumping at its current rate, with the recharge lagoons returning all this water to the aquifer.

Table 2
Major Non-municipal Aquifer Withdrawals
Wellhead Protection Delineations
Town of Cortlandville

Well	Pumping Rate (1) (MGD)	(gpm)	Comments
Recovery Well at former Smith-Corona Facility	1.15	800	Based on current rate reported by operator
Recharge Lagoons at former Smith-Corona Facility	-1.15	-800	All treated effluent returned to aquifer via lagoons
Intertek Testing Services	0.72	498	Current average annual rate provided by Intertek
Pall Trinity	0.09	62.5	Current average annual rate based on pumping records provided by Town of Cortlandville
Gutchess Lumber	0.015	10.4	Current average annual rate based on data provided by Gutchess Lumber
Bestway Lumber	0.022	15.3	Current average annual rate based on data provided by Bestway Lumber

(1) MGD = million gallons per day; gpm = gallons per minute
Positive value indicates aquifer withdrawal, negative indicates recharge to aquifer.

6.4 Zone 1A (2-year Travel Time)

Zone 1A represents land directly over the aquifer, and immediately surrounding the well. Groundwater within this portion of the aquifer will reach the well in two years or less. Zone 1A should receive the greatest protection measures because potential contamination within this part of the aquifer is more likely to impact the well. There is also less time to respond to an identified groundwater problem because of the relatively short time it takes for groundwater to reach the well. A 2-year travel time was selected for two main reasons:

1. Two years was estimated to be the minimum amount of time needed to form an adequate response to a significant source of contamination within the aquifer. A higher degree of protection should be implemented within this zone. Lesser protection outside the zone is warranted because affected parties would have time to take actions to prevent contamination from impacting the well.

2. Federal/state regulations related to protection of groundwater supplies from viruses and bacteria are being implemented that include a travel time component. Although a specific travel time has not officially been set, a 2-year travel time has been discussed.

6.5 Zone 1B (5-year Travel Time)

Zone 1B represents land directly over the aquifer, but outside of Zone 1A, farther from the supply well. Groundwater in this portion of the aquifer takes more than 2 years, but less than 5 years, to reach the well. Contamination in Zone 1B can impact the well, but does not represent as great a threat to the well as contamination within Zone 1A. Physical, chemical and biological processes can naturally reduce potential impacts, depending on the type of contamination. There is also more time to implement a clean-up response, identify alternate sources of water, or provide additional treatment at the well if necessary.

While groundwater contamination in Zone 1B poses less of a risk to a supply well than Zone 1A, it still represents a significant concern. Protection and management of this part of the aquifer is important.

A 5-year travel time for Zone 1B was selected for two main reasons:

1. Federal EPA and NYSDOH SWAP guidance both suggest use of a 5-year travel time for wellhead protection.

2. Five years is a critical travel time for natural reduction of contaminant concentrations in highly permeable aquifers. In other words, a contaminant plume traveling through an aquifer will undergo dilution, degradation and other processes that reduce its "strength" over time. After five years, some contaminants might be reduced to the extent that they do not pose a human health concern. It should be noted, however, that this depends on many factors, and should not be taken to mean that pollution will travel for no more than five years through an aquifer.

7. Zone 2 (Watershed Recharge Area)

Zone 2 represents all land outside Zones 1A and 1B that contributes water to the supply well. In general Zone 2 requires less protection than Zones 1A and 1B, but there are circumstances in which pollutants in this zone can have a significant impact (see Section 8).

Zone 2 can include portions of the aquifer that contribute flow to the supply well, but that would take longer than five years to reach the well. It can also include land in upland areas, outside the aquifer boundary. As much as 50 percent of the water reaching the aquifer is estimated to come from upland areas.

Zone 2 is essentially the drainage area to Zones 1A and 1B. Zone 2 areas were delineated based on topography.

8. Stream Loss Impacts to Supply Wells

All three types of wellhead protection area described above represent land areas from which groundwater will travel through the aquifer and reach the supply well. The main difference between them is the length of time it takes for the water to reach the well.

In the Otter-Dry Creek aquifer, stream losses can be a significant source of water to the aquifer, and to supply wells. Stream losses occur when groundwater levels are lower than stream levels, and water from the stream seeps down to the aquifer. This condition occurs fairly frequently. Because water travels much more quickly along a stream than through the aquifer, it is possible for pollutants from remote areas to reach a supply well relatively quickly. For example, a pollutant discharged to a stream several miles from a well could reach the vicinity of the well within a day or two via surface flow. The pollutant could then infiltrate to the aquifer as a stream loss, and reach the well much more quickly than a pollutant traveling solely by groundwater flow over the same distance.

The likelihood that a pollutant would reach a well in this way is unknown, and the wellhead protection areas described above do not fully address this type of pathway. The Town and City should be aware that this type of threat exists. One possible way to address this issue is to adopt buffer zones around surface waters. Activities within the buffer zone could be regulated and/or restricted to reduce the risk of pollutant discharge to surface waters.

9. Mapping

Figure 4 shows the Zone 1A and Zone 1B areas for the Terrace Rd. well, the Lime Hollow well, and City of Cortland wells. The zones are overlain on a tax parcel basemap. Note that separate zones were established for the Town wells because of the distance between them. The three City wells are close to one another, and have overlapping capture zones. Therefore, a single Zone 1A and 1B area was delineated.

Each delineation is a union of the capture zones for high and low recharge simulations. For example, the 2-year wellhead protection area (Zone 1A) for the Terrace Rd. well is the union of the 2-year high

and 2-year low recharge simulations with this well on line. Note that for the City's supply, the final areas are the union of four simulations rather than two because separate pumping scenarios were simulated, first with Terrace Rd. well pumping, and then with Lime Hollow well pumping.

Figure 5 shows the Zone 2 area, combined for all the municipal supply wells. Also shown are the Zone 1A and 1 B areas. The individual Zone 2 areas for the Terrace Rd. and Lime Hollow wells are completely contained within the Zone 2 area for the City's wells, and are not shown separately on Figure 5.

Note that the Zone 2 area extends outside Cortlandville, into Homer to the north, Virgil to the south, and Tompkins County to the west. The Town cannot control land use activities in these areas, but can work with the other communities to encourage protection of their water supply.

Figures 6 and 7 show the Zone 1A, Zone 1B, and Zone 2 areas for the Terrace Rd. and Lime Hollow wells respectively. These figures are presented to show the extent of the Zone 2 areas for these wells individually.

10. References

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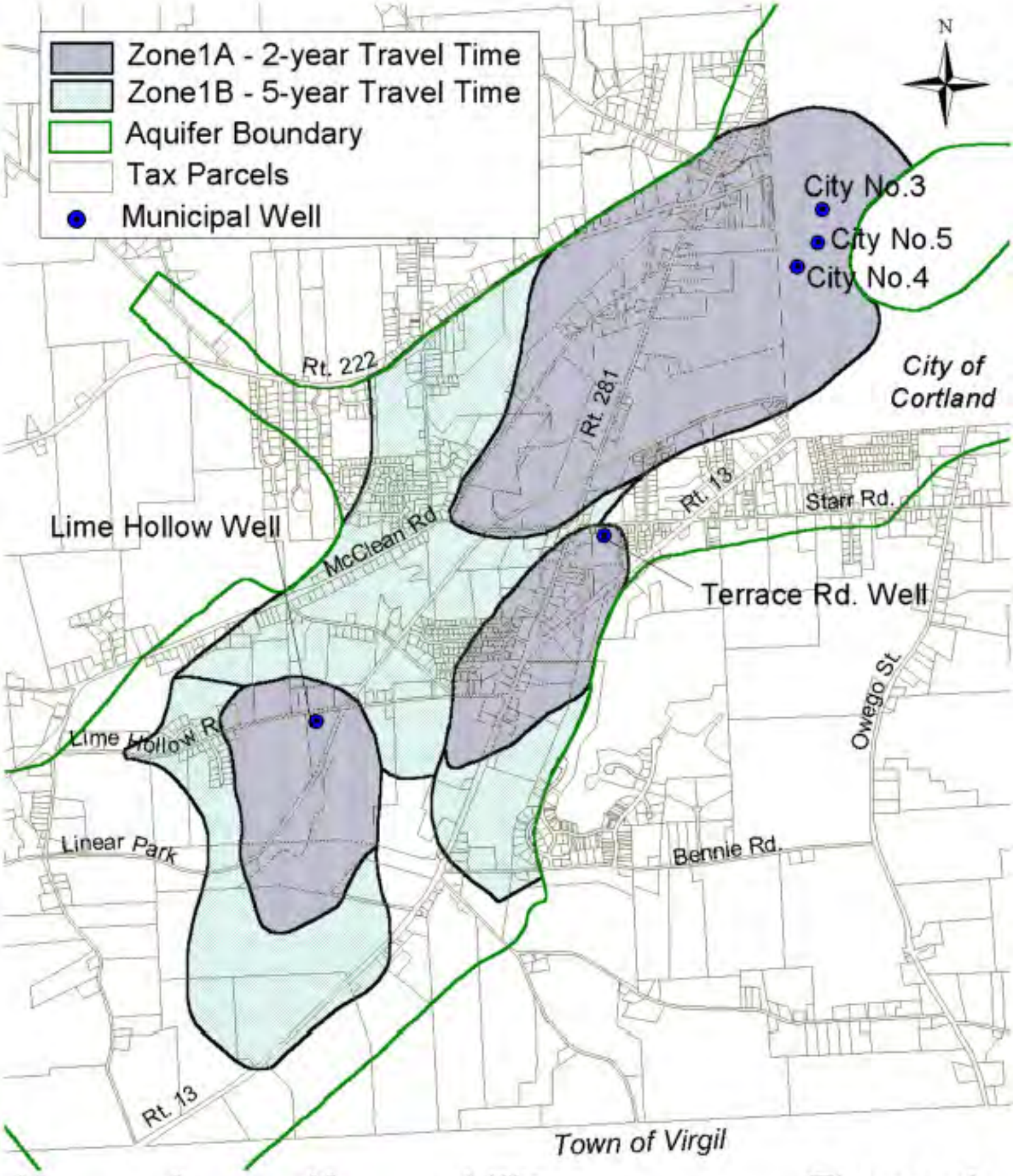

Figure 4.
Zones 1A and 1B
Wellhead Protection Area Delineations
Town of Cortlandville

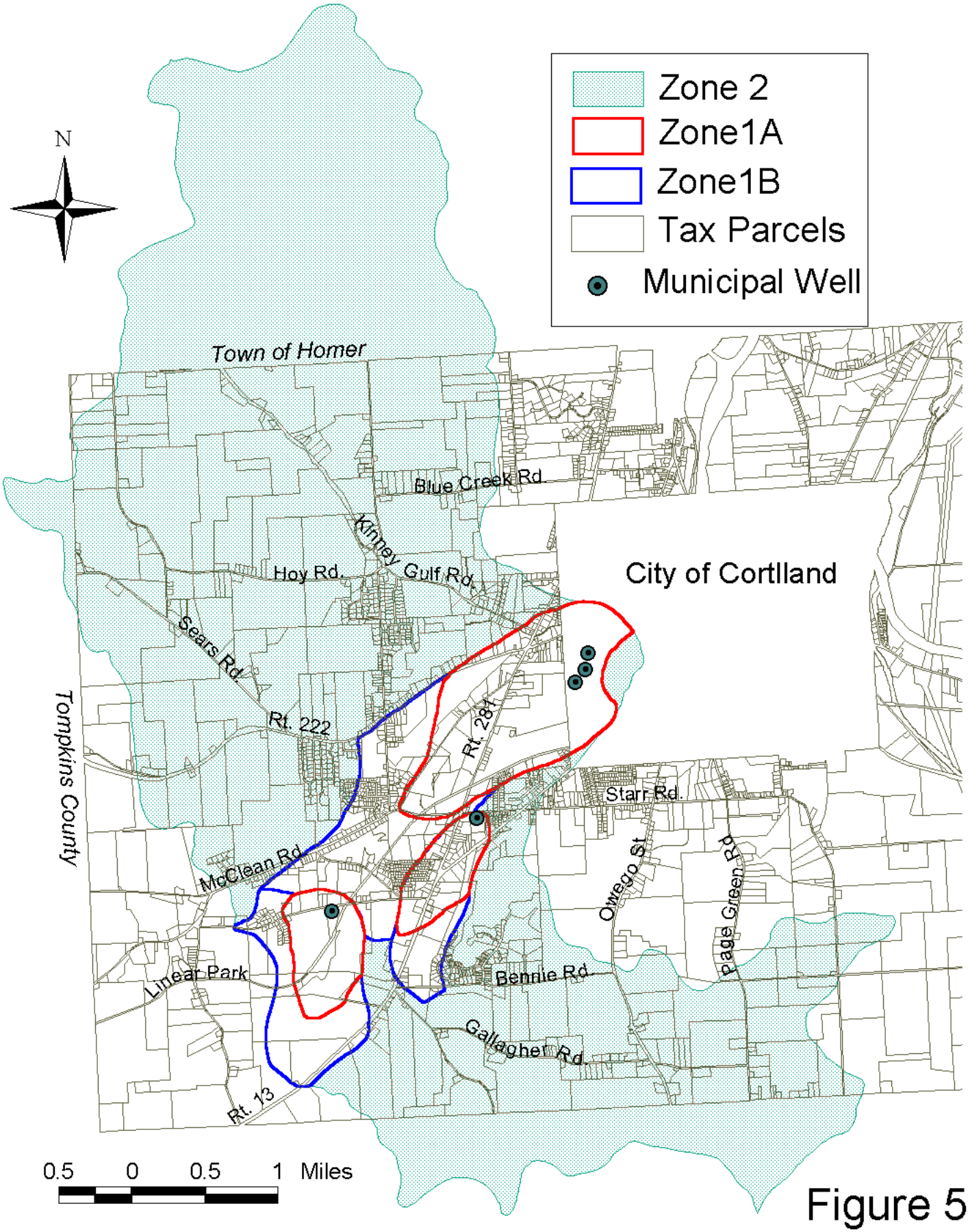

Figure 5.
Zone 2 - Watershed Recharge Area
Wellhead Protection Area Delineations
Town of Cortlandville

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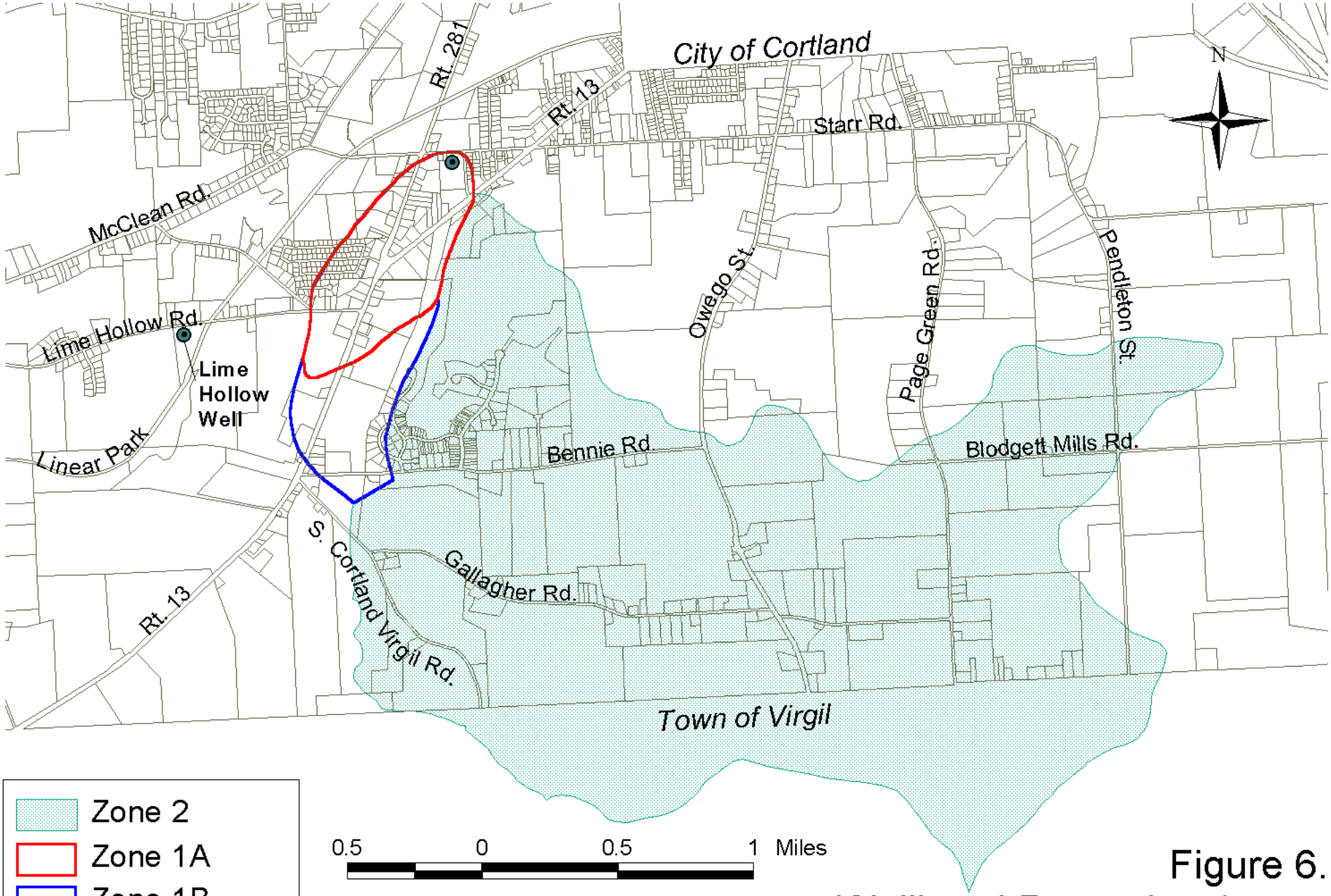

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Figure 6.
Wellhead Protection Areas for the Terrace Rd. Well

Wellhead Protection Area Delineations
Town of Cortlandville

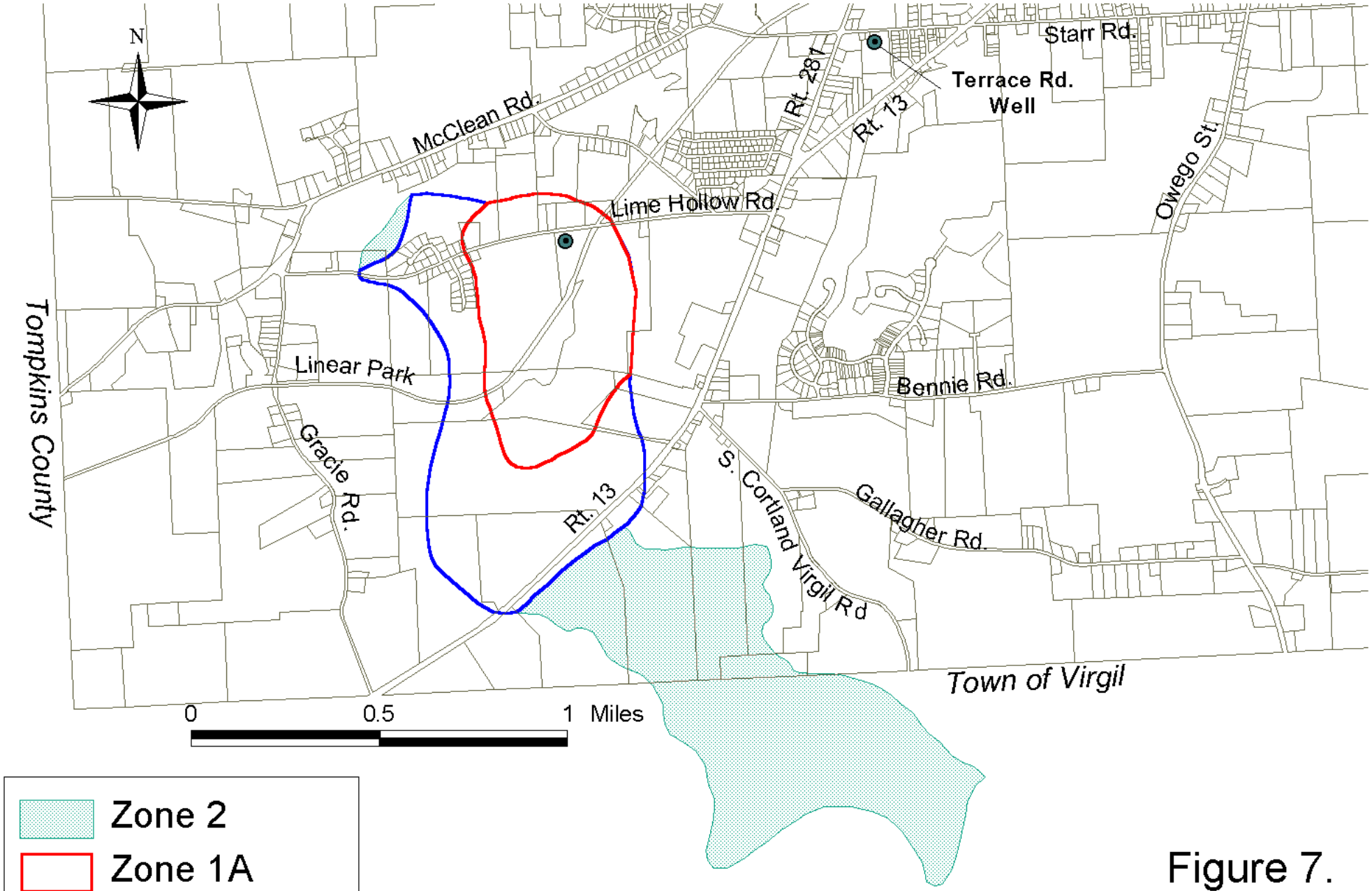

Figure 7.
Wellhead Protection Areas
for the Lime Hollow Well

Wellhead Protection Area Delineations
Town of Cortlandville

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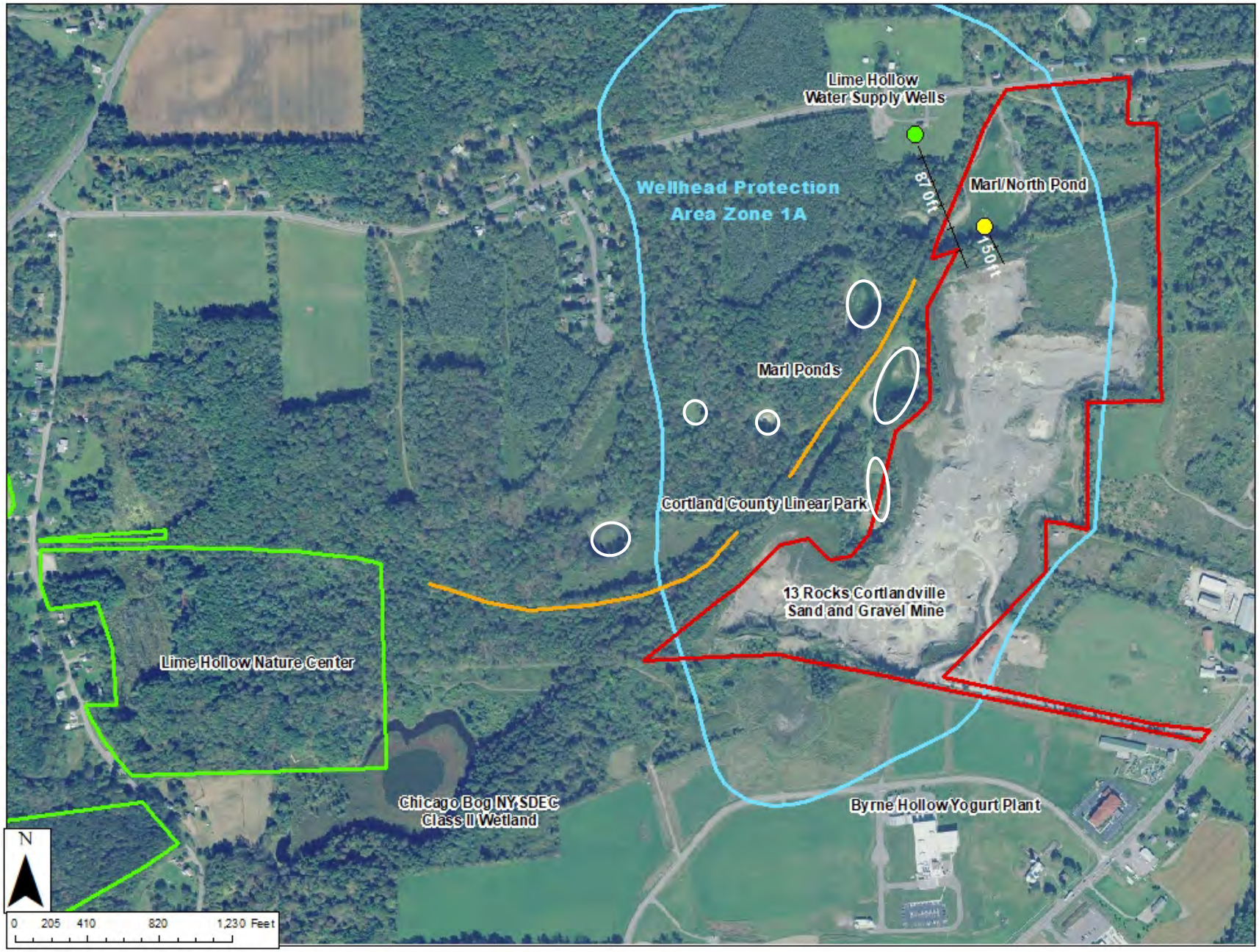
Lime Hollow
Water Supply Wells
Wellhead Protection
Area Zone 1A
870 ft
150 ft
Marl/North Pond
Marl Ponds
Cortland County Linear Park
13 Rocks Cortlandville
Sand and Gravel Mine
Lime Hollow Nature Center
Chicago Bog NY SDEC
Class II Wetland
Byrne Hollow Yogurt Plant
N
0 205 410 820 1,230 Feet

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SUMMARY 5

1. INTRODUCTION 6

2. SOURCES AND ENTRY 7

3. DIVERSITY OF PATHOGENS IN GROUNDWATER AND RELATED DISEASES 10
- 3.1 Bacteria 10
- 3.2 Viruses 12
- 3.3 Protozoa 13
- 3.4 Fungi and helminths 13

4. TRANSPORT AND ATTENUATION 14
- 4.1 Soils and the unsaturated sediments 14
- 4.2 The saturated zone 16

5. SURVIVAL AND GROWTH 19
- 5.1 Survival of bacterial pathogens 20
- 5.2 Persistence and proliferation of pathogenic viruse 22
- 5.3 Survival of pathogenic protozoa 23
- 5.4 Microbial antagonisms 24
- 5.5 Microbial strategies for a long-term survival 24

6. CONTAMINATION OF DRINKING WATER AND OUTBREAK OF WATERBORNE DISEASES 26
- 6.1 Waterborne disease outbreaks 26
- 6.2 Seasonality of pathogen occurrence 29
- 6.3 Economic impact of waterborne outbreaks 31
- 6.4 Groundwater protection regulations 31
- 6.5 Water treatment 32

7. USE OF INDICATOR ORGANISMS AND METHODOLOGICAL LIMITATIONS 34
- 7.1 Indicator organisms 34
- 7.2 Methods used in pathogens detection 36

8. RÉSUMÉ - KNOWLEDGE GAPS AND RECOMMENDATIONS 38
- 8.1 Status quo 38
- 8.2 Challenges 38
- 8.3 Recommendations 38
  - 8.3.1 Next generation enrichment techniques 38
  - 8.3.2 Methodological developments and challenges 39
    - 8.3.2.1 Reliable indicators of viral and protozoan contamination 39
    - 8.3.2.2 Improvement and development of molecular tools 39
    - 8.3.2.3 Infectivity tests for all prominent pathogens 39
    - 8.3.2.4 Consideration of genotypes/serotypes in case of contaminations and outbreaks 39
    - 8.3.2.5 A simple modular set for the estimation of pathogen reduction 39
  - 8.3.3 Improved monitoring of drinking water 40
    - 8.3.3.1 Drinking water produced from surface water 40

8.3.3.2 Retain samples 40
8.3.3.3 Epidemiological monitoring 40
8.3.4 Improved water management 40
8.3.5 Legal framework - groundwater protection zones 40
8.3.6 Basic research 41
8.3.6.1 Viral surrogates 41
8.3.6.2 Attenuation and survival of pathogens in *situ* – The unseen fraction 41
8.3.6.3 Elimination processes and microbial antagonism 41
8.3.6.4 Ecology of pathogens – Strategies for long-term persistence 41
8.3.6.5 Pathogens with antibiotic resistance 42
8.3.6.6 General framework – standards for lab tests 42
8.3.6.7 Current research - joint project on detection, transport and elimination of pathogenic viruses in water 42

9. EMPFEHLUNGEN 43
9.1 Technisch-methodische Weiterentwicklung moderner Filtersysteme zur Anreicherung pathogener Viren 43
9.2 Integratives Indikatorkonzept 43
9.3 Weiterentwicklung von DNA/RNA-Extraktionsmethoden 43
9.4 Biologische Testverfahren/Infektionstests für alle relevanten Krankheitserreger 44
9.5 Berücksichtigung von Geno- und Serotypen in der Ursachenforschung 44
9.6 Entwicklung eines einfachen modularen Sets von Reduktionspotentialen zur Risikobewertung 44
9.7 Moderne Konzepte zur Rohwasserüberwachung vor allem bei der Produktion von Trinkwasser aus Oberflächenwasser 44
9.8 Rückstellproben von Roh- und Trinkwasser zur verbesserten Dokumentation von wasserbürtigen Erkrankungen 44
9.9 Epidemiologisches Dokumentationsnetz für wasserbürtige Erkrankungen 45
9.10 Weiterentwicklung von Wassermanagementstrategien (über Multi-Barrieren-Konzept hinaus, analog zum Water Safety Plan) 45
9.11 Ausweisung von Grundwasserschutzgebieten unter Berücksichtigung von extremen klimatischen und hydrologischen Bedingungen 45
9.12 Modell- und Referenzviren für Forschungszwecke 45
9.13 Feldversuche zu Transport und Überleben von Pathogenen in Sediment 46
9.14 Beitrag biotischer antagonistischer Prozesse zur Eliminierung von Pathogenen 46
9.15 Moderne Methoden zum Nachweis von infektiösen Dauerstadien 46
9.16 Ökologie von Antibiotika-resistenten pathogenen Mikroorganismen in der Umwelt 46
9.17 Einführung internationaler Standards für Labor- und Feldversuche 47
9.18 Aktuelle Forschung – Verbundprojekt zu Nachweis, Transport und Elimination von pathogenen Viren im Wasser 47

10. REFERENCES 48

SUMMARY

Groundwater represents the quantitative most important freshwater resource on our planet. Generally well protected by overlaying soil and sediment layers, it is a valued source for drinking water. Along with demographic development and global change the quality of groundwater is increasingly challenged by anthropogenic impacts including the direct and indirect introduction of potentially harmful pathogenic microorganisms and viruses. Does this pose a new risk to human health? This review paper provides a brief summary on (1) the diversity of pathogens continuously or occasionally found in groundwater, (2) their sources and ways of entry to groundwater systems, (3) their transport and attenuation, as well as (4) their survival and potential growth in aquifers. Further sections of the paper focus on (5) drinking water contamination and disease outbreaks, (6) developments in pathogen detection and the use of indicator organism. Finally, the report (7) highlights knowledge gaps and open research questions and provides recommendations for safeguarding groundwater and drinking water resources.

1. INTRODUCTION

Groundwater is one of men's most important sources for life. Globally groundwater accounts for approximately one third of all freshwater resources and represents around 99% of available freshwater (UNESCO 1999; Danielopol *et al.* 2003). In most countries worldwide it is used as the main source of drinking water. Groundwater usage in Europe ranges from only 13% in Norway up to 100% in Denmark, Lithuania and Austria (EEA 1999; UNECE 1999; Ashbolt 2004; WHO 2006; BGR 2007). The average proportion of groundwater as drinking water in US states is about 65% and hence quite similar to the European consumption. In Germany, about 70% of the drinking water derives from aquifers. However, there is a huge variation between the federal states, with Bremen, Hamburg, Saarland and Schleswig-Holstein as the top groundwater consumer states (100%), whereas the proportion of groundwater in drinking water in Berlin and Saxony is only about 25% and 33%, respectively (BGR 2007).

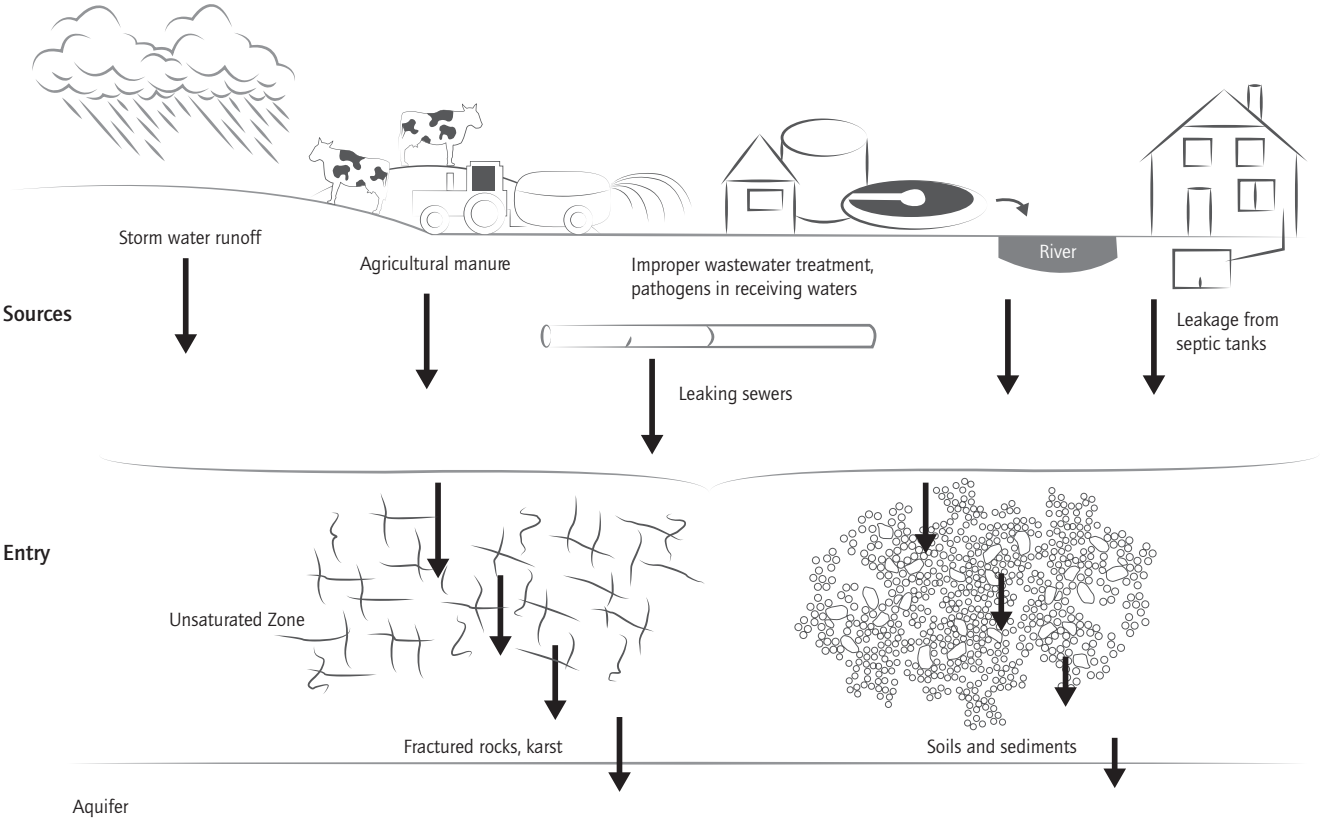
There is logic behind the utilization of groundwater as drinking water source. Naturally, groundwater ecosystems are well protected by overlaying soil and sediment layers. Water from precipitation recharging aquifers needs to pass these zones which act as effective mechanical and biological filters, hence providing a natural clean-up of newly generated groundwater. In aquifers, the biological components, mainly microorganisms, provide the valuable ecosystem services of water purification and storage at high quality for decades and centuries (Herman *et al.* 2001; Avramov *et al.* 2010). Nevertheless, today groundwater faces increasing threats from anthropogenic impacts (Sampat 2000), including contamination with pathogenic microorganisms and viruses (Pedley and Howard 1997). Thus, although drinking water in Germany is the best controlled food (Bundesregierung 2009) and therefore generally considered to be safe, there is a steady and possibly increasing risk for human health from contaminated groundwater.

Groundwater for a long time has been thought completely free of microbial contaminants and viruses, believing that vertical transport times are long enough and microbial survival too short to reach the aquifers. However, the risks of water contamination are obvious when having a look at the manifold small and huge endemic outbreaks from pathogenic microbes and viruses in the last two centuries which could be linked to contaminated groundwater and drinking water consumption (Andersson and Bohan 2001; OECD 2003; Craun *et al.* 2006; Craun *et al.* 2010). Today, there is no doubt that pathogenic microorganisms and viruses can be found everywhere in the environment. Some relevant pathogenic microorganisms even became or always have been members of natural microbial communities (e.g. species of the genus Legionella; Fliermans *et al.* 1981; Fliermans 1996; Steinert *et al.* 2002). Others may survive for years and decades or even reproduce in the environment. There are multiple sources of contamination including wastewater entering different environmental compartments and manure applied to fields in agricultural areas. Pressures on terrestrial and aquatic environments may increase in the future due to global change. It may be suggested that pathogenic microorganisms and viruses will more often enter soil, river banks and aquifers along with irregular storms, flood and drought events (Foster and Chilton 2003; Schwarzenbach *et al.* 2010). The efficiency of natural attenuation of pathogenic agents in soils, vadose zone sediments and porous, fissured or karst aquifers is highly dependent on the matrix characteristics and environmental conditions. In regions with thin soil layers, fractured rocks or in karst regions, aquifers are especially vulnerable to contamination. In contrary, extended soil layers are a good protection shield against pathogens entry. More specific, biologically active environmental compartments, such as soils, often have been observed to support fast and efficient pathogen elimination (Hurst *et al.* 1980; Hurst 1988; Nasser *et al.* 2002). Unfortunately, hardly any of the various antagonistic biological processes have been elucidated in detail. Thus, it is in time to newly interpret information available on pathogens ecology and reconsider strategies in groundwater and drinking water protection as well as current standards in water quality control and drinking water treatment.

2. SOURCES AND ENTRY

Due to growing populations and expanding land use, sources of pathogen contaminated wastes steadily increase hence also raising the potential pollution of groundwater reservoirs with infectious agents all around the world. This is mainly true for pathogens originating from human and animal faeces. Sources of faecal contamination in groundwater potentially include (i) leakage from on-site sanitation systems such as septic tanks or sewers, (ii) underground storage tanks, (iii) disposal systems, (iv) animal manure and compost, and (v) from (accidental and non-accidental) wastewater discharge or (vi) sewage sludge applied to fields in agricultural areas (Reynolds and Barrett 2003; Gerba and Smith 2005; Arnone and Walling 2007; Fig. 1). Additionally, (vii) surface waters receiving treated or untreated sewage from human sources or livestock enterprises and discharge from non-point sources like urban and agricultural runoff are a steady source and reservoir of pathogenic agents (Kirschner *et al.* 2009).

Fig. 1: Major sources of faecal pathogens and potential entry paths to groundwater.



Today's sewage treatment plants are highly efficient in removing and transforming most organic and inorganic pollutants contained in wastewater; with some exceptions. Although the number of (potentially) pathogenic microorganisms and viruses contained in raw wastewater is reduced by 1-3 orders of magnitude during classical treatment, the elimination processes are incomplete leading to a continuous release of pathogens to the recipient and surface waters (Hirn 1980; Omura *et al.* 1989; Rose *et al.* 1996; George *et al.* 2002).

Especially during periods characterized by increased bacterial and viral infections in the population (e.g. winter time in Germany), the incoming numbers of pathogens in wastewater may rise dramatically. A person that is infected with *Campylobacter* may excrete between 1 x 10^6 and 1 x 10^8 bacteria per gram faeces (Taylor *et al.* 1993). Assuming 200 g of faeces being produced by a person each day, this accounts for 2 x 10^8 to 2 x 10^{10} *Campylobacter* specimen. The numbers are even higher with viruses. The faeces of a person infected with Adenovirus may contain up to 1 x 10^{11} virus particles per gram (Wadell 1984; Albert 1986). A possible cycle between increased numbers of pathogenic agents released with faeces from infected persons to wastewater treatment plants and consequently surface waters and groundwater and the distribution of these agents with drinking water is currently discussed (e.g. Soddemann, pers. comm. 2010; see also section 6).

Sources of pathogens, which verifiable caused epidemic outbreaks of waterborne diseases are most often related to improper management of wastewater disposal being the top-of-the-list responsible cause of direct pathogens entry to aquifers (Lawson *et al.* 1991; Kukkula *et al.* 1997; Willocks *et al.* 1998). In the US leaked septic fluids from tanks or cesspools, compared to all human sources, account for the highest overall quantity of wastewater discharged directly to groundwater, and are therefore a major concern regarding the potential risks to human health (Miller 1980; Yates 1985; Bloetscher and Van Cott 1999). In comparison, other point sources, such as leachates associated with land disposal of industrial and human wastes, are of only minor concern related to groundwater contaminants (Miller 1980; Ritter *et al.* 2002).

A serious source of pathogens entering soils and groundwater is diffuse contamination (= non-point sources), for example from spreading of manure to fields and crops. Similar to human faeces, animal manure may contain high concentrations of pathogenic organisms (>10^6 per gram of faeces) including bacteria, viruses, protozoa and helminths, potentially causing zoonotic diseases in humans (Cotruvo *et al.* 2004; Gerba and Smith 2005). This poses a serious risk for human health in rural areas (Bianchi and Harter 2002; Cotruvo *et al.* 2004), arising for example from frequent contamination of private wells that are used for drinking water supply of farms. A statistical evaluation of 1,200 rural farms in the US revealed that approximately one-third of the private wells were, from a hygienic and bacteriological point of view, contaminated (Goss and Barry 1995).

Outbreaks of waterborne diseases in developing countries frequently correlate with flooding events resulting in a direct pulse response of shallow groundwater contamination to rainfall (Godfrey *et al.* 2005). Similar in Europe, strong rainfalls after the application of manure foster the contamination of shallow groundwater. In urban areas run-off from the mainly sealed surface captured in the public drainage system often exceed water holding capacities of water treatment plants. Consequently, flooding of sewage plants results in high loads of pathogens in the recipient. Additionally, public water drainage systems discharge their surplus untreated into nearby surface waters. Further down the line, floods trigger the fast import of water carrying contaminants including pathogenic agents into bank sediments and aquifers.

The ex-filtration of wastewater and thus the release of pathogens into groundwater via leaking sewers is a common source in urban areas. A significant proportion of wastewater is lost to the underground during transport from households and industry to water treatment plants. Investigations from the late 1980s documented potential sewage ex-filtration at a length of about 22% of the total sewer system in Germany. For Munich the amount of wastewater loss was estimated with 5% of the total sewer flow (Reynolds and Barrett 2003). Subsequent studies in Germany estimated the yearly leakage of wastewater from partly damaged sewage systems into soil and groundwater with several 100 million m^3 (Eiswirth and Hötzl 1997). These values underline the continuous contamination of groundwater in urban areas. There is also a small risk of cross contamination since underground drinking water distribution networks in Germany are often in close vicinity to sewage pipes, and are suggested to have a similar frequency of leaks.

Proper wastewater management, modern sanitation and groundwater protection strategies efficiently contribute to a reduction of pathogen entry into the subsurface. This is often not implemented in developing countries. Consequences of poverty and overpopulation are becoming most noticeable in problems related to hygiene and sanitation. Sanitation standards

are often outdated and insufficient and most of the sewage is discharged to the environment without any treatment (UNESCO 1999). Groundwater and/or drinking water in these regions differ fundamentally in its quality from what is generally served in developed countries (Schwarzenbach *et al.* 2010). More than half of the world's population will still not be connected to public sewerage systems in the next 20 years (UNESCO 2009).

3. DIVERSITY OF PATHOGENS IN GROUNDWATER AND RELATED DISEASES

Groundwater is an active and quantitatively very important component of the hydrological water cycle. Pathogens which appear in soil and surface waters, regularly or at least occasionally enter aquifers. It is therefore not surprising that most of the known pathogenic microorganisms and viruses have been found in groundwater.

3.1 BACTERIA

There is a great diversity of pathogenic bacterial groups and species potentially harmful to human health, of which representatives are frequently detected in groundwater and even drinking water. The majority's natural habitat is the gastrointestinal tract of humans and animals which they leave unintentionally via the excretion of faeces. Most known pathogenic bacteria belong to the family *Enterobacteriaceae*. Members of the *Enterobacteriaceae* are not necessarily pathogenic. Many representatives are widely distributed in soils and aquatic environments (Stevens *et al.* 2003). The most prominent members of the *Enterobacteriaceae* are the coliforms including a heterogeneous mix of different genera and species which vary considerably in terms of their pathogenic properties and virulence. Members of the coliform group, including the total coliform bacteria, the thermotolerant coliform bacteria, *Escherichia coli* and faecal streptococci are to date the most important indicators of faecal contamination (Gleeson 1997; Ashbolt *et al.* 2001; Leclerc *et al.* 2001). A common characteristic of this group is the growth at 37 °C. Thermotolerant coliforms, including *E. coli*, are even able to grow at up to 44 °C (WHO 2006). Among the pathogenic representatives of the *Enterobacteriaceae* are several *E. coli* strains responsible for severe infections, namely enteropathogenic *E. coli* (EPEC), enterotoxic *E. coli* (ETEC) and enterohaemorrhagic *E. coli* (EHEC) (Nataro and Kaper 1998). The *Enterococcus* group, a subgroup of the faecal streptococci is known to be, within the coliforms, most resistant to environmental conditions and changes and carry resistances to several antibiotics (McFeters *et al.* 1974; Hartke *et al.* 1998; Sapkota *et al.* 2007). One member of this group, *E. faecalis*, tolerates high temperatures (up to 45 °C), high pH values (9.6), and high salt concentrations (up to 6.5% sodium chloride) and is therefore also a valuable bacterial indicator for determining the extent of faecal contamination of water (Foulquie Moreno *et al.* 2006; Farnleitner *et al.* 2010). The coliform group and its advantages and disadvantages as indicators are discussed in more detail in section 7.

Further typical bacterial pathogens distributed by the faecal-oral route and occasionally found in groundwater include species of *Salmonella* and *Shigella*, and, emerging mainly in developing countries, species of *Vibrio* with *Vibrio cholerae* being the most prominent representative. The genus *Salmonella* and *Shigella* are also members of the *Enterobacteriaceae*, however, they are not considered coliforms.

Table 1: Pathogens found in groundwater.

PATHOGEN	MAJOR DISEASES	SOURCES
Bacteria		
Escherichia coli	Gastroenteritis, Haemolytic Uraemic Syndrome (enterotoxic *E. coli*)	Human faeces
Salmonella spp.	Enterocolitis, endocarditis, meningitis, pericarditis, reactive arthritis, pneumonia	Human and animal faeces
Shigella spp.	Gastroenteritis, dysentery, reactive arthritis	Human faeces
Campylobacter jejuni	Gastroenteritis, Guillain-Barré syndrome	Human and animal faeces
Yersinia spp.	Diarrhoea, reactive arthritis	Human and animal faeces
Vibrio cholerae	Cholera	Human faeces and freshwater zooplankton
Legionella spp.	Pneumonia (Legionnaires' disease)	Thermally enriched water
Pseudomonas aeruginosa	Pneumonia, urinary tract infections, bacteremia	Soil and water
Mycobacterium spp.	Pulmonary disease, skin and soft tissue disease	Soil and water

Viruses		
Poliovirus	Poliomyelitis	Human faeces
Coxsackievirus	Fever, pharyngitis, rash, respiratory disease, diarrhoea, haemorrhagic conjunctivitis, myocarditis, pericarditis, aseptic meningitis, encephalitis, reactive insulin-dependent diabetes	Human faeces
Echovirus	Respiratory disease, aseptic meningitis, rash, fever	Human faeces
Enteroviruses 68-71	Polio-like illness, aseptic meningitis, hand, foot and mouth (E71), epidemic conjunctivitis (E70)	Human faeces
Hepatitis A	Fever, nausea, jaundice, liver failure	Human faeces
Hepatitis E	Fever, nausea, jaundice	Human faeces
Norovirus (Norwalk virus)	Gastroenteritis	Human faeces
Calicivirus	Gastroenteritis	Human faeces
Astrovirus	Gastroenteritis	Human faeces
Sapovirus	Gastroenteritis	Human faeces
Orthoreovirus	Gastrointestinal and upper respiratory disease	Human faeces
Rotavirus A and C	Gastroenteritis	Human faeces
Coronavirus	Gastroenteritis	Human faeces
Adenovirus	Respiratory disease, gastroenteritis	Human faeces
Protozoa		
Cryptosporidium parvum	Cryptosporidiosis (gastroenteritis)	Water, human and other mammal faeces
Giardia lamblia	Giardiasis (chronic gastroenteritis)	Water and animal faeces
Entamoeba histolytica	Dysentery	Human and animal faeces
Acanthamoeba spp.	Encephalitis, Keratitis	Human faeces
Naegleria fowleri	Meningoencephalitis	Warm water
Toxoplasma gondii	(congenital) Toxoplasmosis (Encephalitis)	Human and animal faeces

Resource: Adapted from Macler and Merkle 2000; Ashbolt 2004.

As shown in Table 1 several pathogenic bacteria are causing acute gastrointestinal illness. The outbreak of disease is caused through growth inside the host (e.g. *Salmonella*) or by release of toxins (e.g. *Campylobacter*, *Shigella* and some species of *E. coli*). Newly recognized pathogens from faecal pollution include *Campylobacter* and *Yersinia* (Szewzyk *et al.* 2000). Outbreaks of *campylobacteriosis* show an increasing trend (USEPA 2006). Exclusively carried and shed by humans, contaminations with *Shigella* are less widespread than contaminations with *E. coli*.

There are numbers of other pathogens of serious health concern readily detected in the environment. For example, different species of *Staphylococcus*, a common antibiotic resistant organism, are often found biofilm-associated (Hall-Stoodley *et al.* 2004; Singh *et al.* 2009). They are frequently disease triggers of severe chronic infections in hospitals. Their occurrence in groundwater could be documented by a study on a large number of wells in Turkey. *Staphylococcus* was found in about 30% of all groundwater samples tested (Aydin 2007).

Half of the world's population is assumed to be infected with *Helicobacter pylori* and in developing countries even 70 to 90% of the population seems to carry this pathogen (Dunn *et al.* 1997). Infections are harmless in the majority of cases, however, part of the infected individuals suffer from chronic gastritis or even gastric cancer (Ernst and Gold 2000). The potential transmission of *H. pylori* via drinking water was supported by epidemiological studies in developing countries but also independent findings of

H. pylori in Europe and the USA provided evidence for infection via well water (Engstrand 2001; Park *et al.* 2001; Krumbiegel *et al.* 2004). Nevertheless, more data are needed on the occurrence of this pathogen in the environment and explicitly in groundwater.

There are a few pathogenic and potentially pathogenic bacteria that naturally occur in aquatic environments, reproducing without any specific host, e.g. members of the genus *Legionella*, *Pseudomonas aeruginosa* and several species of the genus *Mycobacterium* (Riffard *et al.* 2001; Leclerc *et al.* 2002; Brooks *et al.* 2004). These may cause infectious disease, however, mainly in compromised and only rarely in healthy individuals (Rusin *et al.* 1997; Falkinham *et al.* 2001; Sharma *et al.* 2003; Ashbolt 2004; Fok 2005). Infecting their host they take opportunity of weakened defence mechanisms and hence are called opportunistic microorganism. They typically inhabit surface waters or appear to grow in biofilms in water pipes causing regular problems in drinking water distribution systems. Representatives of *Pseudomonas* and *Mycobacterium* potentially cause pneumonia or skin diseases (Tab. 1). Growth of several species of *Legionella* is best in warm waters, in-house hot water systems and cooling towers (Park *et al.* 2003). A potentially new habitat are zones of aquifer thermal heat storage, areas in the subsurface to which warm water is pumped during summer to be used in winter for heating purposes (Brielmann *et al.* 2011). In natural groundwaters opportunistic pathogens are usually found in only small numbers and thus the risk of infection or disease outcome in healthy individuals is low.

3.2 VIRUSES

The smaller a particle, the easier it may pass filters such as soil and sediments. Hence, the penetration of pathogenic viruses to aquifers seems much more likely than for pathogenic bacteria and protozoa (Schijven and Hassanizadeh 2000). The risk of viral contamination of water is further increased because of the extremely high numbers by which enteric viruses are shed into the environment. Their numbers in infected individuals range from 10^5 up to 10^{11} per gram of stool (Fong and Lipp 2005). Moreover, viral pathogens from human and animal faeces have much longer survival times in water than most intestinal bacteria, are generally more infectious than bacteria and protozoa and are remarkable resistant to common disinfection treatments (Fong and Lipp 2005). These features make pathogenic viruses the most important candidates for faecal contamination of groundwater.

To date more than 15 different groups of enteric viruses are known including more than 140 different serotypes that can be found in the human gut (Leclerc *et al.* 2002). Therefore, the group of enteric viruses comprises the highest diversity among all waterborne pathogens (Wyn-Jones and Sellwood 2001). The enteric viruses of major concern belong to the families *Picornaviridae* (poliovirus, enterovirus, coxsackievirus, hepatitis A virus, and echovirus), *Caliciviridae* (norovirus, calicivirus, astrovirus, and sapovirus), *Reoviridae* (reovirus and rotavirus), *Adenoviridae* (adenovirus), and *Coronaviridae* (coronavirus). The hepatitis E virus, once considered a calicivirus, now belongs to an unassigned genus, the hepatits E like-viruses (Berke and Matson 2000). Most of these mammalian viruses are nonenveloped (except the enveloped coronavirus) RNA viruses. Adenoviruses exclusively bear a genome of double-stranded DNA (Fong and Lipp 2005).

Besides the taxonomic affiliation of the individual viruses, there is a functional and physiological systematic that combine some of the potential viral pathogens to the enteroviruses. Members of this group include the *polioviruses*, *coxsackieviruses* A and B, echovirus and four ungrouped enteroviruses (types 68 to 71). One main characteristic of enteroviruses is the extreme resistance to environmental stress and stability under acidic conditions (to pH 3). Common diseases caused by enteroviruses are aseptic meningitis or respiratory diseases, or poliomyelitis in the case of *poliovirus*. As obvious from Table 1 the major disease caused by most of the enteric viruses is acute gastroenteritis, one of the most common illnesses, affecting both adults and children. Members of the familiy *Caliciviridae*, including norovirus, calicivirus, astrovirus, and sapovirus, are probably the most important cause of gastroenteritis in adults and adolescents. In contrast, infections with rotaviruses are the most important viral causes of severe gastroenteritis in infants and young children (Tyring *et al.* 2006).

The species coronavirus, also a potential pathogen of viral gastroenteritis, is the only enveloped virus listed here. Infectivity of these viruses depends on an intact lipid layer envelope which is generally more susceptible to environmental changes in physical and chemical parameters. Although reduced environmental stability of enveloped viruses compared to more robust non-enveloped viruses is known, coronavirus was surprisingly shown to be quite resistant in cold water, remaining infectious for more than 100 days in pasteurized settled sewage (Casanova *et al.* 2009; Gundy *et al.* 2009). The potential high risk for human health from transmission of waterborne coronavirus was underlined by the evidence that coronaviruses from a faulty sewage system were responsible for the major outbreak of severe acute respiratory syndrome (SARS) in Hong Kong in 2003 (Peiris *et al.* 2003).

Members of the family *Adenoviridae* frequently occur in aquatic environments potentially causing respiratory and gastrointestinal diseases (Tab. 1) in both adults and children and were included in the 'Contaminant Candidate List' (CCL, the document was first published in March 1998 with the intention to inform about potential hazardous pathogens in public water systems) in 1998 as part of the Safe Drinking Water Act (SDWA) by the US Environmental Protection Agency (USEPA 1998). To date, fifty-one different serotypes of human adenoviruses have been identified and adenoviruses are considered to be the second most important viral pathogen of childhood gastroenteritis following rotavirus (Crabtree *et al.* 1997; Gu *et al.* 2003). The risk of adenoviral contamination of groundwater and drinking water is considerably high as adenoviruses are up to 60 times more resistant to water treatment by UV irradiation when compared to RNA viruses, such as enteroviruses and hepatitis A virus (Meng and Gerba 1996; Gerba *et al.* 2002; Mena and Gerba 2009).

3.3 PROTOZOA

Most common species of human pathogenic protozoa include the zoonotic *Cryptosporidium parvum*, *Giardia lamblia*, and *Toxoplasma gondii* as well as *Entamoeba histolytica* which potentially cause severe diarrhoe, encephalitis or even dysentery in the infected individuals (Smith and Smith 1990; Exner and Gornik 2004). Generally infections with the four mentioned protozoan pathogens are self-limited in healthy individuals. However, they can cause life threatening diseases in elderly, immunocompromised hosts or unborn children. Within parasites *E. histolytica* infections are third in terms of lethality, right behind malaria-causing plasmodia and schistosomes (Marshall *et al.* 1997). While giardiasis and amoebiasis can effectively be cured with drugs, at present no efficient drug treatment exists for cryptosporidiosis (Smith and Smith 1990; Chakrabarti and Chakrabarti 2009).

Free-living amoebae are common members of aquatic microbial communities. Some representatives, e.g. *Acanthamoeba spp.* and *Naegleria fowleri*, have been documented to cause disease in humans (Schuster and Visvesvara 2004). *Naegleria fowleri* occur in warm water bodies and may cause primary amoebic meningoencephalitis (Blair *et al.* 2008; Laseke *et al.* 2010).

At present, several symbiotic and pathogenic interactions between bacteria and free-living protozoa or even higher organisms (e.g. copepods) are described (Bichai *et al.* 2008; Thomas *et al.* 2009). For example, increased numbers of the protozoan parasites Naegleria spp. generally go along with a contamination of the water with coliforms. Some species of protozoa were shown to interact with *Legionella* spp., and might play a role in its distribution (Visvesvara and Stehr-Green 1990). In many cases the human pathogenic species *L. pneumophila* was identified as the bacterial endosymbiont (Rowbotham 1980; Barker and Brown 1994; Park *et al.* 2003). This aspect adds a new perspective to protozoan pathogenicity and should be considered for the determination of waterborne protozoan diversity. However, high numbers of bacterial infected amoebae were, so far, found only in cooling towers, but not in natural environments (Berk *et al.* 2006).

3.4 FUNGI AND HELMINTHS

There is little information regarding groundwater and fungi in general (Schlosser 2011) and to date pathogenic fungi have not been implicated in waterborne outbreaks. Hence water works appear to have only little expertise with waterborne fungi (Paterson *et al.* 2009). Current control strategies and water treatment against fungi are poorly understood, and the few studies conducted are inconsistent (Niemi *et al.* 1982; Nagy and Olson 1985; Frankova and Horecka 1995; Kelley *et al.* 2003). Chemical coagulation with iron or sand filtration are currently discussed as the most promising removal strategies of fungi during water treatment while chemical disinfection of fungal spores was found to be most effective with chlorine dioxide and ozone (Niemi *et al.* 1982; Kelley *et al.* 2003). Also the group of helminths include waterborne pathogens that potentially cause human disease. However, parasitic helminths, e.g. *Ascaris lumbricoides*, are typical pathogens in surface water of developing countries. Their transmission into groundwater is unlikely, due to the size of the organism and their eggs, and if so, they are easily removed from raw water during drinking water production by filtration (Ashbolt 2004; Levantesi *et al.* 2010).

4. TRANSPORT AND ATTENUATION

Potential entry of pathogenic microorganisms and viruses into groundwater strongly depends on the vulnerability of the aquifer which is assigned by several parameters regarding thickness, structure and activity of the soil and vadose sediment layers covering the aquifer, the hydrological regime and the type of contamination source (Harter and Walker 2001; Chilton 2006). Preferential flow and transport pathways such as fractures, fissures, and heterogeneities in soil and porous sediments, as well as abandoned boreholes substantially increase the risk of pathogens entry into an aquifer (Cronin *et al.* 2003).

4.1 SOILS AND THE UNSATURATED SEDIMENTS

Soils and unsaturated sediments are effective natural barriers constituting mechanical and biological filters. A pathogen that enters unsaturated soil and sediments is challenged with a multitude of complex processes (Ginn *et al.* 2002). In the uppermost layers filtration and adsorption constitute important attenuation mechanisms (Pekdeger and Matthess 1983; Yavuz Corapcioglu and Haridas 1984). The effect of filtration is mainly related to the sediment grain size distribution (Jin *et al.* 2000; Chu *et al.* 2001). Fine sediments with lots of dead end pores support effective straining of microorganisms and viruses. Maybe the most important process is adsorption to soil particles and sediment surfaces. It is mainly determined by the hydrophobicity of the sediment, soil and sediment moisture, the pH, the ionic strength and composition of the soil water (Dizer *et al.* 1984). Moreover, cell wall properties of pathogens are a crucial factor. Adsorption may be irreversible or reversible (Gerba 1984). Recharge of high amounts of rainwater may lead to a lower ionic strength of the pore water due to dilution potentially causing the release of formerly attached pathogens (Carlson *et al.* 1968; Duboise *et al.* 1976; Landry *et al.* 1979; Bales *et al.* 1993).

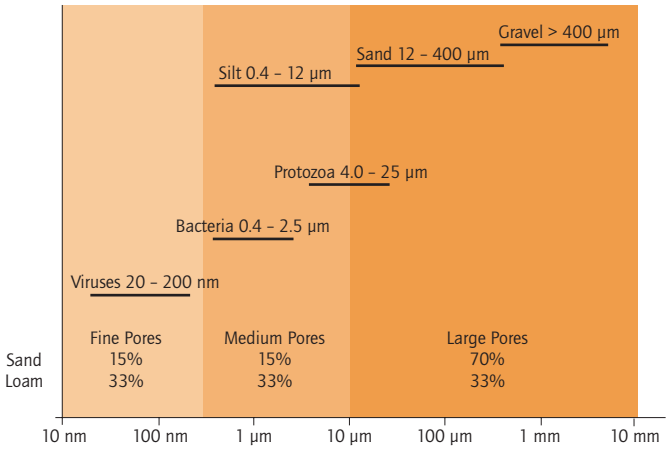
Not surprisingly, the size of pathogens matters for its transport and attenuation (Tab. 2, Fig. 2). As shown for bacteriophages, larger particles exhibited a better retardation (Aronino *et al.* 2009).

Table 2: Average size ranges of selected microorganisms and viruses.

CLASS	MICROORGANISM	SIZE
Virus	Bacteriophage	0.02-0.2 µm diameter
	Poliovirus	0.03 µm diameter
Bacteria	Bacterial spores (*Bacillus*, *Clostridia*)	1 µm
	E. coli	0.5 µm x 1.0 µm x 2.0 µm
	Salmonella typhi	0.6 µm x 0.7 µm x 2.5 µm
	Shigella spp.	0.4 µm x 0.6 µm x 2.5 µm
Protozoa	*Cryptosporidium oocysts*	4.0-6.0 µm diameter
	Giardia	7.0-14.0 µm diameter
	Enteroamoeba histolitica	20-25 µm diameter

Resource: Adapted from Pedley *et al.* 2006.

Fig. 2: Size range of pathogens compared to aquifer matrix characteristics (at the top pore size ranges of silt, sand and gravel are shown).



Resource: Adapted from Matthess and Pekdeger 1981.

Table 3: Factors affecting transport and attenuation of microorganisms and viruses in groundwater.

CHARACTERISTICS OF THE PATHOGEN	AQUIFER PROPERTIES
Size	Groundwater flow velocity
Shape	Dispersion
Organism Type	Pore size (intergranular or fracture)
Cell motility	Kinematic/effective porosity
Density	Organic carbon content (solid)
Growth phase	Temperature
Surface charge	Chemical properties of groundwater (ionic strength, pH, etc.)
Inactivation rate (die-off)	Mineral composition of aquifer/soil material
(Ir)reversible adsorption	Predatory microflora (bacteria, protozoa, fungi, algae, etc.)
Physical filtration	Moisture content Pressure

Resource: Adapted from West *et al.* 1998.

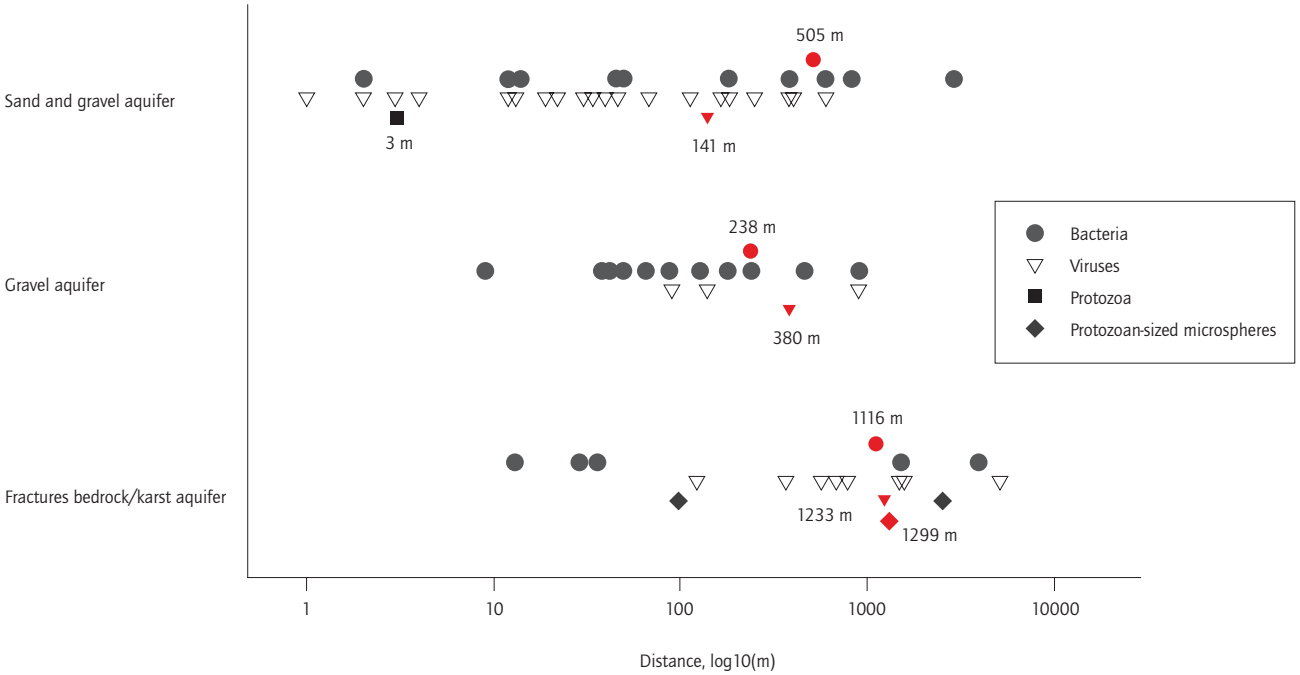
Further factors taking influence on the transport and attenuation of pathogens through the unsaturated zone include the sediment mineral composition, the organic matter content and the biological activity (Tab. 3). Global change, including new climatic dynamics (irregular heavy storm and rain events, long-term drought periods) as well as a change in land use may locally or even regionally lead to a deterioration of natural attenuation capacity of soils (Foster and Chilton 2003; Morris *et al.* 2003).

In most studies the soil zones and the unsaturated sediments turned out to carry a higher attenuation capacity when compared to the saturated subsurface (Lance and Gerba 1984; Powelson *et al.* 1990; Powelson and Gerba 1994; Chu *et al.* 2001; Chu *et al.* 2003). To give one example, infectious viruses were reduced by 8 orders of magnitude in dune sand within 30 m transport distance (equalled 25 d of travelling) from the source at the surface. The same degree of reduction took a 40 d travel distance when injected to a deeper saturated subsurface at the same site (Schijven 2001).

4.2 THE SATURATED ZONE

Arrived in the saturated zone, pathogens are distributed by advection, dispersion and diffusion (Harvey 1993; Sen 2010). Aquifer porosity and water flow velocity contribute two important variables determining the attenuation and transport of pathogens in aquifers (Taylor *et al.* 2004; Pang 2009). In this context, the type of aquifer, porous, fissured or karst, which is strongly related to groundwater flow velocities, significantly affects the travelling distance of the pathogenic agents (Tab. 3, Fig. 3).

Fig. 3: Transport distances of pathogens in different aquifer matrices. The average travel distances are represented by red symbols. Data collected from the literature.



Best attenuation of pathogens is achieved in porous sediments (Logan *et al.* 2001; Stevik *et al.* 2004). Clay, silt and fine sand deposits are characterized by flow velocities of only centimetres to decimetres per day. Middle sand, coarse sand and gravel-cobble aquifers typically exhibit high groundwater flow velocities in the range of meter to tens of meters per day (Matthess and Pekdeger 1985; Chilton and Seiler 2006). Water flow in fissured aquifers exhibits a strong variation with less than a meter per day to hundreds of meters per day. Highest flow velocities and longest travel distances for all pathogens are found in the big channels of karst aquifers often with thousands of meters a day (Matthess and Pekdeger 1985; Fig. 3). Therefore, karst aquifers are extremely susceptible to contamination due to their low filtration capacity (Leibundgut 1998; Kačaroğlu 1999; Goeppert and Goldscheider 2010). Consequently, waterborne disease outbreaks are often related to non-porous media aquifers, such as fractured bedrock (metamorphic rock) or karst (limestone) (Fong *et al.* 2007). However, also in porous aquifers microbes and viruses may travel long distances of several hundred meters (Fig. 3). This can, at least partly be explained by the pronounced structural heterogeneity of aquifers. Surprisingly, in porous sandy aquifers the average travel distance of bacterial cells is almost 4-times higher compared to the smaller viral particles (Fig. 3). Reduced retardation of larger particles can be explained by the phenomenon of pore-size exclusion in porous sediments which obviously not applies to coarse gravel aquifers as smaller viruses travel furthest under these conditions (Fig. 3; Sinton *et al.*, 2000).

Retention of pathogens in porous aquifer systems depends on mainly the same physical, chemical and biological parameters already discussed for the unsaturated zone. The extent of retardation of pathogens is highly dependent on water chemistry and surface charge of both the aquifer matrix and the cells of the pathogens (e.g. Thurston *et al.* 2001; McCarthy and McKay 2004; Branford *et al.* 2005). Additionally, further cell- and particle-specific factors such as the physiological state (e.g. starvation) or growth conditions can affect bacterial transport behaviour (Yang *et al.* 2006; Haznedaroglu *et al.* 2008; Haznedaroglu *et al.* 2009).

Direct comparison of the transport of *E. coli* and *Campylobacter jejuni* in saturated porous media revealed a very species-specific transport behavior, mainly due to differences in cell properties (Bolster *et al.*, 2006). Transport characteristics of both organisms were analyzed taking into account their cell geometry, hydrophobicity and electrophoretic mobility. *C. jejuni* exhibited a significant greater negative surface charge than *E. coli*. Thus, *C. jejuni* was removed more efficiently by metal-oxide-coated sands (Ø 250-350 µm). In contrast, attenuation of *E. coli* cells was more pronounced in all setups with uncoated quartz sand, resulting in greater transport distances of *C. jejuni*. This was the case, although cells of *C. jejuni* were slightly longer, narrower, and less spherical than *E. coli* cells. This contradicts what was repeatedly found in other studies, that a spherical cell shape favors transport in porous media (Weiss *et al.* 1995; Dong *et al.* 2002; Salerno *et al.* 2006; Bolster *et al.* 2009). These exemplary results are of great significance as they demonstrate that pathogenic *C. jejuni* might be present in zones of aquifers not reached by the indicator organism *E. coli*. Even within different strains of mammal *E. coli* isolates a large diversity in transport behaviour was observed (Bolster *et al.*, 2009). Again, this was related to a strain-specific surface charge and hydrophobicity. Foppen *et al.* (2010) analyzed the transport behaviour of 54 different *E. coli* strains in terms of their outer membrane lipopolysaccharide (LPS) composition under identical flow conditions in saturated quartz sand. The attachment efficiencies varied by two orders of magnitude within the strains tested. No single factor out of all cell characteristics tested (cell shape, motility, surface charge, cell aggregation, LPS composition, variation in gene expression) was of statistical significance to solely explain variations in attachment and transport. Unfortunately, most studies on bacterial transport have been conducted in columns packed with quartz sand. Recent studies including *E. coli* O157:H7, as well as other pathogenic bacteria, *i.e. Yersinia enterocolitica* and *E. faecalis*, revealed that attachment efficiencies calculated for *E. coli* and *E. faecalis* were lower in columns packed with loamy agricultural sand when compared to a setup with quartz sand (Schinner *et al.* 2010). Hence, it is questionable to what extent experiences from laboratory studies can be used to predict attenuation and transport behaviour of pathogens in different environmental compartments (Unc and Goss 2004).

The attenuation of viral particles in the saturated zone is also strongly affected by virus particle properties, e.g. the varying content of hydrophobic substances in their capsids and varying isoelectric points (Powelson and Gerba 1994). Filtration efficiency, as was shown for non-infectious recombinant noroviruses, is highly dependent on the nature and magnitude of electrostatic interactions that develop between the virus particle and the matrix (Redman *et al.* 1997). High amounts of dissolved humic substances and organic matter in general compete with viruses for hydrophobic sites at sediment surfaces (Dizer *et al.* 1984; Lance and Gerba 1984). Consequently, the risk of potential entry into aquifers and long distance transport of pathogenic viruses, as shown for *poliovirus*, are increased at high organic matter conditions (Gerba *et al.* 1975; Farrah *et al.* 1978; Powelson *et al.*

1991). Comparative adsorption studies on human enteroviruses, simian rotavirus and five bacteriophages underlined, similar to pathogenic bacteria, that adsorption behaviour is highly strain specific (Goyal and Gerba 1979).

Although adsorption in sediments tends to be very effective in retarding the major mass of virus particles within only decimeters to meters of unsaturated soil and saturated aquifer sediments, numerous exceptions of successful viral entry into groundwater systems have been documented. Finally this is a matter of the source virus concentration. As demonstrated for the model virus PRD-1, a strong decrease in abundance was observed within 1 to 5 meters in uncontaminated and contaminated sediments, respectively. However, a small part of the virus populations continued to migrate with groundwater flow without further decrease in concentration (Blanford *et al.* 2005).

Studies on *C. parvum* transport in saturated porous media showed that retardation of protozoan oocyst is a complex process that is very sensitive to water ionic strength and flow velocity. Again, the sediment grain size was found a critical factor (Kim *et al.* 2010). These results underline that retardation of protozoan oocysts generally is very efficient in fine-grained sediments (Fig. 3). Several studies demonstrated that protozoan oocysts from *C. parvum* are efficiently removed from water and wastewater by sand filtration (Chapman and Rush 1990; Timms *et al.* 1995; Logan *et al.* 2001). A significant amount of initially deposited oocysts, however, might be remobilized due to time-dependent detachment (Harter *et al.* 1999).

Transport of *Giardia cysts* through aquifer sands also seems to be mainly controlled by straining. A hundred percent retention of *Giardia cysts* was observed in sediment columns packed with fine sand (Ø 150 µm). A recovery of only 1.8% was found with coarse sand (700 µm). The amendment of manure suspensions, surprisingly, resulted in a strong increase in oocyst concentration in the effluent varying from 75 up to 172%. These results highlight that many pathogen transport studies neglecting the simultaneous presence of manure (as the source) are in risk to underestimate real oocyst transport distances in manure-contaminated sediments (Bradford *et al.* 2006).

5. SURVIVAL AND GROWTH

Terrestrial and aquatic environments are generally hostile habitats for most human pathogenic microorganisms and viruses, and fortunately an efficient decay based on physical, chemical and biological retardation, inactivation and destruction of pathogens takes place. Environmental factors, such as exposure to light (at the surface), water characteristics including temperature, pH and ionic strength as well as the adsorption of pathogenic agents to soil and sediment particles are currently considered main factors affecting pathogens survival (Keswick and Gerba 1980; Fattal *et al.* 1983; Gerba 1983; Yates *et al.* 1985; Burkhardt *et al.* 2000). Since the decay of pathogenic agents at the generally low temperatures in the subsurface is suggested to be slow, physical and chemical attenuation processes are of major importance (Riemer 1983; Matthess and Pekdeger 1985; Filip *et al.* 1986). The factors that lead to the destruction of pathogenic agents in aquifers are hardly known, but may be mainly based on biological activities, *i.e.* microbial antagonism (Tab. 4; Keswick and Gerba 1980; Yates *et al.* 1987; Hurst 2000).

In surface waters the majority of pathogenic microorganisms and viruses are readily inactivated when exposed to solar radiation (visible light and UV) (Brookes *et al.* 2004). Two other factors which effectively contribute to pathogen decay at the surface are temperature and desiccation (Tab. 4). By contrast, after infiltration into the subsurface transport, attenuation and survival of pathogens are mainly influenced by attachment and sorption to soil and sediment particles (Buchan and Flury 2008). However, adsorption to soil particles does not necessarily result in inactivation of the pathogen.

Table 4: Factors that influence the survival of pathogens in the subsurface.

FACTOR	INFLUENCE
Temperature	Long survival at low temperatures, rapid die-off at high temperatures. For some faecally-derived bacteria high temperatures might give rise to growth.
Moisture content	Desiccation is detrimental to most microorganisms (spores excepted). An increased rate of reduction will occur in drying soils. This is of most relevance in the unsaturated zone.
Sunlight	More rapid die-off at the soil surface due to UV irradiation.
pH	Bacteria die-off more rapidly in acid soils (pH 3-5) than in alkaline soils. The pH influences the adsorption of microorganisms and viruses to the soil matrix and indirectly influences survival.
Microflora	Soil bacteria and fungi may produce exo-enzymes that damage the structure of faecal microorganisms, while amoebae and other protozoa may feed on them. Bacterial survival is shorter in natural soils than in sterilised soils, but for viruses no clear trend is observed.
Organic carbon content	The presence of organic carbon increases survival and may give rise to the regrowth of bacteria.
Cations	Certain cations have a thermal stabilising effect on viruses and increase virus survival. Cations also enhance virus adsorption to soil and this indirectly increases survival, as viruses appear to survive better in the adsorbed state.

Resource: Adapted from Gerba 1984.

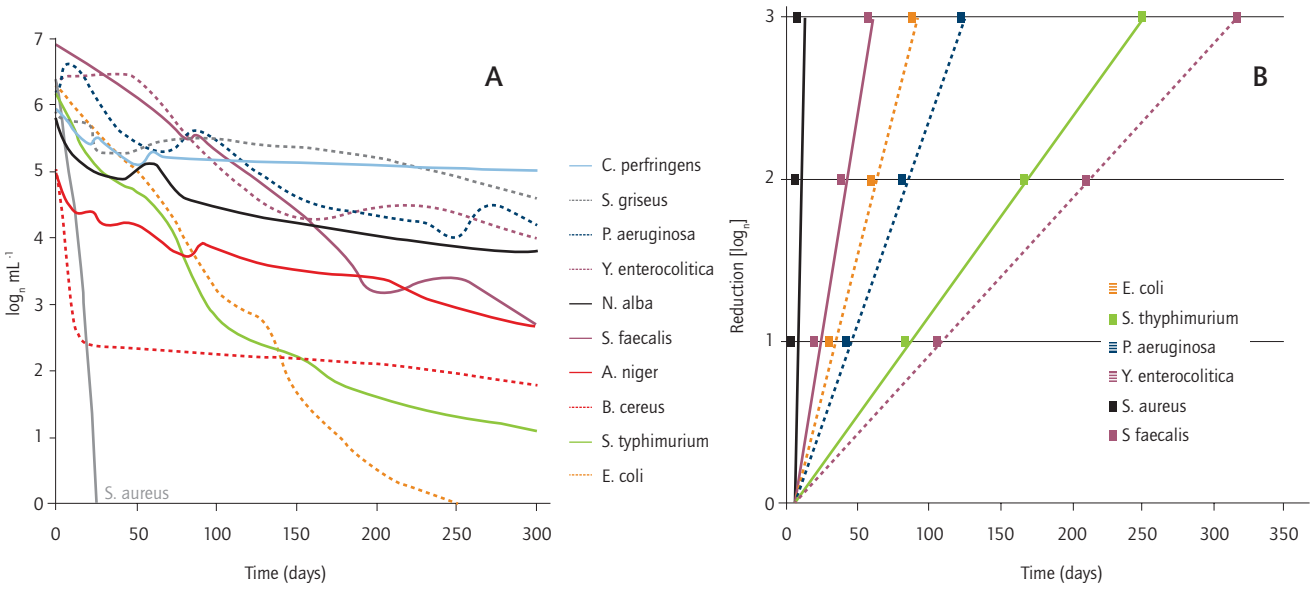
Pathogen survival in groundwater has been studied in various experimental setups including laboratory batch and microcosm experiments and incubation of pathogens in groundwater using membrane chambers or dialysis tubes. However, although most of these studies mimic the situation in aquifers in various ways, the data obtained for pathogen survival need to be critically interpreted in terms of survival rates in the environment.

5.1 SURVIVAL OF BACTERIAL PATHOGENS

There is a pile of literature on the survival of pathogenic bacteria in the aquatic environment. Survival periods reported are very group-, species- and strain-specific and last, in exceptional cases, for up to several years (e.g. spores). Moreover, there are pathogenic bacteria which have been reported to reproduce in soils and aquatic environments as well as in water distribution systems and house water installations. In the following, the pathogen-specific variations and factors related to survival and growth are described by selected examples.

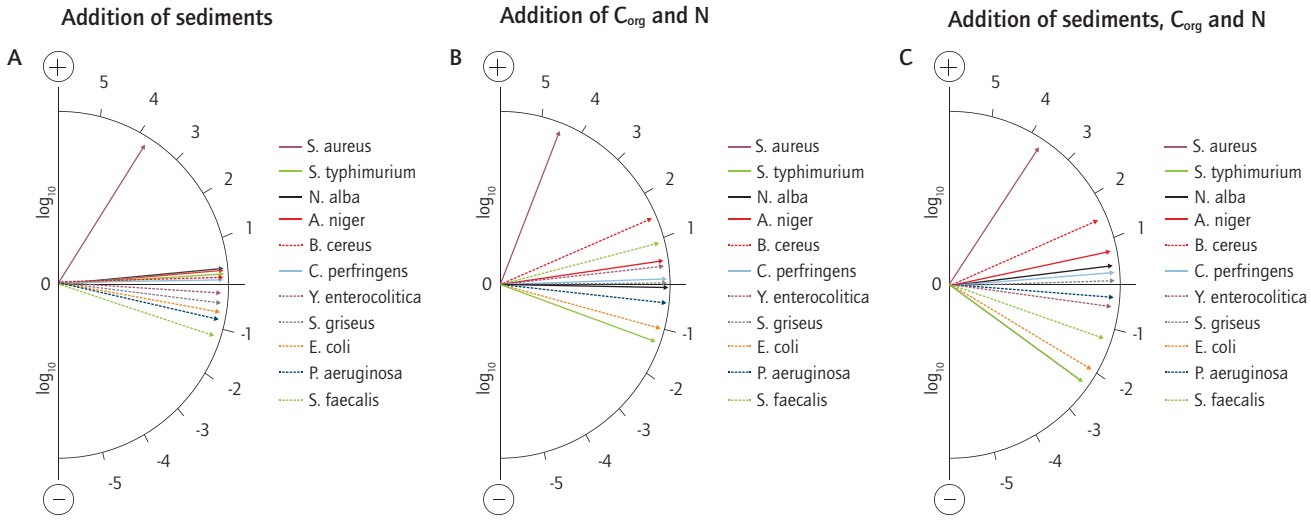
In the framework of an interdisciplinary research project funded by the German Federal Environment Agency (UBA), several working groups evaluated the effectiveness of the 50 days protection zone, as it is applied in Germany to safeguard drinking water production (see section 6). In a series of batch and column experiments numerous model microorganisms (bacteria and fungi) and viruses were tested for their persistence in sterile and non-sterile groundwater (Filip *et al.* 1986).

Fig. 4: Survival (detectability) of various model microorganisms in groundwater (pH = 7.3, O_2 = ≥ 0.8 mgL-1, DOC = 3.4 mgL-1, PO_4 = 0.25 mgL-1) batch experiments at 10±1 °C lasting for 300 days. *Escherichia coli*, *Salmonella thyphimurium*, *Pseudomonas aeruginosa*, *Yersinia* enterocolitica, *Staphylococcus aureus*, *Streptococcus faecalis*, *Bacillus cereus*, *Clostridium perfringens*, *Streptomycos griseus*, *Nocardia alba*, *Aspergillus niger*.



Resource: Data compiled from Filip *et al.* 1986.

Fig. 5: Effect of sediment and nutrient (organic carbon [C_{org}; DOC = 1.1 gL-1] and nitrogen [NO_3 = 50 mgL-1] onto the survival (detectability) of various model microorganisms in groundwater batch experiments at 10±1 °C lasting for 100 days. The final concentration of microbes in unamended batch bottles containing only groundwater served as reference. The experiment lasted for 100 days. For the effects observed with the originally three different sediment treatments (addition of middle sand fraction, coarse sand fraction and natural sand) we depicted a mean value. In case of *Staphylococcus aureus*, 25 d data and 30 d data have been extracted for (A) and (B, C), respectively. Also in case positive as well as negative effects have been found with different sand fractions, a mean trend is given. For persistence and disappearence of the various strains tested in unamended groundwater see Fig. 4. Arrows pointing in the positive (+) direction indicate growth, those directed in the negative (–) direction indicate cell inactivation and decay. *Escherichia coli*, *Salmonella thyphimurium*, *Pseudomonas aeruginosa*, *Yersinia* enterocolitica, *Staphylococcus aureus*, *Streptococcus faecalis*, *Bacillus cereus*, *Clostridium perfringens*, *Streptomycos griseus*, *Nocardia alba*, *Aspergillus niger*.



Resource: Data compiled from Filip *et al.* 1986.

As can be seen in Fig. 4A, when starting batch incubations with cell densities of 1 x 10^5 to 1 x 10^7, almost all strains tested could still be detected after 300 days at 10°C in groundwater. Only *Staphylococcus aureus* and *Bacillus megaterium* (data not shown) readily disappeared decreasing in numbers by more than six orders of magnitude within 15 to 25 days. *E. coli* fell below detection after 250 days (Fig. 4A). For *Bacillus cereus* an initial decrease was observed which then labelled off for the residual time of the experiment. A similar pattern was observed for *Clostridium perfringens*, which was most probably caused by spore formation in both strains (Filip *et al.* 1986). The decay rates for selected strains are shown in Fig. 4B. The results of Filip *et al.* (1986) are in agreement with findings from others. Weber *et al.* (1982) reported the persistence of *E. coli*, Y. enterocolitica, P. aeruginosa and other enterobacteria of more than 300 days in cold drinking water (4°C).

Filip *et al.* (1986) further tested the effect of adding (1) sediment of varying grain size, (2) organic carbon (1.1 gL-1) and nitrate (50 mgL-1), or (3) a combination of both, sediment and substrate, to the batch experiments. After an incubation time of 100 days it was found that the presence of sediments resulted either in no or only a slight reduction of suspended microorganisms when compared to the numbers incubated in groundwater only (Fig. 5). With a few strains a slight increase in suspended microbes were observed. The combination of both treatments revealed growth for some strains, while others decreased faster in numbers in the presence of C_{org}, N, and sediments (Fig. 5C).

The set of treatments allows drawing some conclusion on factors influencing the survival, decay or growth of pathogenic microbes, which is discussed exemplarily for selected strains. *E. coli*, for example, showed a faster disappearance from the water phase with both treatments which 'added up' when combined (Fig. 5C). This is contradicting other studies, which postulated longer survival times for *E. coli* when adsorbed to particles. In most cases, extended survival times were detected in sediments when compared with overlying waters (Merkli 1974; Gerba and McLeod 1976; Filip *et al.* 1983). No 'additive' effect could be observed in the experiments of Filip *et al.* (1986) for *Streptococcus faecalis*, *i.e.* the addition of C_{org} and N allowed longer survival, while the presence of sediment significantly reduced the cell numbers in the water phase. When combining both treatments,

the sediment effect was found determining (Fig. 5C). Although the experiments of Filip and co-workers revealed very interesting findings with respect to the survival of pathogenic bacteria and fungi in groundwater, the mechanisms behind the decrease or increase of cell numbers are not clearly understood.

It was believed for a long time that enteric bacterial pathogens are not able to grow outside its human host (Burgess 1998), and growth and replication of pathogens in the environment is the exception but not the rule (Camper *et al.* 1991; Pedley *et al.* 2006). However, there is growing evidence that individual pathogenic bacteria are able to reproduce in soil and aquatic systems. This has been shown, for example, for *Vibrio cholerae* (strain O1 Ogawa Eltor) und *E. coli* (strain O157) which grew in sterile oligotrophic river and pond water (Vital *et al.* 2007; Vital *et al.* 2008). Growth of both strains was positively correlated with temperature. *Vibrio cholerae* even showed a positive growth rate in non-sterile waters (Vital *et al.* 2007), which allows the conclusion that growth of specific pathogens in groundwater can not be ruled out.

5.2 PERSISTENCE AND PROLIFERATION OF PATHOGENIC VIRUSES

Viruses are particles without own metabolism. In that way they may be compared to resting stages of bacteria and protozoa, such as spores and cysts, respectively. This may also explain the comparably long persistence of pathogenic viruses in the environment (Fig. 6). At the surface, irradiation is an important factor promoting viral inactivation and decay (Fattal *et al.* 1983; Sinton *et al.* 2002; Brookes *et al.* 2004). Another important parameter is temperature, while low temperatures support a long persistence (Yates *et al.* 1985). Consequently, at typical groundwater temperatures of ≤ 15°C viruses may survive and stay infectious for several hundred days (Fig. 6). In groundwaters, examined all over the US, only temperature, out of several physical-chemical parameters measured, significantly correlated with the survival or inactivation rate of viruses. Similar observations were made for viral decay in soils (Yeager and O'Brien 1979).

Among enteric viruses, members of the familiy *Adenoviridae* are known to be very stable in natural aquatic environments. The same seems to be true for *poliovirus* as early studies described enormous stability of infectious particles in cold groundwater for up to 550 days (Althaus 1983; Fig. 6). However, in comparative tests, adenovirus serotypes 40 and 41 were found much more stable in 4°C tap water than hepatitis A and *poliovirus* 1. Prolonged incubation at 4°C revealed a total persistence time of 304 days for serotype 41 (Enriquez *et al.* 1995). These results demonstrate common discrepancies regarding persistence data most likely due to experimental variations. Recent studies on adenovirus serotype 2 (AdV2) repeatedly assessed viral survival in groundwater via simultaneous analyses of each sample by both a cell culture assay (infective particles) and real-time reverse transcription (RT)-PCR (total particles) (Charles *et al.* 2009; Ogorzaly *et al.* 2010). AdV2 survived at least 364 days in groundwater at 12°C and viral DNA was detectable for 672 days of the 728 day monitoring period (Charles *et al.* 2009).

By contrast to adenovirus, to date no adequate cell culture assay exists to determine the number of infectious particles of human pathogenic noroviruses (Duizer *et al.* 2004a). The detection of viral nucleic acid in groundwater samples by quantitative RT-PCR is helpful but does not reveal information on infectivity (Duizer *et al.* 2004b). Thus, during the last years several culturable viral surrogates (e.g. murine norovirus, feline calicivirus, *poliovirus* or phage MS2) were tested with respect to inactivation rates and persistence in water. In these studies murine norovirus turned out to be the most promising candidate as a human norovirus surrogate, as both viruses revealed comparable nucleic acid stability in surface water (25°C) and groundwater (4°C) (Kadoi and Kadoi 2001; Allwood *et al.* 2003; Wobus *et al.* 2006; Bae and Schwab 2008). However, up to now data on survival of human noroviruses in groundwater and drinking water are sparse and partially contradictory (Beuret *et al.* 2002; Lamothe *et al.* 2003; Sanchez *et al.* 2005; Ngazoa *et al.* 2008; Charles *et al.* 2009).

Survival of enteroviruses, including coxsackie- and *polioviruses*, at low temperatures was shown for weeks to months in shallow groundwater (Wellings *et al.* 1975) and also exposed to deep groundwater (Keswick *et al.* 1982; Bitton *et al.* 1983). Filip *et al.* (1986) tested survival of selected model viruses, *i.e. coxsackievirus* A9, echovirus 7 and *poliovirus* 1 in groundwater in laboratory batch experiments at 10°C. It was observed that the virus titer dropped by only 2 to 3 orders of magnitude within 260 days. All three of the tested viruses showed at the end of the experiment higher numbers in the controls (autoclaved groundwater), pointing at antagonistic effects of the natural groundwater microbial community.

Further factors discussed to influence the survival and decay of pathogenic viruses in aquatic environments, include the concentration of dissolved oxygen and redox conditions. A removal study with bacteriophages ΦX174 and MS2, two surrogates for hu-

man pathogenic viruses, revealed that removal during transport through an anoxic aquifer was considerably lower compared to that in oxic aquifers due to lower inactivation and adsorption rates. One explanation for higher inactivation rates in aerobic sediments might be the presence of ferric oxihydroxides resulting in higher adsorption rates of pathogenic agents (Abudalo *et al.* 2005). Consequently the authors suggest to differentiate between oxic and anoxic aquifers regarding to groundwater protection and to extend the microbial protection zones around anoxic aquifers (Van der Wielen *et al.* 2008).

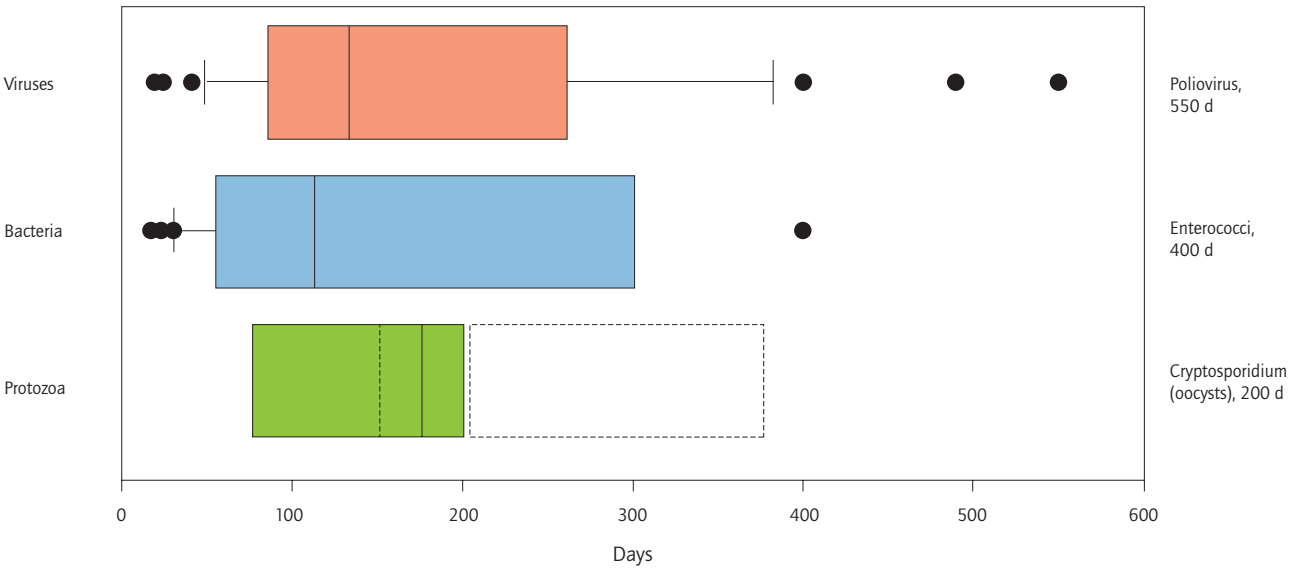
Studies on different enteric viruses and bacteriophages also underlined the role of adsorption as controlling factor in viral survival (Hurst *et al.* 1980). Noteably, most of the studies published took into account only the virus fractions suspended in the water phase. What really happens to virus particles adsorbed to sediment is generally unknown.

5.3 SURVIVAL OF PATHOGENIC PROTOZOA

Protozoa are able to outlast long periods of time as oocysts which are insensitive to environmental stress and many treatments procedures applied during drinking water production. However, data on protozoan survival in groundwater and subsequent infectivity in humans are sparse as only in a few studies infectious oocysts could be detected in aquifers due to the influx of contaminated surface water (Hancock *et al.* 1998). At the land surface survival of protozoa and their cysts are heavily influenced by temperature, desiccation and freezing, respectively. Drying of *C. parvum* cysts on microscope slides for more than 2 h at room temperature resulted in 100% death (Robertson *et al.* 1992). In soil and sediments protozoan oocysts are efficiently retarded by filtration and adsorption. Inactivation rates of *Cryptosporidium* in surface water matrices and sterile river water were found to be very low for a temperature range of 5 to 20°C (Robertson *et al.* 1992; Medema *et al.* 1997; Chauret *et al.* 1998). *Cryptosporidium* oocysts that were held in sterile water at 15°C remained infectious in mice and cell cultures for 7 months (Fayer 2004). For groundwater at 5°C, survival times of protozoan cysts were calculated to range between 176 days and more than 200 days (Fig. 6; Robertson *et al.* 1992; Ives *et al.* 2007).

The results obtained on survival and persistence of pathogenic bacteria, viruses, and protozoa in natural groundwater need to be viewed and interpreted critically, before transferred to the situation *in situ*. First, the various experiments conducted in the lab and in the field strongly differed according to their experimental setup, model pathogens used, sampling and detection protocols applied. Jansons *et al.* (1989) nicely demonstrated the significant difference of seeded vaccine strains or natural viral isolates in terms of sorption and inactivation. Second, in most studies, the focus was only on the suspended fraction of pathogens. Rarely

Fig. 6: Survival times of pathogens in groundwater and drinking water. Only survival times in the temperature range between 4 and 15°C were summarized from the literature. Data of protozoan survival in groundwater are scarce (green box) and do not reflect general survival times of oocysts in the environment. To better illustrate the high environmental persistence of oocysts, also published experimental data from different water types have been introduced (dashed box).



the sediment associated (adsorbed, attached) fraction was further evaluated for its long-term fate.

5.4 MICROBIAL ANTAGONISMS

It was repeatedly suggested that microbial activity and competition with autochthonous microorganisms, summarized here as microbial antagonism, supports a faster decay of pathogens in the environment (Keswick and Gerba 1980; Althaus *et al.* 1982; Filip *et al.* 1986; Yates *et al.* 1987; Hurst 2000). Processes may include grazing of bacteria and viruses by protozoa, bacterial endoparasitisms, bacterial production of toxins and lysogenic enzymes. Althaus *et al.* (1982) provided a comprehensive summary of early literature on microbial antagonism. However, the question if such processes are of relevance in groundwater could so far not be satisfactorily answered.

An early study of Bagdasaryan (1964) showed that virus inactivation was greater in intact soil compared to sterile soil incubations while others, 16 years later, found no significant differences between active and inactive, as well as aerobic and anaerobic set-ups (Hurst *et al.* 1980). Very often, the fact that survival of viruses and bacteria is longer in sterile waters or waters of low microbial activity was quoted as direct evidence for antagonistic interactions (McCoy and Hagedorn 1979; Matthess and Pekdeger 1985; Althaus 1983). Similarly, faecal pathogens, such as *poliovirus* 1 and *E. coli*, were found more stable in groundwater than in sea and river water, which was attributed to the higher microbial activity in surface waters (Bitton *et al.* 1983). Microbial activity is directly influenced by the concentration of organic matter and nutrients, temperature, oxygen and light. These factors also have been shown to have a direct influence on the decay of individual pathogens. For example, correlations between increased virus inactivation rates, higher activity of indigenous microorganisms in groundwater, and the water oxygen concentration have been observed (Yates *et al.* 1988; Jansons *et al.* 1989; Gordon and Toze 2003). Hurst (1988) impressively demonstrated that the presence of aerobic microorganisms significantly influenced virus survival, resulting in a two- to threefold increase of viral inactivation.

Hirsch and Rades-Rohkohl (1983) tested 217 aerobic bacterial isolates from groundwater against *E. coli* K12. More than 20% of the strains showed inhibitory effects to *E. coli*, about 8% showed aggregation, and about 7% stimulated the model pathogen. Cliver and Herrmann (1972) demonstrated the inactivation of Cocksackie virus type A-9 by bacterial (*Pseudomonas aeruginosa*) proteolytic enzymes and the uptake of ^{14}C-label from the virus coat protein by the bacterial cells. Also Lipson and Stotzky (1985) indicated that bacteria may utilize viruses as growth substrates. Nasser *et al.* (2002) reported the effect of different microbial enzyme activities on virus reduction in saturated soil. Low concentrations of protease pronase led also to an inactivation of Cocksackie virus type A-9. *Pseudomonas aeruginosa* extracellular enzymes additionally reduced hepatitis A virus, while *poliovirus* type 1 and MS2 bacteriophages seemed insensitive to these treatments. Virus decay in the environment may be further caused by biological degradation of the viral genome by free nucleases and destruction of viral capsids by proteases (Gerba 1987).

It may further be expected that pathogenic viruses are also reduced by grazing protozoa, similar to natural prokaryotic bacteriophages (Gonzalez *et al.* 1992; Suttle and Chen 1992). Gonzalez and Suttle (1993) estimated that flagellates feeding on viral particles can thus gain up to 9% of the carbon they obtain from ingested bacteria. The authors also indicate that it may need a critical number of bacteriophages to serve as a sufficient carbon source for protozoa. Without doubt, protozoa may also ingest viruses and large viruses might be taken up preferentially (Murray 1995), thus part of the pathogenic viruses can be suggested to be reduced by grazing, what needs to be addressed in future investigations.

5.5 MICROBIAL STRATEGIES FOR A LONG-TERM SURVIVAL

Several behavioural and physiological strategies of bacteria, including encapsulation, attachment and participation in microbial biofilms or a shift to low-activity or dormant stages, successfully contribute to a longer survival in the environment (LeChevallier *et al.* 1988). The embedment of pathogens in microbial biofilms efficiently provides protection against external factors such as water treatment. For unencapsulated *Klebsiella pneumoniae* attachment to glass slides was shown to increase its resistance to chlorination 150-fold (LeChevallier *et al.* 1988). Biofilms in aquatic environments and especially in drinking water distribution systems are places for the long-term persistence of potential pathogens such as *E. coli*, *Legionella*, *Klebsiella* and/or *Pseudomonas* (Banning *et al.* 2003; Taylor *et al.* 2009; Declerck 2010). However, because real biofilms hardly occur in oligotrophic, energy-limited aquifers, numbers of *Legionella* spp. detected in groundwater were always lower than those detected in man-made environments (Costa *et al.* 2005; Diederen *et al.*

2007). *Legionella* species might survive also protected in protozoan amoeba. The human pathogenic *L. pneumophila* proliferates in various amoebal hosts (Rowbotham 1980). Fortunately, so far high numbers of infected amoeba have been found only in cooling towers but not in natural environments. Therefore, this association between bacteria and amoeba might be favoured only under special environmental conditions (Berk *et al.* 2006).

Together with a multitude of natural non-pathogenic bacteria some faecal pathogens developed a unique strategy to survive in oligotrophic, energy-limited conditions. These bacteria, including the species *E. coli*, *E. faecalis*, *V. cholerae*, *Shigella spp.*, and *Campylobacter* spp. may change their physiological stage and enter a low-active or dormant, viable but not culturable state. This state, characterized by a very low content of nucleic acids and significantly smaller cell size, allow the organisms to resist unfavourable conditions (Colwell *et al.* 1985; Rollins and Colwell 1986; Byrd *et al.* 1991; Ravel *et al.* 1995; Rahman *et al.* 1996; Arana *et al.* 1997). Although still alive, partially still infectious or at least able to return to an infectious stage they are no longer detectable by traditional enrichment assays (Oliver 2005).

One of the most persistent bacterial states of dormancy is the survival in spores. The production of spores, as known for species of the genus *Bacillus* and *Clostridium*, allows surviving hostile conditions such as the physical and chemical treatments used in drinking water production. Fortunately, efficient adsorption of *Cl. perfringens* spores to sand particles was shown, however the attachment was reversible for most of the spores dependent on their total concentration (Schijven *et al.* 2003).

6. CONTAMINATION OF DRINKING WATER AND OUTBREAK OF WATERBORNE DISEASES

The top candidates of harmful pathogens in aquatic environments changed during the last centuries due to the improvement of water hygiene. In the 19th century life-threatening bacterial outbreaks including cholera and typhoid fever dominated waterborne diseases (Exner and Koch 2011). Today, and especially in Europe and the USA, human populations are mainly challenged by waterborne gastrointestinal illnesses that are self-limited or curable in most cases of infections. The responsible agents are high infectious and environmental resistant pathogenic viruses including norovirus, rotavirus, adenovirus or members of the enteroviruses, besides individual bacterial pathogens such as *Campylobacter* species or *E. coli* (Domingo and Ashbolt 2010). It is worth mentioning that the risk of infection when consuming contaminated drinking water is 10- to 10,000-fold greater with viruses than with pathogenic bacteria. However, some pathogens of great concern in the past are still serious causative agents for waterborne epidemics. The bacterial pathogen *Vibrio cholerae* was indicated as the causative agent in the first documented waterborne outbreak in 1892 and it seems to be still a serious risk for human health in other regions of the planet as is demonstrated by the current cholera epidemic in Haiti with nearly 210,000 infected individuals and more than 4,000 deaths (CDC 2010).

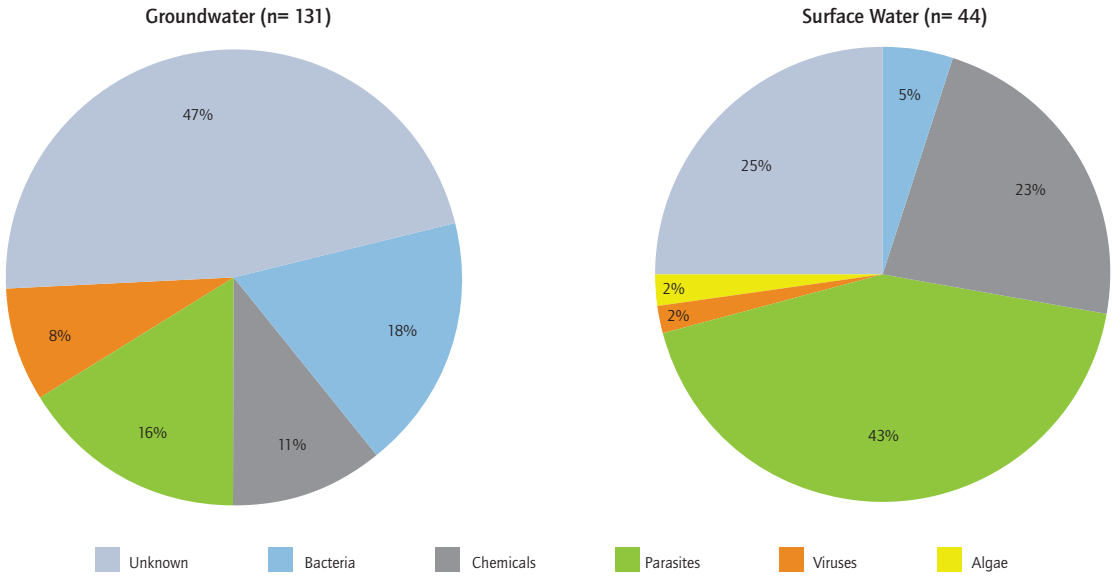
6.1 WATERBORNE DISEASE OUTBREAKS

There is a long history of severe outbreaks of waterborne disease. Historical outbreaks in Germany are documented for typhoid fever (*Salmonella typhi*) in Berlin in 1889, Gelsenkirchen in 1901, Pfortzheim in 1919, Hannover in 1926, and in Neuötting twice in 1946/47 and 1948. The last severe outbreak of cholera in Germany (*V. cholerae*) dates back to 1892 in Hamburg (Althaus *et al.* 1982). A very recent outbreak of dysentery (*Shigella spp.*) took place 1978 in Ismaning (Bavaria) (Althaus 1983). In all cases, the outbreaks were connected to contaminated groundwater and/or drinking water.

Also nowadays pathogens are frequently detected in groundwater and drinking water, and still regular small and even larger disease outbreaks occur in Germany, Europe and all over the world, which can directly or indirectly be related to groundwater and drinking water consumption.

A comparison of etiologic agents and their impact in outbreaks via groundwater or surface water in the United States

Fig. 7: Etiologic agents associated with drinking water outbreaks in the US between 1989-2000 distinguished into the type of source water, *i.e.* groundwater or surface water. Unknown = acute gastrointestinal illness of unknown cause (etiology). n = number of outbreaks traceable to either a groundwater or surface water source. An outbreak is generally defined as two or more people experiencing similar illness traceable to a common drinking water source. The three primary categories of pathogens, bacteria, viruses, and parasites (including protozoa), are highlighted in terms of colour.



Resource: Adapted from the Centers for Disease Control and Prevention, Gerba 2004.

(US) is shown in Fig. 7. The significance of viral transmission via groundwater becomes obvious as the viral contribution in waterborne outbreaks due to groundwater is four-times higher than surface water related outbreaks. Similarly, bacteria are preferentially transmitted via groundwater, while the risk of parasitic (including protozoa) outbreaks is highest with surface water (Fig. 7). It is important to mention that a large portion (47%) of etiologic agents in groundwater is still unknown.

Contaminated groundwater is the most commonly reported source of waterborne disease in the US, associated with 64% of the drinking water outbreaks between 1989 and 2002 (Fong *et al.* 2007). An even increasing tendency of groundwater associated pathogen outbreaks was observed between 2003 and 2006. In these years the National Center for Infectious Disease (CDC) documented 11 pathogen associated drinking water outbreaks in the US and in 82% of all cases contaminated groundwater was found to be the major source (Liang *et al.* 2006; Yoder *et al.* 2008). However, waterborne outbreak documentation is difficult as it is not possible to backtrack all waterborne outbreaks to the relevant water source and outbreaks are often underreported because those infected do not always seek medical care (Craun *et al.* 2006; USEPA 2006).

Some of the recent severe waterborne outbreaks due to pathogenic bacteria, viruses and protozoa in contaminated groundwater are listed in Table 5. Pathogenic pollution of groundwater is often attributed to the failing of septic systems and uncontrolled release of sewage. Moreover, water supply wells in regions with fractured rocks or karst are highly vulnerable to faecal pollution as impressively demonstrated by three major disease outbreaks in Walkerton, Texas and Ohio (Tab. 5; Barwick *et al.* 2000; Worthington *et al.* 2002; Fong *et al.* 2007). A minor norovirus outbreak in Wisconsin in June 2007 also occurred due to highly vulnerable hydrogeological settings as an 85 m deep well in a fractured dolomite aquifer was contaminated by faecal pathogens (Borchardt *et al.* 2010). Settings like this are especially at high risk of contamination during times of snowmelt or irregular heavy precipitation events and flooding as it was also demonstrated by several studies on waterborne outbreaks in Canada (Charron *et al.* 2004; Schuster *et al.* 2005; Thomas *et al.* 2006). Unfortunately, such extreme hydrological events accumulate in the future due to climate change.

Table 5: Recent major groundwater-borne outbreaks.

OUTBREAK/IMPLICATIONS	PATHOGEN	REASON	REFERENCE
Salmonellosis, May/June 1965, Riverside, California, USA; 16,000 infected individuals.	Salm*onella typhimurium*	Unknown source	Boring *et al.* 1971; Report 1971
Gastroenteritis and Hepatitis A, June 1980, Georgetown, Texas, USA; ~ 8,000 (79%) infected individuals.	Enterovirus, Rotavirus, *Coxsackievirus*, Hepatitis A	Leaky sewage line	Hejkal *et al.* 1982
Viral gastroenteritis, March 1981, Eagle-Vail, Colorado, USA; 56 (44%) infected individuals	Rotavirus	Improper working sewage treatment plant	Hopkins *et al.* 1984; Hopkins *et al.* 1985
Bloody diarrhoe, Dec 1989/Jan 1990, Missouri, USA; 243 infected individuals, 4 died.	*E. coli* O157:H7	Unchlorinated water supply	Swerdlow *et al.* 1992
Viral gastroenteritis, April 1994, Finland; up to 3,000 (50%) infected individuals.	Norwalk Virus (Norovirus), Adenovirus, Rotavirus	Spring flood, contamination by polluted river water	Kukkula *et al.* 1997
Diarrhoe, August 1995, Idaho, USA; 82 (35%) infected individuals.	*Shigella sonnei*	Heavy rainfall, improperly drained sewage	CDC 1996
Cryptosporidiosis, spring 1997, North Thames, UK; 345 infected individuals.	*Cryptosporidium*	Contaminated water from treatment works	Willocks *et al.* 1998

Cryptosporidiosis, 1998, Brush Creek, Texas, USA; 1,300-1,500 infected individuals.	*Cryptosporidium*	Spill of raw sewage (karst aquifer)	Bergmire-Sweat *et al.* 1999
Gastroenteritis/Campylo-bacteriosis, May 2000, Walkerton, Ontario, USA; ~ 2,300 infected individuals, 7 died.	*E. coli* O157:H7, *Campylobacter*	Heavy rainfall, cattle manure contamination	Hrudey *et al.* 2003
Gastroenteritis, August 2000, Gourdon, France; ~ 2,600 (37%) infected individuals.	*Campylobacter* coli, Rotavirus, Norovirus	Contamination by agricultural run-off, failure in the chlorination system	Gallay *et al.* 2006
Viral gastroenteritis, summer 2004, South Bass Island, Ohio, USA; ~ 1,450 infected individuals	*Campylobacter* spp., Norovirus, *Giardia* spp., and *Salmonella typhimurium*	Contamination with untreated or partially treated sewage (karst region)	USEPA 2006; Fong *et al.* 2007; O'Reilly *et al.* 2007

In less developed countries with lower sanitation standards there is a clear correlation of climate and groundwater contamination in rural and urban areas. The burden of improper installed on-site sanitation or inadequately protected wells and boreholes is increased by a direct pulse-response between heavy rainfalls and pathogenic contamination (Lewis *et al.* 1982; Lewis and Chilton 1984; Godfrey *et al.* 2005).

Also in the USA a correlation between enteric waterborne outbreaks and precipitation becomes obvious as more than half of the 548 reported outbreaks between 1948 and 1994 were related to heavy rainfalls (Curriero *et al.* 2001).

In industrialized countries, virus infections took over as the most common cause of waterborne disease, mainly gastroenteritis. Meanwhile, norovirus infections are considered to be the most common cause of gastroenteritis in the western world (Besner *et al.* 2011).

Approximately half of all waterborne diseases outbreaks in the US from groundwater consumption are presumed to be of viral origin (Borchardt *et al.* 2007). In 2003, Abbaszadegan *et al.* performed a survey of 448 utility wells in 35 states of the USA. In this study approximately one third of groundwater supplies sampled were found to be positive for infective enteric viruses (including enterovirus, rotavirus, and hepatitis A) or viral indicators as detected by molecular methods (RT-PCR). As the detection limit for the molecular assays is rather high, *i.e.* a minimum of 9.3 virus particles in 1 mL as shown for enteroviruses (Donaldson *et al.* 2002), the real number of contaminated wells can be suggested much higher.

The main causative agents of bacterial gastroenteritis that are characterized by relatively high infectivity are *C. jejuni* and *E. coli* O157:H7, with *C. jejuni* found to be one of the leading causes for acute gastroenteritis worldwide (Swerdlow *et al.* 1992; Allos 2001; Hrudey *et al.* 2003; Besner *et al.* 2011). The infectivity of *E. coli* O157:H7, also known as enterohaemorragic *E. coli* (EHEC) is one of the highest known for bacterial pathogens. As few as 10-100 EHEC cells compared to 500-1000 *C. jejuni* cells and 10^5 *Salmonella* cells can cause infections (Pachepsky *et al.* 2006; Besner *et al.* 2011).

An additional risk may arise in the future as more and more bacterial strains are detected carrying antibiotic resistance (McKeon *et al.* 1995). The analyses of E.coli strains in sewage revealed a broad resistance against several antibiotics, especially in hospital sewage. These strains might cause severe disease when released into the environment (Reinthaler *et al.* 2003). Another potential hazard of antibiotic resistance are antibiotic-resistant enterococci that have been detected in swine manure. With the application of manure to agricultural land, these may enter soils and aquifers and are potentially distributed with groundwater (Sapkota *et al.* 2007). The high risk of water pollution by agricultural land use is highlighted by a comparison of agricultural lands with non cultivated natural areas in Finland. While faecal indicators such as *E. coli* and streptococci where detected in only half of the samples in non cultivated land (up to 100 bacteria per 100 mL) probably originating from wild animals, coliform concentrations in agricultural areas were frequently more than tenfold higher and hence vastly exceeded that of treated wastewater (Niemi and Niemi 1991).

Environmental transmission, mostly due to farm animals, is also relevant for zoonotic protozoan pathogens such as Cryptospiridia and *Giardia*. These pathogens are frequently involved in waterborne outbreaks due to their relatively high infectivity; ingestion of less than 10 oocysts can lead to infection. However, most of these outbreaks were related to contaminated surface waters or groundwater directly influenced by polluted surface water (Hancock *et al.* 1998; Semenza and Nichols 2007; Valderrama *et al.* 2009). Due to the bigger size of protozoan pathogens (oocysts of *Cryptosporidium*, 4-6 µm) compared to bacteria (≈ 1-2 µm) and

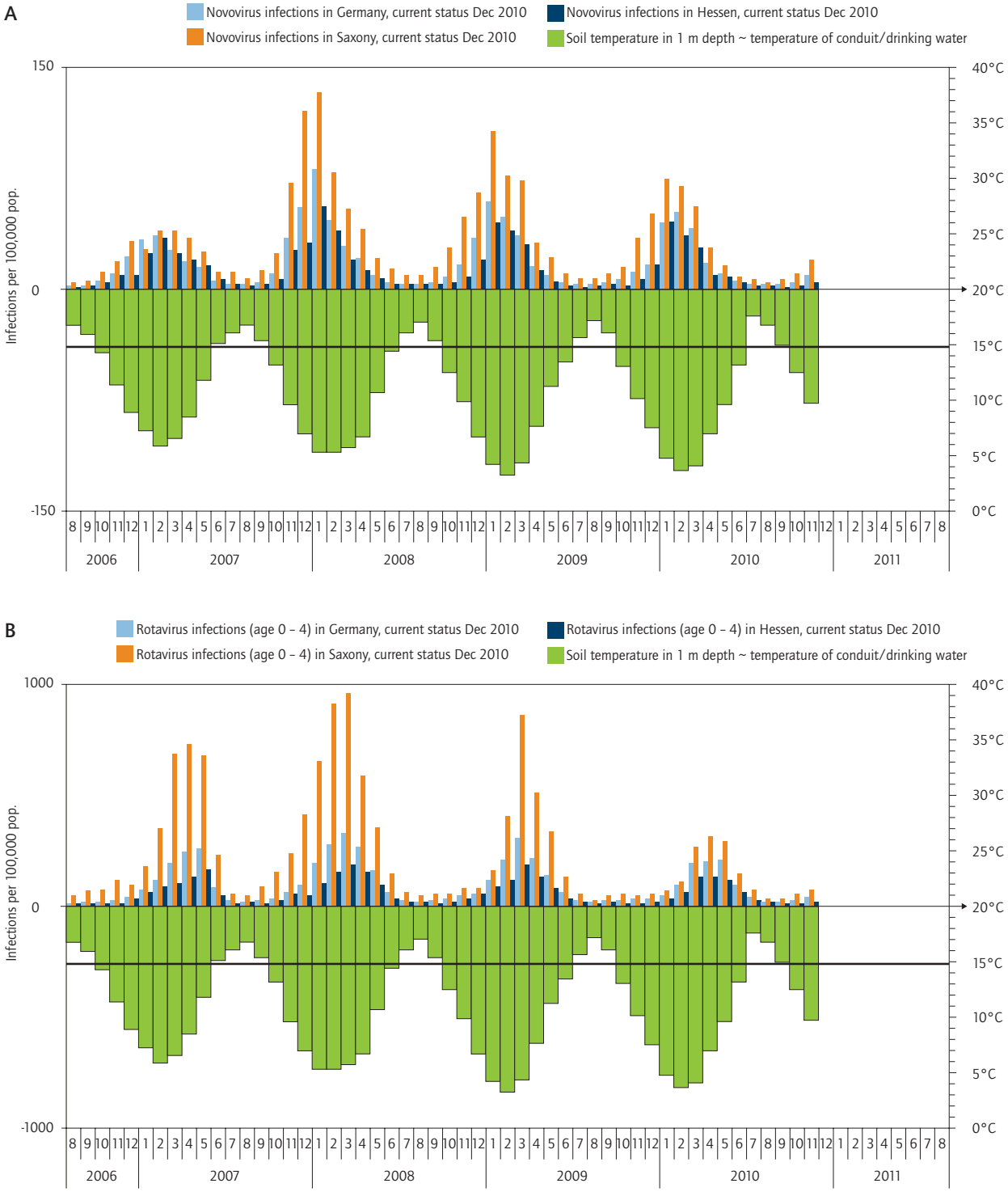
viruses (20-200 nm) well protected groundwater aquifers are generally at low risk with respect to protozoan contamination. However, contaminated or improper treated groundwater contributed 18% of all outbreaks caused by *Giardia* and *Cryptosporidium* (Howard *et al.* 2006; USEPA 2006). In the case surface water is used for drinking water supply and routinely applied water treatment processes as coagulation and filtration fail, cryptosporidiosis may cause severe epidemics as impressively demonstrated by one of the largest waterborne outbreaks in the US history in 1993 in Milwaukee with more than 400,000 infected individuals (Mac Kenzie *et al.* 1994). Highest concentrations of protozoa, e.g. *Cryptosporidium*, are found in urbanised or agricultural waters compared to relatively low concentrations in pristine waters (LeChevallier *et al.* 1991; Rose 1997; Medema *et al.* 2006). To reduce the risk of groundwater contamination in rural areas constructed wetlands have emerged as a promising technology for sanitation of wastewater effluents with low operational maintenance cost (Redder *et al.* 2010).

6.2 SEASONALITY OF PATHOGEN OCCURRENCE

There is some seasonality observed with the occurrence of pathogens in aquatic systems. This seasonality is mainly correlated to water temperature. While the warmer temperatures in late summer go along with *Salmonella*, *Campylobacter* or *E. coli* infections (Kovats *et al.* 2004; Kovats *et al.* 2005; Fleury *et al.* 2006), the cold season is characterized by the occurrence of noro- and rotaviruses, which can persist over months to years at low temperatures (Cook *et al.* 1990; Levy *et al.* 2009; Keller *et al.* 2010). A wintertime seasonality of norovirus, for example, causing the so called 'winter vomiting disease' was observed between 2005 and 2008 when 253 outbreaks could be related to norovirus in Toronto, Canada (Greer *et al.* 2009). In accordance to published data, the current monitoring of noro- and rotavirus infections in drinking water in Germany also indicates a seasonality of these viral pathogens (Soddemann, pers. comm. 2010).

The number of infections by noroviruses seems to go parallel with cold temperatures in the subsurface (Fig. 8A). Similar results are available for rotavirus infections in Germany. However, the maxima of rotavirus infections are slightly shifted and occur a few months later (Fig. 8B). These results provoked some speculation on distribution of noroviruses and rotaviruses with drinking water during winter time (Soddemann 2006).

Fig. 8: Norovirus (A) and rotavirus (B) infections in the federal states of Saxony and Hessen compared to the average overall infections in Germany displayed along with soil temperature.



Resource: By courtesy of W. Soddemann, 2010; data from Robert Koch Institut (RKI).

Another fact, which supports this argument is, that in federal states of Germany that produce their drinking water almost exclusively from groundwater (e.g. Hessen) the numbers of infections are significantly lower than in federal states where predominantly surface water is used (e.g. Saxony; Fig. 8; Soddemann, pers. comm. 2010).

It is known that a significant number of viruses enter together with treated wastewater rivers and streams. In times of epidemics, this load of viruses released from infected patients results in increased concentrations in wastewater and finally in much higher concentrations in the water which leaves the sewage treatment plant. In surface waters, at the low winter temperatures, decay of the pathogenic viruses is slow. Additionally, irradiation, as an important factor linked to viral reduction, exhibits a reduced intensity in winter. Similarly, microbial activity in surface waters and sediments is low at that time. Taking these circumstances into account, there is an improved persistence of viruses and where surface water is used for drinking water production, a high risk for the entry of viruses into drinking water.

Irrespective of sporadic infection events no waterborne outbreaks of enteric viruses via drinking water due to contaminated groundwater and water treatment issues are known for Germany. This is, as repeatedly argued because of the high standards in groundwater protection and the German drinking water ordinance (Trinkwasserverordnung). Single drinking water related outbreaks in Switzerland and Germany only occurred due to obvious failures in water treatment or break-in of sewage (Maurer and Sturchler 2000; Szewzyk *et al.* 2006).

The newly proposed regular spreading of pathogenic agents with drinking water (Soddemann, pers. comm. 2010) still awaits confirmation by drinking water analysis. This indeed is not trivial, as no simple plate and cell culture assays exist for norovirus and the detection limit with molecular methods is not sufficient at all for the monitoring of low concentration of viruses (e.g. 1 virus particle per litre or several litres of water), which still may constitute an infective dose and thus a high risk to human health. New techniques for the concentration of virus particles from large quantities of water are urgently needed (see section 8).

Currently seasonal endemics of human influenza viruses are also discussed to potentially occur through transmission via groundwater. The fact that endemics mostly occur local regarding virus subtypes and areas and that they are generally restricted to colder regions might be explained by their increased stability in cold drinking water (Soddemann 2005; Mauckner and Soddemann 2007). Human influenza viruses were also detected in faeces of several mammals, including swine and cattle (Graves and Oppenheimer 1975; Zhou *et al.* 1996; Webster 1998; Brown 2000). Therefore the transmission from the environment to natural waters and groundwater can not be excluded at the moment.

6.3 ECONOMIC IMPACT OF WATERBORNE OUTBREAKS

Waterborne outbreaks do, besides the risk of human infection, have a severe impact on our economic and social system and places a major burden on the health system. Payment (1993) estimated the total costs of infectious gastrointestinal illness, the major disease of waterborne outbreaks, in the US to be more than $20 billion per year. This is a major part of the estimated annual costs of $6.5-$34.9 billion for total microbial foodborne illness, demonstrating the great significance of waterborne outbreak (Buzby and Roberts 1997). A more detailed study on the costs of loss of productivity because of sick leave during a waterborne gastroenteritis outbreak affecting 1,600 people in Denmark were amounted to 1,600,000 Danish kroner (about $280,000 or €215,000, respectively) (Laursen *et al.* 1994). The costs for enteric viral infections per individual were calculated in the US based on 1997-1999 data. Direct and indirect costs ranged from $88/case for a norovirus infection to $1,193/case for enterovirus aseptic meningitis for non-hospitalized cases. Direct costs of hospitalization were even higher and ran from $887/case for norovirus to $86,899/case for hepatitis A (Nwachuku and Gerba 2006). These data impressively demonstrate the importance of proper water management and control of waterborne disease spread, not only to prevent life threatening illnesses but also to keep the economic damage of waterborne infections as low as possible.

6.4 GROUNDWATER PROTECTION REGULATIONS

Risk assessment is one of the major tasks for the prevention of contamination of groundwater that is intended for drinking water supply. As shown in Table 6 most countries in the world apply a similar system of protection zones, comprising of three individual zones to protect drinking water production wells.

The dimensions of the zones are very similar. Zone I is dedicated to protect the direct neighbourhood of the production well. Size of zone II is derived from tracer tests or hydrogeological modelling and accounts for individual groundwater travel times. Zone

Table 6: Comparison of protection zones in different countries.

COUNTRY	INNER PROTECTION ZONE (WELLHEAD)	MIDDLE PROTECTION ZONE	OUTER PROTECTION ZONE
	Travel time and/or radius of zone		
Australia	50 m	10 years	Whole catchment
Austria	< 10 m	60 days	Whole catchment
Denmark	10 m	60 days or 300 m	10-20 years
Germany	10-30 m	50 days	Whole catchment
Ghana	10-20 m	50 days	Whole catchment
Indonesia	10-15 m	50 days	Whole catchment
Ireland	100 days or 300 m	–	Whole catchment or 1000 m
Oman	365 days	10 years	Whole catchment
Switzerland	10 m	Individually defined	Double size of middle zone
United Kingdom	50 days and 50 m minimum	400 days	Whole catchment

Resource: Adopted from Chave et al. 2006.

III in most cases encompasses the whole catchment. Obvious differences in the wellhead protection zone are found for very arid countries as indicated for Oman (Tab. 6). In Arab regions were water resources are very limited, protection zones are used primarily to ensure adequate control over abstraction rates (Chave *et al.* 2006).

The groundwater well risk assessment in the US, which is laid down in the 'Guidelines for the Delineation of Wellhead Protection Areas' (USEPA 1987) is different to most other countries as no certain zoning system is proposed. Hence, the implementing authority can decide and plan the appropriate procedure in each individual case which can reduce costs. Additionally, the preparation of a contingency plan and the plan for the siting of new wells (vulnerability maps) is required. The lack of a zoning system might be due to the large variations of conditions from state to state. However, the guidelines leave much room for arbitrary delineations of protection zones and decisions might be difficult to defend legally (ACSAD-BGR 2003). By contrast, no vulnerability maps that might be essential to delineate protection zones in karst aquifers are included in the German guidelines.

Further, no contingency or emergency response plan is included in the law and regulations so that most water supply companies prepare their own plans. However, a comparison of the inexpensive well-established German wellhead protection area (WHPA) delineation models to the more cost-intensive USEPA-recommended WHPA delineations for agricultural settings revealed that several German delineations fitted well with an advanced numerical EPA module. Hence German WHPA methods might be a cost-saving alternative for farm operators in the US (Strobl and Robillard 2006). To further improve groundwater protection and to reduce the risk of infection via water a new European 'multi barrier system' was appointed in 1980 and especially the German drinking water suppliers have agreed on this advanced protection concept. The approach includes three major principles, (1) the protection of drinking water resources, (2) high technical standards regarding to the production, treatment, storage and distribution of drinking water, and (3) a proper operating domestic installation (Castell-Exner 2001; Szewzyk *et al.* 2006). In summary, the German regulations have proven to be effective in groundwater protection in a global point of view as to date no waterborne outbreaks of enteric viruses via drinking water due to improper water treatment are documented (Szewzyk *et al.* 2006).

6.5 WATER TREATMENT

The production of safe drinking water generally requires specific processing steps including physical (filtration, UV light), biological (aerobic microbial purification) and chemical treatments (free chlorine, chlorine compounds, ozone). In the past artificial groundwater recharge or bank filtration was proved to be highly effective in natural attenuation of contaminants including pathogens and emerged nowadays as a way of drinking water supply of growing importance (Balke and Zhu 2008). Physical filtration is known to efficiently remove the majority of bacterial and protozoan pathogens, however, viruses have been shown to pass

Table 7: CT values (disinfectant concentration and contact time, mg x min/L) for 99% inactivation at 5°C.

PATHOGEN	FREE CHLORINE (PH 6-7)	PREFORMED CHLORAMINES (PH 8-9)	CHLORINE DIOXIDE (PH 6-7)	OZONE (PH 6-7)
E. coli	0.034 – 0.05	95 – 180	0.4 – 0.75	0.02
Poliovirus 1	1.1 – 2.5	768 – 3740	0.2 – 6.7	0.1 – 0.2
Rotavirus	0.01 – 0.05	3806 – 6476	0.2 – 2.1	0.006 – 0.06
Phage f2	0.08 – 0.18	–	–	–
G. lamblia cysts	47 – 150	–	–	0.5 – 0.6
G. muris cysts	30 – 630	1400	7.2 – 18.5	1.8 – 2.0[a]
C. parvum	7200[b]	7200[c]	78[b]	5 – 10[c]

a Values for 99.9% inactivation at pH 6-9.
b 99% inactivation at pH 7 and 25°C.
c 90% inactivation at pH 7 and 25°C.

Resource: Adapted from Clark *et al.* 1993.

many filter systems (Szewzyk *et al.* 2006). Additionally, viruses (especially adenoviruses) are known to be very resistant against UV treatment, a habit which they share with bacterial spores and the protozoan *Acanthamoeba*. By contrast, most vegetative bacterial cells and oocysts of Cryptospridium and *Giardia* are highly susceptible to UV inactivation; between 19 and 28-times more sensitive compared to viruses (Hijnen *et al.* 2006).

A similar picture can be drawn according to traditional chemical treatment of water by chlorination or ozonation. The significantly increased viral persistence is best illustrated by the need for much higher doses and intensities of disinfection agents and treatments, respectively (Tab. 7). The wide range given is mainly related to water pH and exposure time, as well as water temperature. The efficiency of chlorination or ozonation, for example, is decreasing along with water temperature. Moreover, elimination of viruses by chlorination, ozone treatment or UV irradiation is insufficient with aggregated microorganisms or in biofilms (Lechevallier and Au 2004).

Protozoan oocysts are most resistant to chlorination (Tab. 7, Korich *et al.* 1990; Betancourt and Rose 2004). Viruses, on the other hand, are more resistant to inactivation than bacterial cells but are still effectively inactivated by free chlorine. Most pathogens seem to be quite resistant to chloramines. By contrast, ozone is a very powerful oxidant and a much better biocide than the other antimicrobial compounds (Tab. 7). It is therefore very useful as primary disinfectant.

It is worth to mention that disinfection by-products of chlorination, ozonation or UV treatment have been linked to cancer and reproductive defects (Amy *et al.* 2000). Better knowledge about the fate of pathogenic microorganisms and viruses in soil and groundwater allows optimizing disinfection needs and the kind of disinfection. Therefore, current research also focuses on potential alternative non-chemical water treatments. It has been shown that viruses (ΦX174 and MS2) could be efficiently removed by nanoscale zero-valent iron (nZVI) by inactivation and/or adsorption (You *et al.* 2005). However, application needs to be further evaluated since nZVI may also interact with other organisms. If unspecific reactions are comparable to free chlorine which is much more active against bacteria compared to viruses, nZVI may potentially also kill autochthonous bacteria in groundwater (Keane 2009).

7. USE OF INDICATOR ORGANISMS AND METHODOLOGICAL LIMITATIONS

Table 8: Coliform group and faecal streptococci.

GROUP	CHARACTERISTICS	
	Growth	Cells per g faeces
Total coliforms	37±1°C	10^7 – 10^8
Faecal coliforms	44±1°C	
E. coli	44±1°C	
Faecal Streptococci	45±1°C	10^6
Enterococci	10 – 45°C, pH 9.6, NaCl 6.5%	

7.1 INDICATOR ORGANISMS

Routine monitoring of hygienic water quality is essential to rule out waterborne disease outbreaks. This has led to guidelines for the assessment of water quality in various types of water bodies, including bathing waters and most important drinking water (Barrell *et al.* 2000). For the purpose of routine monitoring an indicator system is of great use as it is impossible to screen the high number of water samples for each specific known pathogen. Early, the group of coliform bacteria (total coliforms) was identified as indicator that is (1) universally present in human and warm-blooded mammal faeces in large numbers, (2) easy to detect, (3) not reproducing in natural aquatic environments or water distribution systems, and (4) behaving similar regarding persistence and water treatment as the waterborne pathogens of concern (WHO 1996). Coliforms themselves are, with some exceptions, non-pathogenic. All members of the total coliform group belong to the *Enterobacteriaceae*, sharing common characteristics including being gram-negative, non spore forming, oxidase negative, and rod-shaped facultative anaerobes that are defined by their ability to ferment lactose (using the enzyme galactosidase) with the production of acid and gas (Gilpin and Devane 2008). Because, the total coliforms also include organisms of environmental origin, there value as indicator for faecal contamination is frequently discussed. In Germany, the total coliforms lost importance as formerly mandatory indicator with a set quantitative threshold (0/100 mL) in the new drinking water ordinance (Trinkwasserverordnung), and stay as a qualitative indicator only (Exner and Koch 2011). The group of total coliforms is sometimes further distinguished into the subgroup of faecal coliforms. Members of the faecal coliforms are all thermotolerant (Tab. 8).

Escherichia coli is the most prominent coliform among the intestinal microflora and its presence is therefore a good indication for faecal contamination. Furthermore, faecal streptococci, especially enterococci are used as indicators. They are characterized by longer survival times than *E. coli* and are thus very stable in the environment (section 5, Fig. 6). Hence, their presence might be a hint to previous faecal contaminations (McFeters *et al.* 1974; Geldreich 1976; Edberg *et al.* 1997). However, some *E. coli* species can also be found in natural waters with no known sources of faecal contamination and environmental species also known within the enterococci (Carrillo *et al.* 1985; Brtkova *et al.* 2010).

Most laboratories responsible for water quality monitoring routinely test for the presence of total coliforms, faecal coliforms, *E. coli*, or enterococci (Leclerc *et al.* 2001). The guideline values for the number of individual indicator allowed to be present in safe drinking water are internationally accepted with only minor variations (Tab. 9).

Table 9: International guidelines for drinking water.

	TOTAL COLIFORM	*E. COLI*	MONITORING REQUIREMENTS	
			Population	Samples/months
United States (USEPA 1990)	0/100 mL (95%) A consecutive sample from the same site must be coliform-free	0/100 mL (100%)	–	ca. 1/1000 inhabitants
Canada (Ministère de la santé 1996)	10/100 mL (90%) None should contain more than 10 CFU/100 mL a consecutive sample from the same site must be coliform-free	0/100 mL (100%)	< 5000 5000 – 9000 > 9000	4 samples/month 1/1000 inhabitants 90+ (1/10000 inhabitants)
WHO (1994)	0/100 mL (95%)	0/100 mL (100%)	–	–
Germany (Trinkwasser-verordnung, 2001)	0/100 mL	0/100 mL (100%)	–	–

Resource: Adapted from Rompré *et al.* 2002.

Since coliform bacteria, faecal coliforms and *E. coli* are used as indicators for faecal contamination, their appropriateness and reliability is continuously discussed. Major points of discussion include (i) their natural occurrence in the environment, (ii) their possible growth outside their hosts, (iii) huge variation in survival between individual species and strains. Without doubt, their common use as surrogates of bacterial enteric pathogens requires knowledge on their behaviour in natural environments.

There is a pile of studies, which proved that coliforms and especially *E. coli* do not reproduce under natural conditions. For example, more than 40 field and laboratory survival experiments of Mancini in 1978 reported no coliform growth in natural waters. Similar results were obtained exclusively for *E. coli* revealing survival times in a range of 4 to 12 weeks (Edberg *et al.* 2000). However, there is also a number of contradicting studies. Several hints of reproducing *E. coli* are available from raw wastewater studies, were growth is enabled by nutrient-rich conditions (Niemi *et al.* 1987; Ashbolt *et al.* 1997). The growth of selected pathogenic and non-pathogenic enteric bacteria was observed in river water at 30°C, which was, however, not sufficient for a survival at 5°C (Hendricks 1972). Similarily, growth of *E. coli* O157 was shown under low carbon conditions in sterile freshwater at temperatures between 20 and 30°C. At temperatures below, no growth could be observed or was negligible (Vital *et al.* 2008). These data are promising. The common characteristics of oligotrophic and 'cold' groundwater represent hostile conditions for *E. coli*. The fact that up to date there is no strong evidence for growth of *E. coli* in groundwater or drinking water systems favours its application as common indicator organism of faecal groundwater contamination (Leclerc *et al.* 2001). However, does the absence of *E. coli* also guarantee the absence of other pathogenic bacteria?

The use of faecal coliforms and E.coli as universal indicators of groundwater contamination needs to be considered carefully. There are many enteric pathogens that behave differently to *E. coli*, particularly with respect to transport behaviour, survival, and disinfection resistance (Stevens *et al.* 2003). Several studies on *E. coli* and other enteric pathogens showed that the different cell properties of the individual strains tested significantly changed their transport behaviour (Bolster *et al.* 2006; Bolster *et al.* 2009). Even within *E. coli* isolated from different host species (Dombek *et al.* 2000; Carson *et al.* 2001) or even from the same host species (Kudva *et al.* 1997; Galland *et al.* 2001; Vali *et al.* 2004) a high genetic variability was observed. These genetic differences went along with differences in cell surface characteristics that again affected transport and/or cell motility in the environment (Yang *et al.* 2004; Morrow *et al.* 2005).

A critical point in safeguarding drinking water quality is that common tests for faecal contamination are generally done with freshly produced drinking water and not with source water prior to its treatment. As some pathogenic bacteria show a higher resistance to chlorination and UV-radiation than *E. coli* or total coliforms, the absence of *E. coli* does not exclude the presence of others. An example is the Salmonellosis outbreak due to *Salmonella typhimurim* in Riverside, California in 1965. Routine bacteriological test revealed no significant contamination (Report 1971). Also pathogenic viruses and protozoa have been shown to be much more resistant against common chlorination (Tab. 7; Engelbrecht *et al.* 1980; Korich *et al.* 1990; Li *et al.* 2002) and have been detected in water free of *E. coli* (< 1 colony in 100 mL) and other indicator bacteria (Payment *et al.* 1994; Lees 2000; Szewzyk *et al.* 2006).

The situation of using bacterial indicators as surrogates for faecal contamination potentially including pathogenic viruses and protozoa, besides pathogenic bacteria, is unsatisfactory. As already mentioned, in Germany drinking water quality is typically diagnosed for the absence of *E. coli* and faecal enterococci in 100 mL after treatment (Szewzyk *et al.* 2006). Because of their long-term persistence in the environment and their much higher resistance against some of the common water treatment procedures, the absence of *E. coli* does clearly not prove the absence of enteric viruses. Contrariwise, the presence of E.coli makes it very likely that enteric viruses are also present. And indeed, studies on drinking water wells demonstrated the inadequacy of bacterial indicators for the assessment of virus contamination. Although most of the wells considered (> 80%) were tested negative for coliforms almost 90% were tested positive for enteric viruses (Wellings *et al.* 1975).

Currently, intensive research is directed to find adequate indicators that are able to reliably indicate viral contamination in water samples (Ashbolt 2004; current research project – see discussion below). Studies concentrate on the main subgroups of bacteriophages, the F-RNA and the somatic bacteriophages (Bitton *et al.* 1983; Snowdon *et al.* 1989; Palmateer *et al.* 1991; Ijzerman *et al.* 1994; Woody and Cliver 1994; Leclerc *et al.* 2000; Grabow 2001; Espinosa *et al.* 2009). To date, a number of frequently used model bacteriophages, *i.e.* MS2, PRD1 and ΦX174, provide first estimations on removal rates of pathogenic viruses during sediment passage in column studies and during artificial groundwater recharge (Schijven and Hassanizadeh 2000; Schijven *et al.* 2003; Harvey and Ryan 2004). A comparable removal was observed for the model virus MS2 and the enteric virus *coxsackievirus* B4, but not with *poliovirus* 1 (Schijven *et al.* 2003). MS2 is very common in surface waters and/or treated wastewater that is used for groundwater recharge. Moreover, MS2 is very stable in the environment poorly adsorbing to surfaces (Schijven and Hassanizadeh 2000). Therefore, these authors suggested that the F-specific RNA bacteriophage MS2 may well fulfill the function of a worst-case viral indicator. It needs to be considered, however, that bacteriophages may replicate in nature and the concentration of autochthonous coliphages in unpolluted aquatic environments is high (Moriñigo *et al.* 1992; Gleeson 1997; Leclerc *et al.* 2000; Tallon *et al.* 2005).

But also model viruses of human and non-human origin within the enteric viruses itself, e.g. the very environmentally resistant adenoviruses, are currently tested for their applicability as universal viral faecal indicators (Ley *et al.* 2002; Choi and Jiang 2005; Griffin *et al.* 2008; Ahmed *et al.* 2010).

Besides bacteriophages several microorganisms were intensively tested for their adequacy as surrogates in the indication of pathogens where *E. coli* might fail (Tallon *et al.* 2005). The list includes *Cl. perfringens* and *Clostridium* spores as surrogates for contamination with protozoan oocysts (Schijven *et al.* 2003; Tyagi *et al.* 2006). However, limitations are given to the fact that *Clostridium* is an anaerobic organism and present in faeces in relatively low numbers.

7.2 METHODS USED IN PATHOGENS DETECTION

The sensitive and specific detection of pathogens in groundwater is one of the biggest challenges as microbial and viral agents are generally present in very low numbers (Girones *et al.* 2010). In case of faecal pollution, fast and reliable detection methods are required to ensure the rapid identification of pathogen type and its origin, which constitute the most important initial steps to prevent epidemic waterborne disease outbreaks.

To date, detection of pathogens in drinking water and groundwater depend mainly on cultivation techniques and increasingly on steadily improving molecular methods. The most traditional approaches which have been developed for the detection of faecal indicator organisms (total coliforms and subgroups) are the multiple-tube fermentation (MTF) technique, the aerobic plate count and the membrane filter (MF) technique using different specific media and incubation conditions (Tortorello 2003). Although more rapid enzymatic and molecular based methods (e.g. PCR) are available today, these assays are not yet fully developed and have serious limitations in specificity and resolution

(high detection limit). For these reasons, the relatively simple to perform and inexpensive MF technique is still the approach most commonly used for routine enumeration of coliforms in drinking water (Rompré *et al.* 2002). Unfortunately, for many well known and emerging pathogens no appropriate standardized cell culture system exists (Dong *et al.* 2008). Also biofilm associated bacteria or bacterial pathogens that have entered a viable but not culturable (VBNC) state cannot be detected by cell culture assays (Cenciarini-Borde *et al.* 2009). Consequently, molecular methods such as the real-time or quantitative PCR (qPCR) technique are used with an increasing frequency for qualitative and quantitative assessment. Despite the many advantages of qPCR including speed, high sensitivity and specificity, detection limit is often reached due to very low pathogen concentration in environmental samples. Thus, initial enrichment steps (see below) are needed (Noble and Weisberg 2005).

Approaches for the detection of viable microorganisms in aquatic environments include fluorescent microscopy or the highly specific fluorescent *in situ* hybridization (FISH) technique (Bottari *et al.* 2006). FISH has been successfully applied in studying bacterial pathogens in water, sewage and sludge, and biofilms (Gilbride *et al.* 2006). In contrast to FISH which is mainly used for community analyses, flow cytometry (FCM) can be used for microbial analysis at both the community and single-cell levels. FCM combined with immunological staining (immunofluorescent assays) have been successfully used for the detection of aquatic pathogenic protozoa. A recently developed FCM protocol for the detection of *C. parvum* using a specific monoclonal antibody-conjugate revealed a detection limit of 2 x 10^3 oocysts mL-1 (Barbosa *et al.* 2008). Another FCM-based protocol was used for the fast detection of *L. pneumophila*e in water with a detection limit of 500 cells L-1. Füchslin *et al.* (2010) described a 'speed' protocol based on immunomagnetic separation and FCM, which allows sample analysis within 3 h. Using specific antibodies, this approach could be applied also for a great variety of other pathogenic microorganisms (Wang *et al.* 2010). The application of FCM could also be an additional or alternative method to the molecular PCR-based detection of pathogens. Although PCR-based techniques are highly sensitive in the nucleic acid detection of potential pathogens, it is not possible to distinguish between dead, inactivated or still infectious cells or particles. Microfluidics-FCM is proposed to be a new rapid and inexpensive approach for the detection of pathogenic bacteria (Sakamoto *et al.* 2007).

As faecal groundwater pollution can be of both human and animal origin, microbial source tracking methods (MST) emerged in the recent past (Meays *et al.* 2004; Cimenti *et al.* 2007; Field and Samadpour 2007). These methods include several approaches such as culturing, phenotypic and genetic analyses, and chemical analyses. The main focus within MST methods today lies on genetic fingerprinting of faecal microorganisms.

Keeping in mind that only one single viral particle might be sufficient for human infection a low detection limit is of great significance regarding to human health risks. To date more than 100 types of enteric viruses of faecal origin are known but only a few can be detected by established cell culture systems. PCR-based methods are, in this respect, the most promising tool for pathogenic virus detection in the future (Rodriguez *et al.* 2009). However, due to the high detection limit, analysis of pathogens (mainly viruses) in water requires a two-stage process, consisting of (1) pathogen enrichment either by ultracentrifugation or adsorption to charged microfiltration membranes, followed by (2) the application of infectivity tests or specific molecular analysis. Commonly used filtration techniques rely on combined adsorption and elution procedures, e.g. filtration of water through electropositive filters or glass wool columns or ultrafiltration (Donaldson *et al.* 2002; Haramoto *et al.* 2005; Rajal *et al.* 2007; Lambertini *et al.* 2008; Hill *et al.* 2010). However, for testing the putative presence of enteric viruses in drinking water, large sampling volumes (10-30 m^3) need to be screened. The problem of low numbers of target microorganisms and viruses is accelerated by difficulties in a quantitative extraction and amplification of nucleic acids from environmental samples. This is mainly due to co-extraction of inhibitory substances such as humic compounds (Lebuhn *et al.* 2003). Most virus detection assays are restricted to the amplification of viral nucleic acids by molecular techniques including several modified protocols of the PCR method such as reverse transcriptase (RT)-PCR, nested PCR, integrated cell culture PCR (ICC-PCR), or qPCR. Real-time qPCR allows the quantitative determination of nucleic acid copies and is currently the preferentially used molecular approach for the analysis of viral genomes in clinical and environmental samples (Espy *et al.* 2006).

8. RÉSUMÉ - KNOWLEDGE GAPS AND RECOMMENDATIONS

8.1 STATUS QUO

The use of naturally, well protected groundwater is generally the safest way of drinking water supply for human consumption. In Germany about 70% of all drinking water is produced from groundwater and spring water (Statistisches Bundesamt 2009). However, the continuous growth of the world´s population with all its consequences compromises our natural groundwater resources in many ways and not in all areas groundwater quantity and quality is sufficient. Alternatively, drinking water is produced from surface water via bank filtration and artificial groundwater recharge. On average drinking water produced by bank filtration or infiltration (artificial groundwater recharge) in Germany is about 8% (Statistisches Bundesamt 2009). In Berlin, as much as 75% of the drinking water originates from river bank filtration (Schmidt *et al.* 2003). In consequence, such areas have a partly closed water cycle. Treated wastewater which leaves the sewage treatment plants into rivers is to some extent 'reused' for drinking water production. Water recycling and reuse increases the risk of contamination by persistent pathogens, such as viruses.

8.2 CHALLENGES

Groundwater in Germany is a well protected resource. In contrast to most other countries of the world a comprehensive area-wide groundwater protection is legally defined (SRU 1998). Based on the epidemiological data available, the risk of waterborne outbreaks from drinking water which was produced from groundwater seems negligible (Botzenhart and Fleischer 2009; Preuß *et al.* 2011). However, there are still a number of risks which need to be considered and even today a waterborne disease outbreak caused by contaminated groundwater and drinking water is possible. The risks are mainly associated with (1) a malfunction of wastewater storage (leaks in septic tanks), treatment (flooding of sewage treatment plants and/or collapse of microbial communities in there) and transport (leakages in sewers and pipes), (2) insufficient attenuation of pathogens in river bed sediments and soils (along and after heavy rain falls and floods), (3) excessive application of manure, (4) contaminated surface water, and (5) deficient protective layers (thin soil zones on top of karst systems). In such cases, a severe contamination and risk to human health is given. Finally, there is some vital discussion on a possible regular distribution of pathogenic viruses during the cold season with drinking water produced from surface water (Soddemann 2005, 2006). These speculations await urgent evaluation.

In this final section of the paper it was tried to identify and highlight the lack of knowledge with respect to the distribution, survival, ecology, and detection of pathogenic microorganisms and viruses in groundwater and drinking water in general. Based on the information condensed in this review and the identified gaps of knowledge, recommendations for future scientific research and water management actions are expressed. Especially the recommendations for an improved safeguarding of water quality are emphasized with a focus on drinking water independent of its source. Some of the topics listed have already been discussed before in the framework of an expert forum organized by the German Federal Environment Agency (UBA) in 2005 (Szewzyk *et al.* 2006). Our résumé is primarily from the point of view of microbial ecologists and unlikely complete.

8.3 RECOMMENDATIONS

8.3.1 Next generation enrichment techniques

While there are strict thresholds for the microbial contamination of drinking water, there are so far only recommendations for pathogenic viruses (Botzenhart and Fleischer 2009). With regard to the USEPA recommendations for drinking water quality, the probability of an infection by pathogens via consumption of drinking water should not exceed one infection per 10,000 persons per year ('tolerable infection risk'; Rose and Gerba 1991). The WHO developed the concept of 'Disability Affected Life Years' (DALY), which considers the concentration of viral particles, their infection potential, and the outcome of an illness (WHO 2004). The concept allows calculating the maximum acceptable virus concentration in drinking water. Since for pathogenic viruses – and the same is true for protozoa (e.g. *Cryptosporidium*) - already one particle is an infective unit, this concept runs into a severe problem of detection limits. For rotavirus, as an example, a target value of < 1 virus particle in 32 m^3 of drinking water is recommended, which equals less than 1 DALY per 100,000 consumers (WHO 2006). To take these recommendations serious, large sample volumes need to be screened in the future. To date there is no routinely applicable technique, which allows the quantitative enrichment and recovery of viral particles from large water volumes (> 10 m^3) in a reasonable time (< 1 day).

Recommendation → Development of new enrichment techniques.

Directly connected to the problem of enrichment is the problem of sensitivity of our cultivation-dependent and cultivation-independent (molecular) detection methods. While plate assays (CFU and PFU) are able to detect 1 single cell or virus particle per subsample (generally 1 ml), the same copy number is needed in 50 µl (= 20 cells/particles ml-1) for PCR, or even more if some inefficiency during nucleic acid extraction is assumed. The difference between the USEPA/WHO recommendations and the current detection limits is in the range of 7-8 orders of magnitude.

Recommendation → Sensitivity improvement of molecular assays.

8.3.2 Methodological developments and challenges

> 8.3.2.1 Reliable indicators of viral and protozoan contamination

To date the global water monitoring concepts and surveillance regulations regarding hygienic (pathogenic) contamination of water are based on the coliform indicator principle, *i.e.* on bacterial indicators exclusively. The WHO (2006) states that the absence of *E. coli* is not an appropriate indicator which guarantees the absence of pathogenic viruses. However, to date the surveillance for pathogenic enteric viruses is not mandatorily defined in any regulations with respect to groundwater and drinking water protection. Without doubt due to their high infectious potential, their small size (regularly pass standard filter systems) and their robustness (withstand some of the common water treatment procedures) separate viral indicators are urgently needed. Within the enteric viruses, coliphages and adenovirus have been considered useful indicator viruses (Pina *et al.* 1998; Jiang 2006; Szewzyk *et al.* 2006). The same story is valid for protozoa. To date, the assessment of parasitic pathogens is not mandatory. A modern integrative water quality concept should consider all groups of pathogens, *i.e.* bacteria, viruses and protozoa.

Recommendation → Development of an integrative indicator concept.

> 8.3.2.2 Improvement and development of molecular tools

Pathogen-specific detection using molecular methods require the quantitative extraction and amplification of nucleic acids from environmental samples. To date, extraction often is inefficient and amplification is inhibited by the presence of natural constituents in water and sediments, such as humic substances and iron species. These inhibitory compounds are enriched together with the organisms of interest (*i.e.* pathogens). Consequently, inefficient extraction adds on top to the already 'high' detection limit.

Recommendation → Development and testing of appropriate sample extraction and clean-up protocols.

> 8.3.2.3 Infectivity tests for all prominent pathogens

The moment, the quantification of all pathogens of interest is possible, the question of their infectivity in a given water sample remains. Thus, we need to have in hands tests for infectivity for all frequently occurring pathogenic microorganisms and viruses. To give one example, although today norovirus is the most prominent causative reason for gastroenteritis epidemics, detection of infectious norovirus particles is still not possible due to the lack of an appropriate in vitro cell culture system.

Recommendation → Development of cell culture assays for relevant pathogens.

> 8.3.2.4 Consideration of genotypes/serotypes in case of contaminations and outbreaks

In case of contaminations and along with epidemiological studies, the different genotypes (e.g. in case of norovirus) and/or serotypes (e.g. in case of adenovirus) shall be considered. This is suggested to speed up the identification of the contamination source and therefore might help to prevent more widespread epidemic waterborne outbreaks through improved surveillance of water sources (Nygard *et al.* 2003; Maunula and Von Bonsdorff 2005; Koh *et al.* 2008). Moreover, it has been shown that virus serotypes exhibit a significantly different behaviour in the environment (Fong *et al.* 2010; H.C. Selinka, pers. comm. 2010).

Recommendation → Consideration of genotypes and serotypes in forensic research.

> 8.3.2.5 A simple modular set for the estimation of pathogen reduction

There is a typical reduction in concentration of pathogens associated with different environmental compartments. The load of pathogenic viruses in wastewater is generally reduced by 1-3 orders of magnitude (1-3 log levels) during treatment in a conventional sewage plant. A comparable reduction of pathogens is achieved in a vital top soil zone. This leads to the idea of a

simple modular set for the estimation of pathogen reduction useful in an initial risk assessment. First, the system of interest is distinguished into its main environmental compartments which themselves are characterized by typical reduction potentials. The individual reduction potentials (including attenuation and elimination) are summed up for the compartments from the source of the water (e.g. wastewater) to the raw water (e.g. groundwater) in case of drinking water production via bank filtration.

8.3.3 Improved monitoring of drinking water

> 8.3.3.1 Drinking water produced from surface water

Surface waters, especially close to effluents of sewage treatment plants, carry a higher load of pathogens compared to the naturally well protected groundwater. In consequence, wherever surface water is used for drinking water production (e.g. via bank filtration or artificial groundwater recharge) a frequent end monitoring of the raw water is proposed including irregular events of heavy rainfall and snow melt.

Recommendation → Systematic evaluation of possible viral contamination of drinking water from bank filtration during times of increased viral infections.

> 8.3.3.2 Retain samples

Maunula *et al.* (2005) suggested the implementation of an easy to handle monitoring strategy for water works. The regular (daily or weekly) storage of a representative subsample of the freshly produced drinking water allows the back tracking of the contaminant source in case of waterborne disease outbreaks. Retain samples are stored for 50 days. This is suggested a cost-saving improvement of risk management. We further propose also to store in parallel representative volumes of raw water (1-5 L), where the number of pathogens in case of contamination is likely much higher and thus easier to detect.

Recommendation → Retain samples from raw water and drinking water.

> 8.3.3.3 Epidemiological monitoring

In Germany, single and multiple noro- and rotavirus infections seem to occur throughout the whole year, but with increasing numbers of infected persons during winter time (RKI 2011). For some bacterial pathogens (e.g. *Salmonella*) the peak of documented infections is in summer. The path of transmission is not always clear. To date individual infections are epidemiologically not documented, which in many cases prevents the correlation between disease and source.

Recommendation → Further developed epidemiological documentation of waterborne disease outbreaks.

8.3.4 Improved water management

To better assess the risk of viral infection through drinking water the WHO proposed a 'water safety plan (WSP)'. This concept suggests the combined assessment of raw water quality together with the efficiency of the applied water treatment methods. If the virus concentration in raw water and the efficiency of the respective treatment are known it is possible to estimate the risk of virus contamination of drinking water and therefore the risk to human health (WHO 2004). The 'multi barrier system' applied in Germany is comparable to the WSP of the WHO and is composed of a systematic resource protection as the first step followed by adequate treatment techniques. Finally, the drinking water is tested for the absence of faecal indicators. Not in all cases, the resource protection and the treatment techniques are sufficient (Szewzyk *et al.* 2006). It is thus recommended that viral risk calculations, as recommended by the WHO, are applied additionally to improve the safeguarding of drinking water. This includes, as already mentioned before, a regular control of the raw water taking into consideration also extreme climatic and hydraulic events such as stormwater run-off, flooding or snowmelt (Szewzyk *et al.* 2006).

Recommendation → Improved water quality management strategies. Concepts of groundwater and drinking water protection should be expanded by taking into account the concept of 'aquifer vulnerability' (Harter and Walker 2001; Chilton 2006). In areas with a high aquifer vulnerability protection zones need to be delineated more carefully.

8.3.5 Legal framework - groundwater protection zones

The data summarized in section 5 impressively show, that pathogens may survive or persist at low temperatures in the subsurface for months to several years. Moreover, some pathogens may even reproduce in the environment. This is not in accordance with the 50 days dwelling distance of groundwater protection zone II as applied in Germany and other countries (Tab. 6). Indeed, the transport distance of pathogens in aquifers (and river banks) is much less than just the product of survival time and

flow velocity (Althaus 1983). Physical and chemical processes as well as biological activities contribute to a generally efficient attenuation of pathogens. This was also the conclusion of a large multidisciplinary project funded by the German Federal Environment Agency (UBA) 25 years ago (Filip *et al.* 1986). However, contamination with faecal indicators is regularly detected in karst systems and fissured aquifers. We also see a potential risk for contamination of groundwater in highly heterogeneous porous aquifers.

Recommendation → We thus recommend, from a microbiological point of view, to delineate protection zones based on extensive tracer experiments with non-pathogenic representatives of prominent pathogens or appropriate surrogates taking into account also extreme climatic and hydraulic situations.

8.3.6 Basic research

> 8.3.6.1 Viral surrogates

Several model viruses, e.g. the F-specific bacteriophage MS2, somatic phages (PRD-1, ΦX174) or bacteriophages infecting *Bacteroides fragilis* have been proposed surrogates of pathogenic viruses, which show behaviour of transport and attenuation in the environment similar to some pathogens (Tartera and Jofre 1987; Leclerc *et al.* 2000; Grabow 2001; Van der Wielen *et al.* 2008). Model viruses are needed for many purposes, for example tracer experiments in the field. During the last years the murine norovirus, which has been successfully propagated in cell culture and can reproducibly be detected by RT-PCR, emerged to be a promising surrogate for the human-pathogenic counterpart (Bae and Schwab 2008).

Recommendation → Identification and testing of appropriate viral surrogates.

> 8.3.6.2 Attenuation and survival of pathogens in *situ* – The unseen fraction

First of all, most information available with respect to the transport and attenuation of pathogens originate from lab studies and/or the use of surrogate pathogens. To derive a more reliable picture for the situation *in situ* more field investigations are needed. Second, most studies concentrated exclusively on the recovery of pathogens from water passing through soil and sediments. Rarely, the fraction of strained and adsorbed or actively attached pathogens have been tackled in more detail. There is evidence that this fraction may stay alive and infectious for long periods of time, thus forming a reservoir. This aspect is, to our opinion, of relevance especially in situations where environmental compartments (soil and sediments) are continuously infiltrated with water carrying pathogens which then leads to an accumulation of pathogens over time, *i.e.* where bank filtration is used for drinking water production. At a certain time point sorption places at the sediment particle surfaces may be occupied and the natural attenuation capacity decreases. In case of changing hydrochemical (e.g. ionic strength) or hydraulic conditions (e.g. flow velocity) initially adsorbed pathogens may be released and transported further downgradient.

Recommendation → Studies on pathogen transport and survival in sediments (soils, hyporheic zone of streams, river bank sediments and aquifers) are needed considering the temporally immobilized sediment-bound fraction of pathogens.

> 8.3.6.3 Elimination processes and microbial antagonism

Human pathogens when released into the environment are usually affected by many abiotic and biotic processes which, in concert, determine their stability and survival. It has been repeatedly shown that disappearance (retardation and/or elimination) of pathogens is faster in biologically active systems (Hurst *et al.* 1980; Hurst 1988; Nasser *et al.* 2002). Moreover, direct antagonistic effects onto *E. coli* have been shown for autochthonous groundwater bacterial isolates (Hirsch and Rades-Rohkohl 1983). However, so far there is only sparse information on antagonistic activities of microorganisms causing pathogens elimination. A better understanding of natural elimination processes (natural barrier functions) will contribute to improve water protection and management and might safe costs of common treatment procedures.

Recommendation → Elucidation of biotic antagonistic processes and their significance in the elimination of pathogens.

> 8.3.6.4 Ecology of pathogens – Strategies for long-term persistence

Microorganisms (and viruses) developed a multitude of strategies to survive harsh, hostile conditions. To be released from human or animal intestine into the environment are without doubt harsh conditions for pathogens. It has been shown that pathogenic bacteria and protozoa partly cope with this situation shifting into a viable but not culturable (VBNC) state or forming spores and cysts (Roszak and Colwell 1987; Oliver 2005; Karanis *et al.* 2007). This inconsequence potentially leads to the

situation that pathogens are present in low-activity (potentially still infectious) or dormant state, but they are no longer detectable with traditional cultivation-based approaches (Oliver 2005).

Recommendation → A better understanding of pathogens ecology and improved cultivation independent detection methods are needed.

> 8.3.6.5 Pathogens with antibiotic resistance

The increasing numbers of drug-resistant bacterial strains in the environment and the possibility of horizontal gene transfer between autochthonous and allochthonous species and specimen are of great scientific interest as well as socioeconomic concern. Along with the applications of various antibiotics in modern animal livestock production, an increasing antibiotic resistance among gastrointestinal bacteria is observed (Sapkota *et al.* 2007). Moreover, the potential risk of environmental contamination by antibiotic-resistant bacteria derived from hospital sewage was demonstrated (Reinthaler *et al.* 2003). The fate of these genetically modified organisms in the environment and the probability of horizontal gene transfer in soil and aquatic environments await detailed investigation.

Recommendation → Scientific research on the fate of drug-resistant microorganisms in the environment.

> 8.3.6.6 General framework – standards for lab tests

To our opinion, it would be helpful to establish standards for performing bench-scale studies on attenuation and survival or persistence of pathogens as there is still a tremendous variability within experimental findings observed. It is suggested to set up routine protocols for the propagation and preparation of seeded test organisms. Moreover, the inclusion of standardized internal controls, e.g. the bacteriophage MS2 or *E. coli*, will contribute to minimize the variability of survival data that are reported for pathogenic microorganisms and viruses in groundwater (John and Rose 2005).

Recommendation → Agreement on standard protocols and experimental design.

> 8.3.6.7 Current research - joint project on detection, transport and elimination of pathogenic viruses in water

Currently, a national multidisciplinary research project funded by the German Research Foundation (DFG) tackles several of the 'open' topics mentioned above. Two working groups (M. Seidel & R. Niessner, Institute of Hydrochemistry, Technical University Munich (TUM); M. Exner & C. Koch, Institute for Hygiene and Public Health, University of Bonn), focus on the development of high-throughput filtration techniques (ultra- and nanofiltration). The colleagues from the TUM furthermore test selective methods for subsequent enrichment based on immunoseparation and automated analytical microarrays. The working group from the German Federal Environment Agency (H. C. Selinka & I. Chorus, UBA, Berlin) investigates the fate of pathogenic viruses (noroviruses and adenoviruses) in surface water and try to optimize protocols for nucleic acid extraction and qPCR assays; the later topic in collaboration with colleagues from the University in Bonn (Ch. Drosten, Institute of Virology, University of Bonn Medical Centre). Identification and testing of promising indicator viruses is an additional topic of these two working groups. Factors determining the efficiency of pathogenic virus reduction during wastewater treatment and the improvement of mathematical models with predictive power on virus elimination are tackled by colleagues from Hannover (K.-H. Rosenwinkel & S. Wolter, Institute for Sanitary Environmental Engineering and Waste Engineering, Leibniz University of Hannover). Last but not least, the authors of this review currently conduct lab and field experiments to evaluate the contribution of microbial processes (grazing and bacterial lyses) to the elimination of pathogenic viruses in aquatic systems. In summary, the scientific program of this joint research project on pathogenic viruses in water addresses major aspects in relation to an improved and sustainable drinking water quality management.

9. EMPFEHLUNGEN

(deutsche Version des Originaltextes unter 8.3)

9.1 TECHNISCH-METHODISCHE WEITERENTWICKLUNG MODERNER FILTERSYSTEME ZUR ANREICHERUNG PATHOGENER VIREN

Obwohl aktuell strenge Richtlinien in Bezug auf mikrobielle Kontaminationen von Trinkwasser gelten, gibt es bezüglich pathogener Viren derzeit nur Empfehlungen (Botzenhart und Fleischer 2009). Nach Vorgabe der USEPA sollte die Wahrscheinlichkeit einer Infektion je 10.000 Personen und Jahr durch Pathogene im Trinkwasser nicht übersteigen („tolerable infection risk"; Rose und Gerba 1991). Auch die WHO hat ein Konzept entwickelt („Disability Affected Life Years", DALY), welches die Konzentration von Viruspartikeln, deren Infektionspotential und das Ausmaß der jeweiligen Erkrankung berücksichtigt (WHO 2004). Dieses Konzept erlaubt es, die maximale tolerierbare Viruskonzentration im Trinkwasser, zumindest theoretisch, zu ermitteln. Wenn man berücksichtigt, dass bei pathogenen Viren (und teilweise auch bei pathogenen Protozoen, wie z. B. *Cryptosporidium*) bereits ein Partikel als infektiöse Einheit gilt, stößt man bei Viren schnell an methodische Grenzen. Für Rotaviren wird beispielsweise ein Richtwert von < 1 Viruspartikel in 32 m^3 Trinkwasser empfohlen, der weniger als 1 DALY pro 100.000 Verbrauchern entspricht (WHO 2006). Reicht es für *E. coli* 100 ml Wasser zu filtrieren, müssen in Anbetracht dieser Richtwerte und Empfehlungen für Viren künftig enorme Probenvolumen analysiert werden. Derzeit gibt es jedoch noch keine standardisierten Anreicherungsmethoden, die es ermöglichen, infektiöse Viruspartikel aus solch großen Wasservolumina (> 10 m^3) in angemessener Zeit (< 1 Tag) aufzukonzentrieren. Die Entwicklung von Filtrationssystemen zur Anreicherung von pathogenen Viren ist daher dringend notwendig, um zukünftig eine sichere Trinkwasserüberwachung zu gewährleisten.

Ein weiteres Problem stellt die Sensitivität bestehender kultivierungs-abhängiger und kultivierungs-unabhängiger (molekularer) Nachweismethoden dar. Ein Plattennachweis (CFU bzw. PFU) erlaubt theoretisch die Detektierung einer einzelnen Zelle bzw. eines infektiösen Partikels in einem Milliliter Flüssigkeit. Aus statistischen Gründen sind aber mehr als 10 Kolonien bzw. Plaques notwendig für eine reproduzierbare Auswertung. Für einen PCR-Ansatz benötigt es bereits mehrere Partikel in nur 10-50 µl Probe, was einer Anzahl von mehr als 20 Zellen bzw. Partikeln pro ml entspricht. Bei Umweltproben treten zusätzlich Verluste bei der Extraktion und Aufreinigung von Nukleinsäuren auf, die den sensitiven Nachweis erschweren. Vergleicht man die Empfehlungen von WHO und USEPA mit den heutigen technischen Möglichkeiten, so liegt die Herausforderung in der Anreicherung von Virenpartikeln um 7 bis 8 Größenordnungen.

9.2 INTEGRATIVES INDIKATORKONZEPT

Die Sicherstellung von hygienisch unbedenklichem Trinkwasser basiert heutzutage international auf einem bakterien-spezifischem Überwachungsprinzip. Trinkwasser wird routinemäßig auf bakterielle Indikatoren (zwingend *E. coli*, nicht zwingend Coliforme) getestet. Weitere Pathogene (Viren und Protozoen), die unter Umständen weitaus schwerwiegendere Erkrankungen verursachen können, werden dabei nicht erfasst. So weist die WHO (2006) ausdrücklich darauf hin, dass trotz Abwesenheit von *E. coli* die potentielle Gefahr einer Trinkwasserkontamination mit pathogenen Viren besteht. Dennoch gibt es bisher keine verpflichtenden Regelungen zur routinemäßigen Überwachung von Grundwasser bzw. Trinkwasser auf pathogene enterische Viren. Das hohe virale Infektionspotential, ihre geringe Größe (Viren passieren häufig Standard-Filtersysteme) und ihre hohe Widerstandsfähigkeit (besonders auch gegen die physikalische und chemische Wasseraufbereitung) unterstreichen die Notwendigkeit eines erweiterten Indikatorkonzepts. Aktuell werden Coliphagen und Adenoviren als virale Indikatoren diskutiert (Pina *et al.* 1998; Jiang 2006; Szewzyk *et al.*, 2006). Auch der Nachweis auf parasitäre Protozoen, die ebenfall regelmäßig in noch infektiösem Zustand die Trinkwasseraufbereitung überwinden, ist bei der Trinkwasseranalyse bis heute noch nicht gesetzlich vorgeschrieben. Aufgrund der zunehmenden Kontaminationsquellen, dem steigenden Grund- und Trinkwasserbedarf und der daraus resultierenden Zunahme der Trinkwasseraufbereitung empfehlen wir ein integratives Indikatorkonzept, welches alle relevanten Pathogenen mit einbezieht.

9.3 WEITERENTWICKLUNG VON DNA/RNA-EXTRAKTIONSMETHODEN

Wie bereits zuvor erwähnt, setzt der erregerspezifische molekulare Nachweis von Pathogenen aus Umweltproben eine quantitative Extraktion der Nukleinsäuren sowie deren effiziente Amplifikation voraus. Durch natürlich im Wasser und Sediment vorkommende hemmende Substanzen, wir z.B. Huminstoffe und Eisenverbindungen, ist die Extraktion bei aktuell verwendeten Methoden selten vollständig und der qualitative bzw. quantitative Nachweis erschwert. In der Regel kommt es bei einer Anreicherung von Pathogenen auch zu einer parallelen Anreicherung der inhibitorischen Stoffe. Die Weiterentwicklung und Erprobung verbesserter Extraktions- und Aufreinigungsprotokolle muss vorangetrieben werden.

9.4 BIOLOGISCHE TESTVERFAHREN/INFEKTIONSTESTS FÜR ALLE RELEVANTEN KRANKHEITSERREGER

Da der alleinige (molekularbiologische) Nachweis von Krankheitserregern in Wasserproben noch keinerlei Rückschlüsse auf deren Infektiosität zulässt sind dringend verlässliche Infektiositätstests für alle relevanten pathogenen Mikroorganismen und Viren erforderlich. Dies wird besonders am Beispiel der Noroviren deutlich. Obwohl Noroviren heutzutage nachweislich die häufigste Ursache für den Ausbruch viraler Gastroenteritis-Epidemien sind, konnte bisher kein geeignetes in vitro Zellkultursystem für den Nachweis von infektiösen Noroviren entwickelt werden.

9.5 BERÜCKSICHTIGUNG VON GENO- UND SEROTYPEN IN DER URSACHENFORSCHUNG

Im Falle einer Trinkwasserkontamination und im Hinblick auf epidemiologische Studien könnte die Bestimmung der jeweiligen Genotypen (z.B. im Falle der Noroviren) oder der Serotypen (z. B. im Falle der Adenoviren) entscheidend zu einer verbesserten Trinkwasserüberwachung beitragen. Die exakte Identifizierung des jeweiligen Krankheitserregers erlaubt die Suche nach möglichen Kontaminationsquellen und hilft somit entscheidend bei der Eindämmung von wasserbürtigen Ausbrüchen (Nygard *et al.* 2003; Maunula und Von Bonsdorff 2005; Koh *et al.* 2008). Da mittlerweile bekannt ist, dass verschiedene Virus-Serotypen auch ein unterschiedliches Verhalten in der Umwelt zeigen können, sollte die Typisierung zukünftig für eine verbesserte Ursachenforschung in der Epidemiologie herangezogen werden (Fong *et al.* 2010; H.C. Selinka, pers. Mitt. 2010).

9.6 ENTWICKLUNG EINES EINFACHEN MODULAREN SETS VON REDUKTIONSPOTENTIALEN ZUR RISIKOBEWERTUNG

In Abhängigkeit von den Umweltbedingungen und Wegstrecken, kommt es in verschiedenen Umweltkompartimenten (Luft, Boden, Fluss, Aquifer) zu einer unterschiedlich starken Abreicherung von Pathogenen. Die Abwasseraufbereitung in einer konventionellen Kläranlage, beispielsweise, gewährleistet eine Veringerung der Anzahl an pathogenen Viren um etwa 2 log-Stufen. Dies entspricht dem Reduktionspotential einer biologisch aktiven Bodenschicht. Reduktionspotentiale typisch für verschiedene Umweltkompartimente können in ein einfaches modulares Set zur theoretischen Abschätzung der Konzentrationsabnahme von Pathogenen entlang eines Eintragspfades einfließen und erlauben eine erste Risikoabschätzung. Im Falle der Trinkwassergewinnung durch Uferfiltration könnten so z.B. die einzelnen Reduktionspotentiale vom Ausgangsprodukt (z. B. Abwasser) bis hin zum Rohwasser (z. B. Grundwasser) aufsummiert werden und somit bereits Rückschlüsse auf das Risiko einer Verunreinigung des Trinkwassers gezogen werden.

9.7 MODERNE KONZEPTE ZUR ROHWASSERÜBERWACHUNG VOR ALLEM BEI DER PRODUKTION VON TRINKWASSER AUS OBERFLÄCHENWASSER

Im Gegensatz zum viel besser geschützten Grundwasser enthalten Oberflächenwässer, in die geklärtes Abwasser eingespeist wird eine erhöhte Anzahl an pathogenen Mikroorganismen und Viren. Daher wird speziell bei der Trinkwassergewinnung aus Oberflächenwasser, z. B. durch Uferfiltration oder künstliche Grundwasseranreicherung, empfohlen, eine regelmäßige Endproduktkontrolle am Rohwassers durchzuführen und hierbei besonders auch unregelmäßige klimatische bzw. hydrologische Ereignisse wie Starkregen oder Schneeschmelze zu berücksichtigen. Hierzu zählt auch die systematische Bewertung einer möglichen viralen Kontamination von Trinkwasser in Zeiten erhöhter Infektionsaufkommen.

9.8 RÜCKSTELLPROBEN VON ROH- UND TRINKWASSER ZUR VERBESSERTEN DOKUMENTATION VON WASSERBÜRTIGEN ERKRANKUNGEN

Erst kürzlich wurde für Wasserwerke die Einführung einer einfach zu praktizierenden Methode zur besseren Trinkwasserüberwachung empfohlen (Maunula *et al.* 2005). Nämlich, die regelmäßige (täglich oder wöchentlich) Lagerung einer repräsentativen Stichprobe des frisch produzierten Trinkwassers und des Rohwassers soll im Falle eines wasserbürtigen Krankheitsausbruches einen schnellstmöglichen Rückschluss auf die Kontaminationsquelle ermöglichen. Diese Rückstellproben können problemlos über einen Zeitraum von 50 Tagen gelagert werden und wären somit eine kostengünstige Ausweitung des Risikomanagements.

9.9 EPIDEMIOLOGISCHES DOKUMENTATIONSNETZ FÜR WASSERBÜRTIGE ERKRANKUNGEN

In Deutschland kann eine gewisse Saisonalität von Infektionskrankheiten beobachtet werden. Virale Infektionen, z. B. durch Noro- oder Rotaviren verursacht, treten gehäuft in den kalten Wintermonaten auf (RKI 2011). Erkrankungen mit bakteriellen Krankheitserregern wie z.B. Salmonellen überwiegen dagegen im Sommer. In beiden Fällen sind die Übertragungswege nicht immer eindeutig geklärt. Da einzelne Infektionen heutzutage epidemiologisch noch nicht dokumentiert werden, kann oftmals der wichtige Bezug zwischen Erkrankung und Ursache/ Kontaminationsquelle nicht hergestellt werden. Ein verbessertes epidemiologisches Dokumentationsnetz könnte bei der Suche nach möglichen Kontaminationsquellen helfen und somit dazu beitragen, die rasche Ausbreitung wasserbürtiger Ausbrüche zu verhindern und die Qualitätssicherung von Trinkwasser nachhaltig zu entwickeln.

9.10 WEITERENTWICKLUNG VON WASSERMANAGEMENTSTRATEGIEN (ÜBER MULTI-BARRIEREN-KONZEPT HINAUS, ANALOG ZUM WATER SAFETY PLAN)

Die WHO hat zur besseren Risikoabschätzung von viralen Infektionen durch kontaminiertes Trinkwasser einen so genannten „Water Safety Plan (WSP)" erstellt. Zur besseren Beurteilung der Trinkwasserqualität berücksichtigt dieses Konzept sowohl die Qualität des Rohwassers als auch die Effizienz der angewendeten Wasseraufbereitungsmethode. Bei bekannter Viruskonzentration im Rohwasser und der kalkulierbaren Effizienz der jeweiligen Wasseraufbereitung, ermöglicht dieses Konzept eine Risikoabschätzung (WHO 2004). In Deutschland kommt als vergleichbares Konzept ein so genanntes dreistufiges Multibarrierensystem zur Anwendung, welches primär den systematischen Ressourcenschutz, eine angemessene Aufbereitung und eine ordnungsgemäße Verteilung des Trinkwassers bis hin zur Hausinstallation beinhaltet. Da jedoch diese Schutzmaßnahmen nicht immer ausreichend sind und das Trinkwasser final nur auf die Abwesenheit bakterieller Fäkalindikatoren gestestet wird (Szewzyk *et al.*, 2006), wird nahe gelegt, das deutsche System um von der WHO empfohlene Schritte zu erweitern. Wie bereits zuvor erwähnt sollten für eine verlässliche regelmäßige Kontrolle des Rohwassers gerade auch extreme klimatische und hydraulische Bedingungen, wie z.B. Starkregenereignisse, Überschwemmungen oder auch Schneeschmelze, miteinbezogen werden (Szewzyk *et al.*, 2006). Moderne Wassermanagementkonzepte sollten zudem die Vulnerabilität von Einzugsgebieten und Grundwasserleitern berücksichtigen (Harter und Walker 2001; Chilton 2006). Hierdurch könnten gerade in Gebieten mit erhöhter Gefahr einer Kontamination des Grundwasserleiters die Schutzzonen besser ausgewiesen werden.

9.11 AUSWEISUNG VON GRUNDWASSERSCHUTZGEBIETEN UNTER BERÜCKSICHTIGUNG VON EXTREMEN KLIMATISCHEN UND HYDROLOGISCHEN BEDINGUNGEN

Wissenschaftliche Studien belegen, dass Pathogene im Untergrund bei niedrigen Temperaturen über Monate bis zu mehrere Jahre hin überdauern können. Des Weiteren gibt es Hinweise, dass sich einige pathogene Bakterien auch außerhalb ihres Wirtes vermehren können. Es stellt sich daher die Frage, ob die in Deutschland und vielen anderen Ländern gültige 50-Tage-Linie der Grundwasser-Schutzzone II ausreichend Schutz vor einer Kontamination mit pathogenen Mikroorganismen und Viren gewährleistet. Gerade in Karst und Kluftleitern werden pathogene Verunreinigungen regelmäßig detektiert. Ein besseres Verständnis der komplexen physikalischen und biologischen Prozesse die zu einem Rückhalt bzw. dauerhaft zu einer Elimination von Pathogenen beitragen ist notwendig. Wir empfehlen, in Risikogebieten Schutzzonen auf Basis von weitläufigen Tracerexperimenten unter Verwendung von nicht-pathogenen Vertretern bekannter Krankheitserreger zu überprüfen und dabei auch extreme klimatische und hydraulische Situationen zu berücksichtigen.

9.12 MODELL- UND REFERENZVIREN FÜR FORSCHUNGSZWECKE

In der Vergangenheit wurden zahlreiche Modellviren (z.B. der F-spezifische Bakteriophage MS2, die somatischen Phagen PRD-1 oder Φ174, oder auch Bakteriophagen die spezifisch *Bacteroides fragilis* infizieren) die sich bezüglich Transport und Rückhalt in der Natur ähnlich wie ihre pathogenen Verwandten verhalten als mögliche nicht-pathogene Vertreter (surrogates) getestet (Tartera und Jofre 1987; Leclerc *et al.* 2000; Grabow 2001; Van der Wielen *et al.* 2008). Gerade im Hinblick auf Tracerstudien im Gelände kommt diesen Modellviren eine große Bedeutung zu. Am Beispiel des nicht-kultivierbaren hochinfektiösen Norovirus wird die Notwendigkeit der Identifizierung und Testung geeigneter Modellviren deutlich. In den letzten Jahren ist es gelungen ein murines Norovirus erfolgreich in Zellkultur zu vermehren und

reproduzierbar durch RT-PCR nachzuweisen (Bae und Schwab 2008). Dieses, für den Menschen ungefährliche Virus, könnte in zukünftigen Studien als Ersatzvirus für das menschliche Norovirus fungieren und somit zu einer verlässlicheren Trinkwasserüberwachung beitragen.

9.13 FELDVERSUCHE ZU TRANSPORT UND ÜBERLEBEN VON PATHOGENEN IN SEDIMENT

Die Erkenntnisse, die bisher zu Transport und Rückhalt von Pathogenen in der Umwelt gesammelt wurden, stammen überwiegend aus Laborversuchen und Experimenten mit nicht-pathogenen Modellorganismen und -viren. Daher fordern wir für eine besseren Abschätzung der in *situ* Verhältnisse vermehrt Versuche im Feld. Bisher konzentrierten sich die meisten Studien zudem beinahe ausschließlich auf die Analyse und Wiedergewinnung von Pathogenen aus der wässrigen Phase (Sickerwasser, Porenwasser, Grundwasser). Viruspartikel haften, zum Beispiel, sehr rasch an Sedimentoberflächen an. Diese können über einen langen Zeitraum infektiös bleiben und somit als ein Reservoir an Krankheitserregern verstanden werden. Dieser Aspekt der möglichen Aufkonzentration von unerwünschten Keimen und Viren an der Festphase sollte besonders im Hinblick auf die stetige Zunahme von Wasserrecycling und Trinkwassergewinnung (z. B. Uferfiltration) berücksichtigt werden. Durch die zunehmende Belegung der Adsorptionsstellen kann sich die natürliche Rückhaltekapazität des Untergrunds über die Zeit erschöpfen. Starke Änderungen in der Wasserzusammensetzung, vor allem die Verringerung der Ionenstärke, kann zu einer erneuten Freisetzung ursprünglich adsorbierter pathogener Partikel führen. Es wird daher empfohlen besonders auch den Transport und die Persistenz von Pathogenen im Sediment (Böden, hyporheische Zone von Flüssen, Grundwasserleiter) im Hinblick auf die reversibel immobilisierte Fraktion an Pathogenen zu untersuchen.

9.14 BEITRAG BIOTISCHER ANTAGONISTISCHER PROZESSE ZUR ELIMINIERUNG VON PATHOGENEN

Es gilt mittlerweile als erwiesen, dass das Verschwinden von Pathogenen in Böden und Sedimenten (durch Rückhalt oder Elimination) mit der biologischen Aktivität korreliert (Hurst *et al.*, 1980; Hurst 1988; Nasser *et al.*, 2002). Gegenüber *E. coli* konnten sogar direkte antagonistische Effekte durch autochthone Grundwasserbakterien nachgewiesen werden (Hirsch und Rades-Rohkohl 1983). Insgesamt betrachtet ist bisher jedoch nur sehr wenig über antagonistische mikrobielle Effekte die aktiv zur Elimination von Pathogenen in der Umwelt beitragen und die dahinter stehenden Prozesse bekannt. Ein besseres Verständnis dieser natürlichen Eliminationsprozesse könnte entscheidend dazu beitragen den Trinkwasserschutz und das -management weiter zu verbessern und Kosten für die physikalisch-chemische Wasseraufbereitung einzusparen.

9.15 MODERNE METHODEN ZUM NACHWEIS VON INFEKTIÖSEN DAUERSTADIEN

Mikroorganismen (und Viren) haben zahlreiche Strategien entwickelt um ungünstige Lebensbedingungen zu überstehen. Von pathogenen Bakterien und Protozoen kennt man heute so genannte „Viable But Not Culturable (VBNC)" Stadien, sowie die Ausbildung von Sporen oder Zysten (Roszak und Colwell 1987; Oliver 2005; Karanis *et al.*, 2007). Diese morphologisch und physiologisch veränderten Zustände zeichnen sich durch eine niedrige zelluläre Aktivität aus und ermöglichen es diesen Organismen außerhalb ihres Wirtes lange Zeit zu überdauern. Pathogene mit einer niedrigen Zellaktivität oder in einem Überdauerungsstadium sind oftmals nicht oder nur sehr schwer mit herkömmlichen kultivierungs-abhängigen Nachweismethoden zu erfassen (Oliver 2005). Da Krankheitserreger in diesen Dauerstadien jedoch weiterhin als potentiell infektiös gelten, birgt dies zusätzliche Risiken für eine sichere Trinkwasserüberwachung. Ein besseres Verständnis der Ökologie von Pathogenen und die Weiterentwicklung möglicher kultivierungs-unabhängiger Nachweisverfahren können entscheidend zur Prävention wasserbürtiger Ausbrüche beitragen.

9.16 ÖKOLOGIE VON ANTIBIOTIKA-RESISTENTEN PATHOGENEN MIKROORGANISMEN IN DER UMWELT

Die Zunahme an multiresistenten Bakterienstämmen in der Umwelt und der potentielle horizontale Gentransfer zwischen autochthonen und allochthonen Arten sind nicht nur von großem wissenschaftlichem Interesse sondern betreffen auch sozioökonomische Belange. Aufgrund der heutzutage oftmals unbedachten Anwendung zahlreicher Antibiotika in der modernen Tierzucht kann eine deutliche Zunahme an Antibiotika-Resistenzen innerhalb von gastrointestinalen Bakterien beobachtet werden (Sapkota et al 2007). Ein weiteres Risiko einer Grundwasserbelastung mit multiresistenten Bakterien bergen zudem immer häufiger die Abwässer von Krankenhäusern (Reinthaler *et al.*,

2003). Das Verhalten dieser genetisch veränderten Organismen in der Umwelt ist bisher weitestgehend unbekannt und sollte wissenschaftlich genauer untersucht werden.

9.17 EINFÜHRUNG INTERNATIONALER STANDARDS FÜR LABOR- UND FELDVERSUCHE

Im Anbetracht der großen Unterschiede innerhalb der zahlreichen experimentellen Beobachtungen die bisher hinsichtlich Verhalten (Rückhalt, Adsorption) und Überleben bzw. Persistenz von Pathogenen gefunden wurden, sollte angedacht werden, für die Durchführung solcher Studien im Labormaßstab zukünftig Standardrahmenbedingungen einzuführen. Sowohl die Verwendung einheitlicher Protokolle für die Vermehrung und Präparation von eingesetzten Testorganismen als auch die standardisierte Einführung interner Kontrollen, wie z. B. der Bakteriophage MS2 oder *E. coli*, könnten helfen die große Streuung der dokumentierten Überlebensdaten zu einzelnen pathogenen Mikroorganismen und Viren im Grundwasser zu minimieren (John und Rose 2005).

9.18 AKTUELLE FORSCHUNG – VERBUNDPROJEKT ZU NACHWEIS, TRANSPORT UND ELIMINATION VON PATHOGENEN VIREN IM WASSER

Ein multidisziplinäres Forschungsprojekt, welches von der Deutschen Forschungsgemeinschaft (DFG) finanziert wird, bearbeitet derzeit einige der angesprochenen Fragestellungen. Zwei Arbeitsgruppen (M. Seidel & R. Niessner, Institut für Hydrochemie, Technische Universität München, TUM; M. Exner & C. Koch, Institut für Hygiene und Öffentliche Gesundheit, Universität Bonn) arbeiten beispielsweise an der Entwicklung von Hochdurchsatz-Filtrationstechniken (Ultra- und Nanofiltration) zur Anreicherung von pathogenen Viren. Zwei Arbeitsgruppen am Deutschen Umweltbundesamtes (UBA, Berlin) erforschen unter der Leitung von H. C. Selinka & I. Chorus das Verhalten von pathogenen Viren (Noroviren und Adenoviren) in Oberflächenwasser und bei der Sedimentpassage. Es wird zudem versucht Protokolle zur Nukleinsäure-Extraktion zu optimieren (Zusammenarbeit mit Ch. Drosten, Institut für Virologie, Universität Bonn). Ein weiteres Ziel ist zudem die Identifizierung neuer Indikatorviren. Die Effizienz der Viruselimination während der Abwasseraufbereitung und mögliche beteiligte Faktoren werden von Kollegen aus Hannover (K.-H. Rosenwinkel & S. Wolters, Institut für Siedlungswasserwirtschaft und Abfalltechnik, Leibniz Universität Hannover) untersucht. Im Mittelpunkt steht hierbei die Entwicklung und Verbesserung von mathematischen Modellen zur Vorhersage der Effizienz der Viruselimination während der Abwasseraufbereitung. Die Autoren dieses Gutachtens sind selbst an der Erforschung von mikrobiellen Prozessen und deren Beitrag zur Elimination von pathogenen Viren in aquatischen Systemen interessiert. Im Mittelpunkt stehen Versuche zum Grazing von Viren durch Protozoen und Experimente zur Lyse von Viren durch bakterielle Exoenzyme.

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MATERIALIEN DER PROJEKTGRUPPE „GEORESSOURCE WASSER – HERAUSFORDERUNG GLOBALER WANDEL"

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Exhibit C - H2H Response to Comments 2018-2020

H2H Associates

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October 17, 2018

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Via E-Mail: joe.dlugolenski@dec.ny.gov

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Cortland, NY 13045

Via E-Mail: Kathleen.McGrath@cortlandswcd.org

RE: **Response to NYSDEC and SWCD Comments Sept. 2018**
2nd Notice of Incomplete Application, 7-1122-00043/00008
Mining Permit Modification, MLR #70436
Cortlandville Sand & Gravel Mine
Town of Cortlandville, Cortland County

Dear Mr. Dlugolenski and Ms. McGrath:

On behalf of Route 13 Rocks, LLC, H2H Associates (H2H) would like to take this opportunity to respond to comments received from the New York State Department of Environmental Conservation (NYSDEC) and the Cortland County Soil and Water Conservation District's (SWCD) regarding the above referenced matter. The comments were provided in September 2018 in response to H2H's Application re-submittal (the Application), dated March 28, 2018, that was prepared in response to the first Notice of Incomplete Application (NOIA). NYSDEC's comments were provided to Mr. Chris Henry, Route 13 Rocks. SWCD's comments were submitted to Dick Tupper, Cortland Town Supervisor.

H2H is providing the responses in this one letter to keep all parties on the same page for continued technical review of this pending modification to the mining permit. H2H is submitting three copies including the attached Spill Prevention and Response Plan and the revised Hydrogeologic Assessment Scope of Work.

Our responses to the agencies' comments **(in bold font)** are in *italics* and follow the formats of the NYSDEC and SWCD comment letters.

Responses to NYSDEC Comments:

1. **Based on the United States Geological (USGS) report included in the resubmittal (Appendix D), lacustrine deposits could potentially be encountered at a depth of approximately 1090 feet (+/-) amsl. It is assumed that mining will cease if this lacustrine deposit is encountered prior to reaching the proposed pond floor elevation of 1070 feet amsl. Please confirm.**

That is probable unless this lacustrine material has a commercial economic value. The proposed mining would likely terminate at or above the bottom of the sand and gravel deposit.

2. **Please expound on the attention that will be given to the hydrophytic vegetation proposed along the banks and shore of the pond in the reclamation narrative. How and when will it be established and at what rate, and will the Cortland County Soil & Water Conservation District be consulted on the variety of vegetation to plant, etc**.

   The area above the pond water level will be graded, terraced, and seeded as described in Application's Section 6.2, Reclamation Method and Final Reclamation Activity. The last sentence in the second paragraph of that section is as follows: "Attention will be given to the growth of hydrophytic vegetation at the pond's average water level surface +- 7 feet to prevent erosion at the pond shoreline."

   Reclamation of the shoreline will not take place until the mine pond is fully developed and mining activities that could disrupt shoreline plantings are completed. Plantings will be selected using the latest applicable guidance (e.g. A Field Guide of Aquatic Macrophyte Species Found in New York Lakes along with Potential Non-Native (Exotic) Invaders) and in consultation with NYSDEC and SWCD to determine appropriate vegetative species at that time and confirm optimum planting methodology and timing. The primary objectives would be to prevent erosion, select species that would be protective of water quality in the long-term, and avoid introduction of non-native (invasive) species.

3. **Training Plan- your resubmittal outlines the BMP's to be followed by Route 13 Rocks staff. DEC requests a written Training Plan which will outline how staff shall be trained to implement these BMP's. Training of everyone who works within the mine shall be documented and kept on record. Will there be regular refresher training?**

   H2H has prepared a written Training Plan and includes it as Section 8.0 of the attached Spill Prevention and Response Plan. Training will be documented and will include refresher training as well as new employee training. Training documentation forms and recordkeeping requirements are included in the Plan.

4. **Spills Plan- as noted above your resubmittal outlines the BMP's and the general procedures that staff will be expected to follow. Please provide a detailed Spills Plan that clearly shows how staff will be trained to manage spills at the facility**.

   The attached detailed Spill Prevention and Response Plan includes the BMPs and the Training Plan that show how staff would be trained to manage different types of spills at the facility.

5. **Secondary Containment Maintenance Area Plans- the resubmittal identifies that there will be a designated fueling area on paved surfaces. Please provide a detailed description of the fueling area and show them on your plans.**

   The location and dimensions of the multi-purpose Vehicle / Equipment Maintenance and Fueling Area have been added to Figure 1. The 40-foot x 40-foot paved area is located at the southeastern corner of the site just north of the Scale House. This area is located as far from the Town's wells as possible. The plan is for minor maintenance activities to be performed here, and major

maintenance performed off site. The paved area would also be used for routine fueling of mobile equipment. Larger less mobile equipment used for dredging, such as a long-stick excavator or dragline, would typically be re-fueled at the work sites. In these instances, BMPs, employee training, and ready availability of drip pans or absorbents would mitigate the potential for spills and adverse effects.

6. **Further explain why fuel spills in the mine will have no adverse impact to the Town's water supply. Expand on Page 7 of resubmittal "Contaminants from Petroleum Spills".**

   We have included a discussion following different lines of evidence of why fuel spills at the mine should have no adverse impact to the Town's water supply. The expanded discussion of petroleum spills and contaminants comprises Section 11.0 of the Plan.

7. **As noted in Appendix F of the resubmittal, H2H proposes a scope of work (SOW) to collect additional hydrogeological information that will be used to confirm the current hydrogeologic model and provide data to show how the proposed modification could affect both the quality and quantity of groundwater in the area and the Town's Lime Hollow public water supply well. Please proceed with this study and include the following:**

   Arrangements have been made for a drilling contractor to perform the work at the earliest availability which appears to be in early November.

   a. **Please remember to include a particle size and petrographic analysis that is described on Page 7 of the narrative, but not in the SOW.**

      We have revised the SOW in response to comments by NYSDEC and SWCD. Particle size analysis and petrographic analysis have been added to the revised SOW which is included as Appendix C of the Spill Prevention and Response Plan.

   b. **During installation of the new monitoring wells please collect split spoon samples at 10-foot intervals once below the water table to confirm the geology as opposed to observing drill cuttings to obtain a more accurate location of sample depth.**

      The revised SOW indicates that split-spoon samples will be collected at 10-foot intervals below the inferred water table at new well MW-3D.

   c. **Section 1E of the SOW proposes to sample one of the new monitoring wells (MW-3) to provide background water quality data for the site. Define the water quality testing protocol. Sampling shall include but not be limited to organic and inorganic parameters, and a baseline of field water chemistry measurements will be required at all new and existing monitoring wells. Measurements shall include but not limited to dissolved oxygen (DO), pH, specific conductance, temperature, redox potential, etc**.

      Groundwater sampling, field analytical testing (all monitoring wells) and laboratory analytical water quality analyses (inorganic and organic analytes) are addressed in the revised SOW.

8. **Hydrogeologic Assessment Report- Appendix F Task 2 outlines the proposed work to be done by H2H to characterize hydrogeologic conditions at the facility. Please proceed with this work and submit the assessment report which should also include a proposed management plan that would be intended to protect the water quality at depths near the Town's wells intake levels.**

   Work is proceeding as described above. The report will include recommendations for long-term water quality monitoring including the deep portion of the aquifer corresponding the Town's well screens. The report will also include a groundwater management plan based on the findings of the assessment.

Responses to SWCD Comments:

The proposed permit modification includes: 1) complete removal of the protective 8' gravel layer between active mining and the water table, 2) mining to approximately 100' below the water table across the entire life of mine (LOM) boundary and 3) lateral expansion of the LOM boundary by a net 11.5 acres.

Yes, the permeable gravel buffer will be excavated in the proposed mine deepening area. The maximum mining depth below the nominal water table is roughly estimated as 100 feet based on the maximum reach of a commercial dragline. The actual depth will be less in the nearshore areas as a result of the sand and gravel's natural angle of repose and may be less in the center of the mine if the sand and gravel resource does not extend that deep. It also may be less if the deposit is thinner than maximum supposed.

The mine is approximately 730 feet from the Lime Hollow Road water supply well for the Town of Cortlandville and is within Zone 1A of the Town's wellhead protection area, the most critical zone for protection of this water supply. The aquifer below the mine provides drinking water for the City of Cortland as well.

H2H estimates that the closest approach of the proposed mine pond to the nearest Lime Hollow Well would be 900 feet based on scaling from of Figure 4 in the Application.

Threats to the quality of the aquifer could include petroleum products, hydraulic fluids, flocculants and washwater stored or produced within the mine. Any release of these materials directly threatens water quality of the aquifer.

H2H agrees that these liquids could represent potential threats to groundwater quality at the mine if spilled in sufficient amounts. H2H has summarized in the attached Spill Prevention and Response Plan the petroleum products (including hydraulic fluids) that will be used onsite. Flocculents will not be used. Processing generating washwater is not planned. We believe that only uncontrolled releases would potentially threaten the aquifer. These are addressed in the Spill Prevention and Response Plan.

Mining and interception of groundwater by mining below the water table may affect water quality and quantity of the aquifer with potential effects on, for example, temperature, recharge and water table elevation. In addition, mining below the water surface opens the aquifer to increased risk of contamination from external sources during and beyond the life of the mine. The quality and quantity of the drinking water supply is at greater risk if mining below the water table is approved than if the 8' buffer is maintained.

The Spill Prevention and Control Plan addresses this comment in general and Section 11.0 of the Plan addresses the comment specifically. H2H does not believe that changes to groundwater temperature at the Town's well field would have any significant impact. Groundwater temperatures should equilibrate to approximately the seasonal average within a few hundred feet of the proposed mine pond. Net recharge to the aquifer should not change significantly. Once the mine pond is fully developed the surface water level at the upgradient (south) end of the proposed mine pond would be approximately 2 to 3 feet lower than the adjacent ambient water table. Groundwater would flow into this southern part of the mine pond. The pond level would be approximately 2 to 3 feet higher at the downgradient (north) end. Surface water would flow out of the northern part of the pond and recharge groundwater in this area. H2H expects that the northern end of the mine pond would act as a recharge boundary for the Town wells' cone of depression when the Town wells are pumping. In this case, the effect of the proposed mine pond would be to reduce lateral expansion of the Town well's cone of depression and the amount of drawdown at the well field. H2H believes that these would be beneficial effects to the Town. The reduced radius and magnitude of drawdown would reduce pumping costs. H2H recognizes the potential for increased risk to water quality in the aquifer adjacent to the proposed mine pond but believes that the risks would be substantially mitigated at the well field given the distance from the proposed mine pond to the Town wells and this would be subject to monitoring. Additional details that address this question are provided in the Spill Prevention and Response Plan.

Although we recognize that mining provides benefits to the State of New York and its citizens, not all locations are appropriate for mining and in some locations other priorities should take precedence.

Understood. However, in New York State among many other states, there are thousands of public and private wells located within sand and gravel deposits that serve both the mining industry and the water supply needs of the public. We recognize that it is important to evaluate carefully each location where mining and a potable groundwater resource are in close proximity and that plans should be put in place to mitigate an future potentially significant impact. The situation here in Cortlandville is by no means unique.

For these reasons, the proposed activity of mining below the water table is of particular concern in this important and sensitive area. Any such proposed activities should be reviewed and any uncertainties should be decided, on the side of caution.

Understood.

If this activity is to be authorized, we recommend that the following actions be completed by the responsible party prior to issuance of permit modifications:

1) Conduct spatial and temporal groundwater quality and quantity monitoring via upgradient and multiple downgradient wells to define baseline conditions;

The attached revised Hydrogeologic Assessment Scope of Work describes activities to conduct spatial and temporal groundwater quality and quantity (water level) monitoring upgradient and at multiple locations downgradient of the proposed mine pond to define baseline conditions. The Assessment report will address how these conditions are used to update the hydrogeologic model and define the nature and significance of surface water-groundwater-well water interactions.

2) Establish the water table elevation spatially across the floor of the mine and temporally; and

The proposed Scope of Work provides for establishing water table elevations spatially and temporally across the site.

3) Complete a spill prevention plan and an emergency/contingency plan, each approvable by the NYS DEC and the Town of Cortlandville to address any detrimental effects of the proposed mining itself or the release of contaminants associated with mining, on ground water quality or quantity.

The site-specific Spill Prevention and Response Plan includes an emergency/contingency plan and addresses the potential for detrimental effects of the proposed mining and contaminant releases on groundwater quality and quantity. As stated in the paragraph above, effects of the proposed mine pond on groundwater quantity in the vicinity of the well field are expected to be positive and beneficial.

At such time as the above actions have been completed and approved, if expansion of mining operations as proposed are to be permitted, we recommend that:

1) Monitoring by the responsible party be continued throughout the life of the mine, to ensure prompt detection of any detrimental changes in water quality or quantity of the aquifer that would necessitate triggering of contingency actions;

The Hydrogeologic Assessment report will address long-term groundwater monitoring.

2) Ongoing analyses be conducted to assess effects of mining operations on adjacent waters;

Same comment as above.

3) The use of flocculants not be allowed during mining operations under any condition;

Applicant does not propose to use flocculents.

4) Any contaminant spills be required to be reported to the NYS DEC and the Town of Cortlandville; and

The Spill Prevention and Response Plan requires Applicant to keep a record of all non-trivial spills, including those that meet the threshold for reporting to the NYSDEC Spills Hotline at 800-457-7362. Reporting procedures and a sample form for tracking spills cumulatively are included in Appendix A of the Plan.

5) Appropriate Town of Cortlandville personnel have right of access for inspection of mining operations.

Mining permits issued by NYSDEC typically include a clause that allows inspections by NYSDEC personnel, and the Permit could perhaps modify the clause to include authorized Town personnel. The Spill Prevention and Response Plan includes as Figure 1 a detailed site plan which could facilitate such inspections.

H2H understands the reasonable precautions needed to protect the existing public water supply well from any possible adverse impact and justify a SEQRA determination of no significant adverse impact which is required before the application may be deemed complete. H2H encourages NYS DEC and SWCD to let us know as soon as possible of additional comments or questions regarding the time-sensitive Scope of Work. This cooperation would enable the field work to proceed in a smooth expeditious manner without unnecessary delay.

That concludes the responses to comments. If you or your staff have any questions, please do not hesitate to contact me directly at (518) 270-1620, extension 115 or by email at jgansfuss@h2hassociates.com.

Best Regards,

H2H Associates, LLC

John E. Gansfuss

John E. Gansfuss, P.G.
Senior Engineering Geologist

Attachments

cc. Carol Simon / Christopher Henry, Route 13 Rocks, LLC
Director Matt Marko, DEC R7
Joseph Sluzar, DEC General Council
Thomas Rigley, DEC Minerals

H2H Associates

Dick Tupper, Town of Cortlandville Supervisor
John Proud, Cortlandville Town Board
Pat Reidy, Amanda Barber, Cortland SWCD
Richard Hisert, PhD, PG / Mike Polacco H2H Associates, LLC

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July 15, 2019

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Via E-Mail: Kathleen.McGrath@cortlandswcd.org

RE: **Response to SWCD Comments**
2nd Notice of Incomplete Application, 7-1122-00043/00008
Mining Permit Modification, MLR #70436
Cortlandville Sand & Gravel Mine
Town of Cortlandville, Cortland County

Dear Ms. McGrath:

The purpose of this letter is to provide responses to your comment letter of December 3, 2018, regarding the application for the NYSDEC mine permit modification for the proposed Cortlandville Sand and Gravel mine expansion. We delayed preparation of the response until we had completed the first two quarters of the one-year baseline hydrogeologic investigation in order to develop more informed responses.

HYDROGEOLOGIC INVESTIGATION SUMMARY

Groundwater monitoring wells were installed in December 2018. The monitoring well transducers were downloaded and the wells sampled in March and May 2019. The groundwater level, groundwater temperature and groundwater analytical data have been compiled and reviewed. Methods, results, preliminary findings and recommendations from this initial stage of investigation are summarized in the Baseline Hydrogeologic Investigation Report (the "Report"), July 2019, a copy of which is attached.

RESPONSE TO SWCD COMMENTS

SWCD comment from the December 3, 2018 letter is in bold font and H2H Response in blue font.

1. **Mine pond as recharge boundary – The mine pond is unlikely to be a significant recharge boundary. The cone of depression 700 or more feet from the Lime Hollow well is negligible. A Clough Harbor Associates analysis showed that drawdown is negligible at a distance of 300' from the Lime Hollow well. Thus, reduced pumping cost associated with a reduced lateral expansion of the cone of depression is speculative at best and likely to be insignificant.**

Based on the preliminary findings, we agree. The proposed mine pond is 900 feet from the Town's wells at the closest and is located side-gradient. We would appreciate receiving a copy of the referenced CHA report if you have one.

2. **Use of flocculants – Any future permit should explicitly prohibit the use of flocculants.**

Comment noted. As noted in the Spill Prevention and Response plan, use of flocculents is not planned.

3. **Inspections – Any future permit should require that the mine owner allow the Town of Cortlandville zoning officer to inspect the facility at any time.**

Comment noted. Inspections are addressed in the Spill Prevention and Response Plan and are typically included as a mine permit condition.

Spill Prevention and Response Plan

4. **General: For the long-term (in perpetuity) protection of aquifer, the following concerns should be addressed through incorporation of requirements into the mining permit, property title, or other appropriate legally-enforceable document(s):**

   a. **A. Ownership/easement and future use of property – To protect the water supply upon closure of the mine, property ownership and future use should be adequately addressed. Ownership should be required to be transferred to a willing and responsible party. Future uses should be legally restricted on the property deed.**

Comment noted. The proposed Reclamation Plan shows the site being reclaimed as a groundwater-fed pond. A statement will be added to the MLR Permit narrative stating that any future use of the site past its life as a sand and gravel mine will be a permitted use within the aquifer protection district established by the Town of Cortlandville.

   b. **Security of property – Access to the property should be fully restricted by security fencing prior to permit issuance to prevent dumping or other contamination by outside parties and for public safety.**

Comment noted. Once mining proceeds into the ground water table a locking gate will be established on the access road to the site. The topography and vegetative cover along the perimeter of the site provide a barrier preventing unauthorized access to the site by motorized vehicles. Additional barriers to entry will be added if needed. Signs stating the hazard of an open water feature will be installed along the perimeter of the pond when established.

   c. **Performance bond in perpetuity – The Town is dependent on the Lime Hollow well. The alternative well at Terrace Road cannot meet current or potential future demand by itself. Therefore, current and future mine owners should be required to post financial security, in perpetuity, for the cost of providing additional treatment or a fully adequate replacement water supply, as necessary, should the drinking water supply be contaminated by mine activities.**

Comment noted.

5. **Page 2, Section 4.0 - Any future permit should explicitly prohibit the use of flocculants.**

See Response #2.

6. **Page 3, Section 5.1 - What is capacity of the double-walled tank? Petroleum bulk storage is regulated by the Cortland County Health Department if the capacity exceeds statutorily**

defined limits.

The capacity of the double-walled tank is 1,000 gallons.

7. **Page 6, Section 6.0 - The Town of Cortlandville should be notified immediately of any reportable spill as well as any major spill incident.**

Comment noted. The Spill Prevention and Control Plan can be revised to indicate that a Town representative to be determined by the Town will be notified by a method and within a time frame to be determined later after NYSDEC is notified.

8. **Page 8, Section 7.0 - The Town should be provided with all chemical well data within 60 days of sample collection and all pressure transducer data quarterly**.

H2H will include the Town on the distribution list for future data reports once the baseline hydrogeologic investigation is completed.

9. **Page 11, Section 11.0 – Mitigating factors:**

In reviewing our Responses, it is essential to appreciate that the focus of this section is on mitigative factors, not on preventative factors that imply zero risk. Based on the preliminary findings of the hydrogeologic investigation, many of the comments take on reduced significance. Nevertheless, we provide Responses that reflect our rationale for the prior statements.

a. **Although they have low solubility in water, petroleum hydrocarbons such as gasoline and diesel have much higher solubilities, up to 1000 times, than their Groundwater Quality Standards under NYS DEC regulations. The antifreeze referred to should be identified. Ethylene glycol is highly toxic. The NYS DEC Groundwater Quality Standard for ethylene glycol is 50 □g/L. Propylene glycol is not toxic and is not regulated by the NYS DEC.**

Gasoline and diesel do not have NYSDEC groundwater quality standards per se, their constituents do, primarily (but not exclusively) benzene, toluene, ethylbenzene and xylenes. Benzene would be of most concern because of its toxicity and high solubility. Benzene contents in gasolines vary, but 2% is a typical value. Diesel fuel, the principal fuel used onsite, has about 3% the benzene content as gasoline. Whereas the solubility of benzene is 1,750 mg/L, the typical maximum concentration of benzene in gasoline-water mixtures under equilibrium is roughly 30 mg/L. For a reportable 5-gallon spill of gasoline, only 0.0004 ounces of benzene would dissolve in groundwater. While this is not trivial, it is the basis for mentioning the generically low solubility of petroleum hydrocarbons as a **mitigating factor.** The volume of contaminants of concern is lower than would be implied by the volume spilled, and we consider this a mitigating factor.

As a result of the rigor of the permitting process and the development of the Spill Prevention Plan, awareness has increased of the importance of preventing spills to the maximum extent practicable and to addressing spills that do occur promptly and effectively. This itself mitigates the potential for adverse impacts.

The antifreeze that would be used has not yet been identified, but the plan is for it to be "environmentally

friendly" insofar as practicable and the mining equipment properly maintained and operated.

b. 9 and 10. That the Town's well screen is located toward the bottom of the casing does not protect the water supply from dissolved contaminants, as in [#9a] above, and does not protect the water supply from contaminants introduced at the surface, at the levels of their solubility. In addition, a water supply drawing water at depth can induce or increase a downward vertical gradient (Nichols et al. https://www.api.org/oil-and-natural-gas/environment/clean- water/ground-water/~/media/6176F9B748FE427D809962819E2D7124.ashx).

The Town wells appeared to be well-designed and operated to mitigate the risk of surface contamination. The casings are relatively long and the screens are relatively deep in the aquifer to isolate the withdrawn water from any near-surface contaminants. Drawdowns under operating conditions are relatively low compared to the depth to the top of the screens which promotes efficiency and predominantly horizontal flow into the well screens.

We compared the relative estimated precipitation recharge rate with the estimated ground water flow rate. The ratio is greater than 1,000, that is, the horizontal flow rate is 1,000 times greater than the vertical recharge flow rate, and this does not factor-in the estimated horizontal to vertical hydraulic conductivity anisotropy of ten to one which favors relatively horizontal flow. The ratio suggests that the flow vector would be predominantly horizontal with only a very minor vertical component. Downward flow vectors in the aquifer are very minor.

H2H designed the monitoring well network to include well screens across the full thickness of the aquifer. The monitoring well location closest to the well field is a well pair. MW-3D screens the lower part of the aquifer at the same horizon as the Town wells, and MW-3S screens the aquifer from the top of MW-3D to above the water table. The Report documents the predominantly horizontal groundwater flow for the full thickness of the aquifer, and in fact, the well pair suggests a small upward gradient at that location. Vertical components of flow are not precluded but if they exist, they would be limited to the immediate vicinity of the Town's wells. As the Report surmises, horizontal flows appear to be adequate to make-up the water withdrawn without need for significant vertical downward flow components.

The proposed mine pond would penetrate into the aquifer and therefore the potential for impacts to the deep groundwater must also be considered. The available data suggest that the shallow and deep groundwater flows northeasterly along a flow zone east of the Town wells. The contributing area of recharge to the Town wells is southwest of the well field, and not to the southeast where the proposed mine pond is located. The potential for mine pond water to flow to the Town wells is very minor. Furthermore, as stated in the Response to Comment #1, the closest proximity of the proposed mine pond is beyond the radius of influence of the Town wells.

c. This argument overstates the difficulty of downward movement. Significant downward migration due to infiltrating water and dispersion would likely occur (Weaver and Wilson https://clu-in.org/download/contaminantfocus/mtbe/EPA-Plume-Dive-LL36DvPlm.pdf; https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/diving.html.

See Response #9.b.

d. The separation distances mandated in NYS DOH Part 5 regulations are generalized minima. Whether these distances are effective in protecting water quality is site specific and for this site, the adequacy of these distances is unknown. If this permit is to be reissued as proposed, the sizeable lake that will remain will almost certainly be used by wildlife such as waterfowl. This use has a real potential to introduce pathogens from fecal material. Some fecal pathogens such as viruses can survive for up to 200 days in groundwater. This survival time is much greater than the travel time from the mine to the Lime Hollow well.

We agree, but the proposed mine pond is not located within the contributing area of groundwater to the Town's wells.

Regarding future conditions, it is probable that hydraulic gradients, and groundwater flow rates will increase at the north end of the proposed mine pond after the pond is fully developed. Predominant groundwater flow is expected to continue to be to the northeast away from the Town wells. Diversion of groundwater toward the well field, if any, is expected to be minor and involve substantial dilution. Nevertheless, ongoing water treatment (chlorination) to oxidize and destroy organic contaminants and water quality monitoring and treatment must continue at the Town's wells. Long-term monitoring would include sampling at the MW-3 sentinel well pair.

It is important to appreciate that the same argument regarding pathogens, viruses, etc. from waterfowl or other wildlife could be made, at least seasonally, for the existing ponds that are located just west of the proposed mine pond and closer to the town wells than the proposed mine pond. The newly acquired hydrogeologic data suggest that the existing pond surface water levels coincide with the water table. These existing ponds could represent the same threat to groundwater quality as stated above for the proposed mine pond during high water table periods.

e. A pumping well draws water from all directions, both vertically and horizontally.

Yes, potentially but the relative proportions of flow may differ depending upon site-specific conditions. The preponderance of recharge to the Town wells would be from horizontal flow because of the aquifer's high hydraulic conductivity, probably high anisotropy, and relatively low drawdown.

f. Text in the document referenced includes (underlining added, bolding is in original document):

"Nevertheless, it is important to know more about the water column in the adjacent gravel pit, including the chemical and biological character of the vertical water column and sediments in the pit. Plant nutrient levels, pH, temperature, and oxygen levels are especially important. These data will provide a basis to detect and react to any problematic changes and to be well prepared to provide guidance for the renewal of CAC's [Cranesville Aggregate Company] mining permit in 2014. We have requested permission from CAC to begin such studies, but we have been denied access to this property. We have also requested guidance on such matters from Region 4 NYSDEC but, again, our request was unsuccessful, perhaps because of post-flood complexity and a litigious atmosphere at the time of our request. *We thus urge that every effort be made to gain access to the quarry lands and waters of CAC for routine, long-term annual monitoring, as a prudent action, necessary to respond to emerging*

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All sites must be evaluated on a case-by-case basis. The proposed Cortlandville Sand and Gravel operation does not set a precedent. Conditions at one site may not be applicable to conditions at another site, but knowledge that other similar situations exist often helps reduce perceived risk, and that is why these examples were mentioned.

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We agree. See Response #9.a. H2H does not believe there is zero risk, which is why a hydrogeologic investigation is underway, why mitigation factors were described, why there is a Spill Prevention and Response Plan, why the mine permit will include special conditions, why a long-term monitoring plan must

be developed and followed if the mine is deepened, and why annual water quality sampling and analysis is performed and reported routinely for the Town's well water.

Appendix C Hydrogeologic Assessment Scope of Work

10. General: If a permit for mining below the water table were to be issued, diligent, frequent and long-term sampling of monitoring wells will be of critical importance to detect any contaminants reaching the aquifer before they reach the Lime Hollow well. Monitoring requirements after permit issuance are not addressed in the October 2018 Spill Plan and Hydrogeologic Assessment Scope of Work, and should be.

This comment presumes, conservatively, that groundwater flows from the proposed mine pond to the Town's wells. This appears to not be the case. As stated above and in the Report, groundwater at the proposed mine pond flows northeasterly and does not make a significant contribution to the Town well-fields water recharge. Regardless, long-term monitoring will be performed. The specific monitoring requirements would best be finalized after the baseline period hydrogeologic data are collected and the updated conceptual model refined. The Report addresses long-term monitoring in a general way. The post Quarter 4 report will address future monitoring frequency, sampling method, indicator analyte list, and monitoring protocols.

11. Monthly sampling of one downgradient well for mobile, toxic and volatile organic indicator parameters is strongly recommended for any month in which active mining occurs. Because the estimated travel time from the mine to the Lime Hollow well is 2 to 3 months, quarterly sampling is insufficient to detect a contaminant release, initiate remediation activities, and protect the public from a contaminated drinking water supply.

See Responses #9.d. and #10. H2H maintains that quarterly monitoring would be appropriate for four major reasons:

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2. Constituents within groundwater typically do not travel at the same rate as groundwater flow; they are retarded and migrate slower because of fate and transport processes such as volatilization, adsorption, precipitation, filtration, biochemical transformation, degradation, and dispersion.
3. No underground petroleum storage tanks are present onsite.
4. The paved vehicle and equipment and maintenance area is located at the far south end of the site, nearly 3,000 feet from the Town wells.

We proposed quarterly sampling for one year during the baseline period to assess seasonal variations. Sampling frequency for the long-term monitoring will be addressed in a later report. The long-term monitoring plan would depend upon mining progress, that is, development of the proposed mine pond.

12. In addition, specific discharge limits should be defined as part of the permit, similar to SPDES permit requirements.

There is no surface water discharge from the site, all stormwater is contained on site. There is also no discharge associated with pumping to surface water or groundwater on site.

H2H Associates

13. Page 4 – Based on sampling data from Cortlandville and the City of Cortland monitoring wells, we highly recommend that a minimum of two rounds of full chemical analyses be performed. Temporal variation in concentrations of all parameters can vary significantly; one round is insufficient to adequately characterize the chemical environment of a well. NYS DEC regulations for sanitary landfills requires a minimum of four rounds of sampling prior to placement of waste. Given the importance of this aquifer as a drinking water supply and the proximity of the mine to an essential water supply well, a minimum of two and preferably four rounds of sampling is not unreasonable.

The Plan currently proposes one full round of background chemical analyses for four monitoring wells and four full rounds of comprehensive analyses in the shallow and deep monitoring wells closest to the Town's well field. The need for additional data will be continually evaluated as data become available. The available water quality data do indicate one apparent non-health related anomaly (iron centration in one well) and it will be addressed in Quarter 3. The Report lists data gaps that will be addressed in Quarters 3 and 4.

It would be helpful if H2H could receive a copy of the latest four rounds of NYSDOH comprehensive water quality analyses for the Lime Hollow wells to augment the local aquifer water quality database, further characterize water quality variations, and evaluate the significance of the water quality variations.

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The upgradient monitoring well, MW-1S, was part of the initial comprehensive round of groundwater sampling. Unfortunately, the well casing was found to be bent during the first sampling round and groundwater could not be collected. This well has been repaired and was sampled during the second round. It will be further evaluated in Quarters 3 and 4. MW-2S was sampled during the first sampling round as an alternative to MW-1S.

MW-1S is located relatively close to the upgradient end of the local groundwater basin. It is currently planned that this well will be an integral part of the long-term monitoring program as described in the Report and as will be described in greater detail in a future report following Quarter 4.

Many conditions can cause changes in groundwater quality. Causes for water quality changes should not be speculated or attributed without adequate data.

That concludes the responses to comments. Any refinements based on new data will be included in a future report. If you or your staff have any questions, please do not hesitate to contact me directly at (518) 270-1620, extension 115 or by email at jgansfuss@h2hassociates.com, or Mike Polacco at extension 102, mpolacco@h2hassociates.com.

Best Regards,

H2H Associates, LLC

H2H Associates

John E. Gansfuss, PG
Senior Engineering Geologist

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H2H Associates

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Environmental Professionals
Geologic Consultants
Construction Services

July 23, 2019

Kathleen McGrath
Water Quality Specialist
Cortland County Soil and Water Conservation District
100 Grange Place, Room 202
Cortland, NY 13045

Via E-Mail: Kathleen.McGrath@cortlandswcd.org

RE: **Response to SWCD Comments**
2nd Notice of Incomplete Application, 7-1122-00043/00008
Mining Permit Modification, MLR #70436
Cortlandville Sand & Gravel Mine
Town of Cortlandville, Cortland County

Dear Ms. McGrath:

The purpose of this letter is to provide responses to your comment letter of December 3, 2018, regarding the application for the NYSDEC mine permit modification for the proposed Cortlandville Sand and Gravel mine expansion. We delayed preparation of the response until we had completed the first two quarters of the one-year baseline hydrogeologic investigation in order to develop more informed responses.

HYDROGEOLOGIC INVESTIGATION SUMMARY

Groundwater monitoring wells were installed in December 2018. The monitoring well transducers were downloaded and the wells sampled in March and May 2019. The groundwater level, groundwater temperature and groundwater analytical data have been compiled and reviewed. Methods, results, preliminary findings and recommendations from this initial stage of investigation are summarized in the Baseline Hydrogeologic Investigation Report (the "Report"), July 2019, a copy of which is attached.

RESPONSE TO SWCD COMMENTS

SWCD comment from the December 3, 2018 letter is in bold font and H2H Response in blue font.

1. **Mine pond as recharge boundary – The mine pond is unlikely to be a significant recharge boundary. The cone of depression 700 or more feet from the Lime Hollow well is negligible. A Clough Harbor Associates analysis showed that drawdown is negligible at a distance of 300' from the Lime Hollow well. Thus, reduced pumping cost associated with a reduced lateral expansion of the cone of depression is speculative at best and likely to be insignificant.**

Based on the preliminary findings, we agree. The proposed mine pond is 900 feet from the Town's wells at the closest and is located side-gradient. We would appreciate receiving a copy of the referenced CHA report if you have one.

2. **Use of flocculants – Any future permit should explicitly prohibit the use of flocculants.**

Comment noted. As noted in the Spill Prevention and Response plan, use of flocculents is not planned.

3. **Inspections – Any future permit should require that the mine owner allow the Town of Cortlandville zoning officer to inspect the facility at any time.**

Comment noted. Inspections are addressed in the Spill Prevention and Response Plan and are typically included as a mine permit condition.

Spill Prevention and Response Plan

4. **General: For the long-term (in perpetuity) protection of aquifer, the following concerns should be addressed through incorporation of requirements into the mining permit, property title, or other appropriate legally-enforceable document(s):**

   a. **A. Ownership/easement and future use of property – To protect the water supply upon closure of the mine, property ownership and future use should be adequately addressed. Ownership should be required to be transferred to a willing and responsible party. Future uses should be legally restricted on the property deed.**

Comment noted. The proposed Reclamation Plan shows the site being reclaimed as a groundwater-fed pond. A statement will be added to the MLR Permit narrative stating that any future use of the site past its life as a sand and gravel mine will be a permitted use within the aquifer protection district established by the Town of Cortlandville.

   b. **Security of property – Access to the property should be fully restricted by security fencing prior to permit issuance to prevent dumping or other contamination by outside parties and for public safety.**

Comment noted. Once mining proceeds into the ground water table a locking gate will be established on the access road to the site. The topography and vegetative cover along the perimeter of the site provide a barrier preventing unauthorized access to the site by motorized vehicles. Additional barriers to entry will be added if needed. Signs stating the hazard of an open water feature will be installed along the perimeter of the pond when established.

   c. **Performance bond in perpetuity – The Town is dependent on the Lime Hollow well. The alternative well at Terrace Road cannot meet current or potential future demand by itself. Therefore, current and future mine owners should be required to post financial security, in perpetuity, for the cost of providing additional treatment or a fully adequate replacement water supply, as necessary, should the drinking water supply be contaminated by mine activities.**

Comment noted.

5. **Page 2, Section 4.0 - Any future permit should explicitly prohibit the use of flocculants.**

See Response #2.

6. **Page 3, Section 5.1 - What is capacity of the double-walled tank? Petroleum bulk storage is regulated by the Cortland County Health Department if the capacity exceeds statutorily**

defined limits.

The capacity of the double-walled tank is 1,000 gallons.

7. **Page 6, Section 6.0 - The Town of Cortlandville should be notified immediately of any reportable spill as well as any major spill incident.**

Comment noted. The Spill Prevention and Control Plan can be revised to indicate that a Town representative to be determined by the Town will be notified by a method and within a time frame to be determined later after NYSDEC is notified.

8. **Page 8, Section 7.0 - The Town should be provided with all chemical well data within 60 days of sample collection and all pressure transducer data quarterly**.

H2H will include the Town on the distribution list for future data reports once the baseline hydrogeologic investigation is completed.

9. **Page 11, Section 11.0 – Mitigating factors:**

In reviewing our Responses, it is essential to appreciate that the focus of this section is on mitigative factors, not on preventative factors that imply zero risk. Based on the preliminary findings of the hydrogeologic investigation, many of the comments take on reduced significance. Nevertheless, we provide Responses that reflect our rationale for the prior statements.

a. **Although they have low solubility in water, petroleum hydrocarbons such as gasoline and diesel have much higher solubilities, up to 1000 times, than their Groundwater Quality Standards under NYS DEC regulations. The antifreeze referred to should be identified. Ethylene glycol is highly toxic. The NYS DEC Groundwater Quality Standard for ethylene glycol is 50 □g/L. Propylene glycol is not toxic and is not regulated by the NYS DEC.**

Gasoline and diesel do not have NYSDEC groundwater quality standards per se, their constituents do, primarily (but not exclusively) benzene, toluene, ethylbenzene and xylenes. Benzene would be of most concern because of its toxicity and high solubility. Benzene contents in gasolines vary, but 2% is a typical value. Diesel fuel, the principal fuel used onsite, has about 3% the benzene content as gasoline. Whereas the solubility of benzene is 1,750 mg/L, the typical maximum concentration of benzene in gasoline-water mixtures under equilibrium is roughly 30 mg/L. For a reportable 5-gallon spill of gasoline, only 0.0004 ounces of benzene would dissolve in groundwater. While this is not trivial, it is the basis for mentioning the generically low solubility of petroleum hydrocarbons as a **mitigating factor.** The volume of contaminants of concern is lower than would be implied by the volume spilled, and we consider this a mitigating factor.

As a result of the rigor of the permitting process and the development of the Spill Prevention Plan, awareness has increased of the importance of preventing spills to the maximum extent practicable and to addressing spills that do occur promptly and effectively. This itself mitigates the potential for adverse impacts.

The antifreeze that would be used has not yet been identified, but the plan is for it to be "environmentally

friendly" insofar as practicable and the mining equipment properly maintained and operated.

b. 9 and 10. That the Town's well screen is located toward the bottom of the casing does not protect the water supply from dissolved contaminants, as in [#9a] above, and does not protect the water supply from contaminants introduced at the surface, at the levels of their solubility. In addition, a water supply drawing water at depth can induce or increase a downward vertical gradient (Nichols et al. https://www.api.org/oil-and-natural-gas/environment/clean- water/ground-water/~/media/6176F9B748FE427D809962819E2D7124.ashx).

The Town wells appeared to be well-designed and operated to mitigate the risk of surface contamination. The casings are relatively long and the screens are relatively deep in the aquifer to isolate the withdrawn water from any near-surface contaminants. Drawdowns under operating conditions are relatively low compared to the depth to the top of the screens which promotes efficiency and predominantly horizontal flow into the well screens.

We compared the relative estimated precipitation recharge rate with the estimated ground water flow rate. The ratio is greater than 1,000, that is, the horizontal flow rate is 1,000 times greater than the vertical recharge flow rate, and this does not factor-in the estimated horizontal to vertical hydraulic conductivity anisotropy of ten to one which favors relatively horizontal flow. The ratio suggests that the flow vector would be predominantly horizontal with only a very minor vertical component. Downward flow vectors in the aquifer are very minor.

H2H designed the monitoring well network to include well screens across the full thickness of the aquifer. The monitoring well location closest to the well field is a well pair. MW-3D screens the lower part of the aquifer at the same horizon as the Town wells, and MW-3S screens the aquifer from the top of MW-3D to above the water table. The Report documents the predominantly horizontal groundwater flow for the full thickness of the aquifer, and in fact, the well pair suggests a small upward gradient at that location. Vertical components of flow are not precluded but if they exist, they would be limited to the immediate vicinity of the Town's wells. As the Report surmises, horizontal flows appear to be adequate to make-up the water withdrawn without need for significant vertical downward flow components.

The proposed mine pond would penetrate into the aquifer and therefore the potential for impacts to the deep groundwater must also be considered. The available data suggest that the shallow and deep groundwater flows northeasterly along a flow zone east of the Town wells. The contributing area of recharge to the Town wells is southwest of the well field, and not to the southeast where the proposed mine pond is located. The potential for mine pond water to flow to the Town wells is very minor. Furthermore, as stated in the Response to Comment #1, the closest proximity of the proposed mine pond is beyond the radius of influence of the Town wells.

c. This argument overstates the difficulty of downward movement. Significant downward migration due to infiltrating water and dispersion would likely occur (Weaver and Wilson https://clu-in.org/download/contaminantfocus/mtbe/EPA-Plume-Dive-LL36DvPlm.pdf; https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/diving.html.

See Response #9.b.

d. The separation distances mandated in NYS DOH Part 5 regulations are generalized minima. Whether these distances are effective in protecting water quality is site specific and for this site, the adequacy of these distances is unknown. If this permit is to be reissued as proposed, the sizeable lake that will remain will almost certainly be used by wildlife such as waterfowl. This use has a real potential to introduce pathogens from fecal material. Some fecal pathogens such as viruses can survive for up to 200 days in groundwater. This survival time is much greater than the travel time from the mine to the Lime Hollow well.

We agree, but the proposed mine pond is not located within the contributing area of groundwater to the Town's wells.

Regarding future conditions, it is probable that hydraulic gradients, and groundwater flow rates will increase at the north end of the proposed mine pond after the pond is fully developed. Predominant groundwater flow is expected to continue to be to the northeast away from the Town wells. Diversion of groundwater toward the well field, if any, is expected to be minor and involve substantial dilution. Nevertheless, ongoing water treatment (chlorination) to oxidize and destroy organic contaminants and water quality monitoring and treatment must continue at the Town's wells. Long-term monitoring would include sampling at the MW-3 sentinel well pair.

It is important to appreciate that the same argument regarding pathogens, viruses, etc. from waterfowl or other wildlife could be made, at least seasonally, for the existing ponds that are located just west of the proposed mine pond and closer to the town wells than the proposed mine pond. The newly acquired hydrogeologic data suggest that the existing pond surface water levels coincide with the water table. These existing ponds could represent the same threat to groundwater quality as stated above for the proposed mine pond during high water table periods.

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Yes, potentially but the relative proportions of flow may differ depending upon site-specific conditions. The preponderance of recharge to the Town wells would be from horizontal flow because of the aquifer's high hydraulic conductivity, probably high anisotropy, and relatively low drawdown.

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That concludes the responses to comments. Any refinements based on new data will be included in a future report. If you or your staff have any questions, please do not hesitate to contact me directly at (518) 270-1620, extension 115 or by email at jgansfuss@h2hassociates.com, or Mike Polacco at extension 102, mpolacco@h2hassociates.com.

Best Regards,

H2H Associates, LLC

H2H Associates

John E. Gansfuss, PG
Senior Engineering Geologist

Attachments

cc. Carol Simon / Christopher Henry, Route 13 Rocks, LLC
Joe Dlugolenski, DEC Region 7
Kathleen McGrath, Cortland SWCD
Richard Hisert, PhD, PG / Mike Polacco H2H Associates, LLC

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January 23, 2020

Kathleen McGrath
Water Quality Specialist
Cortland County Soil and Water Conservation District
100 Grange Place, Room 202
Cortland, NY 13045

Via email: Kathleen.McGrath@cortlandswcd.org

Subject: **H2H's Response to SWCD's Response to Hydrogeologic Investigation Submittals**
Proposed Mine Permit Modification
Cortlandville Sand & Gravel Mine

Dear Ms. McGrath:

H2H has reviewed SWCD's response letter for the Baseline Quarters 1 & 2 Hydrogeologic Investigation Report and the Response to SWCD Comments that we submitted to the agencies on July 23, 2019. Our comments on the letter, a preliminary synopsis of recent findings, and proposed next steps are summarized below.

Background
The referenced hydrogeologic investigation report pertained to the first half (Q1 and Q2) of a one-year study[1] required by SWCD/NYSDEC in support of the permit modification application. Groundwater levels are typically high during this period compared to the last half of the year. The report indicated that the groundwater flow direction at the north end of the proposed mine pond is toward the northeast. The report concluded that the proposed mine pond would have de minimis hydraulic interaction with and impact to the Town's wells. The report provided the evidence upon which that statement was based. SWCD did not raise additional technical questions in its comment letter or request clarifications regarding the investigation.

USGS Model
Hydrogeologic Model - SWCD comments reference the 1996 U.S. Geological Survey (USGS) model. The USGS model was developed for a 6-square mile area of the aquifer that includes the site. The model predicts groundwater levels and flow directions under three different scenarios – high, average and low groundwater recharge/levels. A more recent Fact Sheet published by USGS in 2004 and based on the 1996 modeling shows the location and extent of the simulated contributing recharge area for the Lime Hollow Road wells during low recharge conditions (Figure 1). H2H considers the low recharge scenario most critical because the hydraulic gradient and the groundwater levels are both at their minimum levels. Since the radius of influence is a function of both hydraulic gradient and aquifer thickness, any impact to the Town's well that might occur would do so under these conditions, if at all.

The contributing area extends to the southwest and hydraulically upgradient of the municipal wells because of the water table that slopes toward the wells. This recharge area is generally parallel to the elongate-proposed mine pond. Three northeasterly aligned natural ponds are present between the contributing recharge area on the west and the proposed mine pond on the east. The 1996 USGS report text suggests (page 25) that the municipal well may induce some recharge from the nearest pond (North Pond) although this pond is shown outside the contributing area. Groundwater seepage from the North Pond normally flows to the northeast as stated in the H2H report.

Comparison of 2019 Groundwater Levels with USGS Simulations - H2H compared the observed 2019 groundwater levels with the USGS simulations. In general, the 2019 levels fell between the USGS's average and low recharge scenarios. The 2019 groundwater levels were generally less than the average USGS simulated groundwater levels, but higher than the low

[1] Data collection for this period was from February 5 through May 20, 2019.

recharge water levels. The lowest observed groundwater levels in 2019 were approximately 1160.5 feet in October 2019 in contrast to simulated USGS low level of approximately 1158 feet (Figure 2). The 2019 data fall within the simulated ranges.

Scenario for Mine Pond Water to Reach Municipal Wells Indirectly - The USGS model does not implicate the proposed mine pond area as a source of recharge to the municipal wells. However, H2H identifies a scenario whereby a limited amount of mine pond water could affect (recharge) the wells indirectly. In general, seepage at the north end of the proposed mine pond would recharge groundwater that would flow to the northeast. Seepage from the cove-like northwest corner of the mine pond, however, could recharge the south end of the North Pond located along the flow path to the northeast (Figure 1). Thus, depending upon the permeability of the bottom of the North Pond, some surface water from the proposed mine pond located more than 900 feet from the wells may indirectly eventually reach the wells under certain conditions per the USGS[2] report. Groundwater recharging the North Pond is diluted by precipitation recharge. Considering the distance involved and the complex surface water-to-groundwater-to-surface water-to groundwater-to well scenario. H2H infers that well recharge from this potential source would be de minimis, if at all likely. A scenario whereby the North Pond dries up during low groundwater levels is discussed later.

Effect of Fully-Developed Mine Pond – Groundwater levels would rise in the vicinity of the north half of the fully-developed mine pond by approximately 2.23 feet during high groundwater elevation conditions and 0.74 feet during low groundwater elevation conditions. Groundwater flow directions in this immediate vicinity would be directed away from the mine pond, but the lateral extent of this effect is uncertain. If groundwater levels are higher in the vicinity of MW-3S it is likely that the water level in the North Pond and the existing ponds to the south may be higher. This may be beneficial for the wetlands. The ponds could dry up less frequently and for shorter durations and could more frequently serve as a flow divide between the municipal wells and the proposed mine pond area. It is anticipated that the prevailing northeasterly flow directions would continue in the mine area, but the potential remains for some de minimis amount of groundwater recharge from the North Pond might flow to the municipal well as per the USGS report.

Wellhead Protection Area

SWCD's comment letter also referenced the wellhead protection area delineated in 2002 partly using the USGS model results. The mine lies within the delineated protection area, Zone 1A, which is possibly a reason for the request to conduct a hydrogeologic investigation in the first place. H2H understands that many factors and assumptions contribute to delineation of a wellhead protection area: political, economic, town planning, environmental and technical considerations. Generic NYS Department of Health guidelines and the presence of a nearby subdivision southwest of the municipal wells and an un-remediated (at that time) inactive hazardous waste site east of the municipal wells may have been considerations during the delineating process. H2H concurs that ordinarily, absent data to the contrary, well head protection area delineations should be conservatively expansive to ensure protection of public water supplies. The H2H report provided site-specific data that suggest that the extent of the well-head protection area is conservatively large relative to the mine site.

Recent Findings

Groundwater Quality - The Quarter 3 and 4 groundwater quality analyses are consistent with the Quarters 1 and 2 data. Considering that the proposed mine pond would be a groundwater flow-through pond, it is our opinion that lake water infiltrating and becoming groundwater would be indistinguishable from the municipal well water. In other words, the quality of groundwater, if any, flowing from the proposed mine pond is expected to be essentially the same as the untreated municipal well water.

Groundwater Flow Directions - H2H is continuing to evaluate the data for Quarters 3 and 4 which includes the seasonal low groundwater level period (Figure 2). Using customized software, H2H has calculated the apparent groundwater flow direction for the three monitoring wells, MW-2S, MW-3S, MW-3D, and MW-4S, nearest the municipal wells (Figure 3). These flow directions were calculated at 10-minute intervals for each water level measurement for the available period of

[2] In this scenario the North Pond would be associated with a water flow divide – some flow northeast and some flow west.

record[3]. A rose diagram was developed to summarize the average daily flow directions during the monitoring period (Figure 3a). The new data is consistent with the H2H and USGS hydrogeologic reports in indicating predominantly northeasterly groundwater flow in the site area adjacent to the wells as indicated in the groundwater contours (Figure 1). The flow direction varies from north 13 degrees east (NNE) to north 31 degrees east (NE). Such flow would not affect the municipal wells.

Drawdown Effects in MW-3S from Municipal Well Pumping - Careful analysis made possible by the use of the continual high-resolution 10-minute water level measurement interval reveals that the water level in monitoring well MW-3S may be very slightly (less than 2 inches) affected by municipal well drawdown when ambient groundwater levels were lowest and (inferred) municipal well drawdown greatest. Well MW-3S is the closest monitoring well to the closest municipal well, no.7. It is located 910 feet away. MW-3S represents the closest location that infiltrated mine pond seepage would approach the municipal wells.

The municipal well's apparent effect on water levels at MW-3S is based on two lines of evidence. First, transient un-sustained 4.8-inch spikes of water levels are observed only in MW-3S and may be related to abrupt water level disturbances from pump startup/shutdown and low water levels in the well (Figure 4). Second, the counterclockwise rotational shift of the calculated apparent net flow directions during the period of low groundwater associated with relatively lower water levels at MW-3S (Figure 3). The apparent drawdown effect appears to be associated with calculated apparent flow directions east of north 13 degrees east. This unique period occurred discontinuously for 14 days over an approximately 3-week period during late October and early November (October 23 – November 14). The magnitude of the observed drawdown effect was typically on the order of only 1.8 inches with a maximum of 3 inches during a one-hour period on the morning of Sunday, October 27[4] during the World Series. These magnitudes are considered negligible and beyond the practical edge of the radius of influence which is taken as 1 foot of drawdown. The North Pond was dry during this period as expected because of the low groundwater levels. A drawdown effect (approximately 2.4 inches) was also observed at MW-3S briefly on the morning of September 2, 2019, Labor Day, which H2H infers was another period of unusually high pumping.

Drawdown Effect at Other Well Locations - The drawdown effect was not observed at MW-2S or MW-4S where northeasterly flow likely persisted during these periods. Monitoring wells MW-2S and MW-4S are substantially more distant from the municipal well than MW-3S and well beyond its radius of influence.

Shallow Groundwater Flow Rate and Travel Time to Municipal Well - It can be estimated how far the shallow groundwater at MW-3S may have migrated toward the municipal wells and contributing recharge area during this 3-week time period assuming that groundwater flow was directly toward the wells[5]. The required parameters are hydraulic conductivity, maximum drawdown in nearest municipal well, estimated well efficiency, aquifer drawdown at the municipal well, hydraulic gradient, effective porosity, pumping duration of interest, distance of MW-3S from the nearest municipal well (No. 7), and distance of MW-3S to the nearest edge of the USGS contributing recharge area under low flow conditions. Estimated parametric values are:

- **Hydraulic conductivity** – 880 ft/day as described in the 1996 USGS report for the Lime Hollow Road well; based on data in the 1996 USGS report the average hydraulic conductivity for the unconfined outwash aquifer is 786 ft/day, 12 percent lower than estimated for the municipal well[6].
- **Maximum drawdown in municipal well no**. 7 – 11 feet, based on the maximum difference of static and pumping water levels observed in the well during first quarter 2019;
- **Well efficiency** – 75%, a typical estimate for a gravel-packed well in an unconfined aquifer;
- **Aquifer drawdown** – 8.25 feet, based on the maximum apparent drawdown observed and estimated well efficiency, i.e. 11.0 feet / 0.75;

[3] Over 40,000 data points through November 20, 2019.
[4] Apparent flow direction was north 7 degrees west.
[5] Darcy equation: Groundwater flow velocity = hydraulic conductivity x hydraulic gradient / effective porosity.
[6] High estimate of hydraulic conductivity leads to overestimated flow rate and travel distance, and underestimated travel time to the municipal well.

- **Hydraulic gradient from MW-3S to well no. 7** - 0.0091 based on the estimated maximum drawdown in the aquifer at the municipal well no. 7, and a distance of 910 feet, i.e. 8.25 feet / 910 feet.
- **Effective porosity** – 0.30, as described in the H2H hydrogeologic report.
- **Pumping duration** – 14 days, the number of days during the three-week period in October-November during which MW-3S is suspected of being affected by the municipal well pumping.
- **Distance to well no. 7** – 910 feet, scaled from H2H site plan map.
- **Distance to near edge of contributing recharge area** – 520 feet, scaled from USGS map.

The estimated maximum groundwater flow velocity would be 26.7 ft/day ((880 ft/day x 0.0091) / 0.30). Travel distance during a 14-day period would be approximately 374 feet, or 40 percent of the distance to the nearest municipal well. At other times the groundwater flow would revert to northeasterly. The distance from MW-3S to the simulated USGS contributing area is approximately 520 feet, which is also beyond the estimated flow distance. Despite the conservative assumptions, groundwater from the MW-3S area would fall well short of reaching the contributing area and the municipal well. Although MW-3S appears to have been located at the fringe of the municipal well's radius of influence during a brief transient three-week period under low groundwater conditions, it was not within the municipal well's capture zone.

Comparison of Shallow and Deep Groundwater Levels at MW-3 - H2H compared water levels in shallow well MW-3S, which screens the upper part of the aquifer, with its adjacent deeper well, MW-3D, which screens the lower part of the aquifer at the same horizon as the municipal wells. The apparent municipal well-induced drawdown effect is not observable in the deeper well data (Figure 4). Drawdown at the municipal production wells on the order of 11 feet or less is apparently restricted to the upper part of the aquifer included within MW-3S's screened interval. The drawdown effect is not observed in the MW-3D data. The reason for the difference is uncertain at this time. Review of concurrent municipal well pumping records may shed light on the causes. Possibilities include but are not limited to one or more of the following possible conditions:

- The drawdown effect at the distance of MW-3 from the municipal well only occurs in the shallow part of the aquifer;
- The relatively low magnitude and short duration of the drawdown effect do not exceed thresholds needed to transmit the effect from the upper to the lower part of the aquifer;
- Aquifer anisotropy (horizontal hydraulic conductivity is estimated as 10 times greater than vertical hydraulic conductivity) damps transmittal of near surface drawdown effects to the deeper part of the aquifer, e.g. relatively low sub-horizontal hydraulic conductivity seams may be present; or
- The effective radius of influence is smaller for the deep part of the aquifer because of greater hydraulic head attenuation with distance than the shallower parts of the aquifer possibly because of lower hydraulic conductivity.

Regardless of the operative conditions, it appears likely that groundwater flow in the deeper part of the aquifer adjacent to the municipal well intakes may persist in a northeasterly direction. In this case, well recharge water would not be affected by groundwater recharge from the vicinity of MW-3 or the proposed mine pond. It follows that the contributing area simulated by USGS for low recharge conditions is the area from which deeper groundwater directly recharges the municipal wells under high pumping rate conditions.

Effect of Mine Pond Water on Municipal Wells – It is improbable for any pond water to reach the municipal wells. Even if it did, the amount of intercepted mine pond seepage groundwater flowing to well no. 7 would be de minimis. Groundwater flows into the well's cone of depression radially from all directions. Groundwater from the direction of the mine would represent only a very small fraction of the inflow and would be diluted by a factor that generally depends upon the ratio of the mine water flow path width to the circumference of the cone of depression.

Concluding Remarks

The hydrogeologic data collected to date provide insight into the local hydrogeologic conditions. H2H maintains a technical position that the proposed mine pond would have a minimal inconsequential hydraulic interaction with and effect on the Town's wells. The potential for significant adverse impacts to the municipal well would be negligible.

To recap, the lines of evidence suggesting inconsequential effect include:

1. The contributing recharge area based on the USGS low flow condition simulations shows no connection with the proposed mine pond's flow path;

2. The complex hypothetical water flow path from the proposed mine pond to the municipal wells shows no direct connection;

3. The high potential for the existing ponds to serve as a recharge source (boundary) for the municipal wells;

4. The anticipated high quality of the proposed mine pond surface water;

5. The prevailing northeasterly groundwater flow direction in the proposed mine pond area as measured;

6. The transient low-amplitude water level disturbances (drawdown?) at MW-3S with incomplete flow pathway to nearest municipal well;

7. The discontinuity between the water level disturbance (drawdown?) effects in the shallow and deep parts of the aquifer; and

8. The dilution of potential mine pond water recharge to the municipal well because of precipitation recharge to the North Pond and the relatively narrow width of the inferred mine pond seepage water's transient hypothetical flow path toward the nearest municipal well.

Next Steps

H2H plans to complete the one-year hydrogeologic investigation and address all the data from all four quarters, especially the last two. One more site visit is planned for February 2020 to retrieve the water level recorder data. A report addendum will be issued in late winter that updates the findings and includes recommendations for long-term monitoring.

We would be happy to discuss this with you further. If you have any questions regarding this information, please contact me at 518.270.1620 ext. 115, or Rich Hisert at ext. 105.

Sincerely,

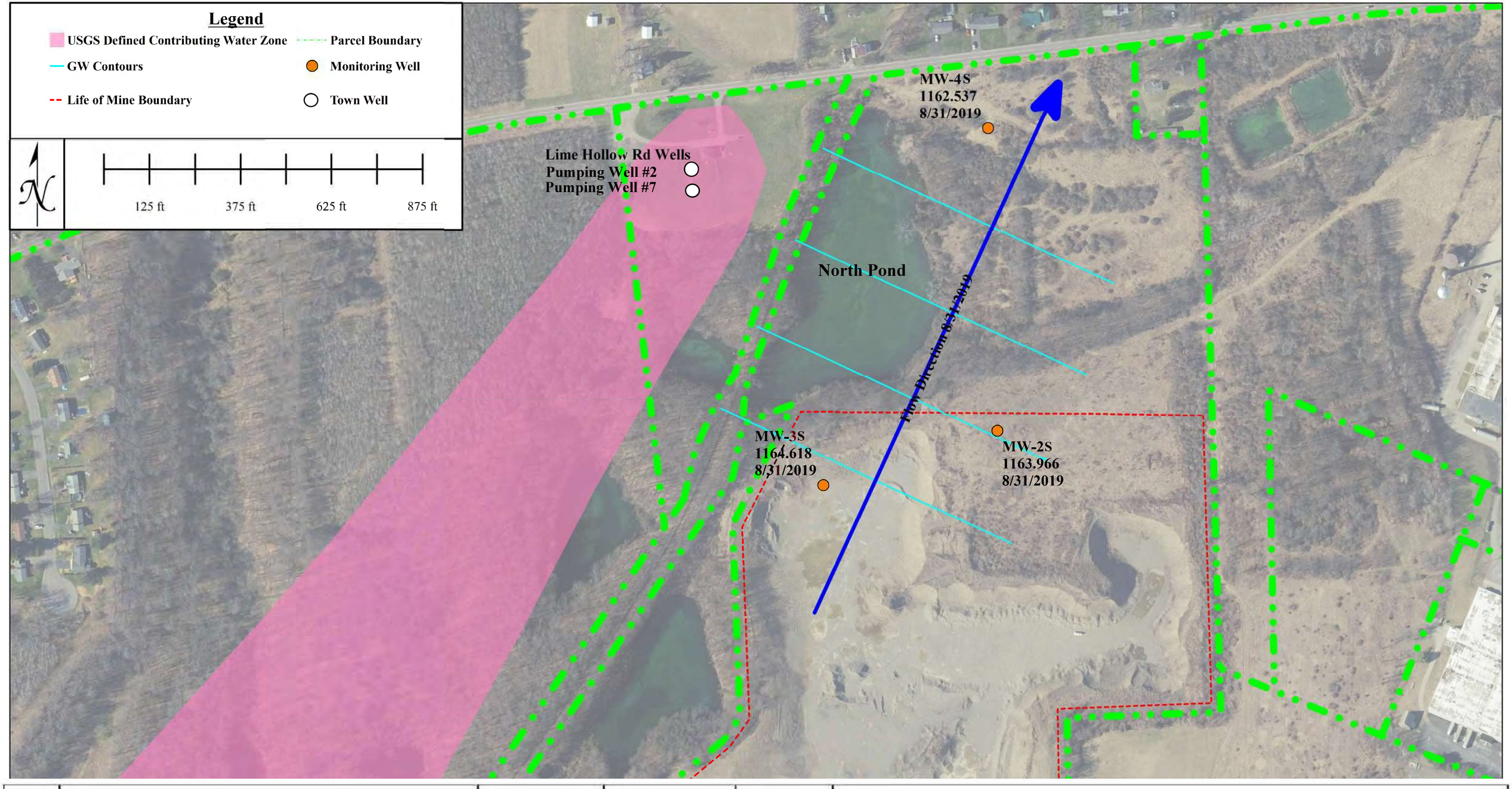
H2H Geoscience Engineering, PLLC

John E. Gansfuss, P.G.
Senior Project Engineering Geologist

William J. Oakes III
Project Geologist

Attachments as noted

c. Chris Henry, Rt 13 Rocks LLC
Joe Dlugolenski, Thomas Rigley, Region 7, NYSDEC
Amanda Barber, Cortland SWCD
John Proud, Town of Cortlandville
Mike Polacco, Will Oakes, Richard A. Hisert, PhD, P.G., H2H



DATE	REVISIONS RECORD/DESCRIPTION

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY:	WJO
CHECKED BY:	JG
DATE:	1/20/2020

Groundwater Flow Direction Under Mean Flow Conditions

Cortlandville Sand and Gravel

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H Geoscience Engineering

TROY, NY WWW.H2HASSOCIATES.COM

Figure 1

SHEET 1 OF 1

Figure 2 - Cortlandville Sand and Gravel - Hydrographs - 2/6/2019-11/20/2019

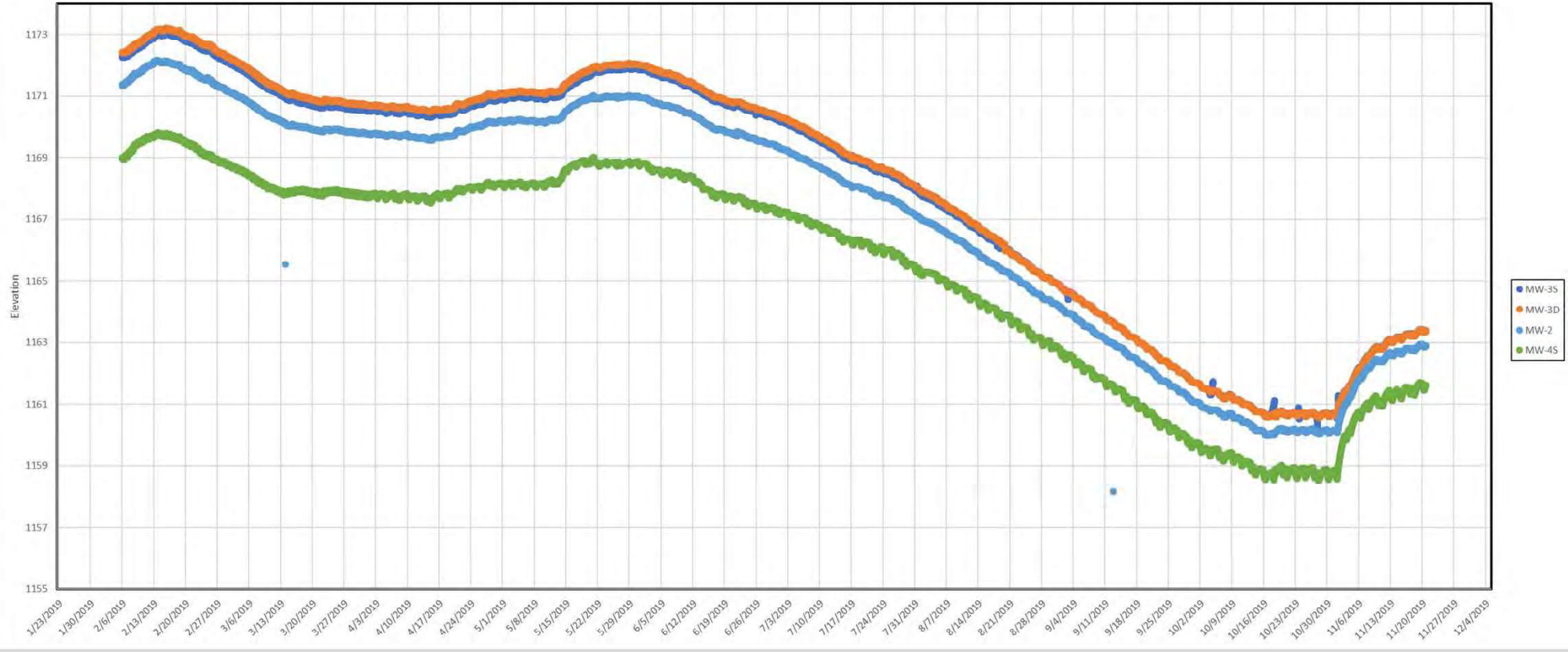


Figure 3 - Groundwater Flow Direction

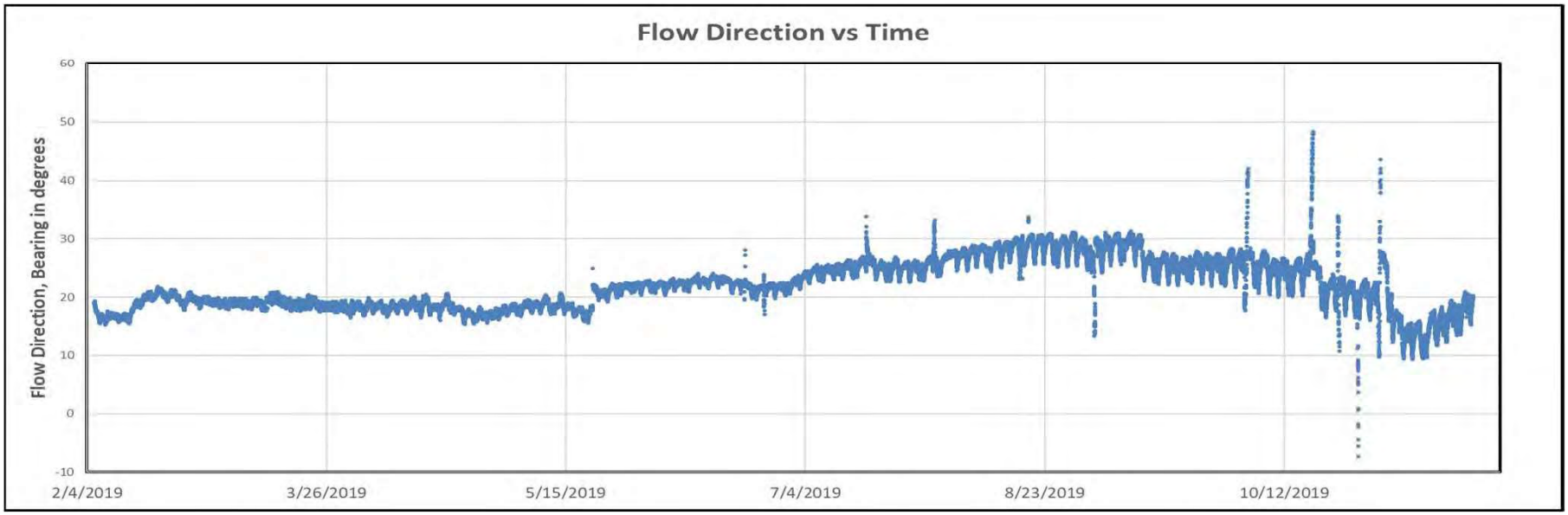
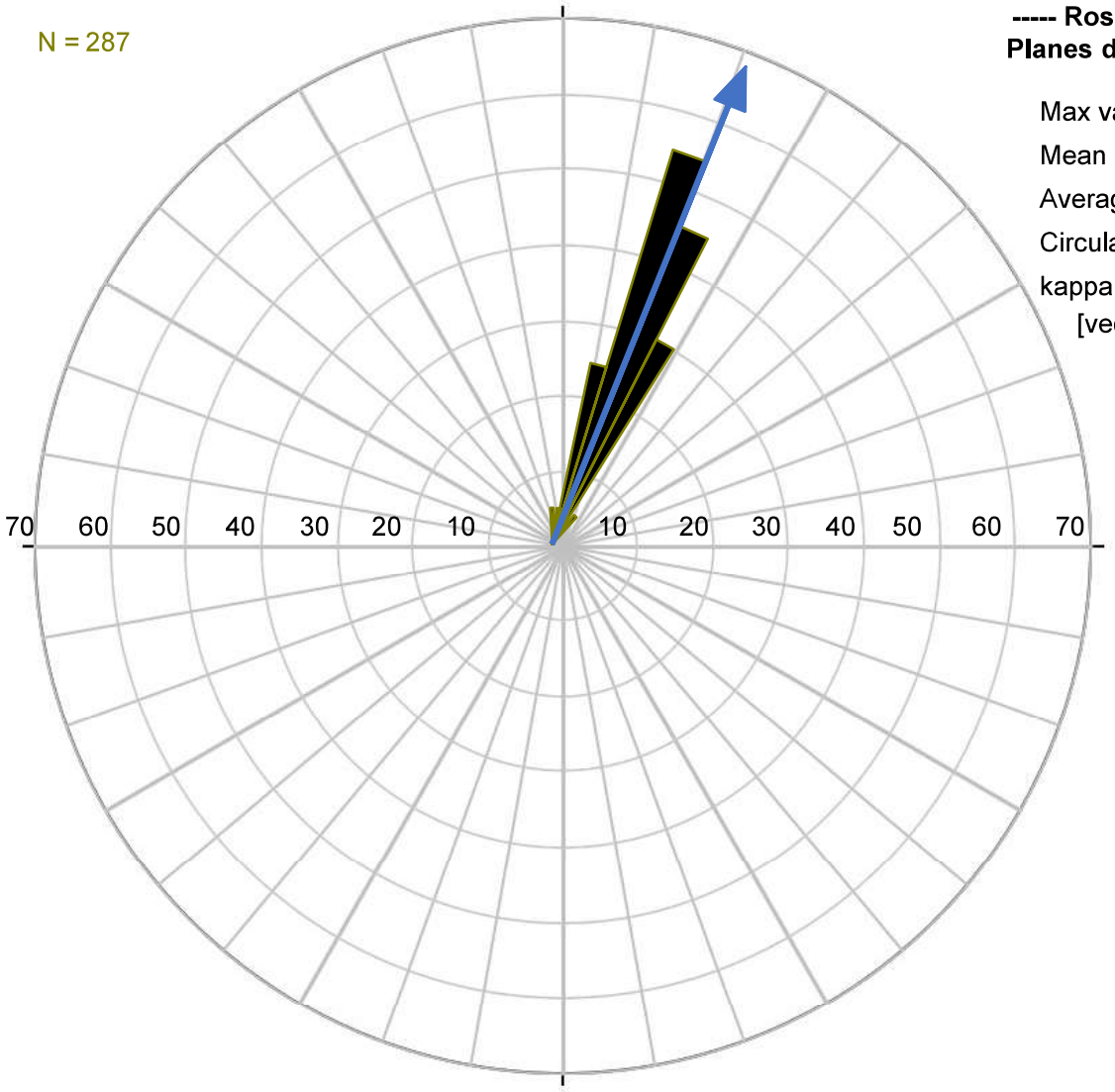


Figure 3a - Groundwater Flow Direction



----- Rose diagram/Circular Histogram | 1/16/2020 -----
Planes data set (petals parallel Flow direction):
MW-3S, MW-4S, MW-2

Max value	= 37.6% between 016° and 020°
Mean Vector	= 021.9° ± 00.3°
Average Length	= 0.9971
Circular Variance	= 0.0029
kappa	= 100.

[vector mean; uncertainty is 1 standard error,
for 95% confidence level multiply by 1.96]

Figure 4 - Cortlandville Sand and Gravel - Hydrographs - 10/1/2019-11/20/2019

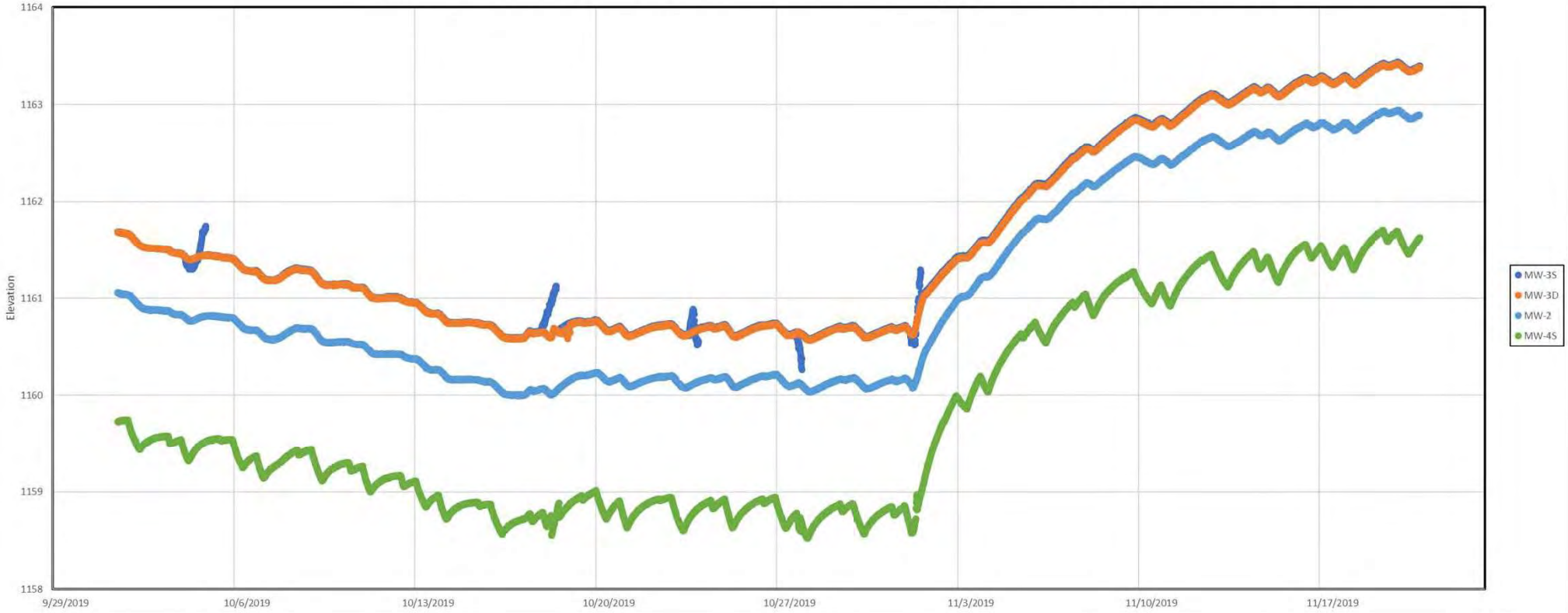
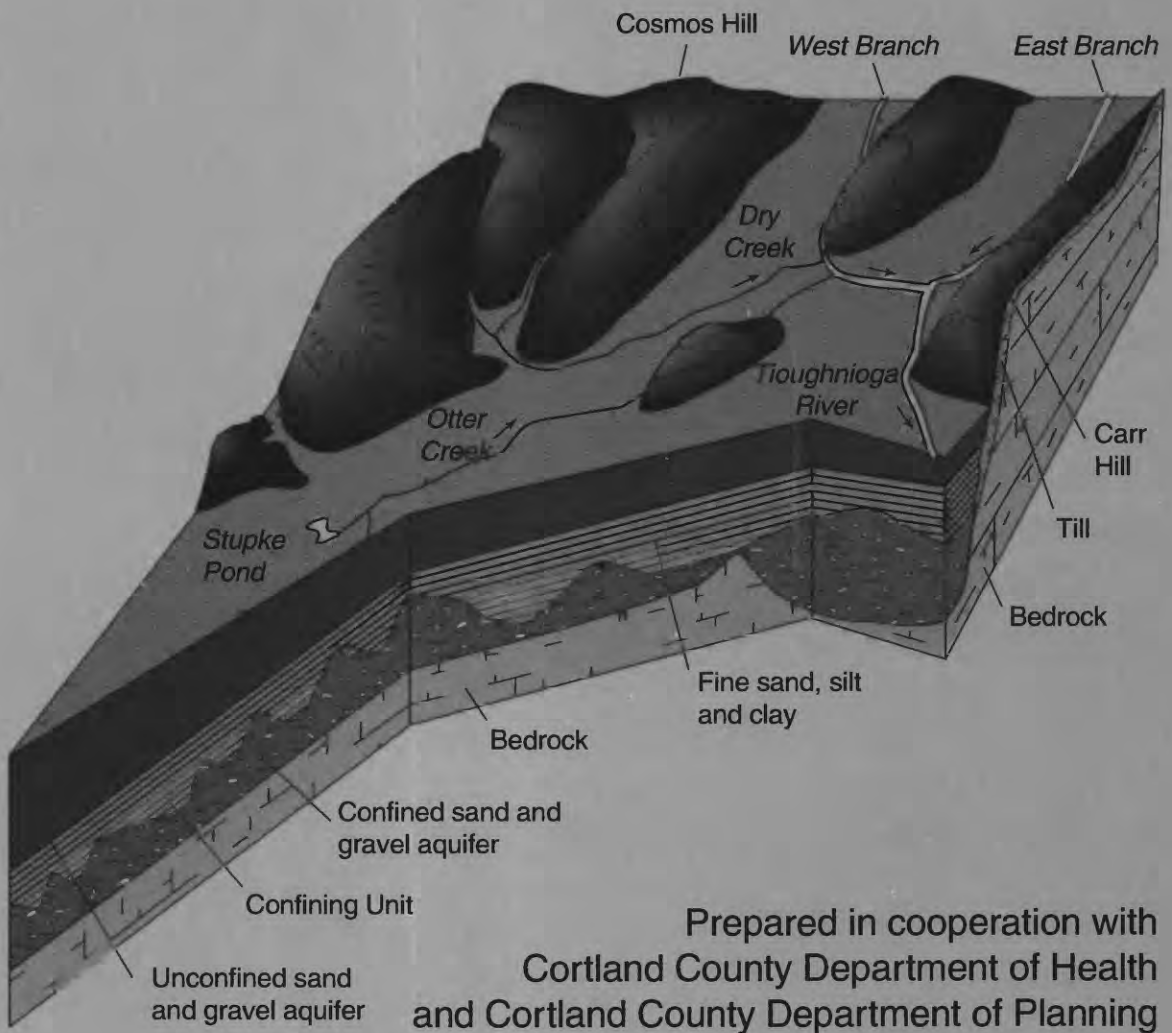


Exhibit D - Referenced Documents

HYDROGEOLOGY, WATER QUALITY, AND SIMULATION OF GROUND-WATER FLOW IN A GLACIAL-AQUIFER SYSTEM, CORTLAND COUNTY, NEW YORK



Prepared in cooperation with
Cortland County Department of Health
and Cortland County Department of Planning

USGS
science for a changing world

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 96-4255

Hydrology, Water-Quality, and Simulation of Ground-Water Flow in a Glacial Aquifer System, Cortland County, New York

By Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 96-4255

Prepared in cooperation with the
CORTLAND COUNTY DEPARTMENT OF HEALTH
CORTLAND COUNTY DEPARTMENT OF PLANNING



Ithaca, New York
1998

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Thomas J. Casadevall, Acting Director

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U.S. Geological Survey
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Ithaca, NY14850

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U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225-0286

CONTENTS

Abstract 1
Introduction 2
Purpose and Scope 3
Previous Investigations 3
Methods of Investigation 3
Well Inventory, Test Drilling, Levels, Water-Level Measurements, and Aquifer Test 4
Streamflow Measurements 4
Seismic-Refraction Surveys 4
Water Sampling and Analysis 4
Simulation Models 5
Description of the Study Area 5
Physiography and Bedrock Geology 5
Climate 6
Land Use 8
Acknowledgments 9
Hydrogeology 9
Glacial Geology 10
Bedrock Scouring 10
Kames and Kame Terraces 12
Valley Heads Moraine System 15
Proglacial Lakes and Lacustrine Deposits in Valleys 15
Glaciofluvial Sediments (Outwash) of the Valley Heads Episode 16
Ice Readvance and Drainage of Proglacial Lake During Late Stages of Deglaciation 16
Hydrology of the Glacial-Aquifer System 17
Geometry of Aquifers and Confining Unit 18
Hydraulic Conductivity 18
Unconfined Aquifer 19
Confined Aquifer 20
Confining Unit 20
Ground-Water Levels and Flowpaths 21
Unconfined Aquifer 21
Confined Aquifer 21
Sources of Recharge 22
Direct Infiltration of Precipitation on the Valley 22
Upland Sources 22
Induced Infiltration by Ground-Water Withdrawals 25
Infiltration from Recharge Basins 25
Ground-Water Discharge 25
Seepage to Streams 25
Municipal and Industrial Withdrawals 26
Underflow From the Study Area 26
Water Quality 26
Volatile Organic Compounds 28
Extent and Migration of Trichloroethylene in the Unconfined Aquifer 28
Horizontal Migration 28
Vertical Migration 29
Effects of Remediation Efforts 29
Long-Term Trends of Trichloroethylene Concentrations 35
Fate and Migration of Trichloroethylene 35
Inorganic Chemical Constituents and Physical Characteristics 38
Specific Conductance, pH, and Alkalinity 38
Chloride and Sodium 38
Trace Elements (Iron and Manganese) 39
Nitrogen 41
Temporal Changes 42
Ground-Water Chemistry and Land Use 42

Simulation of Ground-Water Flow 45
Description and Design of Numerical Model 45
Model Grid 47
Geometry of Model Layers 47
Hydraulic Conductivity 48
Unconfined Aquifer 48
Confined Aquifer 48
Stream-Aquifer Interaction 48
Boundary Conditions 49
Ground-Water Withdrawals and Recharge Basins 50
Model Calibration 50
Model Sensitivity 56
Model Applications 58
Areas Contributing Recharge to Municipal Wells 58
Flowpaths to Wells and Streams from Sources of Contamination 59
Typewriter Plant 59
Superfund Site 59
Summary 61
References Cited 64

APPENDIXES

1. Records of wells and test borings in the Cortland, N.Y., study area 67
2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area 75
3. Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area 81

PLATES

1-5 Maps of Cortland, N.Y. study area showing:
1. Well locations and surficial geology in a glacial-aquifer system.
2. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during high-recharge conditions in the unconfined glacial aquifer, Cortland, New York
3. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during average-recharge conditions in the unconfined glacial aquifer, Cortland, New York
4. Altitude of potentiometric surface, direction of ground-water flow, and contributing areas to public-water supply wells during low-recharge conditions in the unconfined glacial aquifer, Cortland, New York
5. Finite-difference grid and boundaries used to model the glacial-aquifer system

FIGURES

1. Map showing location and principal geographic features of study area, Cortland County, N.Y 2
2. Map showing physiographic features of New York 6
3. Diagram showing geologic time scale and when geologic units in the study area were formed 7
4. Graph showing annual precipitation at Cortland, 1973-92 8
5. Graph showing monthly precipitation and departure from normal at Cortland, from January 1990 through May 1993 9
6. Map showing preglacial drainage in study area 10
7. Hydrogeologic sections:
A. Section A-A′ 11
B. Section B-B′ 12
C. Section C-C′ 13

D. Section D-D' 14
8. Map showing bedrock surface altitude in Cortland study area 14
9. Map showing location of Valley Heads ice and moraines that dammed drainage in valleys of the Tioughnioga River basin 15
10. Map showing upper surface altitude of lacustrine unit in Cortland study area 17
11. Map showing positions of the Valley Heads ice, and of outwash that was deposited in valleys of the Tioughnioga River basin 18
12. Block diagram showing generalized hydrogeologic framework of the glacial-aquifer system in the Cortland study area 19
13. Block diagram showing sources of recharge to stratified drift in valleys in the glaciated Northeast 24
14. Map showing locations of streamflow-measurement sites in Cortland study area 27
15. Maps showing extent of trichloroethylene plume and contours of equal trichloroethylene concentration in Cortland study area:
A. April 3-5, 1990 30
B. September 17-20, 1990 31
C. April 27, 1993 32
16. Diagrams showing vertical distribution of TCE in ground water at two well sites: A. Well 341, 4,000 feet northeast of TCE source, July 19, 1990. B. Well 381, 750 feet from TCE source, September 23-26,1992 33
17. Graphs showing trichloroethylene concentration at three wells: A. Well 350, November 4, 1986-May 20, 1993. B. Well 347, December 12, 1986-May 20, 1993. C. Well 364, December 12, 1986-April 29, 1993 34
18. Diagram showing physical, chemical, and biological processes that affect the fate and distribution of trichloroethylene in the unconfined aquifer at Cortland 36
19. Diagram showing transformation pathways of trichloroethylene under anaerobic conditions 37
20. Graph showing dissolved chloride concentrations in water from wells at the City of Cortland well field for 1943-76, 1980, and 1990 41
21. Map showing distribution of dissolved chloride concentration in the unconfined aquifer in the Cortland area, April 1990 41
22. Boxplots showing concentration of alkalinity, dissolved calcium, nitrite plus nitrate, and dissolved chloride from selected wells in the Cortland, study area in 1976, 1980, and 1990:
A. By year. B. By land use 44
23. Geohydrologic section showing conceptual model of ground-water flow in the glacial-aquifer system in the Cortland study area 46
24. Maps showing location of active and inactive grid boundaries in layers 1-3 of the three-dimensional ground-water flow model in the Cortland study area 47
25. Maps showing simulated head for in model layers 1-3 during steady-state simulations:
A. high-recharge conditions 53
B. average-recharge conditions 54
C. low-recharge conditions 55
26. Graph showing results of sensitivity analyses for hydraulic head in the glacial-aquifer system in Cortland study area 56
27. Graphs showing results of sensitivity analyses for ground-water discharge to major streams during average recharge conditions in the glacial aquifer system in the Cortland study area:
A. West Branch Tioughnioga River B. Reaches A and B of Tioughnioga River 57
28. Maps showing flowpaths and traveltimes of ground water from two sources of contamination in Cortland study area during (A) high-, (B) average-, and (C) low-recharge conditions 60

TABLES

1. Land use in the Otter Creek-Dry Creek basin, Cortland County, N.Y., 1992 8
2. Results of aquifer tests in the glacial-aquifer system in the Cortland, N.Y. study area 20
3. Streamflow losses and gains in tributary streams in the Cortland study area, 1990-91 23
4. Ground-water discharge to West Branch Tioughnioga River, Tioughnioga River, and to Otter Creek during average- and low-flow conditions, 1991 25

5. Ground-water withdrawals from the Cortland study area by major pumping wells during low-, average-, and high-recharge conditions, 1990-91 27
6. Range of half-lives for trichloroethylene and its degradation products 38
7. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland study area during April and September 1990 39
8. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during: A. April 1990. B. September 1990 40
9. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water sampled during three studies in Cortland, N.Y. study area 43
10. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water in the Cortland, N.Y. study area, by land use 45
11. Difference between measured and simulated heads at 49 selected wells in the Cortland, N.Y. study area for high-, average-, and low-recharge conditions 51
12. Measured and simulated streamflow gains and losses, for selected stream reaches during high-, average-, and low-recharge conditions in the Cortland, N.Y. study area 52
13. Steady-state water budgets for the glacial-aquifer system at Cortland N.Y, for high-, average-, and low-recharge conditions 52

CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To Obtain
	Length	
inch (in.)	2.54	centimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Slope	
foot per mile (ft/mi)	0.1894	meter per kilometer
foot per foot (ft/ft)	0.3084	meter per meter
	Area	
square mile (mi^2)	2.590	square kilometer
acre	0.40483	hectare
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
inch per year (in/yr)	25.4	millimeter per year
million gallons per day (Mgal/d)	3.785	cubic meters per day
gallons per minute (gal/min)	0.06309	liter per second
feet per day	0.3084	meter per day
	Temperature	
degrees Fahrenheit (°F)	°C = 5/9 (°F-32)	degrees Celsius

Specific Conductance

microsiemens per centimeter at 25° Celsius (µS/cm)

Equivalent Concentration Terms

milligrams per liter (mg/L) = micrograms per gram (mg/g) = parts per million
micrograms per liter (µg/L) = micrograms per kilogram (µg/kg) = parts per billion

Vertical Datum: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Hydrogeology, Water Quality, and Simulation of Ground-Water Flow in a Glacial-Aquifer System, Cortland County, New York

By Todd S. Miller, Donald A. Sherwood, Peter M. Jeffers, and Nancy Mueller

Abstract

The glacial-aquifer system in Cortland County consists of an unconfined sand and gravel aquifer 40 to 80 feet thick, underlain by a lacustrine and till unit 1 to 155 feet thick that, in turn, is underlain by a confined sand and gravel aquifer 1 to 170 feet thick. The two aquifers are hydraulically connected in some places along the valley walls where the confining layer is absent.

Water in the unconfined aquifer generally moves from areas of recharge along the valley walls toward the center of the valley, then flows northeastward down the Otter Creek-Dry Creek valley and discharges to pumping wells, the West Branch Tioughnioga River, and the Tioughnioga River. Water is pumped from the unconfined aquifer at municipal and industrial wells at a rate of 6.76 to 7.20 million gallons per day.

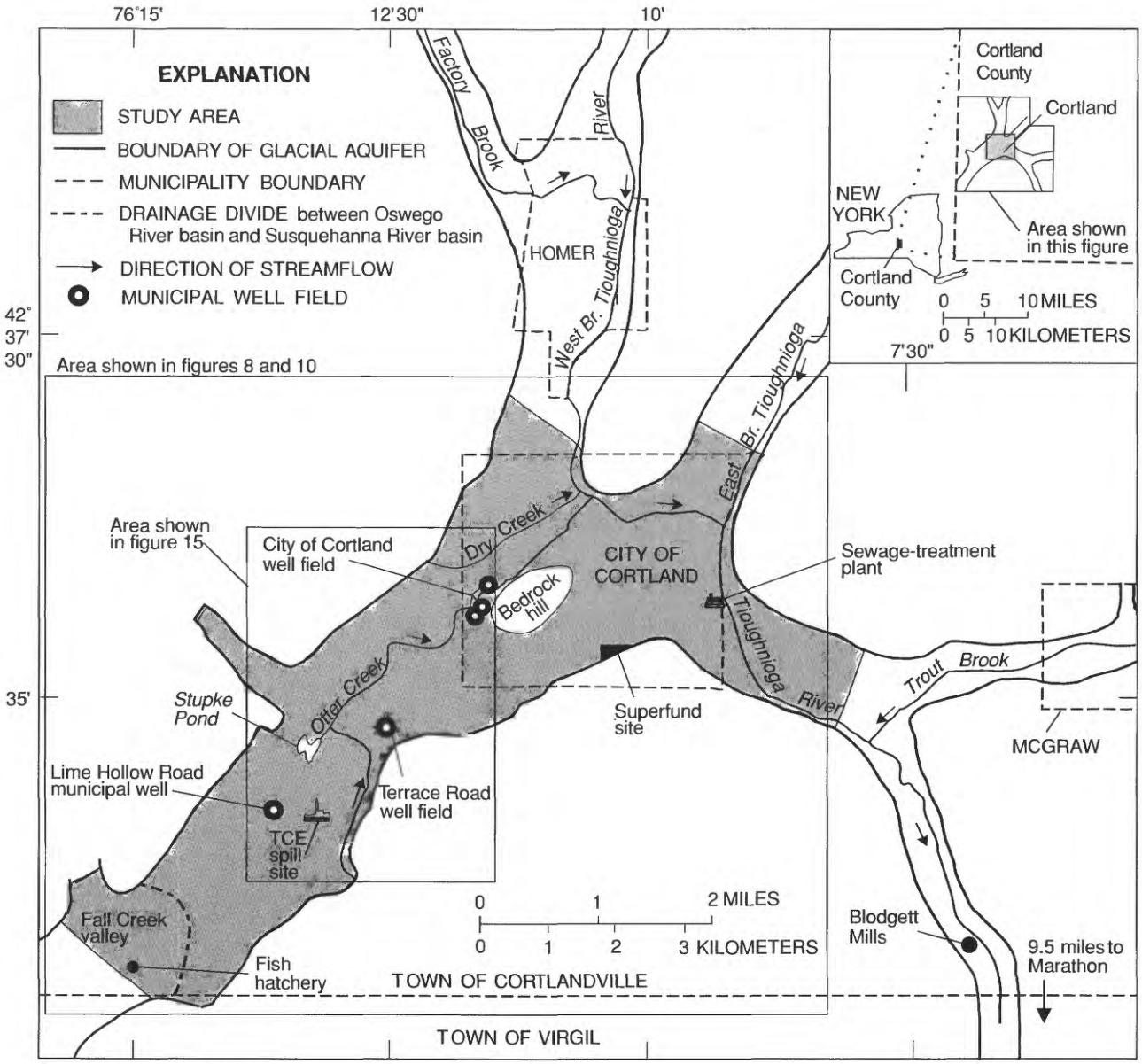
Trichloroethylene (TCE) that was detected in water samples from several wells in 1986 was considered a threat to municipal-water supplies. Results of ground-water sampling in April and September 1990 and in April 1993 indicated that a TCE plume, as defined by concentrations equal to or greater than 5 micrograms per liter, had migrated 1.25 miles northeastward in the unconfined aquifer from a spill area at a typewriter production plant in the west-central part of the aquifer. The extent of the plume was the same in all three sampling periods, indicating that steady-state conditions had been reached. TCE concentrations were below the U.S. Environmental Protection Agency's "Maximum Contaminant Level" of 5 micrograms per liter 1 mile upgradient from the City of Cortland municipal wells, which are 2.25 miles downgradient (northeast) of the spill area. Inorganic- and organic-chemical analyses of ground-water samples collected during April and September 1990 indicate that water generally meets New York State drinking-water standards except in the part of the unconfined aquifer that is contaminated by TCE.

A ground-water flow model (MODFLOW) was used to simulate high-, average-, and low-recharge conditions in the aquifer system, and a particle-tracking routine (MODPATH) was used with output from the flow model to estimate the area contributing water to municipal wells and to delineate flowpaths of ground water from two sources of contamination. The simulated water budgets indicate that the largest source of recharge to the aquifer system (55 to 58 percent of total recharge) is from the uplands; this recharge includes seepage losses from upland streams that flow onto the aquifer, and unchanneled runoff and ground-water inflow from the uplands. The second-largest source of recharge is precipitation (33 to 39 percent of total recharge) that directly falls over the aquifer. Most ground-water discharge (57 to 71 percent of total) occurs as seepage from the aquifer system into streams, and some (26 to 40 percent of the total) occurs as discharge to pumping wells. Results of particle-tracking analyses indicate that the contributing areas are U-shaped and extend over most of the aquifer upgradient from the pumping wells. The largest contributing areas were obtained in the simulation of low-recharge conditions, and the smallest areas were obtained in the simulation of high-recharge conditions. Ground-water flowpaths from sources of contamination shifted southward in the low-recharge simulation in response to changes in the distribution of recharge.

INTRODUCTION

Glacial aquifers are the principal sources of water for many communities in upstate New York, but the high permeability and shallow depth to the water table in these aquifers make them highly susceptible to contamination. Potential contamination sources can include leaking petroleum-product storage tanks, leachate from landfills and septic systems, road-deicing salts, agricultural pesticides and fertilizers, and chemical spills (such as solvents and degreasers) at commercial and industrial facilities. Protection of these aquifers from contamination is critical in areas where ground-water use is great and alternative sources of drinking water are not readily available. Water managers need information on (1) the size and location of the areas that contribute recharge to their public-supply wells, and (2) the direction and rate of flow of ground water from known or potential sources of contamination, to protect the quality of the water.

The City of Cortland and surrounding communities obtain water supplies from a highly productive glacial aquifer system (fig. 1). This system has been designated as a "Primary Aquifer" by the New York



Base from U.S.Geological Survey
1:62,500 series: Cortland (1903) and Groton (1903)

Figure 1. Location and principal geographic features of study area, Cortland County, N.Y.

State Department of Environmental Conservation and as a "Sole Source Aquifer" by the U.S. Environmental Protection Agency (EPA) under the Safe Drinking Water Act.

Several parts of the glacial-aquifer system have been contaminated by: (1) solvents and degreasers, including trichloroethylene (TCE), trichloroethane (TCA), and dichloroethylene (DCE); (2) gasoline that leaked from tanks from at least two service stations; (3) bacteria from failing septic systems; and (4) leachate from inactive hazardous-waste sites. Concentrations of chloride and nitrate in the aquifer generally meet State standards for drinking water but have been steadily increasing since the 1950's as a result of road salt, lawn and garden fertilizers, and leachate from septic systems (Buller and others, 1978).

A study of ground-water contamination (O'Brien and Gere Engineers, Inc., 1987) at a typewriter-production plant in the western part of the aquifer, at which solvents and degreasers were found, resulted in a legal settlement that included funds to study the hydrogeologic framework of the aquifer, the migration of contaminants from the site, and the investigation of other possible sources of offsite contamination. In 1989, the U.S. Geological Survey (USGS), in cooperation with the Cortland County Departments of Health and Planning, began a 3 1/2-year hydrogeologic, water-quality, and numerical modeling study of the glacial-aquifer system in Cortland County. Major objectives of the study were to increase knowledge on how the aquifer system works; provide a numerical ground-water flow model to help manage the ground-water resource; and to determine (a) the extent of a TCE plume, (b) the current ground-water quality in the aquifer, (c) changes (if any) in water quality during the 15-year period since wells were sampled by Buller and others (1978), and (d) whether the ground water meets New York State drinking-water standards.

Purpose and Scope

This report describes the hydrogeology of the glacial-aquifer system including (1) the geologic framework; (2) the ground-water flow system, including ground-water and surface-water interaction, water levels, and water budgets; (3) the water quality, with an emphasis on the extent, trends, and fate of TCE; and (4) results of model simulations of ground-water flow for high-, average-, and low-recharge conditions, including (a) the estimation of recharge areas to municipal wells, and (b) the advective flowpaths of contaminants migrating from sources of contamination. Also included are (1) geologic sections; (2) maps and diagrams depicting well locations, geology, ground-water levels, and direction of ground-water flow for measured and simulated high-, average-, and low-recharge conditions; recharge areas to public water supplies, concentrations of TCE and several other selected chemical constituents, and flowpaths and traveltimes of contaminants; and (3) tables of climate and land-use data, well records, a water budget, and data on hydraulic properties of the aquifers and on water quality.

Previous Investigations

USGS investigations of glacial aquifers in Cortland County began when Asselstine (1946) identified sources of ground-water supplies and collected well and water-quality data. Randall (1972) collected well and test-boring records in the study area. Buller and others (1978) and Miller and others (1981) studied surficial geology, movement of ground water, and water quality in the Otter Creek-Dry Creek valley. Cosner and Harsh (1978) constructed a two-dimensional ground-water model of the glacial aquifer in the Otter Creek-Dry Creek valley; this model was later modified by Reynolds (1985).

Several hydrogeological and engineering consultants conducted site-specific studies at chemical-spill sites in the study area. O'Brien and Gere Engineers, Inc. (1987 and 1990) studied the hydrogeology and organic-chemical contamination in ground water at the typewriter-production plant in the western part of the study area. Blasland, Bouck and Lee, Engineers (1992) investigated the hydrogeology and extent of chemical contamination of an EPA-designated "Superfund site," locally known as the Rosen Superfund Site, in the southeastern part of the study area (pl. 1). Apfel (1967) studied the availability of ground water at a machine-tool plant in the southwestern part of the study area, and Galson Technical Services, Inc., (1988) investigated the hydrogeology and extent of a petroleum-product spill at that site. Resource Engineering (1987) investigated the hydrogeology and extent of contamination from paint-stripping activities at a center for the handicapped in the northern part of the study area.

Methods of Investigation

Hydrogeologic data were collected from several sources, including published reports by the USGS

consulting firms, and data in files of local drillers and government agencies. USGS fieldwork during this study included a well inventory, test drilling, leveling, an aquifer test, water-level measurements, streamflow measurements, two seismic-refraction surveys, and three rounds of ground-water sampling.

Well Inventory, Test Drilling, Levels, Water-level Measurements, and Aquifer Test

Records of 215 wells were collected and compiled (appendix 1). The well inventory was augmented by test drilling in which 20 observation wells and 4 test holes were installed by auger, cable-tool, and air-rotary rigs to obtain data on stratigraphy, hydraulic properties, water quality, and water levels in the aquifers.

Leveling was done to about 100 wells to determine the elevations of water-level-measuring points, which were mostly the tops of the well casings. These elevations were determined by standard surveying methods (Kennedy, 1990) and are generally accurate to within 0.01 ft. Levels were also run to determine channel profiles of major streams that flow over the aquifer. The stream-channel elevations were used in the stream-routing package for the ground-water models.

Water levels were measured monthly in 50 wells from July 1989 through October 1991 and during three synoptic rounds in more than 100 wells during March 28-29, 1990 (high-recharge conditions), May 28-June 4, 1991 (average-recharge conditions), and October 7-9, 1991 (low-recharge conditions). These water-level data were contoured to show the potentiometric surfaces (pls. 2 through 4) for high-, average-, and low-recharge conditions and were used to calibrate the models.

An aquifer test was conducted July 16, 1991 at the Town of Cortlandville municipal well at Lime Hollow Road (fig. 1) to calculate the hydraulic conductivity of the aquifer materials. Drawdown data were analyzed through a curve-fitting procedure that uses type curves developed by Nueman (1974) for partially penetrating wells in an unconfined aquifer.

Streamflow Measurements

Streamflow was measured by current meters in several reaches of most streams in the study area during each of the three recharge conditions that were modeled; techniques are described by Buchanan and Somers (1969). Streamflow measurements were used to identify the location and the amount of gain or loss in streams.

Seismic-Refraction Surveys

Seismic-refraction surveys were conducted at two sites (pl. 1) to supplement data from test drilling. These surveys obtained continuous records on depth to water table and to bedrock. Seismic-refraction techniques used in this study are described by Haeni (1988). A series of 12 geophones spaced 100 ft apart were laid on the ground, and arrival times of compressional waves generated by explosives were recorded and plotted as a function of source-to-geophone distances. A three-layer (unsaturated unconsolidated sediments, saturated unconsolidated sediments, and top of bedrock) boundary-formula computer analysis (Scott and others, 1972) was used to calculate depths to water table and to bedrock.

Water Sampling and Analysis

Water samples were collected from wells and streams in April 1990, September 1990, and April 1993. The main purpose of the two 1990 sampling rounds was to map the extent of TCE migrating from the former typewriter-manufacturing plant in the western part of the aquifer under high- and low-recharge conditions and to define the general chemical quality of ground water throughout the study area. The purpose of the April 1993 sampling was to evaluate what effects remedial practices used at the typewriter plant were having on concentrations of TCE in ground water.

Selection of purging techniques to remove standing water from well casings before sample collection depended on well construction and water-yielding capacity of the well. At least three volumes of water were pumped or bailed from monitoring wells with good yield prior to sample collection. Monitoring wells with low yield were pumped dry, then allowed to partly recover before they were sampled. Large wells (6-in. diameter and larger) were purged with a stainless-steel submersible pump or a 4-in. diameter bailer; wells of 2-in. diameter and smaller were purged either by a Teflon[1] bladder pump, a peristaltic pump (with Tygon tubing), or a stainless-steel bailer. The pumps of domestic wells were turned on for 10 to 15 minutes (the estimated time for evacuation of three volumes of standing water in the casing) before sample was

[1] Use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government.

collected. All sampling and purging equipment were thoroughly cleaned between sampling.

The Chemistry Department at State University of New York (SUNY) College at Cortland analyzed the water samples collected in April 1990 for (1) pH, specific conductance, and total alkalinity; (2) common ions (calcium, chloride, magnesium, sodium, and potassium; nitrate as nitrogen); and (3) volatile organic compounds (VOCs). Temperature and specific conductance of water was measured in the field at the time samples were collected.

The SUNY Chemistry Department also analyzed water samples collected in September 1990 and June 1993 for VOCs. The USGS National Water-Quality Laboratory in Denver, Co., analyzed water samples collected in September 1990 for nutrients, metals and common anions. VOC analyses were done by purge-and-trap/gas chromatograph methods, modified from USEPA 501 methods (U.S. Environmental Protection Agency, 1979).

Quality-control procedures for samples collected during April 1990 consisted of analyses of duplicate samples, replicate samples, and field and laboratory spikes of inorganic constituents. Two samples that were to be analyzed for VOCs were split and spiked; one set consisting of two samples was sent to the USGS National Water Quality Laboratory, and one set was sent to the Chemistry Department at SUNY College at Cortland. Analytical results and recoveries reported by the two laboratories compared favorably.

Simulation Models

A three-dimensional, finite-difference, groundwater flow model, MODFLOW (McDonald and Harbaugh, 1988), was developed to represent the glacial aquifer system and was used for steady-state simulation of three recharge conditions (high, average, and low). The models were used to compute water levels and water budgets. Particle-tracking postprocessing programs, MODPATH and MODPATH-PLOT (Pollock, 1989), were used to estimate the recharge areas of municipal wells, the flowpaths of the advective phase of chemical migration, and traveltime of the advective phase of contaminants migrating from chemical-spill sites to discharge areas.

Description of Study Area

The study area, in the Otter Creek-Dry Creek valley and in parts of West Branch, East Branch, and Tioughnioga River valleys (fig. 1), forms a rectangle 6 mi long by 2 mi wide in the Town of Cortlandville, in the southwestern part of Cortland County (fig. 1). The City of Cortland lies within the study area and within the Town of Cortlandville. The population of the Cortland area increased about 7 percent during 1970-90 and, in 1990, was about 24,100 (U.S. Bureau of Census, 1990).

Physiography and Bedrock Geology

The study area is in the glaciated part of the Allegheny Plateau (fig. 2). The rocks of the plateau consist of gently folded layers of shale with some siltstone, sandstone, and limestone that dip to the south at 40 ft/mi. These rocks are part of the "Catskill Delta" complex (Woodrow and Sevon, 1985) and were deposited in marine seas during late Devonian time (fig. 3). The rocks were then uplifted above sea level millions of years later and then eroded to a nearly flat plain by the middle of the Cenozoic (Isachsen and others, 1991). The rocks were again uplifted during Late Cenozoic time to form the Allegheny Plateau, which was dissected by streams to form a hilly terrain.

Bedrock in the study area is far less permeable than the overlying glacial sand and gravel aquifers. Bedrock forms the bottom of the aquifer system in the study area. Relief in the study area is about 720 ft, and summits are as high as 1,800 ft above sea level. The lowest elevation, about 1,080 ft, is the channel of Tioughnioga River, in the eastern part of the study area. The bedrock surface has a relief of about 1,000 ft in areas where it is more than 300 ft below the flood plain. Uplands have moderately sloping hillsides ranging from 9 to 18 percent.

Muller (1970) described the drainage pattern at Cortland as "the hub of five valleys that converge from the north, northeast, east, south, and southwest" (fig. 1). All five valleys drain into the Tioughnioga River in the eastern part of the study area. Most of the study area is drained by Otter Creek and Dry Creek, which flow northeastward and drain into the West Branch Tioughnioga River in the north-central part of the study area. The western part of the study area contains several kettle ponds, some with bottom sediments of marl that have been mined in the past. Most of the ponds are dry during late summer and fall. Stupke

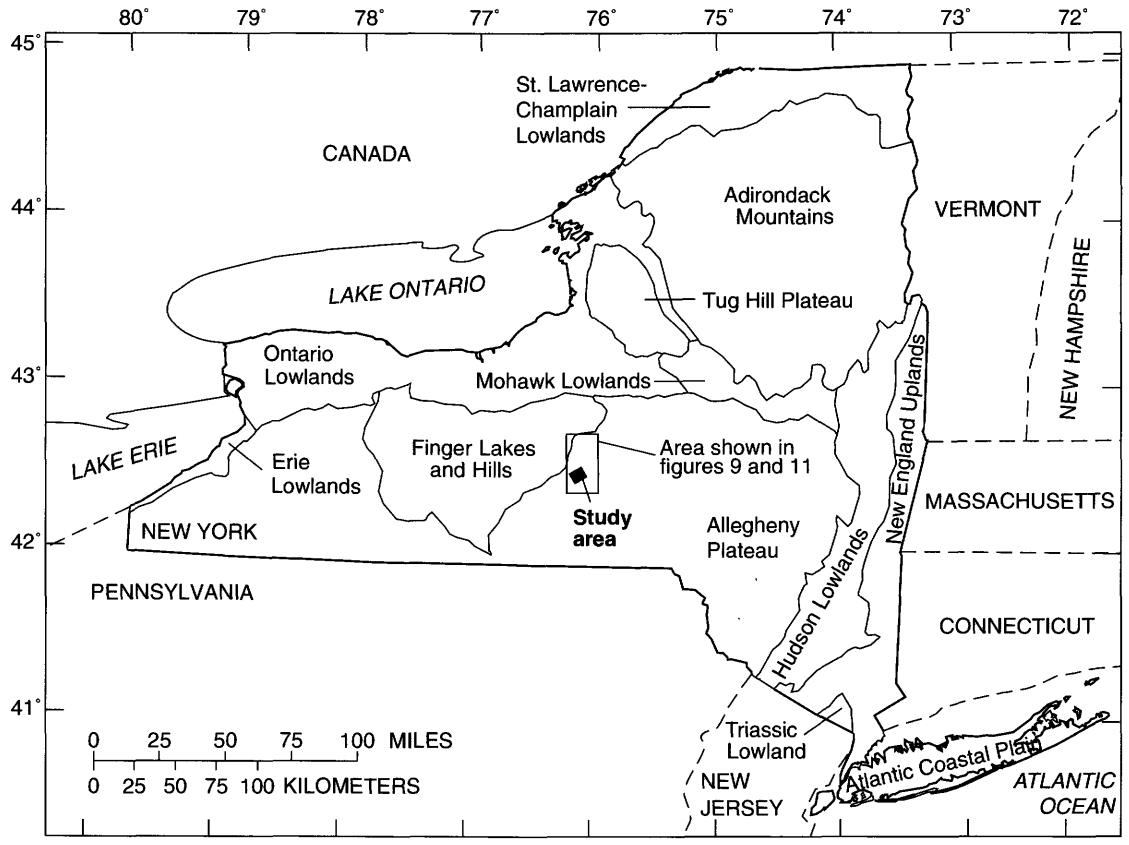


Figure 2. Physiographic features of New York. (Modified from Cressey, 1966, fig. 9, p. 26.)

pond (fig. 1) is a large kettle pond that has no inlet; its outlet is a headwater tributary of Otter Creek.

Climate

Two types of air masses provide the dominant weather characteristics of Cortland—cold, dry airmasses from the northern interior of the continent, which prevail during the cold half of the year, and warm, humid airmasses from the Gulf of Mexico and southwestern part of the continent, which are typical during the warm half of the year (Dethier, 1966). A third, but less common type is the marine airmasses, which move along the North Atlantic Coast (northeasters) and produce occasional cool, wet, cloudy conditions. Large bodies of water near Cortland, such as Lake Ontario, 70 mi to the north, tend to moderate air temperatures and supply moisture to the cold, continental airmasses during the cold season.

Mean annual temperature of Cortland is 45.7 °F (National Oceanic and Atmospheric Administration, 1990). Winters are long, cloudy, and cold, with minimum temperatures ranging from 0 to -10 °F for an average of 13 days per winter (National Oceanic and Atmospheric Administration, 1992). Summer has warm daytime temperatures, cool evenings, and occasional periods of high, uncomfortable humidity. Summer daytime temperatures typically range from the mid-70s to mid-80s reach 90 °F or higher on average of 8 days a year (Roffner, 1985).

The annual precipitation at Cortland for 1973-92 is shown in figure 4; the average for the 20-year period was 41.2 in., and the range was from 32.3 in. in 1982 to 50.6 in. in 1977. Monthly precipitation is normally distributed fairly uniformly throughout the year, but from January 1990 to May 1993 it ranged from 1.35 in. in March 1990 to 8.42 in. in July 1992 (fig. 5). Irrigation for agricultural crops is rarely needed. Severe droughts are rare, but minor droughts that occur periodically cause concern about degradation of water quality of streams during extreme low-flow conditions and of fish survival in reaches that are downgradient of sewage discharges.

Snowfall in Cortland averaged 90.9 in. during 1973-92 (National Oceanic and Atmospheric Administration, 1992). Continuous snow cover typically starts in late December and lasts until mid-March. Some snow is a result of the "lake effect," a process whereby an artic cold front from Canada crosses Lake

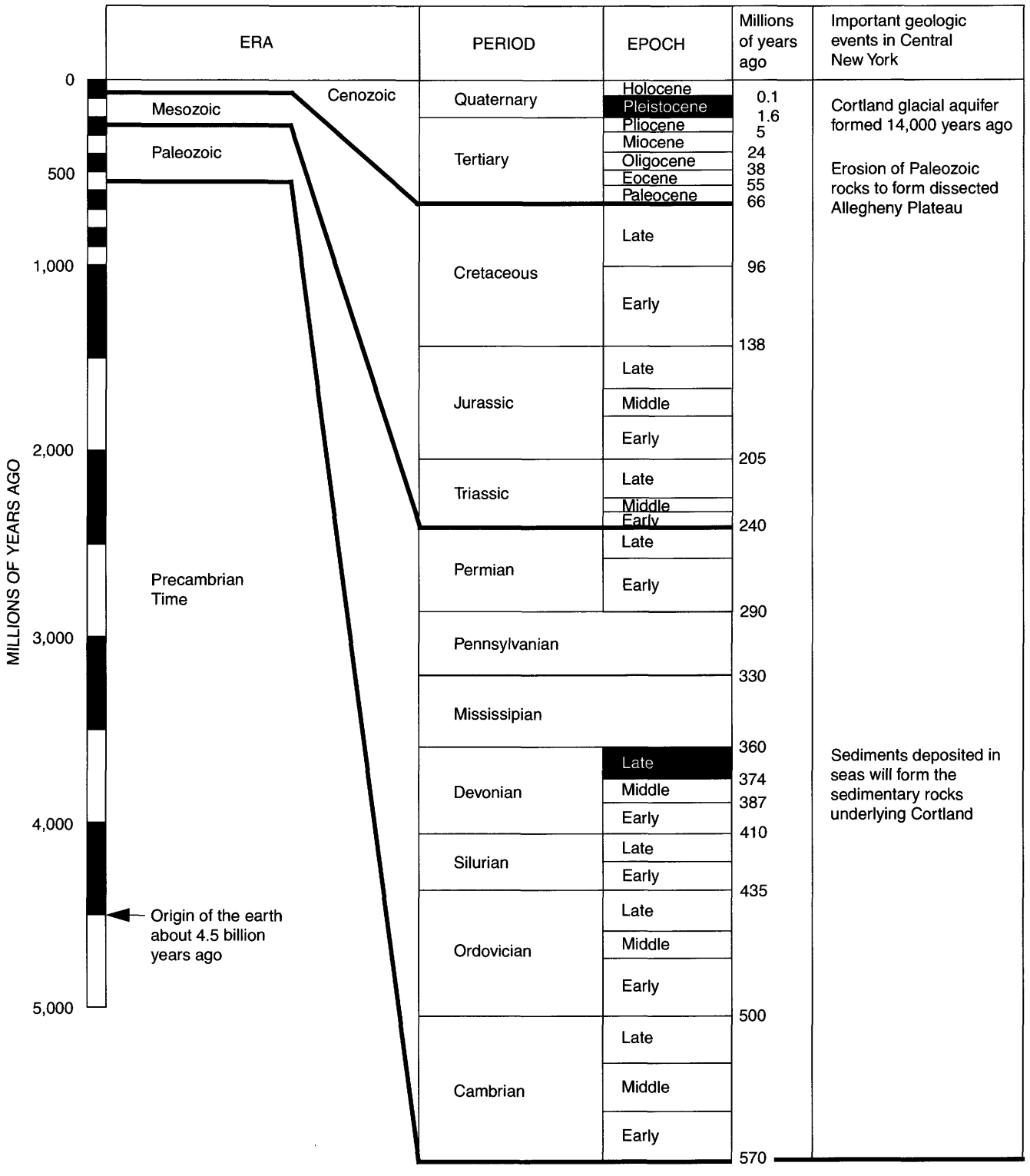


Figure 3. Geologic time scale.

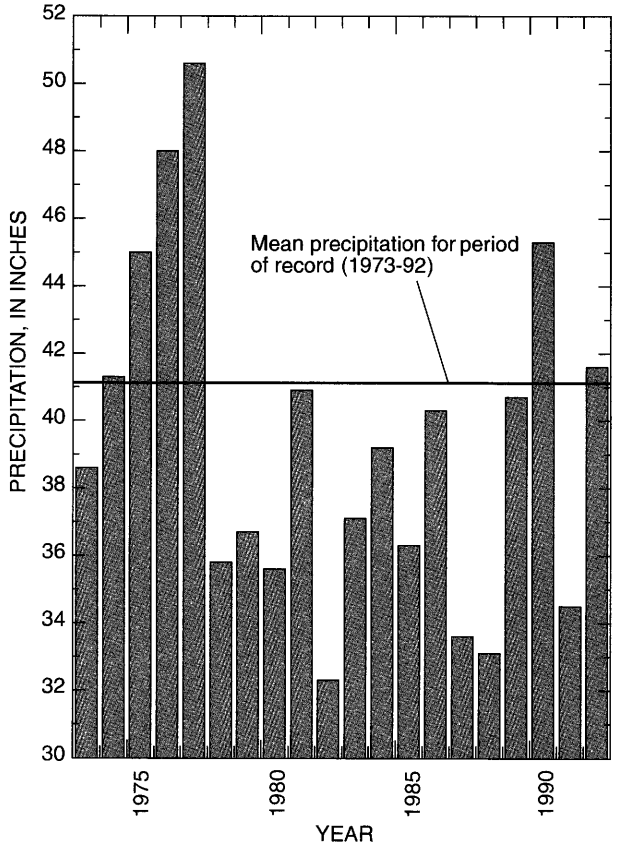


Figure 4. Annual precipitation at Cortland, N.Y., 1973-92. (Data from National Oceanic and Atmospheric Administration, 1992)

Ontario and the Finger Lakes, is warmed in the low elevations and picks up moisture, and then releases some of the moisture as snow as the air rises over the uplands (orographic effects). When the lakes freeze by midwinter,"lake effect" snow becomes infrequent because the ice prevents evaporation off the lake. The heaviest snowfalls, typically 1 to 2 ft, occur when northeasters move inland and cross over or close to Cortland. A severe "northeaster," locally known as the "Blizzard of 93," dumped 3 ft of snow on Cortland during March 13-14, 1993 (National Oceanic and Atmospheric Administration, 1993).

Land Use

Land use in the Otter Creek-Dry Creek basin was inventoried from the 1992 Cortland County Tax Assessment Rolls and from field inspections made in 1992 (table 1).

Agricultural land occupies 35.5 percent of the Otter Creek-Dry Creek drainage basin (5 percent of land over the aquifer). The study area contains three working farms that grow mostly hay and corn. Agricultural land has been decreasing since the 1950's. The prime farmland is in flat outwash valleys, which are also most suitable for urban development; consequently, pressure to convert farmland to residential, commercial, and industrial has increased. The trend of decreasing farm land will probably continue.

Residential, the largest land use, accounts for 29 percent of the Otter Creek-Dry Creek drainage basin. Most of the residential area is within the City of Cortland, and all residential areas within the City of Cortland are sewered. Surrounding the city, in the Town of Cortlandville, are many large suburban housing developments. Most of the residential areas in the Town of Cortlandville are sewered, although residential growth has recently begun to outpace the extension of sewer lines. Most of the residential areas in the bedrock uplands are unsewered.

Commercial land use (8 percent of the Otter Creek-Dry Creek drainage basin) has been continually expanding, especially since 1985, primarily in the form of strip development along major transportation corridors. Most commerce consists of retail sales and services.

Industrial land use also constitutes 8 percent of the Otter Creek-Dry Creek basin. Manufacturing, processing, and warehousing are included in this category. Major products in 1992 were foundation garments, plastic houseware, polystyrene packaging, industrial filters, fishing line, machine tools, and wood products. (The typewriter plant moved to Mexico in 1994.)

Sand and gravel mining constitutes about 2.8 percent of land in the Otter Creek-Dry Creek drainage basin. Most of the gravel is extracted for asphalt production.

Table 1. Land use in the Otter Creek-Dry Creek basin, Cortland County, N.Y., 1992
[Data from Cortland Department of Planning, 1992]

Land use	Percentage of total basin area
Agricultural cropland and pasture	35.5
Residential (sewered)	19
Residential (unsewered)	10
Commercial	8
Industrial	8
Forest and brushland	5
Churches, institutions, and public services	4.4
Parks, athletic fields, and golf courses	3
Sand and gravel mining	2.8
Major transportation corridors	2.0
Water and wetlands	0.9
Other recreational areas	0.8
Cemeteries	0.6

Public land constitutes 7 percent of the Otter Creek-Dry Creek drainage basin. Fortuitously, the City of Cortland owns a 180-acre forested watershed that borders the city's well field; thus, the city's water managers have been able to protect their ground-water supply from contamination, largely by controlling the land use on this property. Other substantial public lands in the study area are the SUNY college campus and a 100-acre fish laboratory owned by the U.S. Fish and Wildlife Service. The campus extends over the aquifer and a bedrock hill (pl. 1). The fish laboratory is on the west side of the ground-water divide in the western part of the aquifer. Other small parcels of public lands include municipal recreational parks and government institution and service sites.

Regulation is the primary means of controlling land use in the study area. Both the City of Cortland and the Town of Cortlandville have zoning ordinances, subdivision controls, and land-use plans. At the County level, the Cortland County Health Department enforces the New York State Sanitary Code, and the Cortland County Planning Board reviews land-use proposals of countywide significance. The Town of Cortlandville adopted an Aquifer Protection District amendment to its zoning ordinance in 1988, to regulate certain land uses over the aquifer.

Acknowledgments

Special thanks are extended to James Feuss, Director of Cortland County Health Department, for providing well and chemical data. Thanks are also extended to Douglas Withey, Superintendent of Cortland County Water Board, for providing pumping data and access for collection of hydrogeologic data in the Waterworks area. Thanks are also extended to Hayne Smith, Town of Cortlandville Engineer, for arranging the aquifer test at the municipal well at Lime Hollow Road.

HYDROGEOLOGY

The glacial aquifer system in the study area, and the ground-water and surface-water flow conditions within it, are the result of glacial processes. Hydrogeologists use concepts and principles of geologic processes and the chronological order in which they

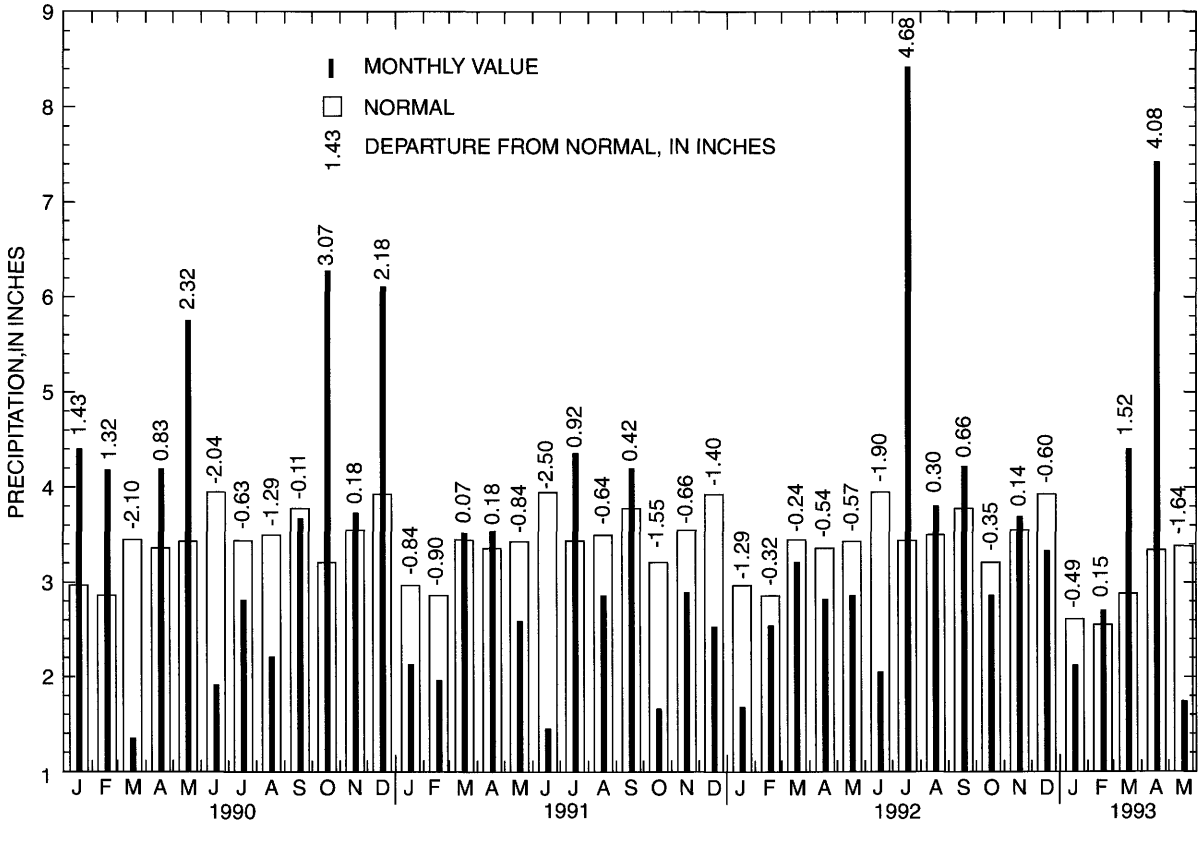


Figure 5. Monthly precipitation and departure from normal at Cortland, N.Y., January 1990 through May 1993. (Data from National Oceanic and Atmospheric Administration.)

have occurred to conceptionalize and interpret the hydrogeologic framework of an aquifer. These processes, when sufficiently understood, form a basis for interpolation and correlation between data points. Glacial processes are highly diverse and have resulted in complex stratigraphy and ground-water flow patterns in the study area; therefore, extensive data are needed for accurate representation of the hydrogeologic system.

Glacial Geology

Erosion by ice and meltwaters during the last glaciation modified the bedrock topography in the study area and removed most of the previously deposited unconsolidated materials (Muller and others, 1988); thus, sediments from the last glaciation (Late Wisconsinan) are prevalent. Some of the sediments that were eroded by ice became entrained in the glacier, or were dragged along its bottom, where they were ground up and later deposited as lodgment till atop bedrock or older glacial deposits. Lodgment till consists of poorly sorted clay, silt, sand, and stones that were compacted by the ice and is a poor aquifer; it is often referred to by drillers and farmers as "hardpan" or "boulder clay"— their testimony to its toughness to drill into or plow.

Valleys in the study area form a dendritic drainage pattern and increase in width to the southwest, indicating that water in the preglacial drainage system in the East and West Branch Tioughnioga River Valleys flowed southward, that Trout Brook flowed westward, and that a stream in the reach of the Tioughnioga River Valley between Polkville and Blodgett Mills flowed northwestward (fig. 6). All four streams converged at Cortland to form a major ancestral river that flowed southwestward in the Otter Creek valley. The southwestward route of the Tioughnioga River was blocked by ice in the Fall Creek valley during Late Wisconsian time and was diverted to the southeast, where it now flows in a narrow valley and exits the study area near Bloggett Mills (fig. 1). The diversion of the Tioughnioga River in the study area resulted in a "separated valley" (Randall and others, 1988), which is a broad valley that is partly filled with stratified drift, is drained by minor streams (Otter Creek and Dry Creek), and abuts a large stream at one end (Tioughnioga River). The small streams in separated valleys are vulnerable to depletion by large ground-water withdrawals, which lower the water table below the streambed and thereby induces water to seep through the streambed into the aquifer.

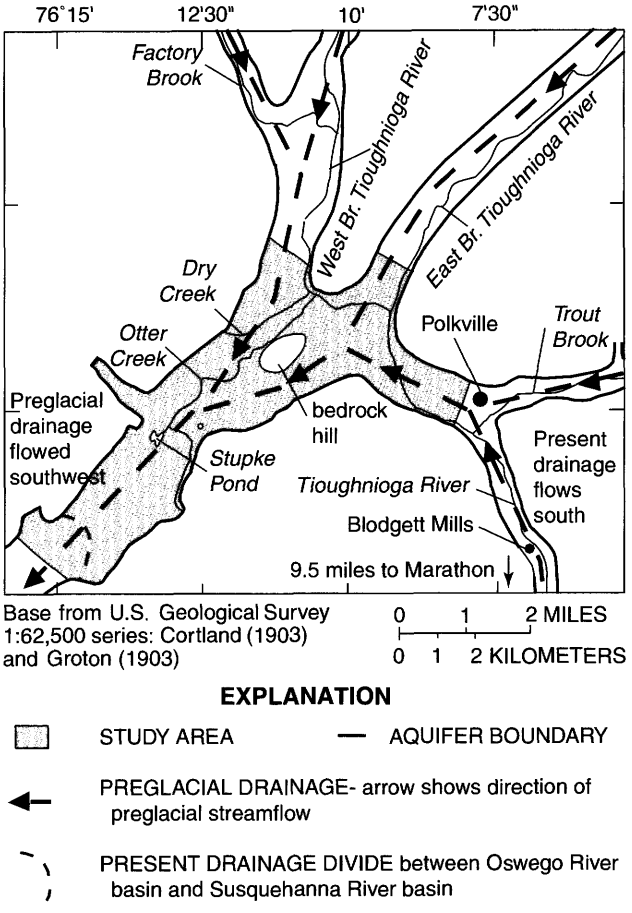


Figure 6. Preglacial drainage in Cortland, N.Y., study area.

Bedrock Scouring

Flowing ice and subglacial meltwaters first removed older unconsolidated deposits, then scoured the underlying Devonian-age shales and siltstones, resulting in widened and deepened bedrock valleys characteristic of glacial terrain. The bedrock valleys are asymmetrical in some places, such as in the Otter Creek Valley near South Cortland (geologic sections A-A′ and B-B′, figs. 7A and 7B), where a buried bedrock bench runs along the northern valley wall, and are nearly symmetrical in other places, such as in the West Branch Tioughnioga River valley (sections C-C′ and D-D′, figs. 7C and 7D).

The longitudinal bedrock profile is nearly flat in the West Branch Tioughnioga River and Otter Creek-Dry Creek valleys, where elevations range from 900 to 950 ft above sea level (figs. 7C and 8). The bedrock floor slopes southward in the East Branch Tioughnioga

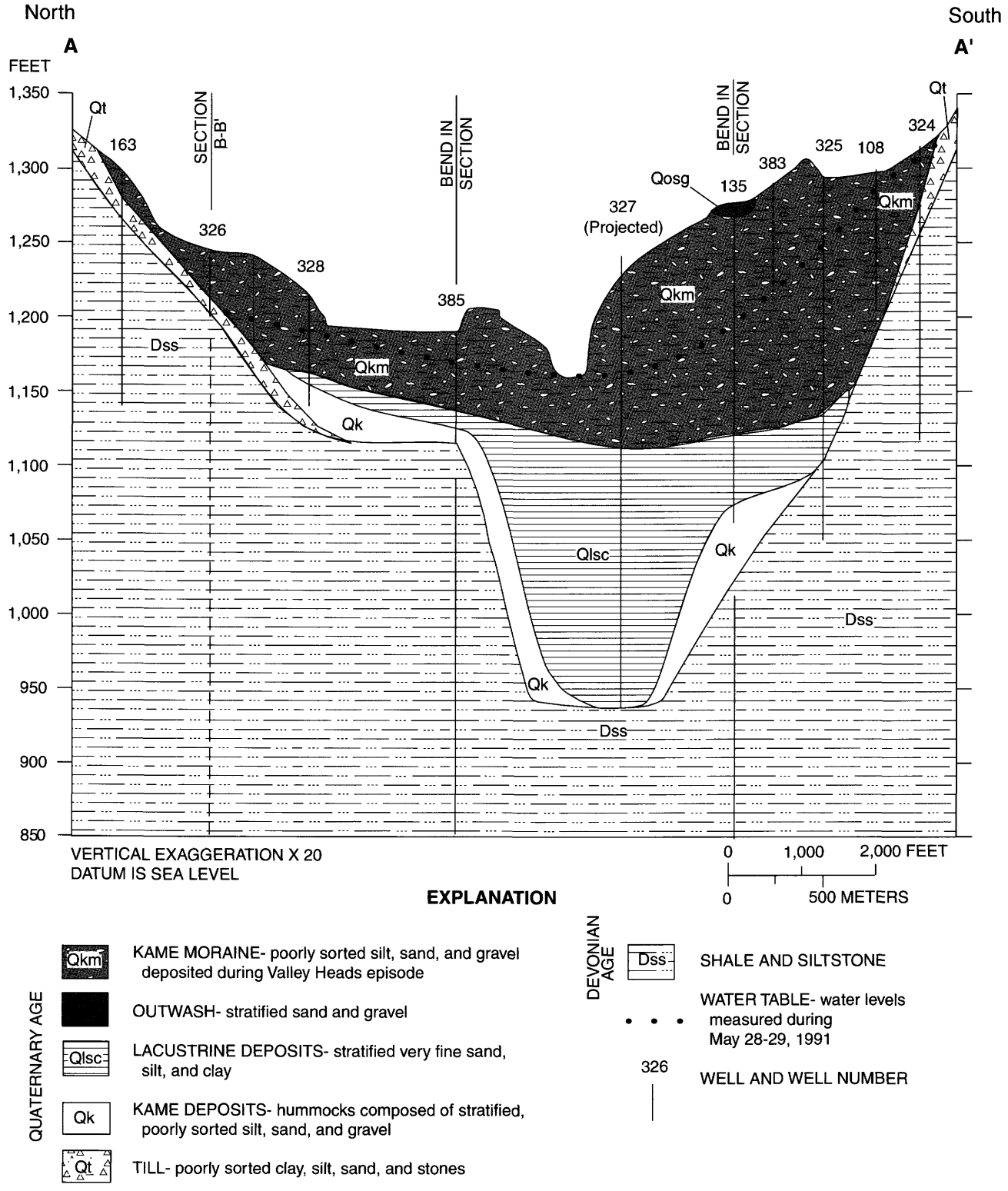


Figure 7A. Hydrogeologic section A-A′. (Line of section and well locations are shown in pl. 1.)

River Valley (Reynolds, 1987) and slopes northwestward in the Tioughnioga River Valley from the col (preglacial divide) near Messengerville to the eastern part of the City of Cortland. A conspicuous depression in the bedrock floor in the eastern part of the city (fig. 8) at well 430 (pl. 1) is the location of the lowest

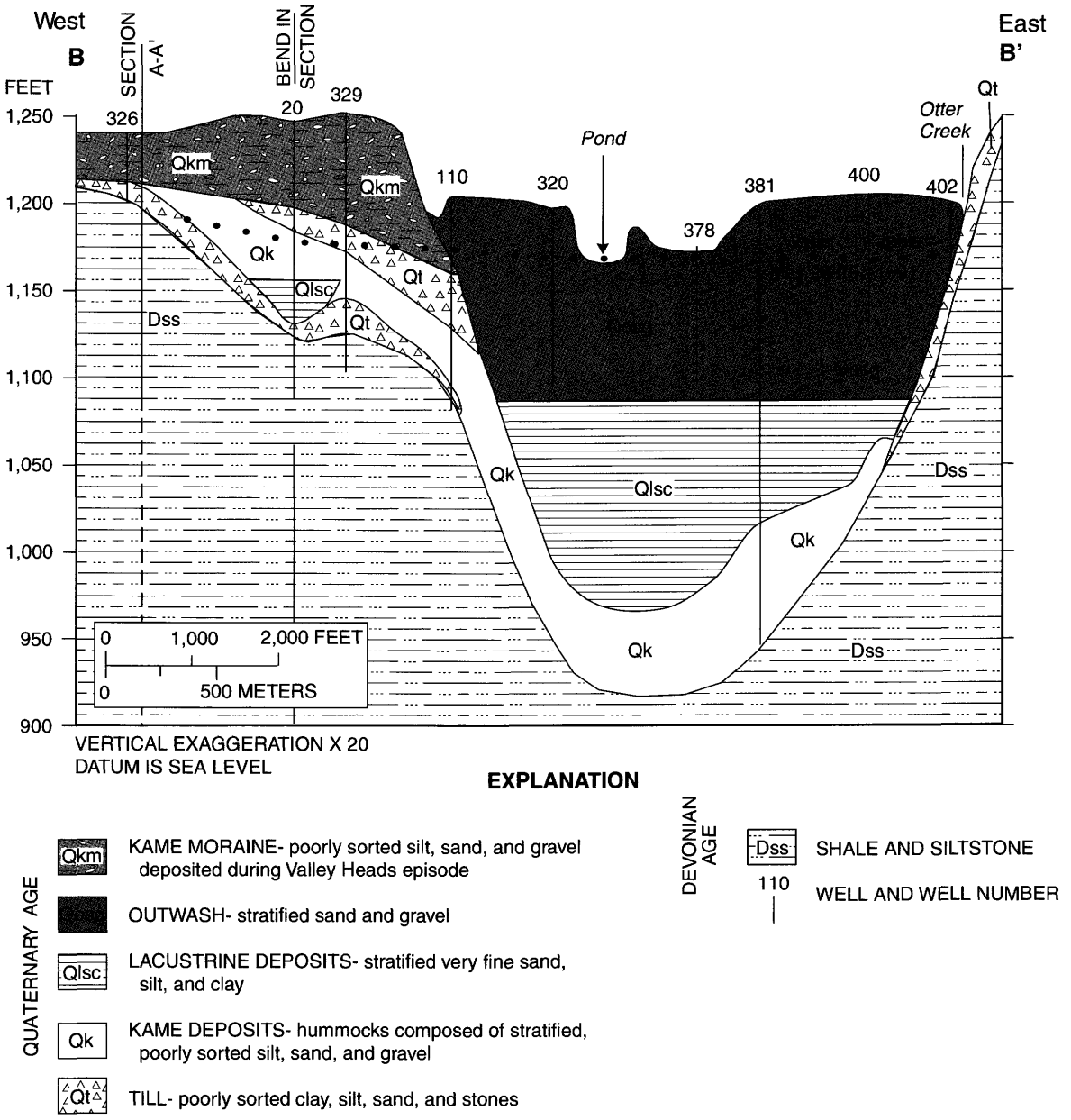


Figure 7B. Hydrogeologic section B-B′. (Line of section and well locations shown in pl. 1.)

elevation of the bedrock surface (801 ft) and the thickest valley fill found in the study area (313 ft thick).

In the center of the city is an isolated, 120-ft-high, egg-shaped (from top view) bedrock hill (fig. 1) that is surrounded by valley-fill deposits more than 200 ft thick. This landform is known as an umlaufberg (Muller, 1970), which formed when meltwaters deposited outwash around the hill and buried a preglacial bedrock spur between the northeast side of the hill and the bedrock massif hills to the north. The SUNY campus is on this hill.

Kames and Kame Terraces

As the glacier began to retreat from its maximum extent in northern New Jersey about 19,000 years before present (Late Wisconsinan time) it took about 5,000 years for the ice front to recede northward and give ground to the Cortland area (Muller and Calkin, 1993). As the glacier receded from the study area (between 14,000 and 15,000 years before present), the uplands emerged first because the ice was thinner there than in the valleys. Meltwater and upland streams that

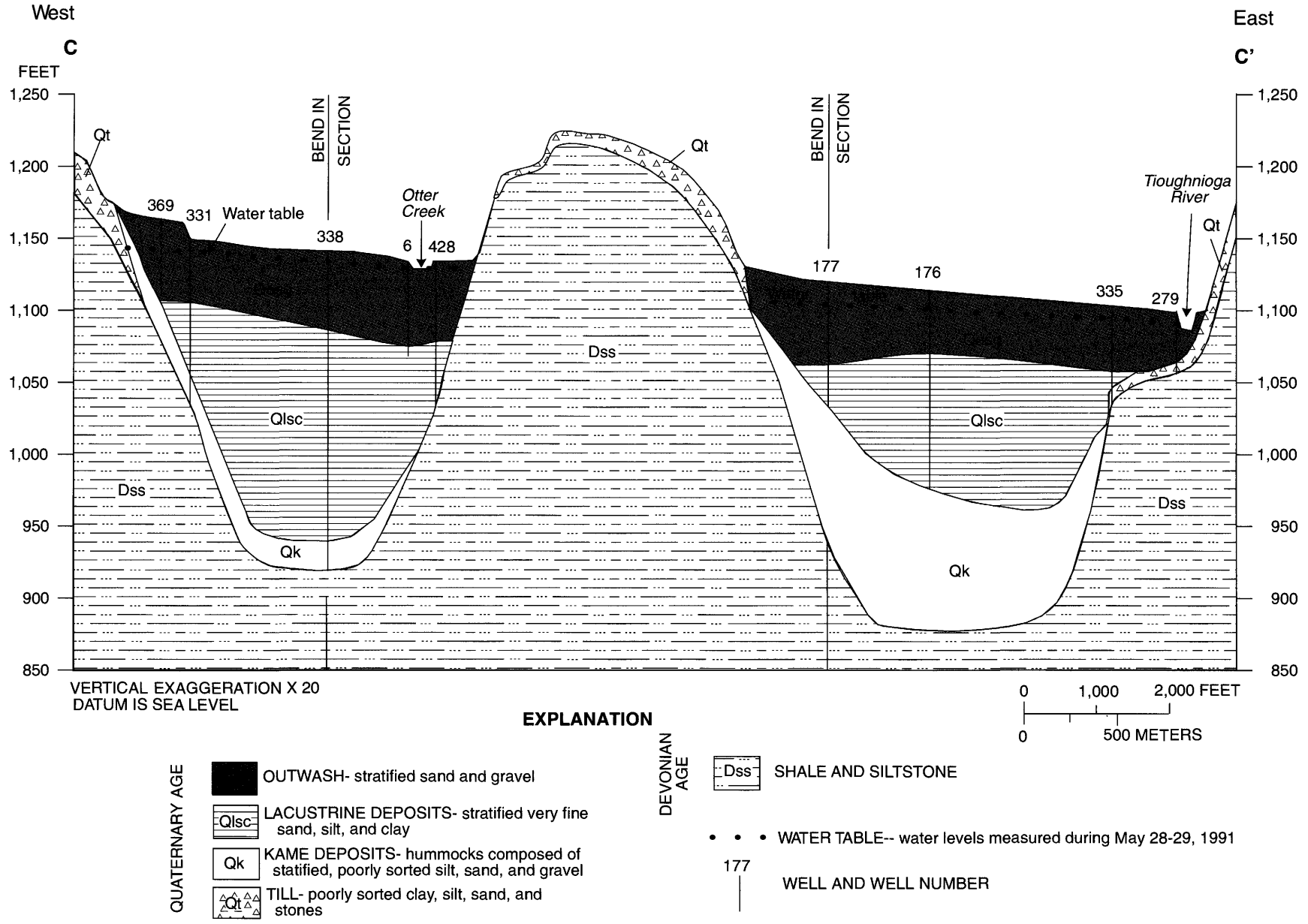


Figure 7C. Hydrogeologic section C-C′. (Line of section and well locations are shown on pl. 1.)

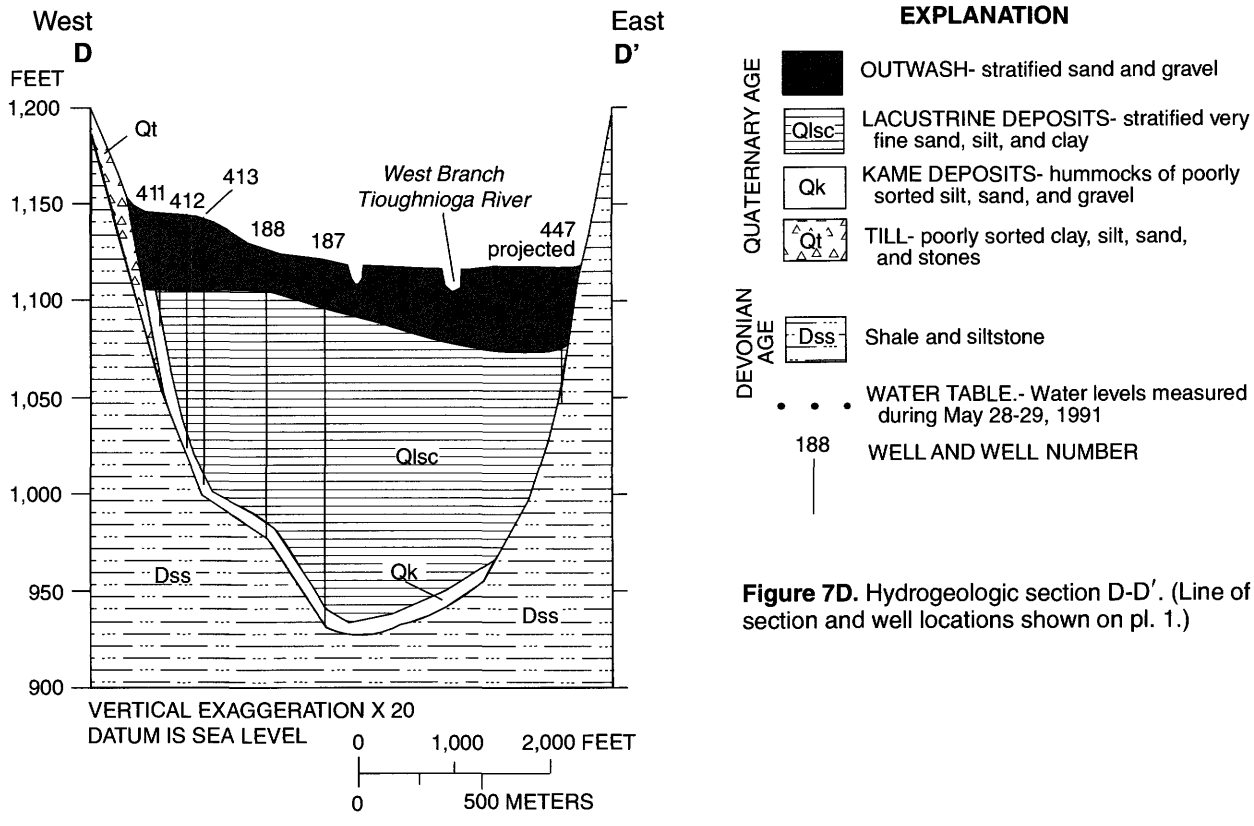


Figure 7D. Hydrogeologic section D-D′. (Line of section and well locations shown on pl. 1.)

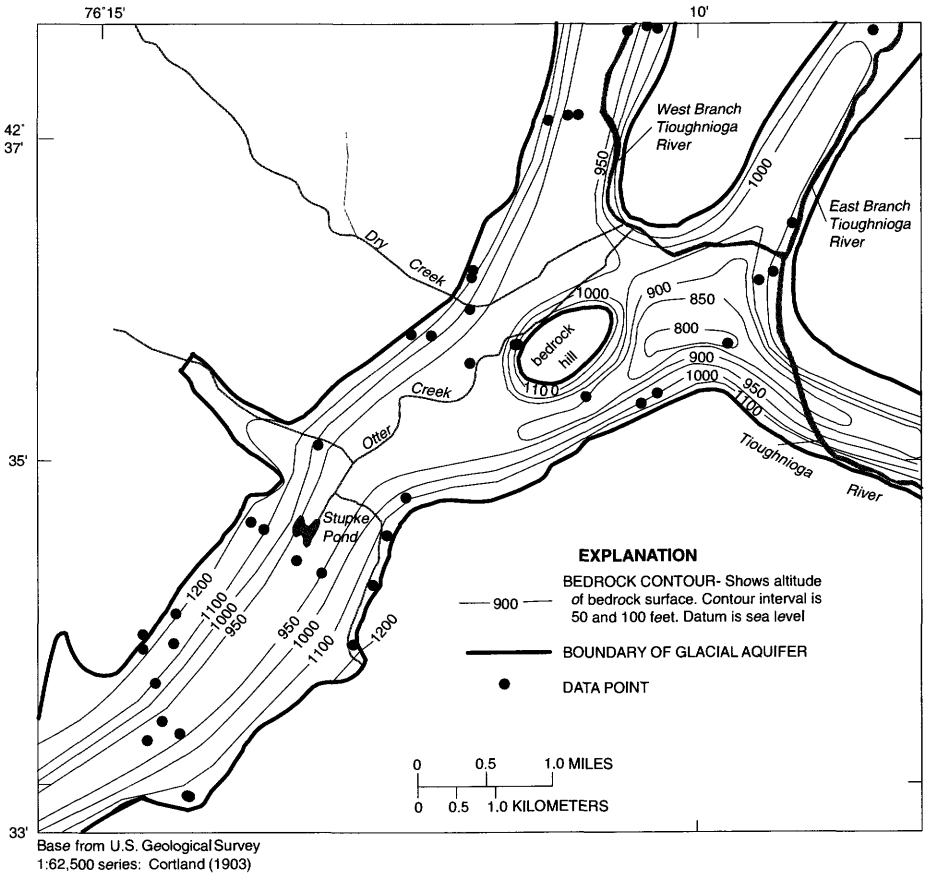


Figure 8. Bedrock-surface altitude in Cortland, N.Y., study area.

drained into the valleys deposited sand and gravel, silt, and clay on the remaining ice and between the ice and the bedrock hillside. When the ice melted, the sediments atop and next to it collapsed, forming hummocky mounds of ice-contact deposits known as kames and kame terraces. Kames typically consist of poorly sorted silty sand and gravel of moderate permeability, but discontinuous zones of well-sorted, highly permeable, coarse sand and gravel are found in some places. Large areas of kames are found on hillsides at Cortland High School in the southeast part of the study area, South Cortland, and in the East Branch Tioughnioga River Valley (pl. 1).

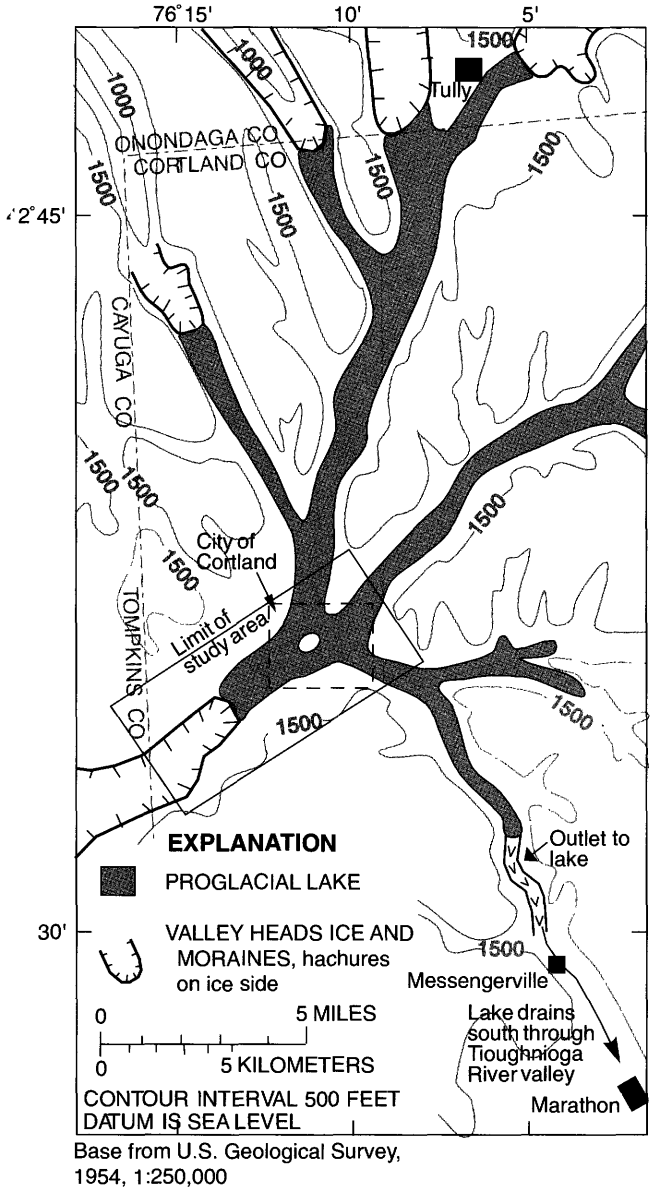


Figure 9. Location of Valley Heads ice and moraines that dammed drainage in valleys of the Tioghnioga River basin. (Location is shown in fig. 2.)

Kame deposits on hillsides are typically 10 to 80 ft thick and form minor aquifers where they are saturated; in some places, however, kame deposits may be only seasonally saturated. Kame deposits in the central parts of the valley form confined aquifers where they are overlain by lacustrine very fine sand, silt, and clay. Buried kame deposits are typically 60 to 170 ft thick in the western and eastern parts of the study area (figs. 7B, 7C), and 2 to 30 ft thick in the West Branch Tioughnioga River Valley (fig. 7D). Kame deposits in areas where the confining layer is absent, or pinches out before extending to the edges of the valley, are overlain by outwash sand and gravel (fig. 7C) and form a continuous unconfined aquifer.

Valley Heads Moraine System

A major standstill of the ice front in the northern part of the Allegheny Plateau of central New York between 14,000 and 14,900 years ago resulted in deposition of large amounts of sediment that formed the Valley Heads Moraine system (Muller and Calkin, 1993). A Valley Heads Moraine formed in the western part of the study area and in valleys north of it (fig. 9). This moraine is called "Valley Heads" because it formed a drainage divide between, and headwater areas of, the southward draining Susquehanna River basin and the northward draining St. Lawrence River basin.

The crest of the Valley Heads Moraine in the western part of the study area is characterized by kame and kettle topography (pl. 1). Kettles formed where blocks of ice melted, leaving depressions. The ice side (southwest side) of the moraine is relatively steep and hummocky, whereas the northeast side grades from hummocky terrain to a moderately sloping, pitted outwash plain that, in turn, grades to a slightly sloping, smooth outwash plain. The moraine deposits consist of heterogeneous sediments including coarse kamic sand and gravel in the upper part, and fine-grained sediments, such as till and lacustrine material, in the lower part.

Proglacial Lakes and Lacustrine Deposits in Valleys

Glaciers were imposing obstructions to streams in northward draining valleys—the ice formed dams that impounded water in valleys. These impoundments are known as proglacial lakes. During the retreat of Late Wisconsinan ice in central New York, proglacial lakes occupied large parts of valley systems, including the Tioughnioga River drainage system (fig. 9).

Upland streams and meltwaters from the glacier transported and deposited gravel, sand, silt, and clay into proglacial lakes. The coarse-grained, heavy sediments carried by these streams (sand and gravel) were deposited nearshore to form deltas, whereas the fine, light sediments (very fine sand, silt, and clay) were carried further out into the lake, were they settled to form a lake-bottom deposit (lacustrine unit). This lacustrine unit is found throughout the valley in the study area except where it thins and pinches out along the valley edges (fig. 10). It is as much as 90 ft thick in the eastern part of the study area, 15 ft thick in the northern and central parts, and 170 ft thick in the southwestern part. This unit underlies the upper outwash aquifer and overlies the confined aquifer.

A delta was found at the well 341 site (pl. 1), on McLean Road in the central part of the aquifer. The well penetrated a sequence of coarse sediments that graded with increasing depth to fine sediments from 0 to 83 ft below land surface. The sequence is interpreted as coarse outwash from land surface to 37 ft below land surface that overlies deltaic sediments from 37 to 83 ft below land surface. This sequence, in turn, overlies fine-grained lacustrine sediment.

The proglacial-lake outlet was south of Messengerville (fig. 9). Elevations of proglacial-lake outlets are useful because they indicate the maximum lake level and, thus, the maximum elevation at which lacustrine deposits can be found. The exact elevation of this outlet is uncertain, however, because the Tioughnioga River eroded much of the sediment plug that formed the outlet channel. The lake's water level can be estimated from other evidence, however. For example, the absence of beaches and hanging deltas that would be expected to flank hillsides along the valleys suggest that the highest water level was lower than the present valley-floor elevation (about 1,100 ft). The highest elevation at which lacustrine deposits were found at drilling sites in the study was 1,090 ft (penetrated by well 429 in the southern part of the city); therefore, the maximum lake level was probably between 1,090 and 1,100 ft.

Glaciofluvial Sediments (Outwash) of the Valley Heads Episode

As the sediment plug that dammed the proglacial lake at Messingerville (fig. 9) was eroded, allowing the proglacial lake to drain to the south in the Tioughnioga River valley, meltwater from retreating Valley Heads ice throughout the area developed a braided-stream system that deposited large amounts of glaciofluvial sediments (outwash) on top of the lacustrine sediments. The outwash forms a wedge-shaped deposit that is more than 100 ft thick near the head of outwash in the western part of the study area (fig. 7B, geologic section B-B′) and thins eastward to 35 to 45 ft thick in the southern and eastern parts of Cortland (fig. 7C, geologic sectionC-C′). Outwash in the study area grades from coarse boulder gravel at the head of outwash in the southwestern part to coarse cobble and pebbly, sand and gravel in distal reaches in the central and eastern parts of the study area. The outwash, along with local deltaic deposits, forms most of the highly permeable unconfined aquifer in the study area (fig. 11). Drilling with percussion-tool and air-rotary drilling rigs is difficult near the head of outwash, where boulder gravel is present, and augering is nearly impossible. The large amount of very coarse sediments that form the outwash in the study area indicate that large discharges of fast-flowing meltwaters characterized the period of the Valley Heads standstill.

Ice Readvance and Drainage of Proglacial Lake During Late Stages of Deglaciation

A discontinuous 10- to 20-ft-thick layer of till that overlies the morainal and outwash deposits in the western part of the study area indicates that ice readvanced or surged northeastward to about Stupke Pond during the late stages of the Valley Heads episode. The till is typically found 10 to 30 ft below land surface and is overlain by 10 to 30 ft of sand and gravel deposited by subsequent meltwater.

The final glacial event to affect the study area was the draining of a proglacial lake that formed in the Fall Creek valley between the retreating ice front and the western side of the Valley Heads Moraine. The lake drained eastward through an outlet on the moraine at an elevation of about 1,195 ft and eroded a 200-ft-wide, 10- to 20-ft deep channel in the moraine and created a widening swath through the outwash in the western and central parts of the study area (pl. 1). This erosion of outwash left 10- to 20-ft-high cutbanks (pl. 1) along the channel, and outwash terraces above it. Test boring 345, in the middle of the channel, encountered boulders the size of bowling balls to depth of 20 ft below land surface, indicating that large volumes of fast-moving water had flowed through the channel.

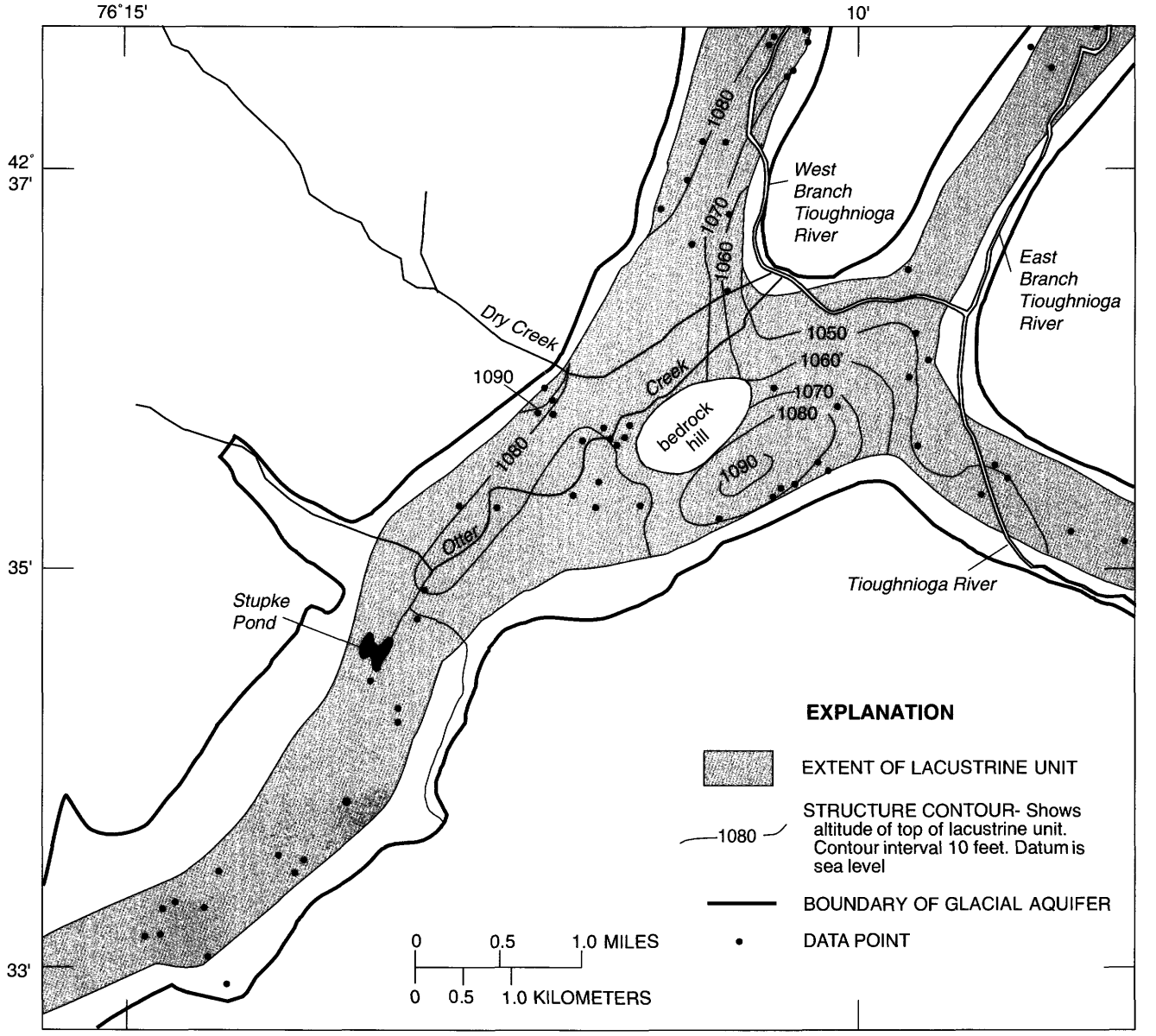
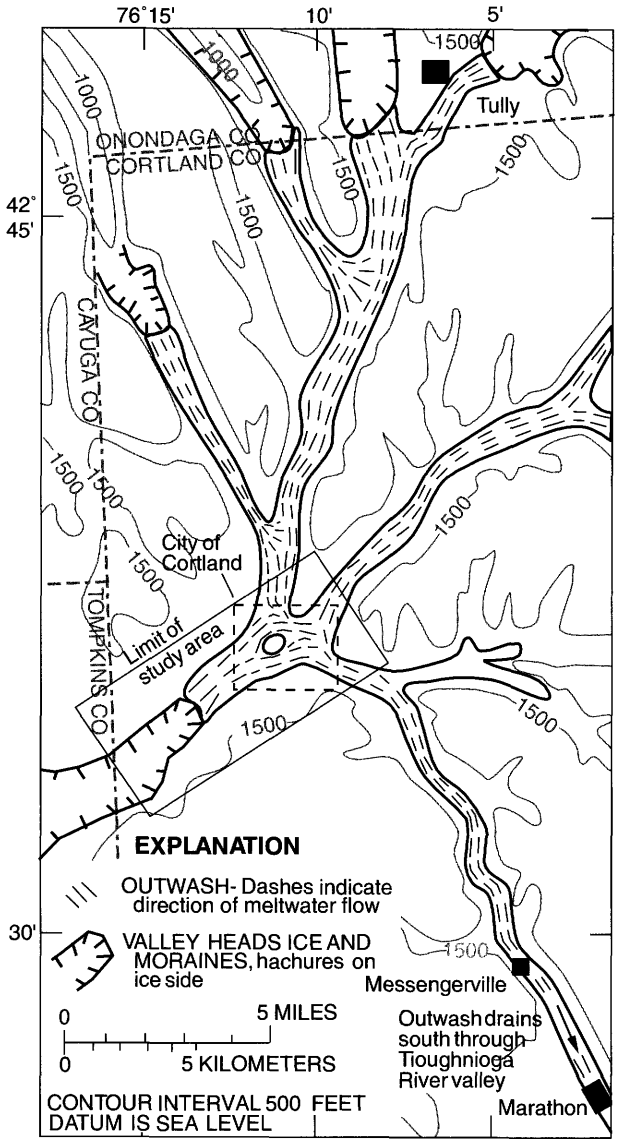


Figure 10. Upper surface altitude of lacustrine unit in Cortland, N.Y., study area.

Hydrology of the Glacial-Aquifer System

The aquifer system in the study area is part of a large regional glacial-aquifer system that occupies major valleys in the Tioughnioga River basin (fig. 11). The regional aquifer system is bounded laterally by till-covered bedrock hillsides (pl. 1) and beneath by the bedrock valley floor. The aquifer system in the study area consists of a 40-to 80-ft-thick unconfined sand and gravel aquifer that overlies a 1- to 155-ft-thick lacustrine confining layer that, in turn, overlies a 1- to 170-ft-thick confined sand and gravel aquifer (fig. 12). The base of the confined aquifer is the till and bedrock. Although the confining unit impedes groundwater movement between the upper and lower aquifers in the middle of the valley, the two aquifers are in hydraulic contact where the confining layer is absent in many places along the valley walls. The unconfined sand and gravel aquifer in the study area is one of the most productive aquifers in New York State and has been designated as a "Primary Aquifer" by the New York State Department of Environmental Conservation, and as a "Sole Source Aquifer" by the U.S. Environmental Protection Agency.



Base from U.S. Geological Survey, 1954, 1:250,000

Figure 11. Positions of Valley Heads ice, and of outwash that was deposited in valleys of the Tioughnioga River basin. (Location is shown in fig. 9.)

Geometry of Aquifers and Confining Unit

The unconfined aquifer forms a wedge-shaped deposit that thins and slopes downward to the northeast. The saturated thickness of the unconfined aquifer (from the water table to the top of the underlying lacustrine confining unit) is as much as 80 ft in the western part of the study area and thins northeastward to about 40 ft at the Tioughnioga River in the eastern part. The unconfined aquifer is underlain in most places by the lacustrine unit, which has a flat or gently northeastward sloping surface.

The lacustrine unit, which forms a confining unit that separates the unconfined aquifer from the confined aquifer (fig. 7, geologic sections A-A′, B-B′, C-C′, and D-D′), is an extensive lens-shaped deposit that consists of interbedded very fine sand, silt, and clay. It is typically 60 to 140 ft thick but is much as 155 ft thick in the middle of the valley. It thins toward the valley walls, where it pinches out. It typically lies 100 to 130 ft below land surface in the western part of the study area, 55 to 85 ft in the central part, and 35 to 65 ft in the eastern part. This unit extends beyond the study area in all valleys (fig. 10).

Beneath the confining unit is the confined sand and gravel aquifer, which is found everywhere except in the middle of the valley in the western part of the study area, where several well records indicate the lacustrine deposit to lie directly over bedrock. The bottom of the confined aquifer is the bedrock valley floor or, in some places, the top of till that overlies bedrock. The top of the confined aquifer has an undulating surface that is typical of hummocky kames and(or) bead-shaped glaciofluvial deltas that form the aquifer. The confined aquifer ranges from 1 to 170 ft thick.

Hydraulic Conductivity

Hydraulic conductivity is a measure of the ability of deposits to transmit water. Well-sorted, coarse-grained sediments have high hydraulic conductivity because they have many large interconnected pore spaces through which water can flow, whereas fine-grained sediments have low hydraulic conductivity because they have fewer and smaller interconnected pore spaces. Although clay may be well sorted and can have high porosity, it has the lowest hydraulic conductivity because the pores are so small that molecular attraction between clay particles and water prevents significant movement of water. Hydraulic conductivity of well-sorted sand and gravel typically exceeds 500 ft/d; that of medium to coarse sand and moderately sorted, fine sandy gravel typically ranges from 25 to 500 ft/d; that of fine sand and poorly sorted silty gravel typically ranges from 1 to 25 ft/d; and that of silt, clay, and till typically is less than 1 ft/d (Heath, 1983).

Hydraulic conductivity of outwash can differ widely from place to place because the complex depositional processes in meltwater environments resulted in a heterogeneous mixture of particle sizes. As stream channels were abandoned, buried, moved

laterally, aggraded, or downcut, the outwash materials became mixed; the particle size in a channel reflects the flow velocity of meltwater discharging from the ice and also the place of deposition within the channel, such as, inside a meander bend, where the velocity is much lower than along the outside of the bend.

Wells that pump large amounts of water are preferred for aquifer tests because tests at these wells affect a relatively large volume of the aquifer and tend to average the effects of local anomalies within the aquifer, whereas slug tests and aquifer tests that remove only small amounts of water affect a relatively small volume of aquifer and are, therefore, more likely to tap a zone that might not be representative of the aquifer. Hydraulic-conductivity values of aquifers in the study area, as determined from aquifer tests that used large pumping rates, are given in table 2.

Unconfined Aquifer

Hydraulic-conductivity values of the unconfined aquifer in the study area, as determined from aquifer tests that used large pumping rates, ranged from 85 to 1,150 ft/d (table 2). The largest values (880 to 1,150 ft/d) were in the unconfined outwash deposits in the western and central parts of the study area, which were close to the ice front during the Valley Heads standstill, where fast-flowing meltwater deposited well-sorted coarse gravel and washed away most of the fine-grained sediment, and redeposited it in more distal reaches. Moderately high values (220 to 380 ft/d) were measured in distal reaches of unconfined outwash aquifer in the eastern part of the study area, where meltwater velocity was lower than that near the ice front and resulted in deposition of finer, less sorted sand and gravel. A moderately low value

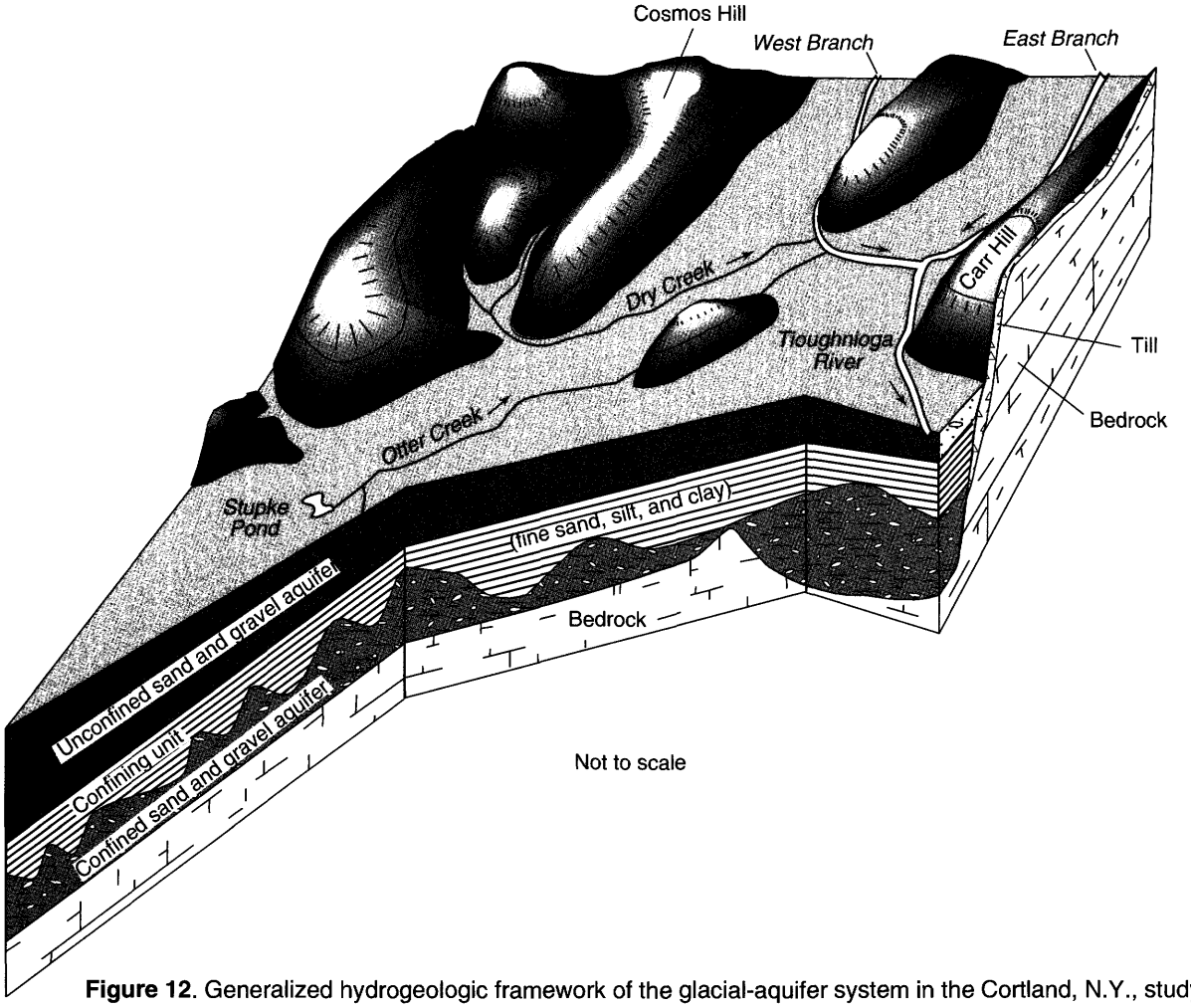


Figure 12. Generalized hydrogeologic framework of the glacial-aquifer system in the Cortland, N.Y., study area.

Table 2. Results of aquifer tests in the glacial-aquifer system in the Cortland, N.Y. study area.

[Well locations are shown in pl. 1, gal/min = gallons per minute, ft/d = feet per day.]

USGS well number	Location	Date	Aquifer	Average pumping rate (gal/min)	Average hydraulic conductivity (ft/d)
317	City of Cortland	9-12-75	Unconfined (outwash)	3,000	1,150[a]
11	Barry School	4-26-76	Unconfined (outwash)	1,200	1,050[a]
355	Town of Cortlandville (Terrace Road)	3-15-76	Unconfined (outwash)	630	950[a]
432	Town of Cortlandville (Lime Hollow Road)	7-16-91	Unconfined (outwash)	1,430	880[b]
434	Smith Corona Corporation	12-26-90	Unconfined (outwash)	975	900[c]
386	ETL Testing Laboratories	9-11-80	Unconfined (outwash)	350	350[d]
447	Rosen Superfund site	1-19-95	Unconfined (outwash)	80	220[e]
435	Monarch Tool Corporation	8-4-67	Unconfined (kame)	150	85[f]
151	Tunison Fish Hatchery	3-12-68	Confined (kame)	125	60[a]
409	Tunison Fish Hatchery	8-14-62	Confined (kame)	82	65[a]

a Cosner and Harsh, 1978
b Determined during this study
c O'Brien and Gere Engineers, Inc., 1990
d Reynolds, 1985
e Blasland, Bouck and Lee, Engineers, 1992
f Apfel, 1967

(85 ft/d) was determined from an aquifer test at an industrial well installed in unconfined kame deposits in the western part of the unconfined aquifer; this reflects the poorly sorted silty sand and gravel that is typical of kame material.

The gradation from high hydraulic conductivity in the western part of the study area to moderately high values in the eastern part is consistent with the observed northeastward decrease in grain size of sediment samples collected during test drilling. Coarse cobble gravel predominates in the western and central parts, whereas coarse sand and gravel is common in the eastern part. The northeastward fining of sediments reflects the increasing distance from the source of sediments at the ice front, and the decrease in the gradients of meltwater channels (from 40 ft/mi in the western part to 20 ft/mi in the eastern part). It also reflects a decrease in bedload particle-size through mechanical erosion during transport.

Moderately high hydraulic conductivity values (260 to 380 ft/d) were determined by three diffusivity analyses (transmissivity divided by storage coefficient), and one specific capacity analysis, in the unconfined outwash deposits along the Tioughnioga River in the eastern part of the study area by Reynolds (1985, 1987). Low to moderately low values (3.4 to 140 ft/d) were obtained by slug tests in small-diameter monitoring wells installed in the unconfined aquifer near the valley wall at the Rosen Superfund site (pl. 1) (Blasland, Bouck and Lee, Engineers, 1992). These low values probably result from the mixing along the valley walls of poorly sorted, silty sand and gravel inwash from uplands with well-sorted outwash.

Confined Aquifer

Low- to moderately low hydraulic conductivity values (16 to 65 ft/d) were obtained for the confined aquifer from two aquifer tests at the fish hatchery in the southwestern part of the study area and one slug test at the Rosen Superfund site (fig. 1). Hydraulic conductivity values determined from aquifer tests at the fish hatchery ranged from 60 to 65 ft/d, and the value determined by a slug test at the Rosen Superfund site was 16 ft/d. These aquifer tests probably represented poorly sorted kame deposits.

Confining Unit

A hydraulic conductivity value of 2.0 ft/d was obtained from analysis of a slug test of a 2-in.-diameter monitoring well installed in the confining unit at the Rosen Superfund site (Blasland, Bouck and Lee, Engineers, 1992). Hydraulic conductivity values of the confining layer were estimated in other locations from grain-size characteristics observed in split-spoon samples and from air-rotary and cable-tool drill cuttings. A value of 2.0 ft/d was estimated for the confining unit where it consists of very fine to fine sand and silt; this value also was estimated for a similar fine-grained deposit in New Hampshire

(Tepper and others, 1990). A value of 0.1 ft/d is estimated for areas where the confining layer consists of silt and clay.

Ground-Water Levels and Flowpaths

Water-level measurements can be used to define the slope of the water table in the unconfined aquifer and of the potentiometric surface in the confined aquifer. The slope determines the direction of ground-water flow. Water levels in about 100 wells were measured during March 28-29, 1990; from May 28-June 4, 1991; and October 7-9, 1991, to obtain values representing periods of high, average, and low recharge, respectively (pl. 2-4). These measurements were used to calibrate the ground-water flow model, as discussed further on. Ground-water levels also were measured monthly in about 50 wells from July 1989 through October 1991 to determine annual water-level fluctuations. The water-level measurements made during this study indicated a hydraulic head loss of about 100 ft over the 6-mi length of the study area, from the ground-water divide in the western part to the Tioughnioga River in the east.

Ground water moves from areas of high head to areas of low head, and the directions of flow depend on local factors such as aquifer geometry, distribution of recharge, and location of discharge areas (streams, ponds, wetlands, and pumping wells). These factors also determine the altitude and slope of the water table (or of the potentiometric surface in a confined aquifer). Ground water flows roughly perpendicular to the potentiometric contours (lines of equal head), as shown in plates 2-4.

Unconfined Aquifer

Water in the unconfined aquifer generally moves laterally from the edges of the valley toward the center, then northeastward along the axis of the Otter Creek-Dry Creek valley and discharges to pumping wells and to the West Branch Tioughnioga and the Tioughnioga Rivers. The study area contains four major pumping centers: (1) the City of Cortland well field, (2) the well field for the Town of Cortlandville on Terrace Road, (3) a well for the Town of Cortlandville on Lime Hollow Road, and (4) the purge well at the typewriter plant in the western part of the study area (pl. 2-4).

The hydraulic gradient in the unconfined aquifer in the middle of the valley typically ranges from 0.0027 ft/ft during periods of low water levels to 0.0037 ft/ft during periods of high water levels. The steeper hydraulic gradients along the edges of the valley in some areas than in the middle probably result from kame deposits of low hydraulic conductivity and(or) proximity to major recharge areas, such as where upland streams flow onto the aquifer and lose water to the coarse sediments.

Ground-water flowpaths during periods of high, average, and low recharge shift with the magnitude and distribution of recharge. For example, water infiltrating from upland tributary streams that flow onto the Otter Creek-Dry Creek valley forms a fan-shaped ground-water mound within the unconfined aquifer. Water spreads from the apex of the mound (where the stream enters the edge of the valley) toward middle of the valley where, in effect, it "pushes" the flowpath of ground water in the middle of the valley (the water is moving down the axis of the valley) toward the opposite side of the valley.

The extent of the "push effect" depends upon the local geology, the size of the upland tributary basin, and recharge conditions at the opposite valley wall. The median annual-minimum streamflow is highly dependent on the size of a drainage basin and the amount of sand and gravel in it (Thomas, 1966). Drainage basins that are underlain by significant amounts of sand and gravel (more than 20 percent of the basin) have significantly higher streamflow during low-flow periods than basins underlain entirely by till or bedrock. During low-recharge conditions, streamflow in small upland till and bedrock basins and on unchanneled hillsides is minimal or absent and would provide little or no recharge to the main valley from these streams. Streams in large upland tributary basins that contain significant amounts of sand and gravel tend to be perennial, however, and provide a continuous amount of recharge to the aquifer (Thomas, 1966).

Confined Aquifer

The study area contains only 15 wells that tap the confined aquifer because the unconfined aquifer has adequate yields in most places, making more costly deep wells unnecessary. Therefore, the inferred directions of ground-water movement in the confined aquifer are less certain than those in the unconfined aquifer, which are based on water-level measurements in more than 100 wells.

The direction of ground-water flow in the confined aquifer, as inferred from water-level measurements

made in 15 wells finished in the confined aquifer, generally follows that in the unconfined aquifer; that is, from the edges of the Otter Creek-Dry Creek valley toward the center, then northeastward down the valley axis. Ground water in the West Branch and East Branch Tioughnioga River valleys flows southward and southwestward, respectively, then, southeastward as underflow down the Tioughnioga River valley at the confluence with the Otter Creek-Dry Creek valley.

Vertical (downward) gradients were measured in some nested piezometers along the edges of the valley where the confining unit is absent. These areas are where water in the unconfined aquifer flows vertically downward to the confined aquifer.

Conceptually, water in the confined aquifer may move up into the unconfined aquifer along the edges of the valley in the eastern part of the study area, as indicated by ground-water-flow simulations (discussed in the modeling section). Monitoring wells would need to be installed along the edges of the valley in this area to determine whether such upward flow actually occurs.

Sources of Recharge

The aquifer system receives recharge from three sources under natural (nonpumping) conditions– (1) infiltration of precipitation on the aquifer, (2) upland sources, such as runoff from unchanneled hillsides and seepage from bedrock that border the aquifer, and (3) seepage from tributary streams that flow onto the aquifer (fig. 13). The unconfined aquifer receives additional recharge from (1) infiltration beneath recharge basins at an industrial site in the western part of the aquifer, and (2) induced infiltration from streams and ponds near the major pumping wells.

Direct Infiltration of Precipitation on the Valley

Part of the precipitation that falls on surficial sand and gravel is returned to the atmosphere by evapotranspiration; the remainder infiltrates and recharges the aquifer. Thus, the amount of recharge by infiltration (R_i) equals precipitation (P) minus evapotranspiration (ET), assuming that ground-water evapotranspiration is negligible:

$$R_i = P - ET \quad (1)$$

Rates of recharge from precipitation vary seasonally. Most of the precipitation that falls during the dormant period of vegetation (typically from mid-October through the end of April) infiltrates into the aquifer, but little reaches the aquifer during the growing season (May through September) because it is lost through evapotranspiration.

In the Northeast, evapotranspiration in any year can be estimated as the long-term average annual precipitation minus long-term average annual stream runoff (Lyford and Cohen, 1987). Average annual runoff for 53 years (1939-91) in the Tioughnioga River basin, measured at a streamflow gage at Cortland (USGS station 01509000, pls. 2-4) was 23.0 in. (Campbell and others, 1992); thus, the average annual evapotranspiration would equal 18.2 in. (long-term average annual precipitation of 41.2 in. minus long-term average annual runoff of 23.0 in.), and the long-term average annual recharge would be 23.0 in. (long-term average annual precipitation of 41.2 in. minus average annual evapotranspiration of 18.2 in.).

Upland Sources

Although direct infiltration of precipitation on the valley has been considered the chief source of recharge to sand and gravel aquifers, recent studies in the glaciated Northeast indicate that, in regions of moderate to high topographic relief (where hills rise more than 500 ft above the adjacent valley floor), more than half of the natural recharge to surficial stratified-drift aquifers in the valleys can be derived from upland runoff (Morrissey and others, 1987). For example, 58 percent or more of the recharge in two glacial aquifers in valleys in central New York was derived from (1) unchanneled runoff from hillsides that border the valley-fill aquifer, and (2) seepage loss from upland tributary streams that flow over the aquifer (Randall and others, 1988).

Recharge to valley-fill aquifers from adjacent unchanneled hillsides include surface runoff and the lateral movement of ground water (within upland till, sand and gravel, and bedrock) that flows toward the valley and seeps into the aquifer along the its edges (fig. 13). All precipitation that is not lost through evapotranspiration in the unchanneled drainage areas in the uplands is assumed to become either runoff or ground water that will eventually reach the valley and infiltrate into the aquifer. If a stream is at the base of the hill, however, runoff and ground water from the hillside will discharge into the stream rather than to the aquifer.

The amount of recharge from runoff from adjacent unchanneled hillsides annually can be calculated by the following equation:

$$R = P - ET \times DA \quad (2)$$

where R = recharge from runoff from unchanneled hillsides
P = precipitation
ET = evapotranspiration
DA = drainage area of hillside

Tributary streams (channeled flow) that drain till-and-bedrock basins in the uplands are major sources of aquifer recharge where they enter and flow over the permeable surficial sand and gravel in the main valley. Small tributaries that flow onto the aquifer typically go dry, especially during the summer, when flow in streams is small and the water table in the valley-fill aquifer falls below the streambed, allowing water in the stream to seep below the channel. The rate of recharge from losing tributaries is controlled largely by the vertical hydraulic conductivity and thickness of the streambed and by the hydraulic heads in the stream and aquifer. Rates of recharge from tributaries were calculated from several sets of streamflow measurements made during periods of high, average, and low recharge in 1990-91 in most tributary streams that flow onto the aquifer (table 3). Discharges at the measuring sites are shown in plates 2 through 4. Most tributary streams in the study area lose water to the aquifer where they flow onto the valley; an exception is Otter Creek, which can be divided into three reaches that have two flow regimes; these are (1) the reach from the point where Otter Creek enters the valley to where it joins the outlet to Stupke Pond, (2) the reach from Stupke Pond to the umlaufberg, and (3) the reach where Otter Creek flows north of the umlaufberg to its mouth. Reaches 1 and 3 lose water during the entire year; and reach 2 typically gains water during high-recharge conditions but loses water during periods of average and low recharge. Reach 3 is hydraulically connected to the aquifer during most of the year, except when the water table is lower than the streambed in the summer, causing Otter Creek to dry up. Otter Creek can be considered the main trunk stream in the Otter Creek-Dry Creek valley because it has the only reach in the valley that gains water, even though for only part of the year.

Only part of the water in upland tributaries recharges the aquifer during periods of high streamflow (during spring and during large storms throughout the year); the remainder flows over the aquifer and discharges into the West Branch Tioughnioga and Tioughnioga Rivers. During average- and low-flow conditions (summer, fall, and winter), however, all of the water in most tributary streams recharges the aquifer, except in Dry Creek, which goes dry only during extended droughts. As the water table declines through the summer, losing streams typically dry up in the upstream direction, starting at the mouth, whereas gaining streams typically dry up in the downstream direction, starting at the headwaters.

Table 3. Streamflow losses and gains in tributary streams above unconfined aquifer in the Cortland study area, 1990-91.

[Values are in cubic feet per second; location of tributaries and streamflow-measurement sites are shown in pls. 2-4.]

Tributary stream	Streamflow loss (-) or gain (+) between measurement sites near valley wall and near mouth, or where streams dry up		
	March 29,1990 (high recharge)	May 30-June 4, 1991 (average recharge)	October 9, 1991 (low recharge)
UPPER REACH OF OTTER CREEK (from valley wall to outlet to Stupke Pond)	-1.20	-0.41	Dry at valley wall
Dry Creek	-0.81	-0.54	-0.37
Perplexity Creek	-0.65	-0.20	Dry at valley wall
Tributary A	-0.95	-0.12	Dry at valley wall
Tributary B	-0.40	-0.12	Dry at valley wall
Tributary C	-0.41	Dry at valley wall	Dry at valley wall
Tributary D	-2.10	-0.23	Dry at valley wall
Tributary E	-1.22	-0.11	Dry at valley wall
Estimated loss from other tributaries not measured	-0.50	-0.05	Dry at valley wall
Sum of tributary losses	-8.24	-2.73	-0.37
LOWER REACH OF OTTER CREEK (Stupke Pond to mouth)	+8.60	-0.42	Entire reach was dry

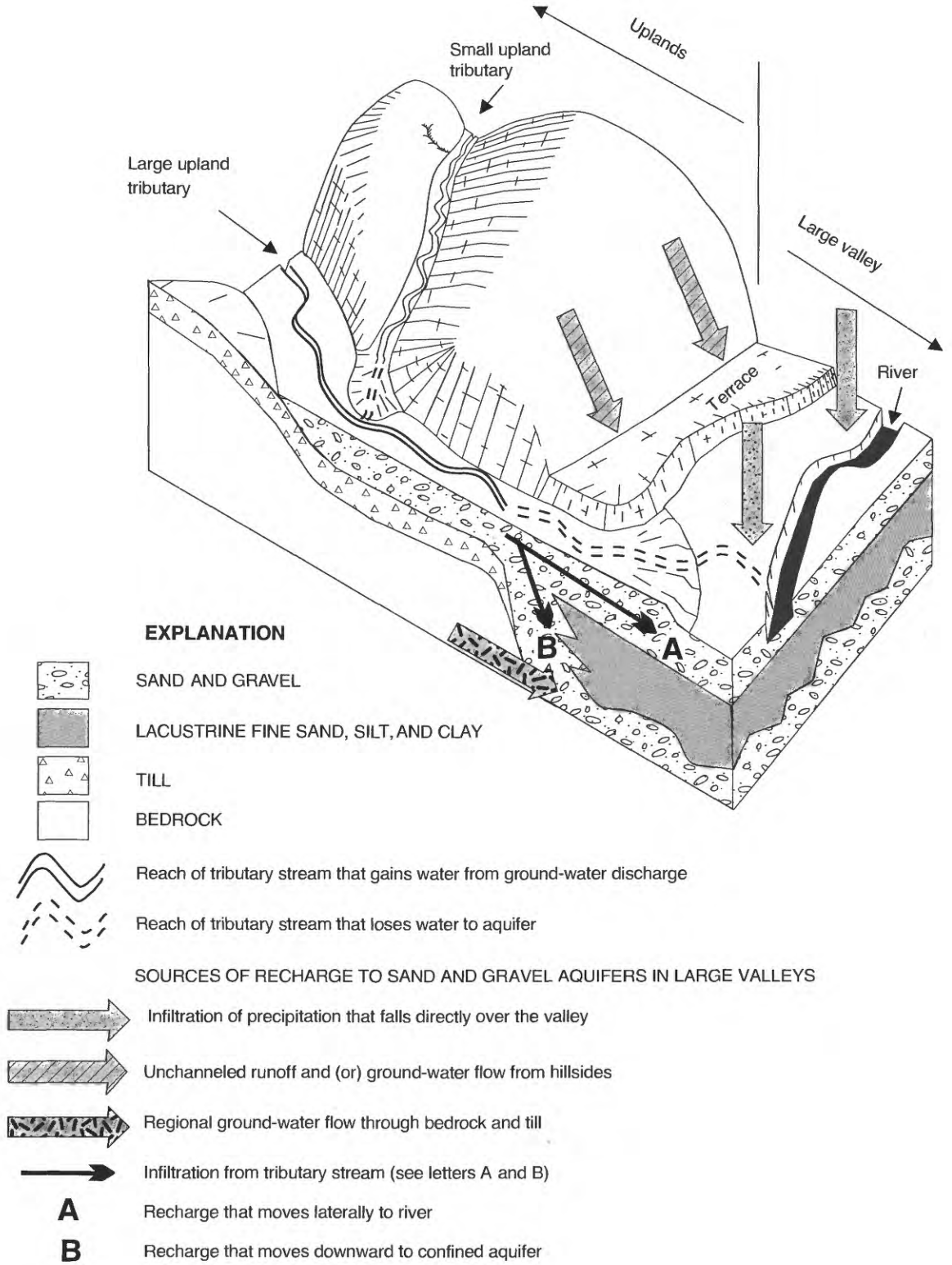


Figure 13. Sources of recharge to stratified drift in valleys in the glaciated Northeast. (Modified from Morrissey and others, 1987, fig. 1.)

Induced Infiltration by Ground-Water Withdrawals

Pumping affects Otter Creek where it flows through the City of Cortland well field because that reach of the creek is hydraulically connected to the aquifer (pl. 2-4). Pumping lowers the water table beneath the stream surface and thereby induces infiltration from the stream to the aquifer. Pumping of a City of Cortland municipal well during low-flow conditions once caused a nearby reach of Otter Creek to dry up, and when the pump was turned off, water reappeared in the creek (James Roberts, former manager of Cortland Water Department, oral commun., 1990). The rate of induced infiltration for a pumping rate of 4.29 Mgal/d, as estimated from results of numerical model simulation of average-conditions, is 0.6 ft^3/s. No induced infiltration can occur when Otter Creek dries up.

The municipal well for the Town of Cortlandville on Lime Hollow Road may induce some infiltration from a pond 400 ft south of the well. The similarity of water levels in the pond to those in the municipal well suggests that the pond is hydraulically connected to the aquifer.

Infiltration From Recharge Basins

A recovery well (well 434, pl. 1) at the typewriter plant in the western part of the study area is pumped at a rate of about 980 gal/min. The water is routed through an air stripper, where most volatile-organic chemicals are removed, then discharged to recharge basins about 750 ft north of the plant (pl. 2-4), where it infiltrates back to the aquifer.

Ground-Water Discharge

Water in the unconfined aquifer discharges (1) as seepage into major streams and, seasonally, to some reaches of Otter Creek; (2) to pumping wells; and (3) as seepage to springs that are headwaters to the Fall Creek valley in the western part of the study area. Most of the water pumped from municipal wells is eventually piped to the sewage-treatment plant as wastewater, where it is treated and discharged into the Tioughnioga River in the eastern part of the study area (pl. 2). Most water in the confined aquifer leaves the study area as underflow in the Tioughnioga River valley in the southeastern part of the study area.

Seepage to Streams

Most of the ground water that discharges to streams enters the West Branch Tioughnioga and Tioughnioga Rivers; lesser amounts enter the reach of Otter Creek from the Stupke Pond outlet to the umlaufberg in the central part of the study area. The confining unit prevents most water in the confined aquifer from flowing upward into the unconfined aquifer and into the streams.

Measurements of streamflow in the West Branch Tioughnioga and Tioughnioga Rivers and in Otter Creek (fig. 14) indicate that total ground-water discharge to these streams was 17.8 ft^3/s for average-recharge conditions and 8.4 ft^3/s for low-recharge conditions (table 4); measurements in these large streams during periods of high recharge were impractical (for safety reasons).

Table 4. Ground-water discharge to West Branch Tioughnioga River, Tioughnioga River, and Otter Creek during average- and low-flow conditions, 1991.

[All values are in cubic feet per second. Location of measurement sites and reaches shown in fig. 14].

Reach	Site no.	Average-flow conditions: Measured discharge	Average-flow conditions: Net gain within reach (upstream value minus downstream value)	Low-flow conditions: Measured discharge	Low-flow conditions: Net gain within reach (upstream value minus downstream value)
A. West Branch Tioughnioga River	1	31.4		12.8	
	2	40.6	9.2	18.7	5.9
A and B. Tioughnioga River	1	83.2		53.3	
	3	99.2		64.4	
minus discharge from sewage treatment pland		-8.4	7.6	-8.6	
	subtotal	90.8		55.7	2.5
B-E. Otter Creek	3	1.4		0.0	
	7	2.4	1.0	0.0	0.0
		TOTALS	17.8		8.4

Municipal and Industrial Withdrawals

Total ground-water withdrawal from the glacial-aquifer system by municipal and industrial wells ranges from 6.76 to 7.20 Mgal/d (table 5), most of which is from the unconfined aquifer. The largest user is the City of Cortland, which, during 1984-92, pumped 3.9 to 4.3 Mgal/d (data from records at the Cortland Water Department). Substantial leaks in the distribution system (Douglas Withey, manager of Cortland Water Department, oral commun., 1994) result in conveyance losses that return some of the water to the aquifer; therefore, actual discharge from pumping is somewhat less than the reported values.

The Town of Cortlandville pumped from 0.65 to 0.99 Mgal/d of water from its two well fields during 1990-91 (Hayne Smith, Town of Cortlandville Engineer, oral commun., 1992). A purge well at the typewriter plant pumped at a rate of 0.69 Mgal/d from December 1989 through October 1990, and at a rate of 1.43 Mgal/d from October 1990 to at least December 1994. All pumped water from the purge well is returned to the aquifer through recharge basins 750 ft north of the plant. When the purge well was pumped continuously (since October 1990),the other production wells for the plant were not used.

Underflow From the Study Area

Within the confined aquifer, water that is northeast of the ground-water divide in the western part of the study area flows northeastward and leaves the study area as underflow through the Tioughnioga River valley at an estimated rate of 40,500 ft^3/d (0.5 ft^3/s), as calculated from Darcy's equation for one-dimensional flow in a prism of porous material:

$$Q = \frac{KA(h_2 - h_1)}{L} \qquad (3)$$

where Q = flow (L^3t^{-1})

K = hydraulic conductivity of the aquifer (Lt^{-1});

A = cross-sectional area perpendicular to flow (L^2);

h_2-h_1 = head difference across the prism of flow (L);

L = length of flowpath (L).

The following hydraulic values were used to calculate underflow (Q) out of the Tioughnioga River valley:

hydraulic conductivity (K)	150 ft/d
cross-sectional area (A) of valley	135,000 ft^2
head difference (h^2-h^1)	0.002 ft
length (L)	1 ft.

Ground water that is west of the divide in the western part of the study area flows southwestward and leaves the study area as underflow to the Fall Creek valley, also at an estimated rate of about 40,500 ft^3/d, or 0.5 ft^3/s.

WATER QUALITY

Water from 15 wells was sampled about monthly by the Cortland State College and Cortland County Department of Planning during 1987-93. In addition, the USGS and these two groups conducted three synoptic rounds of sampling to (1) define the extent of a trichloroethylene (TCE) plume that resulted from a spill at the typewriter plant in the western part of the study area; (2) assess the contamination-remediation efforts at the source (the plant site); and (3) compare current concentrations of common ions, metals, and nutrients in ground water throughout the study area with historical data to detect changes or trends in water quality over time. TCE was used at the typewriter plant for degreasing mechanical parts from 1958 through October 1986 (O'Brien and Gere Engineers, Inc., 1987). Results of chemical analyses are given in appendix 3.

The first round of sampling (April 4-5, 1990, a high-recharge period), entailed collection of samples from 60 wells (31 observation wells, 26 private wells, and 3 municipal wells). All samples were analyzed for common ions, metals, nutrients, and volatile-organic compounds (VOC's). The second round (September 17-20, 1990, a low-recharge period), entailed collection of samples from 31 of the 60 wells sampled previously to verify results from the first sampling, and from an additional 9 observation wells that were installed after the first sampling to obtain data needed to define the extent of the TCE plume. Of the 40 samples collected during the second round, all were analyzed for nutrients, and 30 were analyzed for common ions, metals, and VOCs. The third round of sampling, 3 years later (April 27, 1993), entailed collection and analysis of samples from 18 wells for TCE and its degradation products to determine whether remedial efforts at the typewriter plant site had improved water quality downgradient of the site.

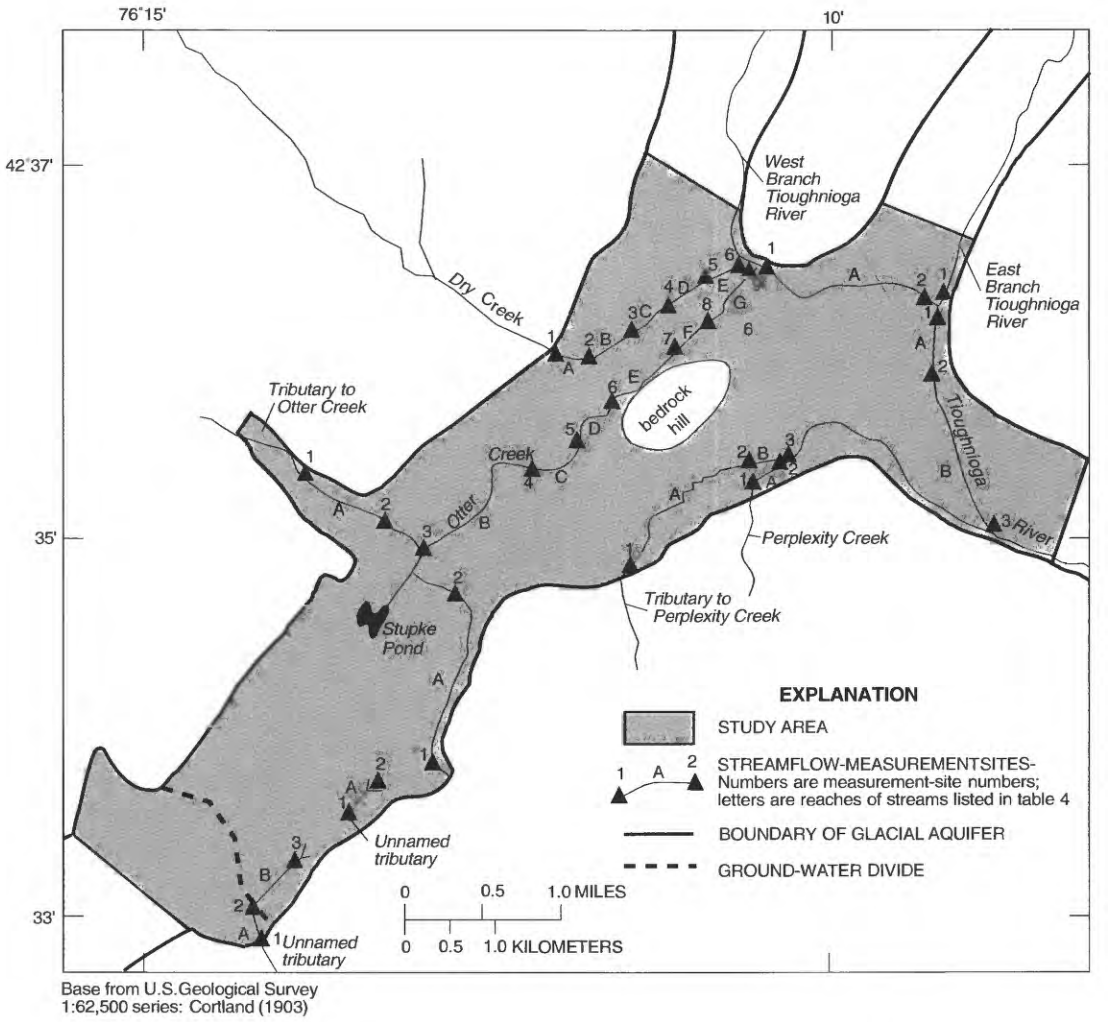


Figure 14. Location of streamflow-measurement sites in Cortland, N.Y., study area.

Table 5. Ground-water withdrawals from the Cortland, N.Y. study area by major pumping wells during low-, average-, and high-recharge conditions, 1990-91.

[All values are in millions of gallons per day. Locations of wells are shown on pl. 1.]

Well number	Owner	Recharge conditions and dates of measurement		
		Low recharge (Oct 7-9, 1991)	Average recharge (May 28-June 4, 1991)	High recharge (Mar. 28-29, 1990)
317	City of Cortland	4.09	4.28	4.41
354, 355	Town of Cortlandville, Terrace Road	0.56	0.40	0.65
432	Town of Cortlandville, Lime Hollow Road	.16	.59	Not pumping
434	Smith Corona Corp., recovery well	1.43	.69	.69
392	Smith Corona Corp., production wells	Not pumping	.48	.36
386	ETL Testing Labs	.22	.22	.22
373	Cortland Hospital	Not pumping	.18	.18
140, 139	Tunison Fish Hatchery	.20	.20	.20
138	Tunison Fish Hatchery	.10	.10	.10
	TOTALS	6.76	7.14	7.20

Volatile Organic Compounds

The U.S. chemical industry produces large amounts of volatile organic compounds (VOCs) that are used extensively by industries and by homeowners. Large-scale production and use of VOCs has resulted in many instances of soil- and ground-water contamination, most of which has resulted from leaks or spills at manufacturing plants, petroleum-product storage tanks, and chemical-waste disposal sites (Plumb, 1991). VOCs are low-molecular-weight hydrocarbons having very low (less than 2 percent) solubility in water, and rapid volatization. VOCs on the USEPA list of "Priority Pollutants" (U.S. Environmental Protection Agency, 1991) include trichloroethylene (TCE), benzene, 1,1,1-trichloroethane, and *cis*-1,2-dichloroethylene. Each is toxic to some degree, and most, including TCE, are believed to be carcinogenic (National Academy of Sciences, 1977). The USEPA "Maximum Contaminant Levels" (MCLs) for drinking water supplied by municipal water systems is 5 µg/L for TCE and benzene; 200 µg/L for 1,1,1-trichloroethane, and 70 µg/L for *cis*-1,2-dichloroethylene (U.S. Environmental Protection Agency, 1991). The MCL is an enforceable, health-based regulation set by the USEPA.

Many VOCs, including many of the chlorinated hydrocarbons (CHCs), are solvents used in degreasers and cleaners for metal and electronic parts, and also in paint removers, dry-cleaning fluids, drain cleaners, spot removers, and septic-tank cleaners. Other VOCs, such as benzene and toluene, are used in fuels. TCE is a CHC and a common industrial solvent that has been in commercial use for about 40 years. CHCs are persistent in the environment because they resist chemical and biological degradation; the average half-life for abiotic CHC transformations range from 2 months to 10^{10} years, and CHC half-lives for biodegradation range from 2 weeks to 8 months (Barbee, 1994). Anaerobic reductive dehalogenation (typically dechlorination) of CHCs is the primary biodegradation process in ground water; for example, *cis*-1,2-dichloroethylene is a reductive dechlorination product of TCE (Barrio-Lage and others, 1986; Wilson and others, 1991).

Extent and Migration of Trichloroethylene Contamination in the Unconfined Aquifer

The Chemistry Department at SUNY College at Cortland detected TCE in samples from a well in the central part of the unconfined aquifer in 1986. The well is 0.25 mi north of the Cortlandville municipal well field and 1.25 mi southwest and upgradient of the Cortland well field, and City and Town water managers and Cortland County health officials were concerned that the TCE could migrate to drinking-water supplies. In December 1986, samples were taken from about 23 observation wells and domestic wells by the college Chemistry Department and the Cortland County Department of Health to determine the extent and source of VOC contamination. Most of these wells were resampled about monthly during 1986-93. Most samples were analyzed by the college Chemistry Department; the rest were analyzed by the USGS laboratory in Denver, Co., and Buck Laboratory in Cortland.

From December 1986 through 1993, TCE was found in concentrations above the MCL of 5 µg/L at many wells in the central part of the unconfined aquifer. The highest TCE concentration found beyond the typewriter plant was 222 µg/L, in well 350 (owner Pace) on Pheasant Run (pl. 1) on April 9, 1987. This well 350 is 1,000 ft downgradient from the TCE source area at the plant. *cis*-1,2-Dichloroethylene, a solvent and reductive dehalogenation product of TCE, was also found in offsite wells where TCE was detected, but concentrations were below the MCL of 70 µg/L.

Horizontal Migration

Analyses of samples collected offsite by the Cortland County Department of Health and the college Chemistry Department, and of samples collected on the typewriter plant site by O'Brien and Gere Engineers, Inc. (1987), indicated that TCE in ground water was migrating northeastward. Hydrogeological consultants working for the plant found much higher concentrations of TCE and *cis*-1,2-dichloroethylene in wells at the plant site than in offsite wells and identified TCE-contaminated soils near the northwest side of the main plant building (O'Brien and Gere Engineers, Inc., 1987). The highest TCE concentrations found were at well site 448 (local well no. MW-7), installed by the consultants along the northwest perimeter of the main plant building (pl. 1), where TCE and *cis*-1,2-dichloroethylene concentrations of 10,000 and 7,600 µg/L, respectively, were found on August 3, 1989. TCE concentrations that day in 19 other wells on the site ranged from <1 to 270 µg/L, and *cis*-1,2-dichloroethylene concentrations ranged from <1.0 to 1,700 µg/L (O'Brien and Gere Engineers, Inc., 1990).

The extent of the TCE plume during the three rounds of sampling is shown in figures 15A, B, and C, respectively; the plume is defined where concentrations exceeded the MCL of 5 µg/L. The extent of the plume was roughly the same during all three sampling rounds, indicating that steady-state conditions probably had been reached. The plume extends 1.25 mi northeast from the plant and follows head gradients and the direction of ground-water flow.

Vertical Migration

The vertical distribution of TCE in the unconfined aquifer at wells 341 and 381 is plotted in figure 16. The TCE concentrations at well 341 (fig. 16A), which is 4,000 ft northeast of the TCE source at the plant, are higher in the middle zone than in the lower and upper zones of the unconfined aquifer, but the TCE concentration at well 381, which is 750 ft northeast of the TCE source, was uniformly distributed with depth (fig. 16B). The vertical distribution of TCE at well 341 (fig. 16A) is likely the result of (1) vertical dispersion of TCE with increasing distance from the source; (2) the vertical distribution of hydraulic conductivity in the aquifer, and (3) dilution by recharge (from precipitation). Coarse-grained sediments that form the top and middle zones of the aquifer and have high hydraulic conductivity provide a preferred pathway for ground-water flow and dissolved contaminants, but the fine-grained sediments of lower hydraulic conductivity in the lower zone retard downward ground-water movement and are a less preferred pathway. Little or no TCE was detected in the confined aquifer, which is protected by the lacustrine confining unit, which prevents the movement of water in the unconfined aquifer into the confined aquifer.

Effects of Remediation Efforts

A recovery well was installed at the typewriter plant as part of a "pump and treat" method for onsite remediation. Contaminated water is pumped from the aquifer and routed through an air stripper, where VOCs are volatilized and released into the atmosphere. The treated water is then piped 750 ft north of the plant and discharged into recharge basins, where it infiltrates to the water table. The return of pumped water to the aquifer causes little or no net loss of ground water. A cone of depression that has formed around the recovery well, and a ground-water mound that has formed beneath the recharge basins, alters the ground-water flow paths in the vicinity of the plant.

The effects of pumping by the TCE-recovery well and the rate of ground-water flow are essential considerations in evaluations of TCE concentrations in the plume. If the pump-and-treat system keeps the contaminated water from leaving the site, concentrations of VOCs will decrease over time through degradation and dispersion, and through downvalley movement of the tail of the plume that developed before pumping .

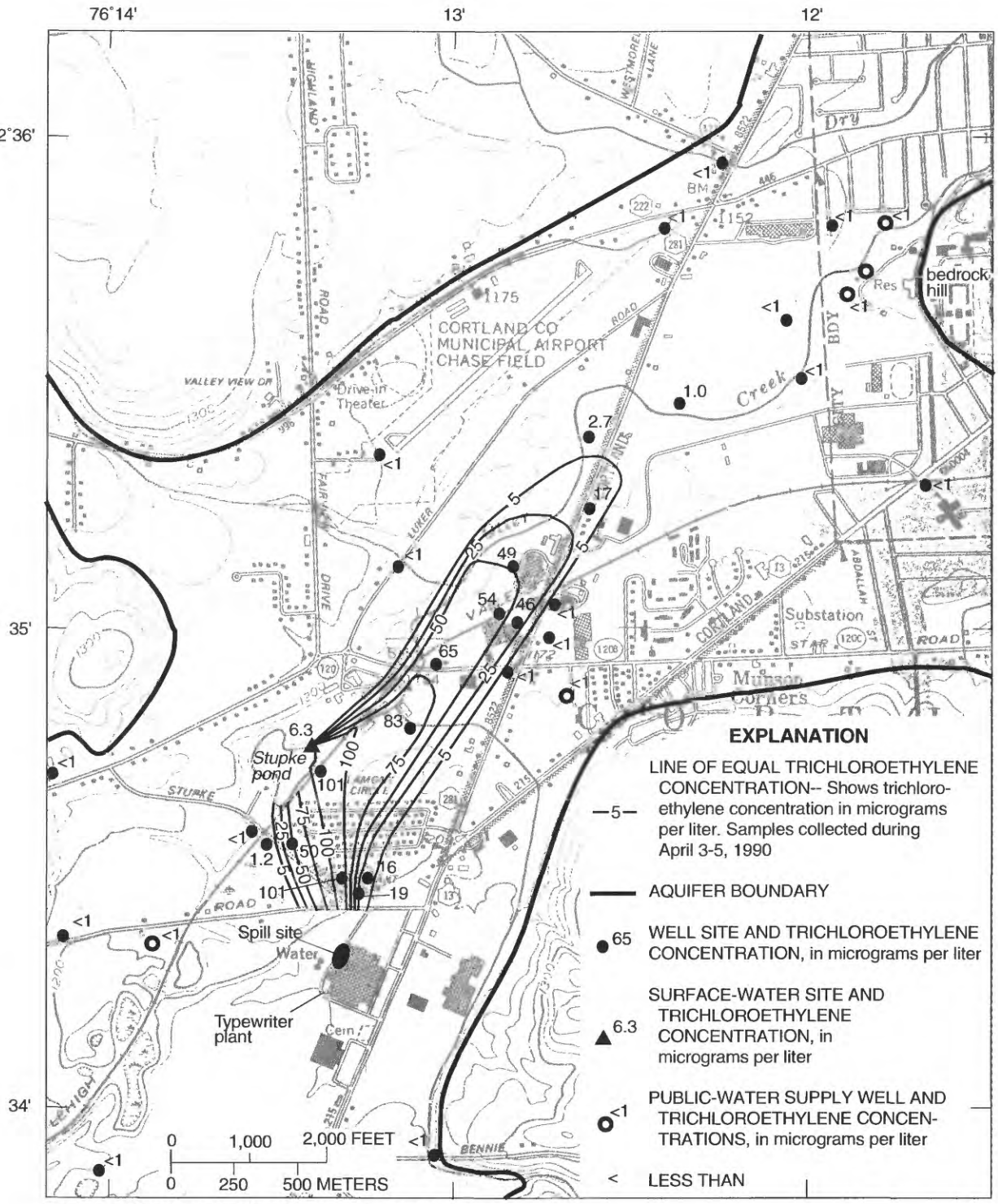
The recovery well was pumped intermittently from December 1989 through October 1990 at a rate of about 980 gal/min for 12 to 18 hours daily and continuously at this rate since October 1990. The TCE concentrations in most wells that were sampled in April 1990 (110 days after the beginning of intermittent pumping) were probably not significantly affected by the pumping because all wells that were sampled, except for well 22 (local well number CT-22), were more than 1,000 ft from the source of TCE– the distance ground water would move in 110 days at a velocity of 9 ft/d (velocity = hydraulic conductivity of 1,000 ft/d, divided by porosity of 0.3, times the hydraulic gradient of 0.0027 ft/ft).

The highest TCE concentrations found during the April 1990 sampling were just above 100 µg/L at well 350 (owner Pace) and well 121 (local well number CT-21), which are 1,000 and 2,400 ft northeast of the source of TCE, respectively (fig. 15A and pl. 1). These two wells have had the highest TCE concentrations of any offsite wells.

Pumping of the recovery well might have affected TCE concentrations at wells as far as 0.5 mi (2,640 ft) northeast of the source by the time of the second sampling round (September 17-20, 1990), as calculated for a pumping duration of 288 days (9.5 months) and a ground-water flow rate of 9 ft/d. TCE concentrations beyond this distance from the source were probably not affected yet.

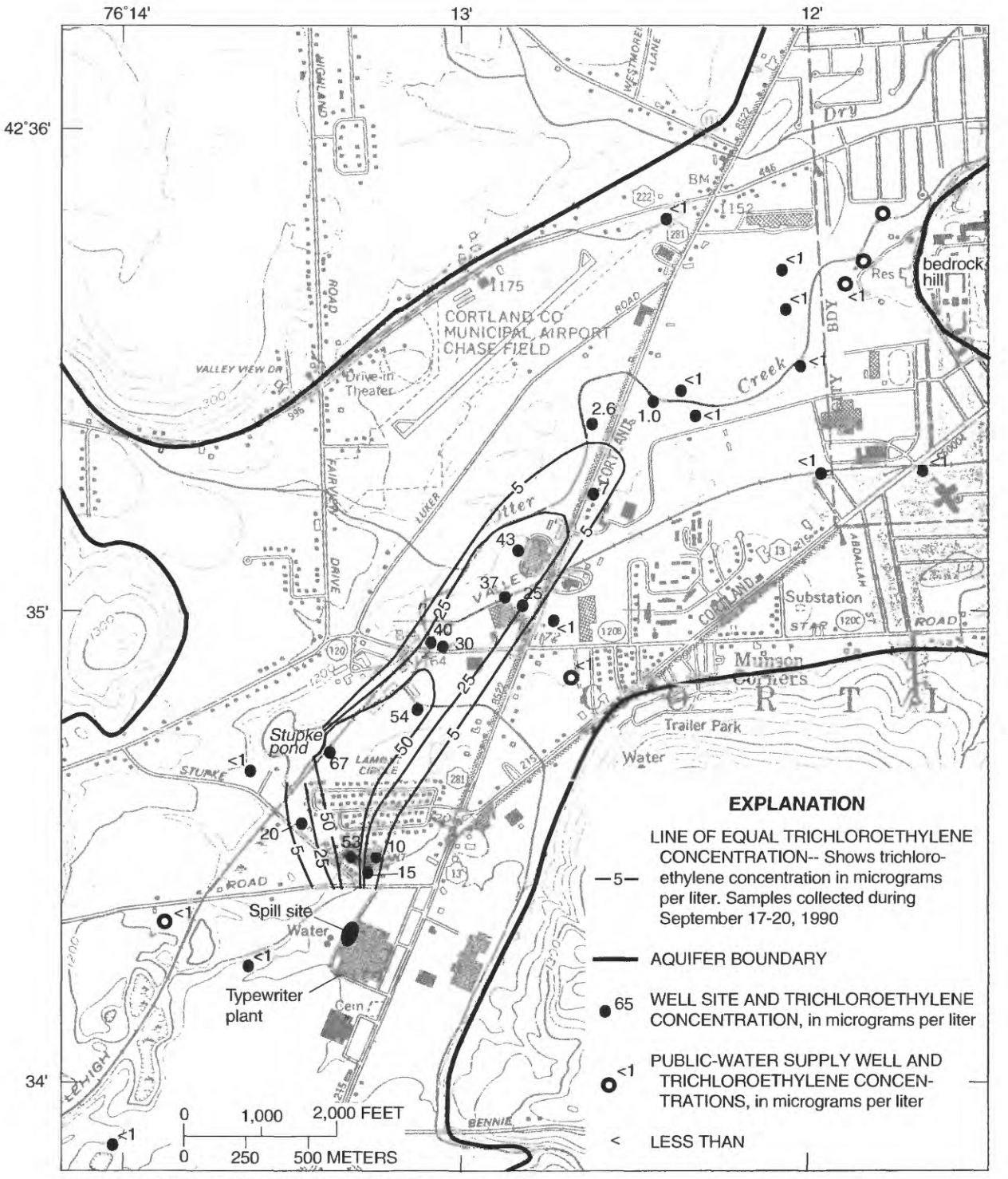
The extent of the TCE plume in September 1990 was about the same as in April 1990, but TCE concentrations were typically 30 to 50 percent lower; this could partly reflect the tendency of TCE concentrations at wells not yet affected by the recovery well to be lower during low-recharge periods (summer and fall) than during high-recharge periods (spring), as explained further on.

By the time of the third sampling round, 3 years later (in April 1993), the recovery well had been operating for 1,186 days (3.25 years), the last 2.5 years of which it had pumped continuously. During those 2.5



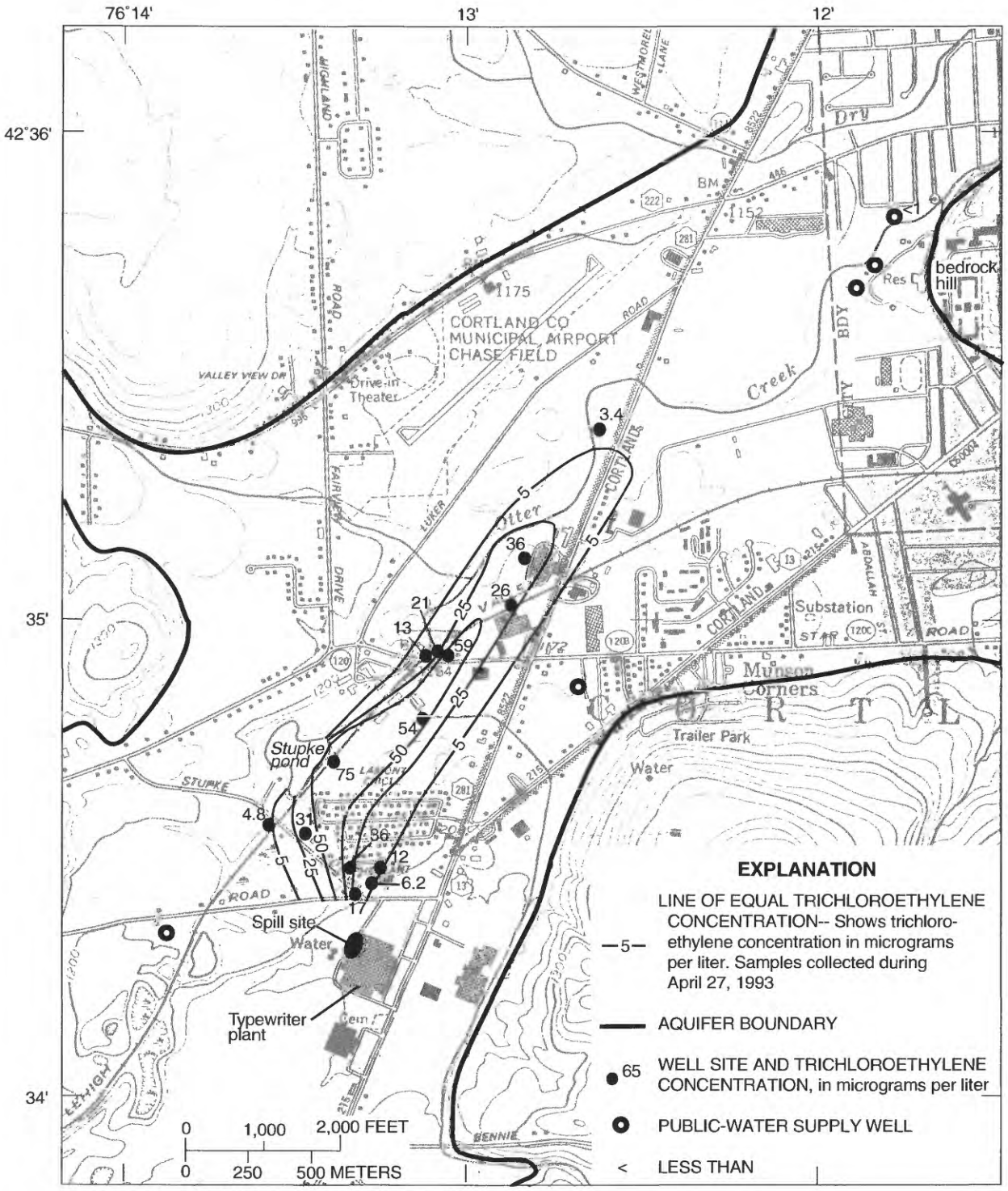
Base from New York State Department of Transportation
1:24,000 series: Cortland, New York (1980)

Figure 15A. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, April 3-5, 1990.



Base from NewYork State Department of Transportation
1:24,000 series: Cortland, NewYork (1980)

Figure 15B. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, September 17-20, 1990.



Base from New York State Department of Transportation
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Figure 15C. Extent of trichloroethylene plume and lines of equal trichloroethylene concentration in study area, April 27, 1993.

years, ground water would had moved more than 1.5 mi from the source–a distance greater than the length of the plume (about 1.25 mi). Therefore, water at all wells sampled during April 1993 would have been affected by the recovery-well operation.

The "pump and treat" remedial program was expected to capture all contaminated ground water on the site; TCE concentrations at the site were expected to decline rapidly, and those offsite were expected to decline significantly. These expectations were bolstered by analyses of several random samples collected in the fall of 1992, which showed that TCE concentrations had decreased significantly, some to the lowest values since December 1986 (fig. 17). These decreases prior to the April 1993 sampling suggested that the pump-and-treat system at the plant site was effective. A large amount of recharge in the winter and spring of 1993 (fig. 5), which included the blizzard of 1993, reversed this trend of improvement, however.

Results of the April 1993 sampling indicated that TCE concentrations at most wells in the middle and distal parts of the plume (figs. 15C, 17B, 17C) had increased significantly since the preceding fall and were nearly as high as those detected during April 1990 (fig. 15A) and September 1990 (fig. 14B). These elevated concentrations could not have been due to additional TCE emanating from the plant area because the ground-water traveltime from there to the middle and distal parts of the plume is from 1.5 to 2.5 years. The elevated TCE concentrations can be explained, however, by desorption of TCE that had previously sorbed onto sediments in the unsaturated zone. The above-normal recharge of March and April 1993 raised the water table to its highest level in at least 10 years and resaturated upper parts of the aquifer that had been

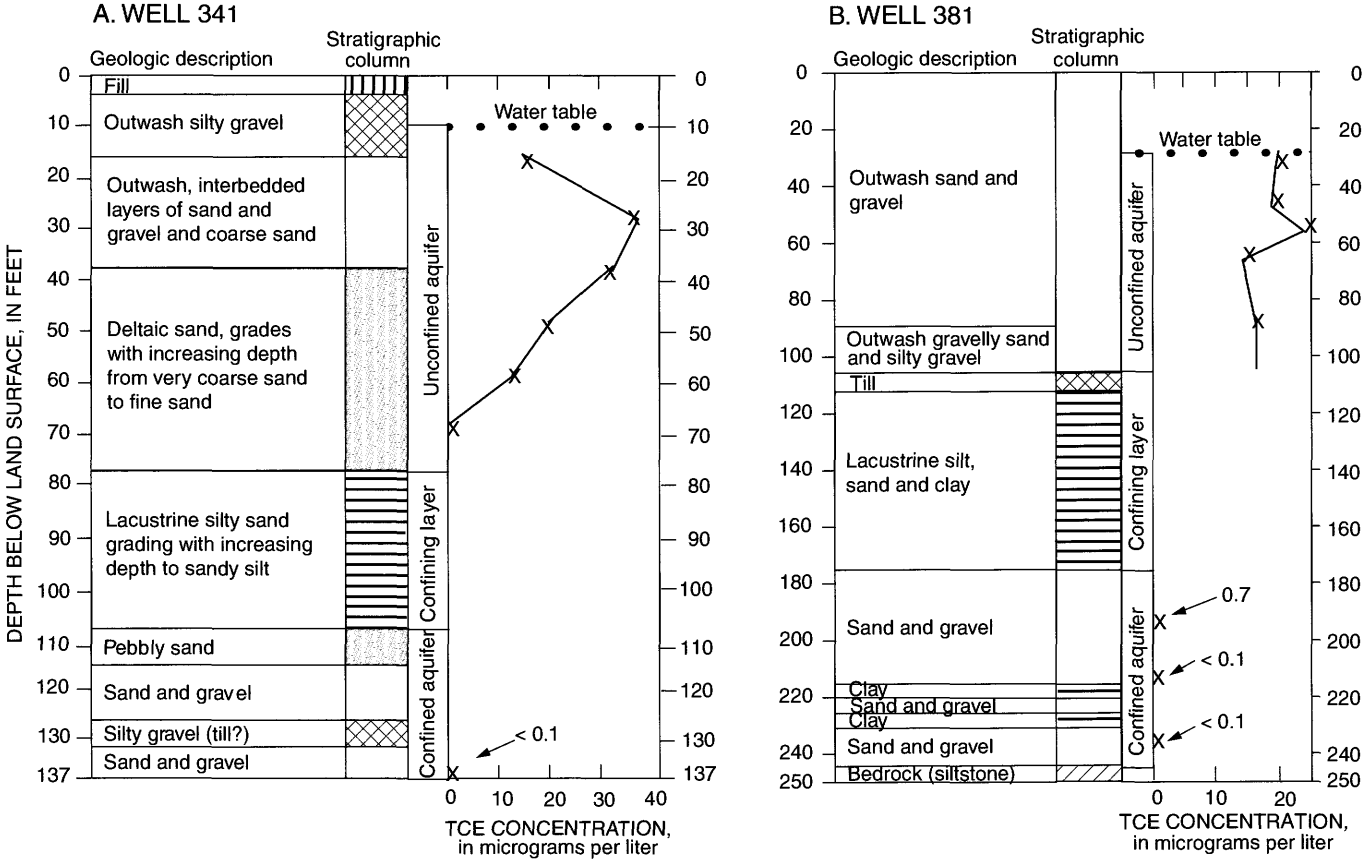


Figure 16. Vertical distribution of trichloroethylene (TCE) in ground water at two wells in Cortland, N.Y., study area: A. Well 341, 4,000 feet northeast of typewriter plant site, July 19, 1990. B. Well 381, 750 feet northeast of plant site, September 23-26, 1992. (Well locations shown on pl. 1.)

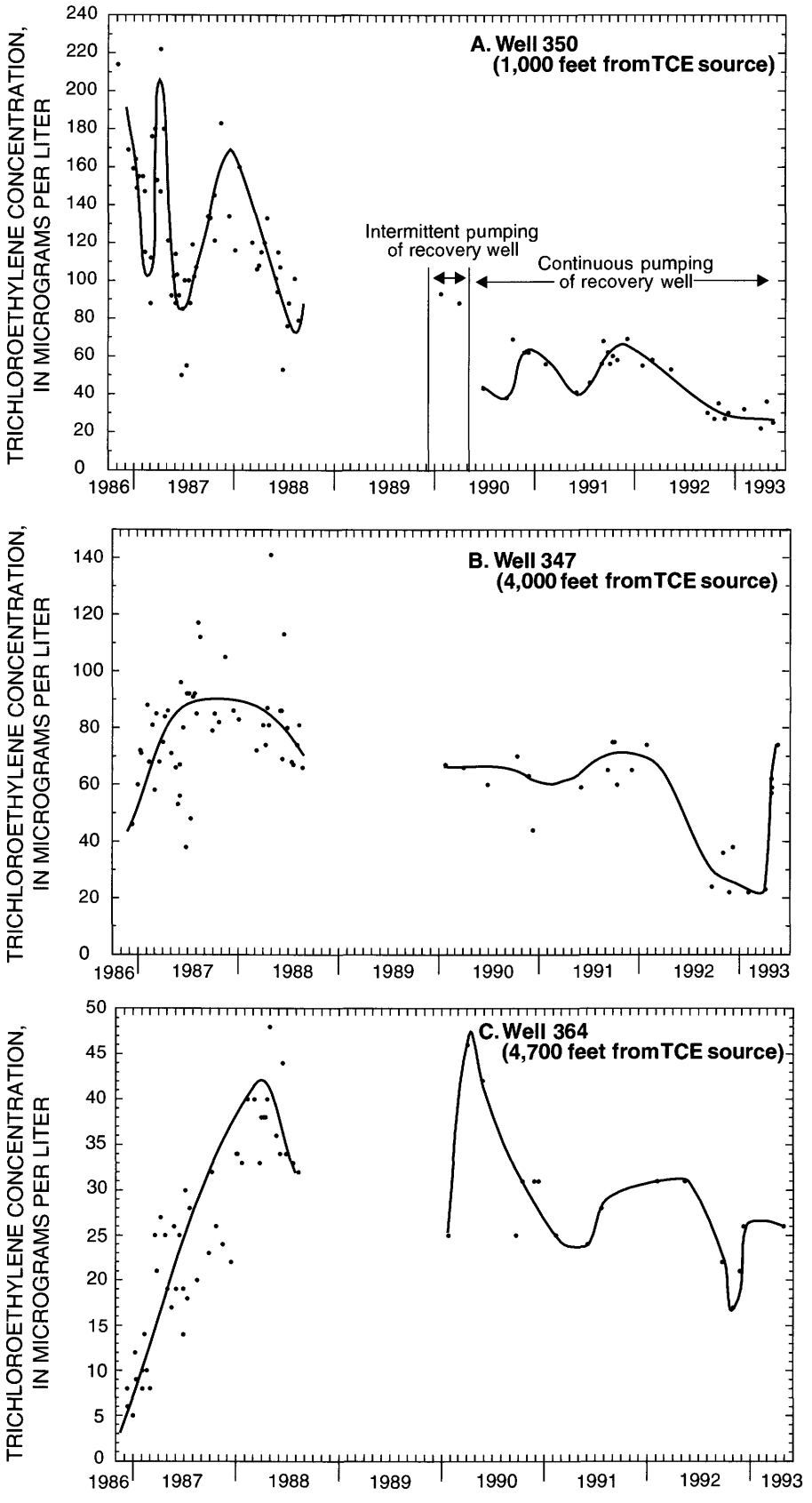


Figure 17. Trichloroethylene concentration at wells 350, 347, and 364 from November 1986 through May 1993. (Locations shown on pl. 1.)

unsaturated and that contained TCE that had not been thoroughly flushed by precipitation.

Results of the April 1993 sampling indicated that TCE concentrations had increased in the middle and distal wells but had declined significantly at some wells near the source, such as well 350 (owner Pace, fig. 17A), and at other wells on Pheasant Run (pl. 1) that had the highest TCE concentrations of the offsite wells. The lowered TCE concentrations at these wells could be explained by changes of ground-water flow paths near the plant site as a result of pumping by the recovery well and infiltration of the pumped water in recharge basins.

Long-Term Trends In TCE Concentrations

The year in which the TCE spill occurred was estimated from the arrival of the front of the plume at well 364 early in 1987 (fig. 17C) and from results of a particle-tracking program (MODPATH) in the back-tracking mode. The program calculated the ground-water traveltime to range from 21 months for high-recharge conditions to 23 months for low-recharge conditions. Subtracting 21 to 23 months from the time when the front of the TCE plume reached well 364 (early in 1987) indicates the time of the spill to be as early 1985. After the front of the plume reached well 364 in early 1987, the TCE concentrations at this well fluctuated only slightly through late 1992 (fig. 17C).

The highest concentrations of TCE in most offsite wells since the first sampling began in 1986 were found during 1987-88. Concentrations decreased slightly thereafter from 1989 through mid-1992, then decreased sharply at the end of the 1992, probably in response to (1) removal of contaminated soil, and (2) capture of contaminated ground water by the recovery well. These decreases were followed in the spring of 1993 by increases to about the same levels as those during 1989-91, however. As explained previously, the simultaneous increases of TCE concentrations in middle and distal parts of the plume suggest local releases of TCE to the aquifer, such as through desorption from a diffuse TCE source in the previously unsaturated zone of the aquifer, rather than to new TCE migrating from the source area at the typewriter plant. Desorption of TCE in the unsaturated zone can occur when (1) precipitation infiltrates the soil, and (2) a rising water table saturates the previously unsaturated zone.

TCE concentrations at wells within 1,500 ft of the typewriter plant, such as well 350 (fig. 17A), showed seasonal fluctuations. TCE concentrations were highest during the spring and lowest during the summer and fall. Hydrogeologic consultants (O'Brien and Gere, Engineers., 1990) also reported seasonal TCE fluctuations in wells at the plant. TCE concentrations at wells more than 1,500 ft from the plant showed little fluctuation, however (for example, well 364, about 4,500 ft downgradient of the plant, fig. 17C and pl. 1), indicating that seasonal fluctuations of TCE concentrations decrease with increasing distance from the TCE source.

Fate and Migration of Trichloroethylene

The fate and migration of TCE through an aquifer system are affected by physical, chemical, and biological processes. Physical processes include advection, dispersion, and nonaqueous-phase flow; chemical processes include volatilization, sorption, and dissolution; and biological processes include aerobic and anaerobic biotransformations (MacKay and others, 1985). Some of these processes are illustrated in figure 18.

The physical processes of advection, dispersion, and nonaqueous-phase flow affect the transport of TCE in the study area. The advective phase of TCE plume generally follows the direction of ground-water flow as it moves northeastward from the typewriter plant and either discharges into Stupke Pond and Otter Creek or remains in the central part of the aquifer. Physical dispersion of TCE results from differing rates of ground-water flow that result from varying lengths of flowpaths (some flowpaths follow a more circuitous route than others) and local variations in the hydraulic conductivity of the aquifer.

The relatively constant TCE concentrations that were found in most offsite wells before operation of the recovery well (1987 through the end of 1990) suggest a slow desorption of TCE from contaminated aquifer sediments and (or) dissolution of a dense, nonaqueous-phase liquid (DNAPL) in the aquifer. DNAPLs migrate downward under gravitational force in the unsaturated zone, where they may disperse, dissolve, degrade, or be removed by pumping or excavation.

DNAPL's in the unsaturated zone tend to partition into a gaseous phase and migrate as volatilized constituents. Most soil-gas TCE will diffuse upward in response to natural concentration gradients and will eventually escape into the atmosphere, but some will be adsorbed onto sediments in the unsaturated zone (Cho, and others, 1991) by one or more of the follow-

ing sorption mechanisms: (1) mineral-surface absorption, (2) partitioning into natural organic matter, (3) partitioning into water that coats the surface of sediments, and (4) adsorption into micropores. The amount of natural organic matter already on the unsaturated sediments is reported as the dominant factor for absorption of CHCs onto sediments, but where the organic content of the sediment is low, absorption in micropores may contribute significantly to sorbate uptake (Farrell and Reinhard, 1994).

Where a spilled DNAPL exceeds the retaining capacity of the unsaturated zone, it seeps to the water table and sinks downward within the aquifer (fig. 18), where some of it becomes trapped in pore spaces, some dissolves in the ground water, and the rest continues downward (DNAPL is denser than water) until it encounters a stratigraphic layer of low permeability (such as at the bottom of the aquifer), where it will accumulate as a pool. Continuous dissolution and dispersion of DNAPL's within the pore spaces of the saturated sediments and in the pool at the bottom of the aquifer then provides a constant release of contaminants (Barbee, 1994). DNAPL pools have been difficult to locate because they are relatively small and commonly migrate downslope along the bottom of aquifer and accumulate in local depressions. No such pools have been found in the study area to date; they may have dispersed or migrated elsewhere, or they could have eluded detection by the few test wells that extend to the bottom of the aquifer.

The rate and extent of chemical and microbial transformation of TCE in the subsurface are controlled by the physiochemical properties of TCE, by chemical properties of soil and water, and the microbial population in the soil (Barbee, 1994). The three major isomers formed by reductive dehalogenation of TCE

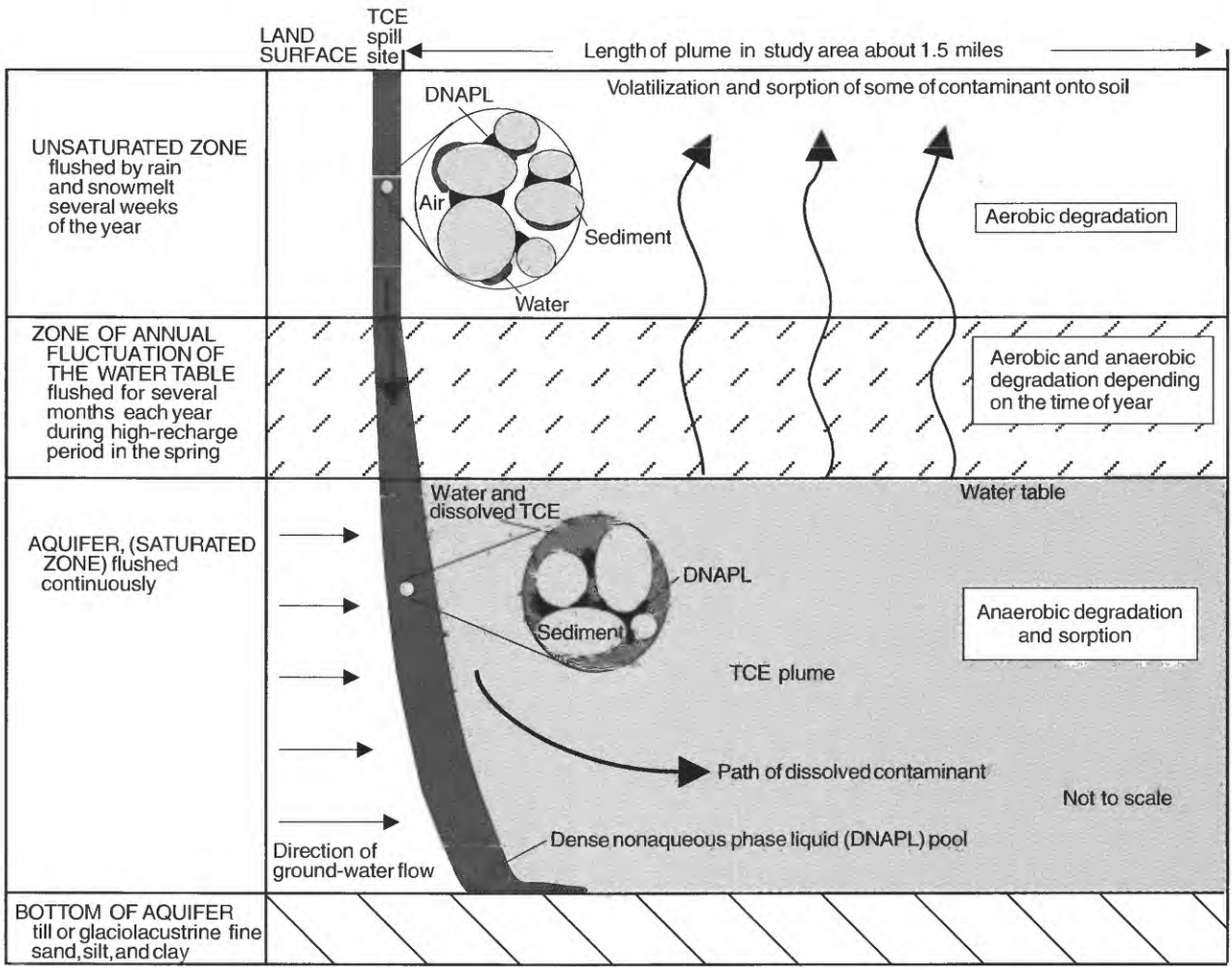


Figure 18. Physical, chemical, and biological processes that affect the fate and distribution of trichloroethylene (TCE) in and above the unconfined aquifer at Cortland, N.Y.

under methanogenic conditions by anaerobic soil microorganisms are *cis*-1,2-DCE, *trans*-1,2-DCE and 1,1-DCE (Ehlke and others, 1991; Imbrigiotta and others, 1991; Davis and Olsen, 1990). *Cis*-1,2-DCE is by far the most common transformation product in ground water in the study area, as well as in most other parts in the United States. The ratio of the *cis* form to the *trans* form of 1,2-DCE in laboratory experiments is about 30:1 (Davis and Olsen, 1990). Primary and secondary chemical and microbiological transformation pathways of TCE under anaerobic conditions are depicted in figure 19.

Anaerobic mechanisms such as hydrolysis and dehalogenation are the primary abiotic transformation pathways of TCE breakdown in typically reduced subsurface environments, but reactivity ranges over 10 orders of magnitude (Barbee, 1994). Under typical ground-water conditions, chlorinated ethenes such as TCE are relatively nonreactive; and 1,2-DCE is the least reactive product. Only under strongly basic conditions will chlorinated ethenes hydrolyze (Jeffers and others, 1989).

Biological transformation of CHCs can occur under a wide range of environmental conditions. The most significant process in the subsurface is microbially mediated dehalogenation (McCarty, 1991). The bacterial process, called cometabolism, involves an inducer/substrate (such as methane) that activates as an enzyme pathway that, in turn, oxidizes the substrate to generate carbon and energy for bacterial growth, while also oxidizing CHCs, such as TCE (McCarty, 1991). The cometabolic reductive dehalogenation process results in degradation products of halogenated and nonhalogenated aliphatic hydrocarbons (fig. 19) that can serve as primary substrates for further biodegra dation of CHCs (Barbee, 1994). The biotransformation of TCE may produce degradation products that are persistent in the environment (such as *cis*-1,2-DCE and *trans*-1,2-DCE), and that are greater health threats than TCE, (such as vinyl chloride, which is carcinogenic to humans). The half-lives for TCE and its chlorinated degradation products are given in table 6.

Further transformation of *cis*-1,2-DCE is uncertain. The half-life of *cis*-1,2-DCE through abiotic hydrolysis is at least 85 million years (table 6); thus, the likelihood of detecting the products of further degradation would be small—only on rare occasions and in trace amounts was 1,2-DCA detected. Other possible transformation compounds, such as vinyl chloride, were not detected. The ultimate transformation products of TCE are carbon dioxide, water, and chloride (fig. 19).

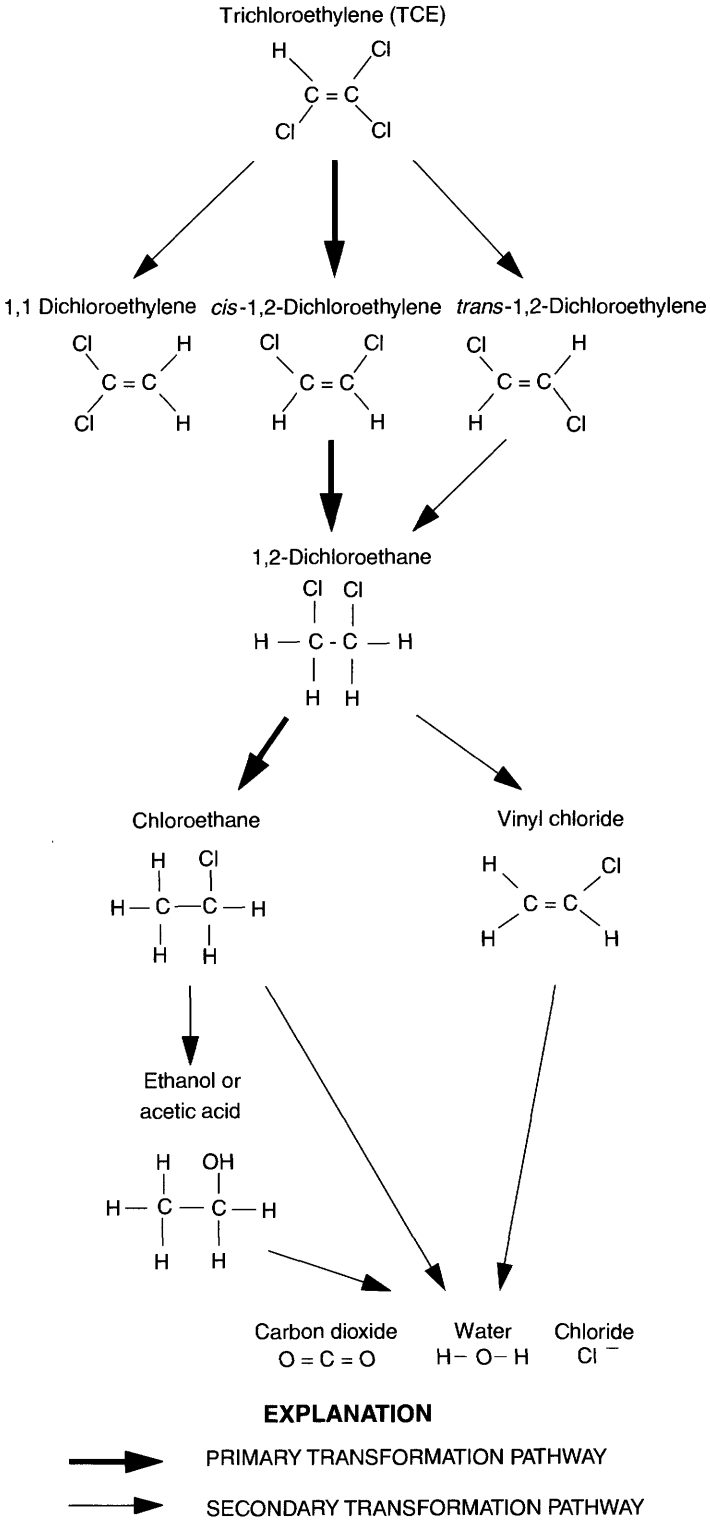


Figure 19. Transformation pathways of trichloroethylene under anaerobic conditions. (Modified from Davis and Olsen, 1990, fig. 1.)

Table 6. Range of half-lives for trichloroethylene and its degradation products.

[> = greater than, data from Barbee, 1994]

Chlorinated hydrocarbon	Half-life process	
	Abiotic hydrolysis or dehalogenation half-life (years)	Anaerobic biodegradation half-life (days)
Trichloroethylene	0.42 - 1.1	33 - 320
cis-1,2-dichloro-ethlene	8.5×10^{7} - 2.1×10^{10}	88 - 339
trans-1,2-dichloro-ethylene	8.5×10^{9} - 2.1×10^{10}	53 - 147
1,1-Dichloroethylene	4.7×10^{7} - 1.2×10^{8}	81 - 173
1,2-Dichloroethane	24 - 61	>60
Vinyl chloride	>10	>60

Inorganic Chemical Constituents and Physical Characteristics

Chemical quality of ground water is generally affected by several factors: (1) the chemical composition of precipitation that recharges the aquifer; (2) chemical reactions with the soil as the recharge passes through the unsaturated zone; (3) chemical reactions between the aquifer material and ground water in the aquifer; (4) residence time of water within the matrix, and (5) land use above the aquifer.

Chemical analyses of ground-water samples collected during April and September 1990 (table 7) in parts of the unconfined part of the aquifer that are not contaminated by TCE indicate that the quality of ground water in the study area generally meets New York State drinking-water standards. Concentrations of some constituents at some wells slightly exceeded the drinking-water standards, however.

Specific Conductance, pH, and Alkalinity

Specific conductance is a measure of the capacity of water to conduct an electrical current and is related to the type and concentration of ions in solution. Specific conductance is affected by precipitation and by chemical and physical reactions such as adsorption, ion exchange, oxidation, and reduction. Specific conductance of water samples collected during April 1990 ranged from 257 to 1,440 µS/cm, with a median value of 544 µS/cm (table 8A), and values in September 1990 ranged from 288 to 3,850 µS/cm, with a median of 612 µS/cm (table 8B). Median specific conductance values for the April samples did not differ significantly from the September values, nor from the median value of 440 µS/cm for samples collected in 1976 (Buller and others, 1978). Median values for the 1990 sampling from Cortland aquifer seemed to be slightly higher than those for other aquifers in upstate New York, however (Miller and others, 1988).

The pH of a solution is a measure of the effective hydrogen-ion concentration. The primary determinant of pH in ground water is the interaction of soil and rock molecules with gaseous and dissolved carbon dioxide, bicarbonate, and carbonate ions. The pH of ground water in the study area ranged from 7.2 to 8.4 with a median value of 7.6 for the April 1990 sampling, and from 6.9 to 8.9 with a median value of 7.7 for the September 1990 sampling. These median values indicate that the water in the study area is slightly basic.

Alkalinity is a measure of the capacity of water to neutralize an acid by chemical buffering; most alkalinity results from bicarbonate (HCO_3) and carbonate (CO_3) ions. Median values for alkalinity in the study area were 190 mg/L during the April 1990 sampling and 202 mg/L for those collected in the September 1990 sampling. These values are within the range of most ground water in the State.

Chloride and Sodium

Potential sources of chloride and sodium in ground water include road-deicing salts, septic-tank effluents, and sodium-bearing minerals within the aquifer. In some places, elevated concentrations of these ions can result from the discharge of mineralized water in bedrock into sand and gravel aquifers.

Elevated concentrations of chloride were generally found in ground water near major roads that are heavily salted. Median concentrations of chloride for the April and September 1990 samplings were 37 and 39 mg/L, respectively. The chloride concentration of 274 mg/L at the Cortland County office building during April 1990 exceeded the New York State drinking-water standard of 250 mg/L (well 177, pl. 1).

Chloride concentrations in ground water at the City of Cortland well field have been increasing since the early 1940's (Buller and others 1978) (fig. 20). Although still well below the New York State drinking-water standards, chloride concentrations there are significantly higher (at the 95-percent confidence level) than in 1976.

Chloride has migrated downward to some degree throughout the study area. The median concentration of samples from depths greater than 22.5 ft below the

water table was 30 mg/L, and the median concentration of samples from depths less than that was 39 mg/L. The chloride concentration of a sample from well 306, which is 255 ft deep, was 28 mg/L. Chloride concentrations during the April 1990 sampling were generally less than 40 mg/L in the western part of the study area, except at the north end of the municipal airport, where the concentration at well 330 was 80 mg/L. Concentrations in the central part of the aquifer ranged from 40 to 80 mg/L, and those in the eastern part ranged from 40 mg/L to 120 mg/L (fig. 21).

Dissolved sodium concentrations in the study area ranged from 4.8 mg/L to 530 mg/L, with a median value of 28 mg/L. Although no standard has been established for sodium, the USEPA (1976) recommends less than 20 mg/L in drinking water for people on sodium-restricted diets. Of the 30 wells that were sampled during September 1990, 20 had sodium concentrations above the 20-mg/L limit.

Trace Elements (Iron and Manganese)

Trace elements generally occur naturally in ground water in extremely low concentrations, but industrial processes and urbanization tend to increase their abundance within the hydrologic system and thereby can seriously degrade water quality. Except for iron and manganese, trace elements detected in ground water in the study area did not exceed drinking-water standards. Iron and manganese concentrations are generally considered together; State drinking-water standards specify a combined maximum limit of 300 µg/L. Concentrations of iron and manganese exceeded the 300-µg/L limit at 7 of the wells sampled during September 1990; the median concentration of iron and manganese at each was 16 µg/L. Extremely high concentrations of iron and manganese (7,900 µg/L and 3,600 µg/L, respectively) were found in water from well 365 (pl. 1), in the eastern part of the study area. This well is at an abandoned gasoline station on the edge of the TCE plume, and dissolution of old under-

Table 7. Minimum, maximum, mean, median, and interquartile range of concentrations for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during April and September 1990.

[Values are in milligrams per liter, mg/L, unless otherwise noted, µS/cm, microsiemens per centimeter; µg/L, micrograms per liter]

Constituent or property	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
Well depth, in feet	86	14	255	55	47	34	67
Alkalinity (as $CaCO_3$)	101	62	312	191	196	167	220
pH	60	6.9	8.9	7.7	7.7	7.6	7.8
Specific conductance, µS/cm	60	257	3,850	673	592	513	705
Phosphorus, total as PO_4	59	.01	1.29	.44	.43	.12	.68
Nitrate as N	59	<.01	12	4.1	4.3	2.4	5.6
Chloride	69	5.0	270	52	38	28	61
Sodium	89	4.8	530	37	23	15	39
Potassium	40	.2	8.3	1.7	1.4	1.0	2.0
Calcium	30	.1	780	94	79	72	89
Nitrite + nitrate as N	40	.10	9.9	4.4	4.6	3.4	5.6
Magnesium	30	6.0	39	15	14	14	16
Sulfate	30	17	25	22	23	21	24
Silica	30	.55	14	7.2	7.4	6.7	7.9
Barium (µg/L)	30	29	290	77	62	50	74
Berylium (µg/L)	30	.50	1.5	.55	.50	.50	.50
Cadmium (µg/L)	30	< 1	3.0	1.1	< 1	< 1	< 1
Chromium (µg/L)	30	< 5	15	5.3	< 5	< 5	< 5
Cobalt (µg/L)	30	< 3	9	3.3	< 3	< 3	< 3
Copper (µg/L)	30	< 10	50	13	< 10	< 10	< 10
Iron (µg/L)	30	< 3	7,900	334	16	10	38
Lead (µg/L)	30	10	30	11	10	10	10
Manganese (µg/L)	30	< 1	3,600	206	16	4	72

Table 8. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground-water samples collected from the glacial aquifer in the Cortland, N.Y. study area during April 1990 and September 1990.

[Values are in milligrams per liter (mg/L) unless otherwise noted, µS/cm = microseimens per centimeter, ft = feet]

Constituent or property	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
A. April 1990							
Well depth (ft)	43	14	255	55	45	28	67
Depth to water surface (ft)	40	3.3	61.6	15.5	11.5	7.2	18.2
Depth below water table (ft)	32	4.3	247	39.7	27.2	17.6	45.5
Alkalinity (as $CaCO_3$)	59	62	265	182	190	154	212
pH	28	7.2	8.4	7.7	7.6	7.5	7.7
Specific conductance, µS/cm	28	257	1,440	581	544	477	660
Phosphorus, total as P	59	.01	1.3	.44	.43	.12	.68
Nitrate as N	59	.1	12	4.1	4.3	2.4	5.6
Chloride	59	5.0	270	52	37	28	61
Sodium	59	5.0	200	29	22	14	35
Potassium	59	.15	8.3	1.7	1.4	1.02	2.0
B. September 1990							
Well depth (ft)	43	14	217	55	48	34	67
Depth to water surface (ft)	29	5.5	72.8	22.9	17.5	13.1	28.0
Depth below water table (ft)	28	2.5	207.3	33.6	22.4	14.6	35.7
Specific conductance	32	288	3,850	753	612	555	796
pH	32	6.9	8.9	7.7	7.7	7.6	7.8
Alkalinity (as $CaCO_3$)	42	104	312	204	202	187	224
Nitrite + nitrate as N	40	.10	9.9	4.4	4.6	3.4	5.6
Calcium, dissolved	30	13	230	82	79	74	90
Magnesium, dissolved	30	6.0	39	15	14	14	16
Sodium, dissolved	30	4.8	530	54	28	18	47
Chloride, dissolved	10	21	79	47	39	30	70
Sulfate	10	17	25	22	23	21	24
Silica, dissolved	30	.55	14	7	7.4	6.7	7.9
Barium, dissolved (µg/L)	30	29	290	77	62	50	74
Berylium, dissolved (µg/L)	30	.50	1.5	.55	.50	.50	.50
Cadmium, dissolved (µg/L)	30	< 1	3	1.1	< 1	< 1	< 1
Chromium, dissolved (µg/L)	30	< 5	15	5.3	< 5	< 5	< 5
Cobalt, dissolved (µg/L)	30	< 3	9	3.3	< 3	< 3	< 3
Copper, dissolved (µg/L)	30	< 10	50	13	< 10	< 10	< 10
Iron, dissolved (µg/L)	30	< 3	7,900	330	16	10	38
Lead, dissolved (µg/L)	30	10	30	11	10	10	10
Manganese, dissolved (µg/L)	30	< 1	3,600	210	16	4	72

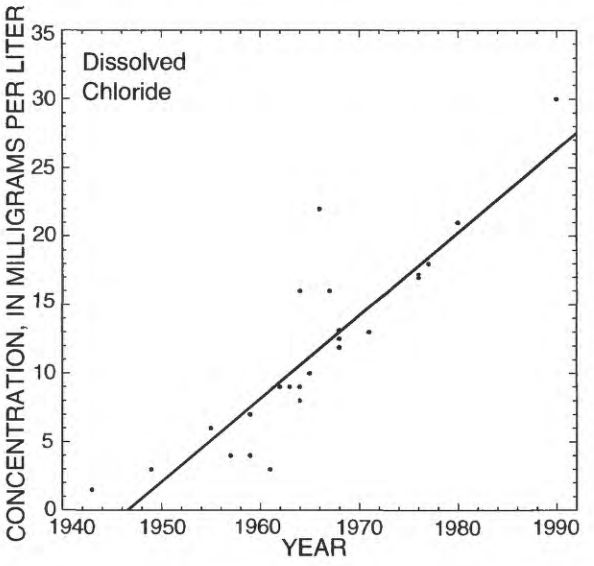


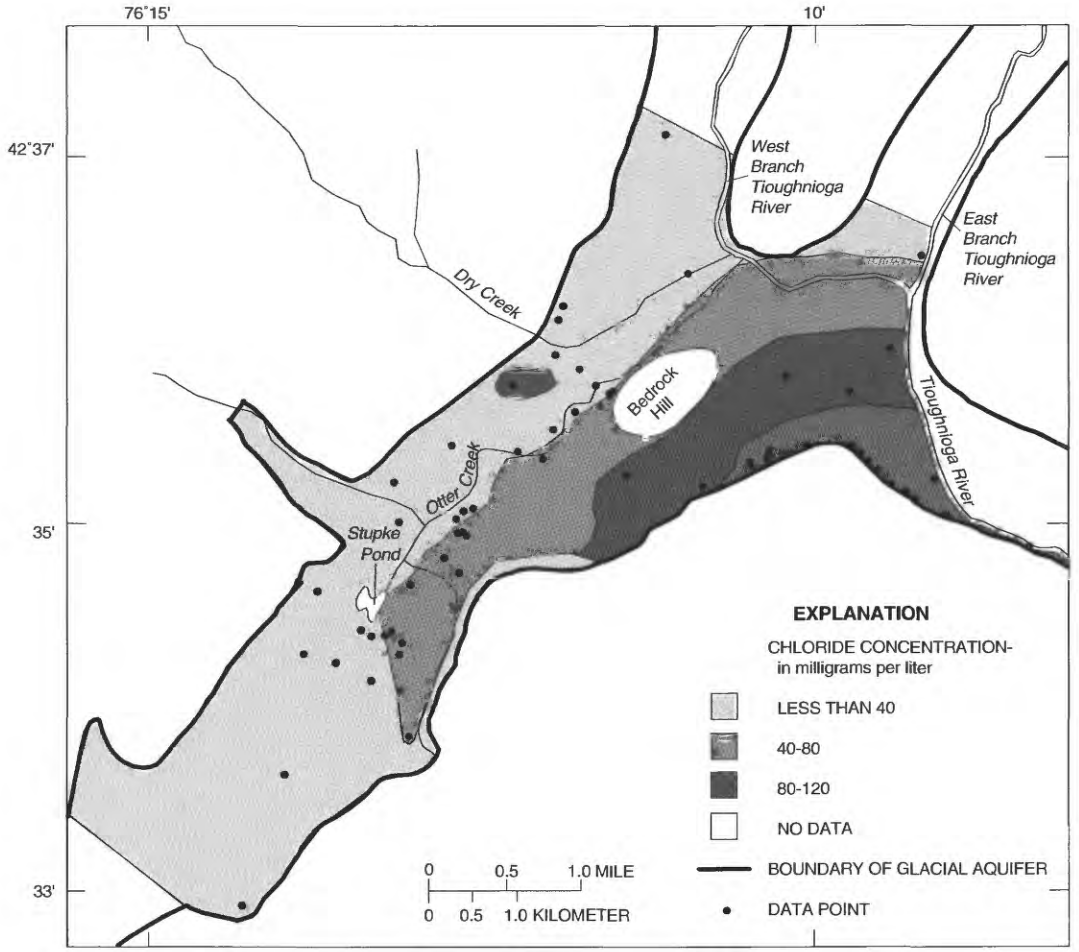
Figure 20. Dissolved chloride concentrations in water from wells at City of Cortland well field, 1943-76, 1980, and 1990. (Modified from Buller and others, 1978, fig. 20.)

ground gasoline-storage tanks may have been the source of the iron and manganese.

Nitrogen

Nitrogen, which constitutes about 80 percent of the atmosphere, generally occurs in nature in combination with other elements and is a common degradation product of organic wastes. Nitrate sources include (1) the decomposition of organic nitrogen that is introduced to the soil by nitrogen-fixing plants and bacteria, (2) human and animal wastes, and (3) organic and inorganic fertilizers.

Total nitrate concentrations (NO_3^- as N) in ground-water samples collected in April 1990 ranged from 0.1 to 12 mg/L, with a median value of 4.3 mg/L. The largest concentrations (12 and 8.6 mg/L) were at wells 304 and 204, respectively, both of which are close to Otter Creek and just downgradient of a large dairy farm.



Base from U.S. Geolocial Survey,
Cortland 1:62,500, 1903

Figure 21. Distribution of chloride concentrations in the unconfined aquifer in Cortland study area, April 1990.

Ground-water samples collected in September 1990 were analyzed for dissolved nitrite plus nitrate ($NO_2^-+NO_3^-$) as N. Nitrate (NO_3^-) is typically the most common nitrogen species in surface water and ground water, whereas nitrite (NO_2^-) is unstable and usually undergoes nitrification or denitrification and typically occurs in concentrations of less than 0.1 mg/L (Behnke, 1974). Concentrations of nitrite plus nitrate ranged from 0.1 to 9.9 mg/L in September 1990 with a median value of 4.6 mg/L. The highest concentrations were 9.9 mg/L and 8.3 mg/L in wells 5 and 207, respectively, both of which are subject to agricultural influences. Wells 304 and 204, which had the highest nitrate concentrations in April 1990, had concentrations of 4.0 and 4.6 mg/L, respectively, in September 1990. Data from several well pairs (a shallow well and a deep well) indicate that the vertical distribution of nitrogen is fairly uniform throughout the upper part of the unconfined aquifer. Nitrate-concentration data from six wells finished in the confined aquifer indicate that nitrogen is present in that aquifer, but in lower concentrations (median value 2.0 mg/L).

Temporal Changes

Data collected in this study (April and September 1990) were compared with data collected in 1978 by Buller and others (1978), and with data collected from November 1979 through January 1981 by Cortland County, to discern trends in water quality in the glacial-aquifer system. Only wells that also had been sampled in the 1978-81 studies were represented in the comparison. Constituents that were compared were alkalinity, nitrite plus nitrate as N, calcium, chloride, and sulfate. Chloride was the only constituent for which concentrations for all four periods were available. Maximum, minimum, mean, median, and interquartile ranges of the constituents that were compared are shown in table 9.

Nonparametric statistical tests were used to discern year-to-year differences in median values. A 0.05 level of significance (95-percent confidence level) was used for all tests to describe the error probability of falsely detecting differences. Simple descriptive statistics such as boxplots and median and interquartile range were used first to examine the distribution of the sample population of each constituent from the three time periods. Because water-quality data typically do not have a normal distribution, the median and interquartile range provide a better measure of the sample-population distribution than do the mean and the standard deviation. For this reason, a Kruskal-Wallis one-way ANOVA (analysis of variance) was done on ranked data to compare the distribution of concentrations by year (Conover and Iman, 1981). Differences among sample populations (by year) indicated by the Kruskal-Wallis test were further defined by Tukey's multiple-comparison test.

Concentrations of chloride, the only constituent with data from all four time periods, were significantly greater during April and September 1990 than in 1976 or 1980. Median values for April and September 1990 were similar (36 and 38 mg/L, respectively), and the median concentration for 1980 (21 mg/L) was slightly greater than for 1976 (18 mg/L). The increase in chloride concentration over the years (fig. 20) is due to increased use of road salt and, to a lesser extent, leakage from aging septic systems.

Median concentrations of alkalinity were greater in September 1990 (210 mg/L) than in April 1990 (191 mg/L), and the September median was significantly greater than that for 1976 (167 mg/L). Median concentrations of calcium for April and September 1990 where nearly equal (80 and 77 mg/L, respectively) but were significantly higher than in 1976 (63 mg/L). Median concentrations of nitrite plus nitrate differed significantly among sampling periods–September 1990 had the highest, and 1976 had the lowest. The trend of increasing nitrogen concentrations may result from increased application of agricultural and lawn fertilizer, as well as leaking septic systems. The significant difference between nitrate concentrations in April 1990 and those in September 1990 may result from three factors: (1) recharge during this period was fairly large; thus, concentrations may have been diluted; (2) ground-water levels in September had declined by an average of 7.4 ft, decreasing the amount of dilution; and (3) nitrogen from fertilizers applied during late spring and summer probably had reached the water table by September. The distribution of concentration data for alkalinity, nitrite plus nitrate, calcium, and chloride in 1976 and the two 1990 sampling periods are shown by year in figure 22A.

Ground-Water Chemistry and Land Use

The available data allow only generalized comparisons between ground-water quality and land use. Because land use in the study area is heterogeneous, the effects of a particular land use on the quality of water at a particular well or group of wells are impossible to isolate. Most of the 52 wells sampled were in

the Cortland municipal area, which contains several land-use categories, including residential, industrial, commercial, recreation, major transportation routes, and other small categories associated with urban areas. The remaining 16 wells were grouped as agricultural. Water from these wells, which were in the southern end of the study area and at its edges, was readily identifiable by characteristics that are associated with agriculture. Thus, ground-water quality was compared simply between two broad categories of land use—urban and agricultural. Six wells that penetrated the confined aquifer were eliminated from the data set prior to analysis of because part of their recharge area is outside the study area.

The distribution of chemical data for the two land-use groups were compared through use of boxplots (fig. 22B). Any statistically significant differences in concentrations reflecting land use were tested with the Kruskal-Wallis one-way ANOVA, which compares the distribution of ranks of concentrations between groups of data to determine whether any of the groups differ significantly from the others. Significance was chosen at 0.05 (95-percent confidence level).

Table 9. Minimum, maximum, mean, median, and interquartile range of concentration or value for selected constituents or properties of ground water sampled during three studies in Cortland County, N.Y. study area

[Values are in milligrams per liter unless otherwise noted, µS/cm, microsiemens per centimeter; dashes indicate no data].

Constituent or property	Sampling date[1]	Number of samples	Minimum	Maximum	Mean	Median	Interquartile range	
							25th	75th
Specific conductance (µS/cm)	1976	84	235	700	451	450	405	499
	1980	0	--	--	--	--	--	--
	April 1990	22	236	797	474	470	334	542
	Sept. 1990	6	413	631	545	556	512	584
Alkalinity (as $CaCO_3$)	1976	23	63	231	168	167	152	182
	1980	0	--	--	--	--	--	--
	April 1990	22	62	239	180	191	167	219
	Sept. 1990	12	151	300	209	210	183	224
Nitrate (total as N)	1976	27	1.6	4.9	3.4	3.4	2.8	4.1
	1980	153	.10	5.0	2.4	2.7	1.6	3.3
	April 1990	22	.80	12	4.6	4.6	2.4	6.1
	Sept. 1990	0	--	--	--	--	--	--
Nitrite + nitrate (as N)	1976	84	.55	5.6	3.2	3.4	2.7	4.0
	1980	0	--	--	--	--	--	--
	April 1990	0	--	--	--	--	--	--
	Sept. 1990	12	3.7	9.9	6.0	5.8	4.7	7.3
Calcium	1976	19	31	80	64	63	59	76
	1980	0	--	--	--	--	--	--
	April 1990	22	32	97	78	80	75	87
	Sept. 1990	6	61	87	76	77	72	81
Chloride	1976	85	3.0	78	24	18	12	28
	1980	153	5.0	72	24	21	14	30
	April 1990	22	15	110	45	36	27	61
	Sept. 1990	7	29	79	46	38	30	72
Sulfate (as SO_4)	1976	18	19	26	22	21	20	24
	1980	0	--	--	--	--	--	--
	April 1990	0	--	--	--	--	--	--
	Sept. 1990	7	19	25	23	24	23	25

[1]1976 data from Buller and others (1978). 1980 data provided by Cortland County Department of Health. 1990 data from present study

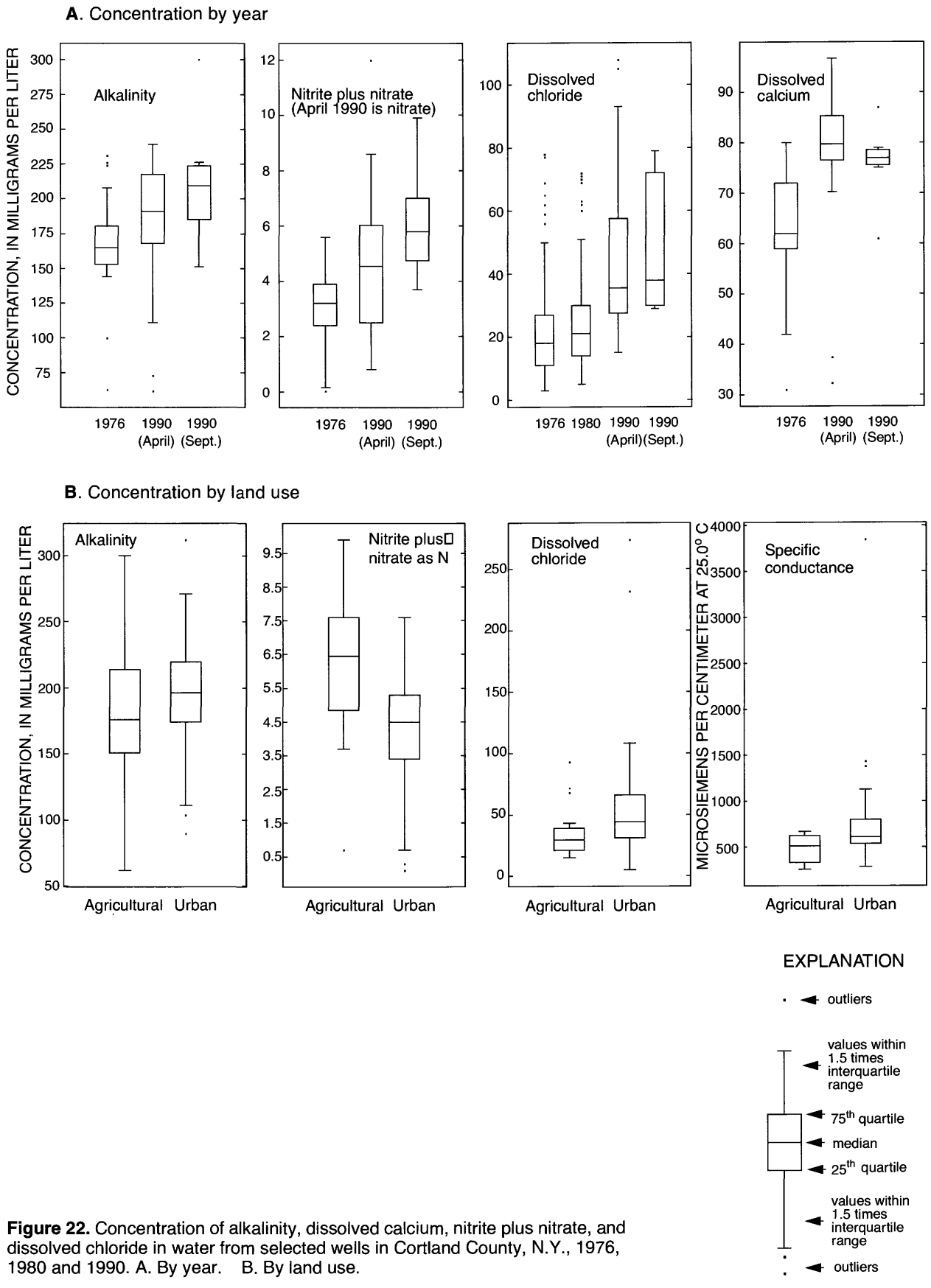


Figure 22. Concentration of alkalinity, dissolved calcium, nitrite plus nitrate, and dissolved chloride in water from selected wells in Cortland County, N.Y., 1976, 1980 and 1990. A. By year. B. By land use.

Only two constituents—specific conductance and chloride—showed a significant difference between the two land-use categories; concentrations of both were significantly higher in the urban area than in the agricultural area. The higher chloride concentrations in the urban area may be attributable to road salt, industrial wastes, and sewage leaked from aging septic and sewer systems, and the significantly greater specific conductance values in the urban area than in the agricultural area are associated with the higher chloride concentrations. The median chloride concentration was 44 mg/L in the urban area and 30 mg/L in the agricultural area, and the median specific conductance values were 610 µS/cm and 516 µS/cm, respectively. Median concentrations of sodium were considerably larger (although not statistically significant) in the urban area than the agricultural area (24 mg/L and 16 mg/L, respectively). Alkalinity was slightly higher in the urban area, and median concentrations of nitrate and calcium were nearly the same in both areas. Concentrations of nitrite plus nitrate were considerably higher in the agricultural area (although not a statistically significant difference) as a result of the agricultural sources of that constituent. Maximum, minimum, median, mean, and interquartile ranges of the selected constituents grouped by land-use categories are in table 10.

SIMULATION OF GROUND-WATER FLOW

A ground-water flow model was constructed to delineate areas that contribute ground water to municipal wells and the flowpaths of ground water migrating from two sources of contamination. Because annual and seasonal fluctuations in the amount of recharge affect flow conditions in the aquifer system, three steady-state ground-water recharge conditions–high, average, and low–were simulated.

Description and Design of Numerical Model

A quasi-three-dimensional, numerical three layer ground-water flow model was constructed to compute hydraulic head and flows in the glacial aquifer system in the study area. Heads in the confining unit were not calculated; instead, resistance to flow in the confining unit is included in terms of vertical conductance between the unconfined and confined aquifers. This approach to simulating flow through a confining layer is called the "quasi-three-dimensional" approach. The model was developed with the computer program MODFLOW (McDonald and Harbaugh, 1988), which is based on block-centered, finite-difference equations that describe the physics of water flowing through a porous medium. The equations relate water levels to geometry and hydraulic properties of the aquifer, such as hydraulic conductivity, and to stresses such as

Table 10. Minimum, maximum, mean, median, and interquartile range of concentrations or values for selected constituents or properties of ground water in Cortland, N.Y. study area, by land use

[Values are in milligrams per liter unless otherwise noted; µS/cm = microsiemens per centimeter, * indicates significant difference at the 95-percent confidence level in constituent concentration between land uses.].

Constituent or property	Land use	Number of observations	Minimum	Maximum	Mean	Median	Interquartile range 25th	Interquartile range 75th
Alkalinity (as $CaCO_3$)	Agricultural	20	62	300	183	180	154	218
	Urban	76	90	312	197	197	177	221
*Specific conductance (µS/cm)	Agricultural	12	257	668	501	516	351	634
	Urban	43	344	3,850	728	610	546	802
Nitrate (as N)	Agricultural	12	.1	8	4.2	4.2	2.3	6.0
	Urban	45	.1	12	4.2	4.5	2.7	5.5
*Chloride (as Cl)	Agricultural	17	15	93	37	30	21	42
	Urban	50	5	270	58	44	31	67
Sodium (as Na)	Agricultural	14	4.8	51	21	16	11	30
	Urban	70	4.8	530	39	24	16	39
Calcium (as Ca)	Agricultural	14	.10	780	150	78	55	88
	Urban	70	47	240	86	79	73	89
Nitrite + nitrate (as N)	Agricultural	6	.70	9.9	5.9	6.4	3.0	8.7
	Urban	31	.30	7.6	4.3	4.6	3.5	5.4

pumping and recharge. The aquifer system is represented by a three-layer grid in which all characteristics of the system, including geometry, hydraulic properties, and stresses, are defined by values specified at the centers of cells, and the model calculates the head at the center of each cell. The process of representing a continuous system with a specified number of discrete points is called discretization.

In the finite-difference method, the discrete points are located along rows and columns, and each point is associated with a cell. Head and flows are calculated only for "active" cells, which represent the aquifers; "inactive" cells are those outside the aquifer boundary and are ignored in the calculations.

The design of the numerical model is based on the conceptualization of the aquifer system as previously discussed in the hydrogeology section and shown schematically in figure 23. The aquifer system is simulated as a quasi-three-dimensional-flow system with three layers, and horizontal flow in the aquifers and vertical flow through the confining unit is assumed. The unconfined aquifer is divided into two layers (layers 1 and 2) to provide adequate vertical resolution and to simulate flowpaths and particles that could flow beneath cells that simulate streams and wells (such cells are known as "weak sinks" because not all flow into a cell is captured by the cell). The confined aquifer is represented by a single layer (layer 3) except where the confining unit is locally absent along the edges of the valley; in these locations an arbitrary elevation that approximates the elevation of the top of the adjacent confining unit was assigned to the top of the layer. In this quasi-three dimensional approach, the confining unit is represented by the vertical conductance between layers 2 and 3. Heads in the confining unit are not calculated, and vertical flow through it is the product of differences in head between layers 2 and 3 and the vertical conductance of the confining unit.

The geometric and hydraulic values that were used as input to the model were based on available data. The values for areas with little or no data were estimated

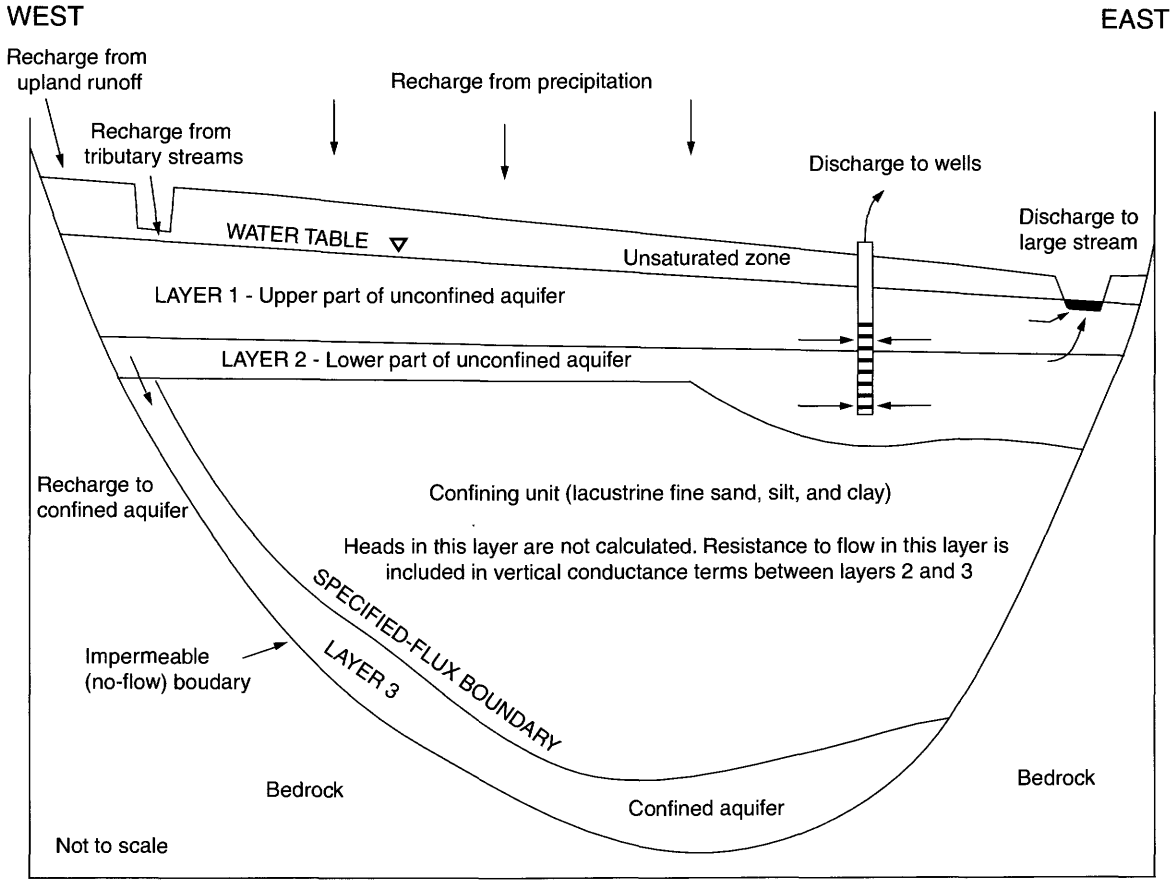


Figure 23. Conceptual model of ground-water flow in glacial-aquifer system in Cortland, N.Y., study area.

and then adjusted, within reasonable limits, during model calibration until the simulated water levels and flows matched the measured values.

Model Grid

A rectangular, finite-difference grid with 66 rows and 119 columns was superimposed on a map of the aquifer system (fig. 24 and pl. 5) to discretize the hydrogeologic conditions of the conceptual model. A uniform cell size of 300 x 300 ft was used because municipal wells, streams, and sources of contamination are distributed throughout the study area. (A grid with cells of uniform size simulates the hydrologic conditions throughout the study area more accurately than a grid with variably sized cells, although the latter provides increased resolution in areas represented by small cells, they may not accurately represent conditions in large-cell areas.

Geometry of Model Layers

A geologic section was drawn for every second row of the model, giving a total of 33 geologic sections. The surface elevations of the bottom of layer 1 and the top and bottom of layers 2 and 3 of the geologic sections were entered as arrays into the model. Corresponding data for intervening rows, for which no geologic sections were constructed, were interpolated, or were determined from records of wells corresponding to those rows. The elevation of the top of layer 1 (water table) was calculated by the model, and the elevation of the bottom of layer 1 (top of layer 2) was arbitrarily assigned to roughly equal to the middle of the unconfined aquifer,

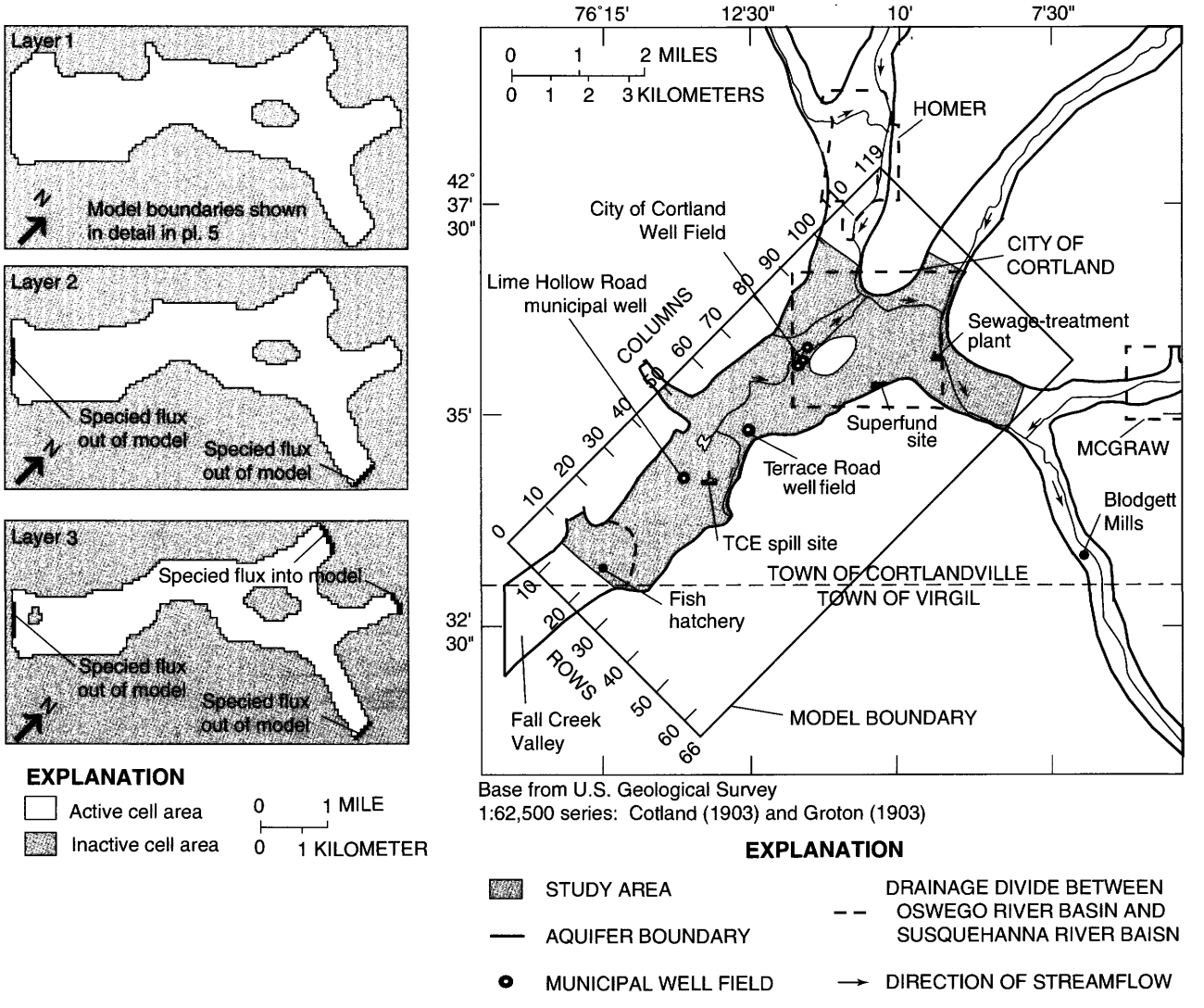


Figure 24. Locations of active and inactive grid boundaries in layers 1, 2, and 3 of the three-dimensional ground-water flow model of Cortland, N.Y. study area.

except along the valley walls, where till or bedrock surface forms the bottom of layer 1. The bottom of layer 2 is either the top surface of the lacustrine confining unit (fig. 12) in the central parts of the valley or the top of layer 3 along some reaches of the valley walls (fig. 23). The top of layer 3 is the bottom of the confining unit or, where the confining unit is absent, the bottom of layer 2. The bottom of layer 3 is the till or bedrock surface in the valley (fig. 23).

Hydraulic Conductivity

Horizontal hydraulic conductivity of the aquifers was estimated to be 10 times the vertical hydraulic conductivity throughout the modeled area (anisotropy 10:1). Vertical hydraulic conductivity of stratified drift tends to be less than horizontal hydraulic conductivity because, at a small scale, the stratified drift consists of many layers of sediment particles, some of which are plate shaped and tend to settle horizontally, thereby impeding the vertical flow of ground water.

Unconfined Aquifer

Horizontal hydraulic conductivity values ranging from 1 to 1,200 ft/d were assigned to layers 1 and 2, on the basis of (1) eight aquifer tests that used large pumping wells, such as municipal and industrial wells (table 2), and (2) several additional hydraulic conductivity measurements made by Blasland, Bouck and Lee Engineers (1992) during slug tests of test wells at the Rosen Superfund site in the southeastern part of the aquifer (pl. 1).

Hydraulic conductivity values of less than 10 ft/d were assigned to the unconfined aquifer on the back (west) side of the Valley Heads moraine in the western part of the study area to represent the poorly sorted, silty sand and gravel and the fine-grained deposits of till and lacustrine fine sand, silt, and clay. Hydraulic conductivity values of 10 to 100 ft/d were assigned to (1) the poorly to moderately sorted silty sand and gravel that form kame deposits at the crest of the Valley Heads moraine, and (2) silty gravel outwash along parts of the valley walls. Blasland, Bouck and Lee Engineers (1992) calculated an average hydraulic conductivity of about 10 ft/d for kame deposits and 30 ft/d for outwash, and a range of 3.4 to 136 ft/d in 20 slug tests of test wells at the Rosen"Superfund" site.

Hydraulic conductivity values ranging from 100 to 300 ft/d were assigned to areas along the edges of the valley, where alluvial inwash and colluvium that consist of silty sand and gravel deposited by upland tributaries and by runoff are mixed with well-sorted outwash sand and gravel along the sides of the valley. This zone is well developed where large tributaries flow onto the aquifer and is weakly developed where small tributaries flow onto the aquifer and where slope erosion has occurred along the valley walls.

Values ranging from 300 to 1,200 ft/d were assigned to areas containing well-sorted outwash sand and gravel in the central parts of the valleys. In general, hydraulic conductivity values northeast of the moraine progressively decrease from more than 1,000 ft/d to less than 400 ft/d to reflect the decreasing grain size of the outwash deposits with increasing distance from the moraine.

Confined Aquifer

Little information is available on hydraulic properties of the confined aquifer (layer 3); therefore, model values were estimated from (1) two aquifer tests in the western part of the study area, (2) six slug tests at the Rosen "Superfund" site, (3) several qualitative estimates of the water-producing capacity of wells installed in the confined aquifer, and (4) distribution of grain size of sediments collected from the confined aquifer during test drilling. The estimated values range from 10 to 150 ft/d and average 60 ft/d.

Stream-Aquifer Interaction

The Streamflow-Routing Package developed by Prudic (1989) was used to simulate the interaction between the water table and the streams and springs in the study area. Streams are divided into reaches and segments; each reach corresponds to an individual cell in the model grid, and a segment consists of a group of connected reaches in downstream order. Streams in the study area are represented by 425 reaches (cells) grouped into 52 segments.

Leakage between the stream and aquifer is subtracted from or added to the amount of streamflow in each reach, depending on the head difference between the stream surface and water table, and is adjusted according to a streambed-conductance term. The amount of leakage is computed by Darcy's Law as follows:

$$Q = C_{str}(H_s - H_a) \quad (4)$$

where Q = leakage to or from the aquifer through the streambed (L^3/T);

H_s = head in stream (L);

H_a = head in aquifer side of streambed (L); and

C_{str} = streambed conductance (L^2/T), defined as the vertical hydraulic conductivity of the streambed, times width of the stream reach times stream length of the stream, divided by the streambed thickness.

Recharge to the aquifer from streams ceases when all streamflow leaks into the aquifer, leaving the stream dry. The stream can flow again in downstream reaches, however, wherever the head in the aquifer is above the streambed elevation.

All streams are in layer 1 of the model, and each stream cell is assigned values for the following: (1) the layer, row, and column number of the cell representing that reach, (2) the average water-surface elevation in the cell, (3) streambed conductance, (4) elevations of bottom and top of the streambed, and (5) stream discharge, in cubic feet per day, for the first reach of each segment. Water-surface and streambed elevations were determined by (1) continuous runs of levels made in the channels of Dry Creek, West Branch Tioughnioga and Tioughnioga Rivers, (2) spot measurements made with levels in the channels of Otter Creek and several other small tributaries, and (3) estimates from 1:24,000-scale USGS topographic maps with 20-ft contour intervals. Water levels and streambed elevations are accurate to several tenths of a foot where levels were run and are accurate to several feet where they were estimated from topographic contours. A streambed thickness of 1.5 ft, which was used in a model of the Cortland aquifer built by Cosner and Harsh (1978), was also used in this model.

Conductance of streambeds within the study area differs from reach to reach. Tributaries that erode fine-grained matrix of till in the uplands transport this material to streams that eventually flow over the aquifer, where they deposit some of it; thus, the streambed in the study area consists of both coarse and fine-grained sediments and has a lower hydraulic conductivity than the aquifer. Estimating the conductance of the streambed entailed adjusting the hydraulic conductivity value in the model until seepage to and from the stream approximated the gains and losses measured at 33 streamflow-measurement sites during each of the low-, average- and high-flow periods. Estimated hydraulic conductivity values ranged from 0.5 to 7.5 ft/d and typically averaged about 3.5 ft/d for streambeds in highly permeable outwash deposits and from 0.1 to 0.5 ft/d for streambeds over less permeable deposits, such as kames. Stream width was measured at the 33 streamflow-measuring sites and was estimated in many other places; the range was from less than 2 ft in small tributaries to 120 ft in the Tioughnioga River.

Boundary Conditions

Several types of boundaries were specified in the model to represent the aquifer system. The types used in layer 1 are indicated on plate 5. Natural boundaries were used where possible, but arbitrary boundaries were used to limit the modeled area because the aquifer system extends many miles beyond the study area. The arbitrary boundaries were placed far enough from municipal well fields and sources of chemical contamination that their effect on model results in these areas of concern would be negligible.

Specified-Flux boundaries refer to those boundaries where a volume of water per unit of time crosses a unit cross-sectional area (such as recharge from precipitation over the aquifer). A specified-flux boundary, represented by recharge wells, was used along the valley walls (pl. 5) to simulate the seepage of surface runoff and ground water from bordering unchanneled uplands into the unconfined aquifer (layer 1). The amount of inflow was determined by the size of the drainage area of the upland bordering the modeled area. Drainage areas of unchanneled uplands were delineated on maps, and their size measured by a digitizer. Then the drainage areas were divided by the number of bordering cells, and each of the resulting areas was multiplied by the recharge rate from uplands (See eq. 2).

A specified-flux boundary also was used to simulate ground-water flow into and out of the confined aquifer (layer 3) along all four major stream valleys (Fall Creek valley, West Branch and East Branch Tioughnioga Rivers, and Tioughnioga River). Ground water in layer 3 flows into the modeled area in the West and East Branches of the Tioughnioga River valleys and flows out of the modeled area in the Fall Creek and Tioughnioga River valleys.

No-flow boundaries represent geologic units or streamlines through which no flux occurs. A stream-

line is a curve that is tangent to the direction of ground-water flow; thus no flow crosses a streamline. A no-flow boundary was applied at the bottom of the confined aquifer (layer 3) to represent the contact between the aquifer and the underlying till or shale along the bottom of the valley because till and shale have extremely low hydraulic conductivity, and any flow across that boundary would be negligible compared to the amount of flow through the sand and gravel aquifer.

Arbitrary streamline (no-flow) boundaries were used where West Branch and East Branch Tioughnioga Rivers and the Tioughnioga River enter the modeled area and flow against the side of a valley; this results in ground-water flow from across the valley to the stream. These streamline boundaries were placed far from pumping wells and chemical plumes to avoid affecting model results.

A *free-surface recharge boundary* was used to represent the water table (top of the unconfined aquifer, layer 1), where recharge from precipitation is applied uniformly. The water table can rise or fall, depending on the balance of stresses in the aquifer system, such as pumping, recharge, and gain or loss of water from streams that flow over the aquifer.

A *specified-vertical leakance boundary* was used to simulate ground-water movement through the lacustrine confining unit between layer 2 and layer 3 (quasi-three-dimensional approach). Resistance to flow through the confining unit is included in the vertical leakance calculations and is defined as the vertical hydraulic conductivity of the confining unit, divided by its thickness. The volume of water that passes through a model cell (vertical conductance) between layers 2 and 3 is equal to the product of vertical leakance and model cell area.

Ground-Water Withdrawals and Recharge Basins

Large amounts of water are pumped from several municipal, industrial, and institutional wells completed in the unconfined aquifer (layers 1 and 2), but no large pumping wells tap the confined aquifer. Ground-water withdrawals by large pumping wells for the three simulated conditions are given in table 5. Withdrawals from pumping wells with a fully penetrating screen (extending from the top of layer 1 to the bottom of layer 2, such as the municipal wells for the City of Cortland) were distributed equally in layers 1 and 2. Withdrawals from wells with short screens (10 to 20 ft long) were assigned to the layer that contained the screen.

Water pumped from the recovery well at the typewriter plant is passed through an air stripper to remove VOCs, then routed through a pipe to the recharge basins in the northern part of the property, where it seeps back into the aquifer. Infiltration of water from the basins to layer 1 was represented by recharge wells in the model.

Model Calibration

The three steady-state models were calibrated to represent high-, average-, and low-recharge conditions. Calibration entailed matching measured and simulated hydraulic heads in the unconfined and confined aquifers, and simulated and measured gains and losses of streamflow along individual reaches of the modeled area. Steady-state conditions were assumed for the three recharge conditions. The water-level measurements used for calibration were made on March 28-29, 1990, during average high-recharge conditions, on May 28-June 4, 1991 during average-recharge conditions, and on October 7-9, 1991, during average low-recharge conditions. The long-term water-level monitoring well (well 102, pl. 1) at the City of Cortland well field and the USGS stream gage on the Tioughnioga River at Cortland (station number 01509000, pl. 2) were used as guides to determine when the three conditions occurred and the time when synoptic ground-water and streamflow measurements were to be made.

The model was calibrated by a trial-and error procedure, whereby the model is first run with the initial input values; if significant differences between measured and simulated water levels and streamflow are noted, the input values are adjusted, and the model is run again. The process is repeated until simulated values are close to measured values. The calibration process resulted in changes of horizontal hydraulic conductivity, vertical conductance of the streambed, and rate of areal recharge.

Calibration was considered satisfactory when: (1) simulated water levels were within 3 ft of the measured water levels, and (2) simulated streamflow displayed the gain-and-loss patterns indicated by measured and estimated values. Differences between simulated and measured ground-water levels are shown in table 11, and differences between simulated and measured streamflow gains and losses are shown

in table 12. The resulting water budgets for each simulated condition are given in table 13.

In all three simulations, the largest source of recharge to the aquifer system (55 to 58 percent of total recharge) is from the uplands–seepage losses from upland streams that flow onto the aquifer plus unchanneled runoff and ground-water inflow from the uplands (table 13A). The second-largest source of recharge is precipitation (33 to 39 percent of total recharge) that directly falls over the aquifer. The largest discharge from the aquifer system (57 to 71 percent of total discharge) is leakage of ground water to streams (table 13B); the second largest (26 to 40 percent of total discharge) is to pumping wells.

Simulated heads in layers 1, 2, and 3 for high-, average-, and low-recharge conditions are shown in figures 25A, B, and C, respectively. Simulated heads in layer 2 are similar to those in layer 1 because both layers represent the same hydrogeologic unit.

Parts of the aquifer that have low hydraulic conductivity, such as the morainal deposits in the western part of the aquifer and kame deposits along the valley edges, have relatively steep hydraulic gradients, and parts that have high hydraulic conductivity, such as outwash deposits, have relatively low hydraulic gradients. Simulated ground-water levels in areas of low hydraulic conductivity differed from measured values more than in other areas, but the differences were less than 3 ft. Simulated water levels in areas with high hydraulic conductivity (outwash deposits) and near perennial streams in the northern and eastern parts of the aquifer were typically within 1 ft of measured ground-water levels.

Simulation of large pumping wells in the study area resulted in losses of streamflow in model stream

Table 11.-- Difference between measured and simulated heads at 49 selected wells in Cortland, N.Y., study area for high-, average-, and low-recharge conditions

[Values are observed head minus simulated head, in feet. Dashes indicate no water-level measurement made during calibration period because well was dry or not yet installed. Well and cell locations shown in pl. 1].

Location			Recharge conditions			Location			Recharge conditions		
Model row	Model column	Well number	High	Average	Low	Model row	Model column	Well number	High	Average	Low
5	91	13	1.7	-0.2	2.7	27	53	203	2.5	1.1	-0.5
5	95	114	0.4	0.3	1.1	28	40	22	-0.6	-0.1	1.9
12	77	404	-0.7	-1.3	0.1	30	11	327	2.5	2.4	0.4
13	67	369	1.3	-0.9	-0.1	30	25	348	1.8	2.0	--
14	53	106	-1.7	0.2	0.0	30	70	11	1.9	1.0	0.4
14	67	330	0.8	1.0	-0.1	31	45	401	--	2.2	2.2
14	96	446	0.1	-0.4	-0.9	31	112	420	1.4	0.8	1.0
16	91	373	0.8	--	0.1	32	45	402	--	2.4	--
18	51	5	0.3	0.4	1.0	32	112	419	1.2	0.5	0.9
20	60	204	1.8	2.0	1.1	36	18	33	3.6	0.2	-5.3
20	70	337	--	-0.1	-0.9	36	77	303	-0.5	-0.9	-1.0
20	74	47	-1.8	-2.0	-2.7	36	103	280	0.3	-0.8	-0.5
21	30	110	-3.1	-3.0	0.5	37	96	365	2.8	0.9	0.0
21	64	358	1.2.	0.9	0.1	37	101	335	--	-0.3	-0.3
21	69	357	0.8	0.4	-0.4	37	105	279	2.3	1.0	1.1
22	49	340	--	-2.0	0.2	38	36	307	1.3	-1.6	-7.5
23	39	306	1.4	-1.3	2.8	38	81	359	4.1	1.8	--
23	43	121	-0.6	-0.5	2.3	38	83	360	-1.0	-1.7	--
23	73	102	0.2	-0.6	-1.8	41	7	108	-4.1	-0.8	-1.0
24	33	320	-1.2	-0.8	4.3	41	95	332	--	-0.6	-0.1
24	47	105	0.4	0.4	1.2	42	87	321	-5.1	-1.4	1.0
24	68	356	-0.5	1.4	-0.6	47	101	281	1.5	0.3	0.5
25	54	368	0.4	0.3	1.8	48	102	282	1.6	0.5	0.6
26	53	4	2.9	2.4	-0.1	50	98	346	-0.8	-1.9	-2.2
27	33	349	-0.2	-0.8	--						
						ROOT MEAN SQUARED			1.92	1.73	1.96

Table 12.-- Measured and simulated streamflow gains and losses, for selected stream reaches during high-, average-, and low-recharge conditions in Cortland, N.Y. study area.

[Values are in cubic feet per second (ft^3/s). Positive numbers indicate gains; negative numbers indicate losses. Dashes indicate no measurement was made in that reach. Reach locations shown in figure 14.]

		Recharge conditions					
		High		Average		Low	
Stream	Reach	Measured March 29, 1990	Simulated	Measured May 30-June 4, 1991	Simulated	Measured October 9, 1991	Simulated
West Branch Tioughnioga River	A	--	9.3	9.2	8.4	5.9	5.4
Tioughnioga River	A	--	3.5	1.9	3.2	3.8	2.5
	B	--	4.1	5.7	4.0	-1.3	2.5
Otter Creek	A	-1.2	-1.7	-0.4	-0.4	Dry	
	B	--	0.0	-0.2	-0.6	Dry	
	C	0.9	0.8	0.1	-0.1	Dry	
	D	-0.8	-0.9	0.0	-0.7	Dry	
	E	1.3	-0.2	0.1	-0.1	Dry	
	F	-1.6	-0.6	-0.3	-0.4	Dry	
	G	0.4	-0.6	-1.2	-0.7	Dry	
Tributary to Otter Creek	A	-1.8	-0.7	-0.2	-0.4	Dry	
Dry Creek	A	-1.0	-0.6	-0.4	-0.4	-0.2	-0.2
	B	-0.6	-0.4	0.0	-0.1	-0.2	-0.1
	C	-0.6	-0.3	-0.4	-0.3	Dry	
	D	-0.6	-0.3	0.0	0.0	Dry	
	E	2.0	0.1	1.0	-0.1	Dry	
Perplexity Creek	A	-0.6	-0.6	-0.2	-0.1	Dry	
Tributary to Perplexity Creek	A	-0.4	-0.3	-0.1	-0.2	-0.05	-0.1
	B	-0.8	-0.1	Dry	-0.1	Dry	

Table 13. Steady-state water budgets for the glacial aquifer system at Cortland, N.Y., for high-, average-, and low-recharge conditions.

[Rates are in cubic feet per second, (ft^3/s)]

	Recharge conditions					
	High March 28-29, 1990		Average May 28-June 4, 1991		Low October 7-9, 1991	
Budget component	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
A. Recharge to the aquifer system						
Precipitation on the aquifer	16.2	39	14.4	38	9.3	33
Upland sources						
Seepage losses from tributary streams	15.2	36	12.2	32	10.4	38
Unchanneled runoff and ground-water inflow from uplands	9.2	22	8.8	23	5.4	19
Ground-water inflow from valleys to model area	1.0	3	.9	3	.5	2
Infiltration at recharge basins	0.0	0	1.7	4	2.2	8
TOTAL	41.6	100	38.0	100	27.8	100
B. Discharge from aquifer system						
Pumping wells	10.7	26	10.7	28	11.0	40
Discharge from aquifer to streams	29.5	71	26.1	69	15.9	57
Ground-water outflow from model area	1.4	3	1.2	3	.9	3
TOTAL	41.6	100	38.0	100	27.8	100

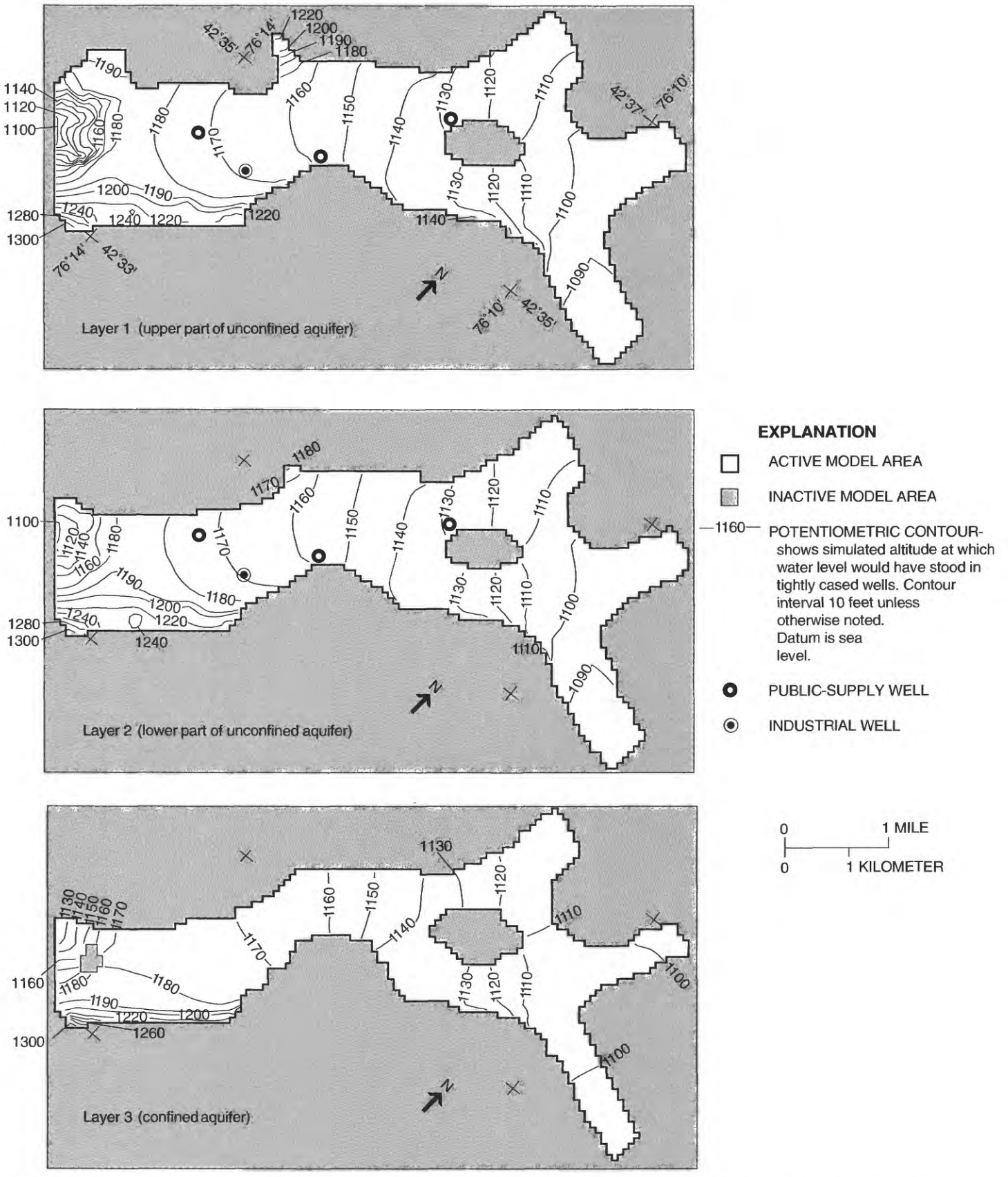


Figure 25A. Simulated head in model layers 1, 2, and 3 during steady-state high-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

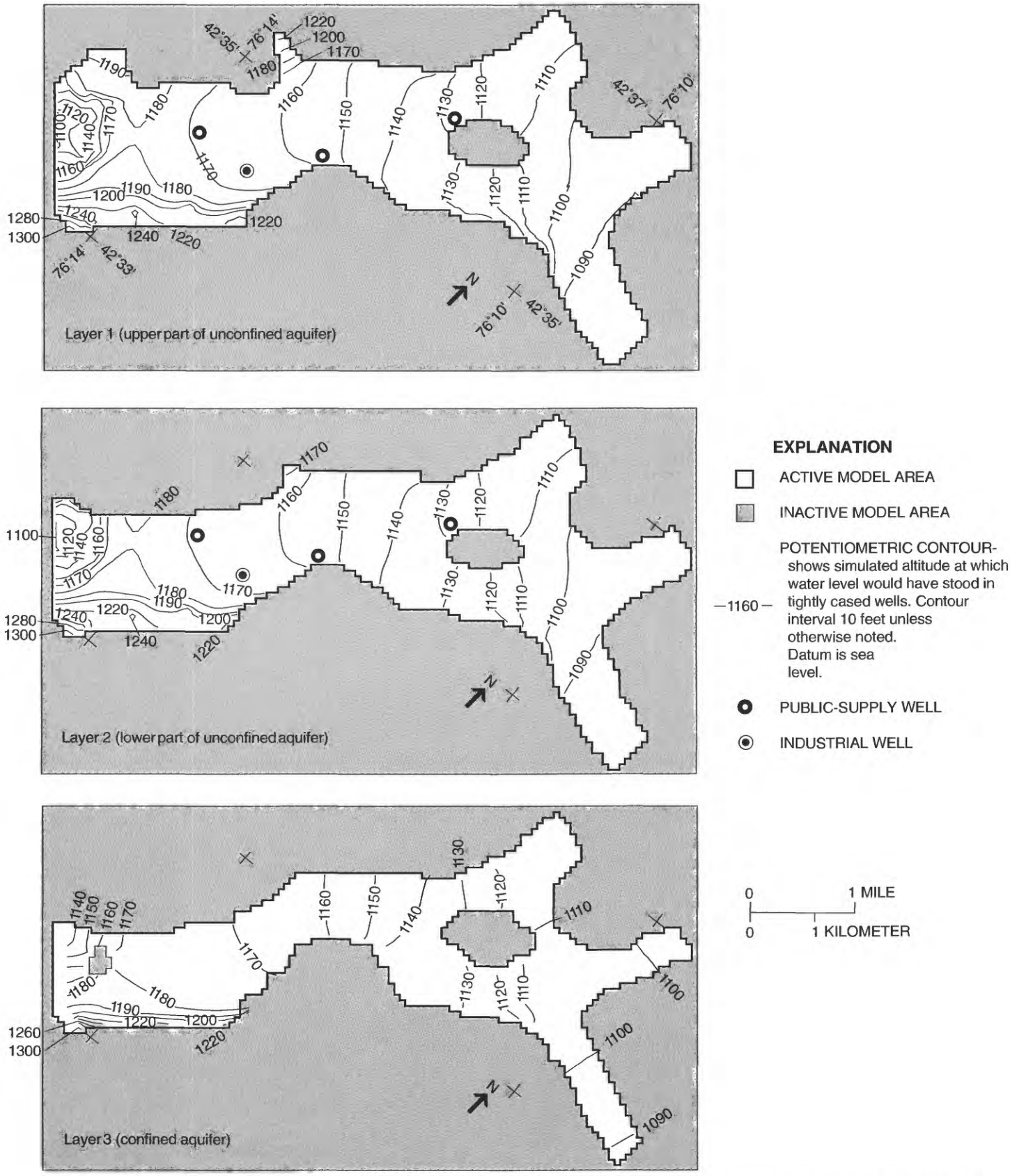


Figure 25B. Simulated head in model layers 1, 2, and 3 during steady-state average-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

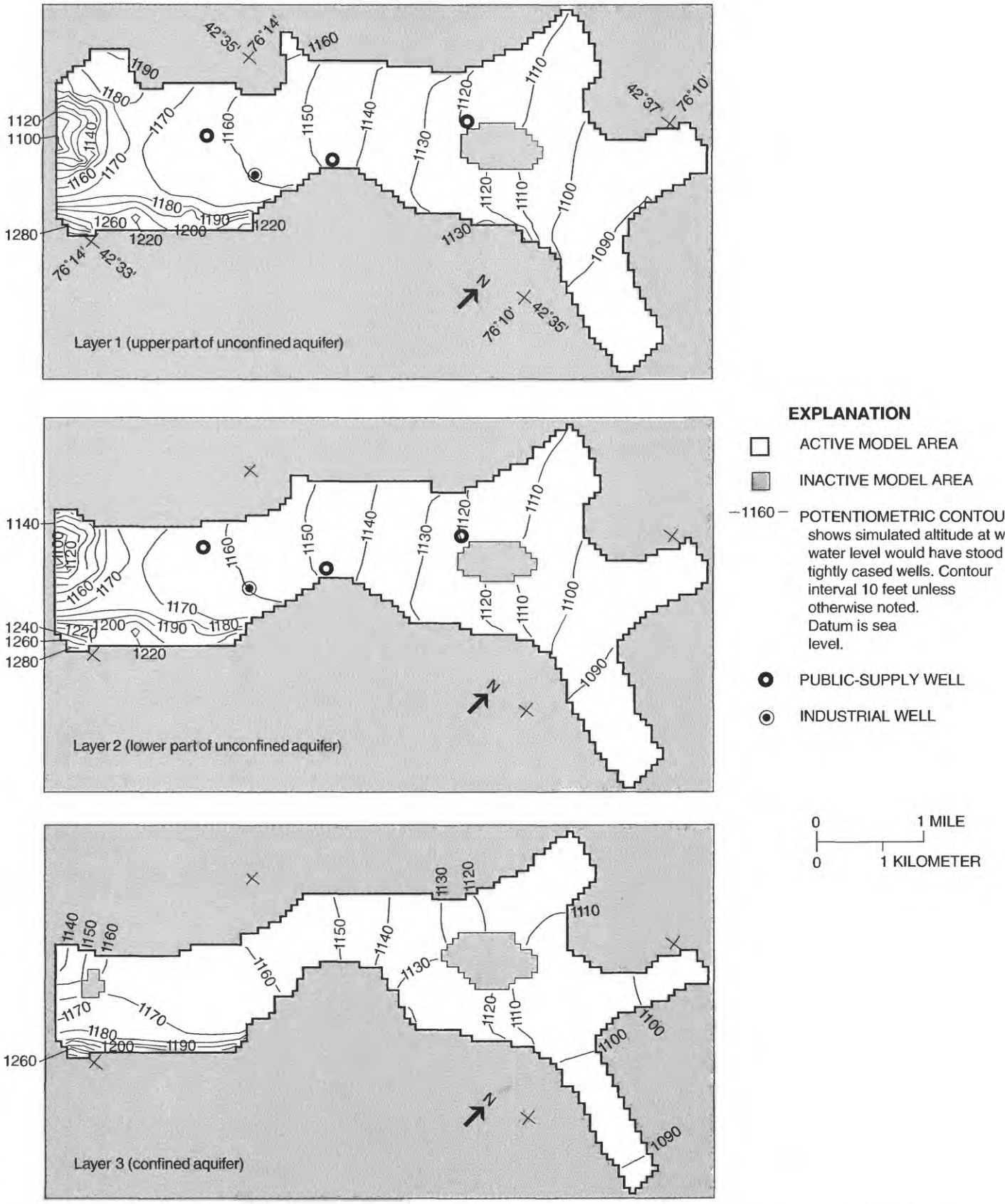


Figure 25C. Simulated head in model layers 1, 2, and 3 during steady-state low-recharge conditions in Cortland, N.Y. study area. (Locations and vertical positions of layers are shown in fig. 23.)

reaches that are near the major pumping wells, such as where Otter Creek flows by the City of Cortland well field.

Model Sensitivity

Sensitivity analyses of the model simulating average-recharge conditions were conducted to assess which model parameters resulted in large changes, and which ones resulted in small changes, in the simulated water levels (heads) and in the streamflow gains or losses. Future data-collection efforts can be directed to those aquifer properties to which the model is most sensitive.

Recharge, horizontal hydraulic conductivity of the unconfined aquifer, vertical hydraulic conductivity of the streambed, and conductance between the unconfined aquifer (layer 2) and the confined aquifer (layer 3) were varied one at a time, and the effect on calculated heads (fig. 26) and on gains or losses in streamflow in reaches of the West Branch Tioughnioga River and Tioughnioga River (fig. 27) were noted. The vertical axis in figure 26 shows the root mean square of the difference between the computed and observed heads at 48 observation wells. The root mean square of the difference between calculated and measured head was 1.29 for the final calculated model (multiplication factor equal to 1 in the graph); all sensitivity analyses for multiplication factors other than 1 had root mean squares greater than 1.29.

Results of these analyses indicate that the model is relatively sensitive to recharge and horizontal hydraulic conductivity of the unconfined aquifer, moderately sensitive to vertical hydraulic conductivity of the streambed, and insensitive to vertical conductance between the unconfined and confined aquifers

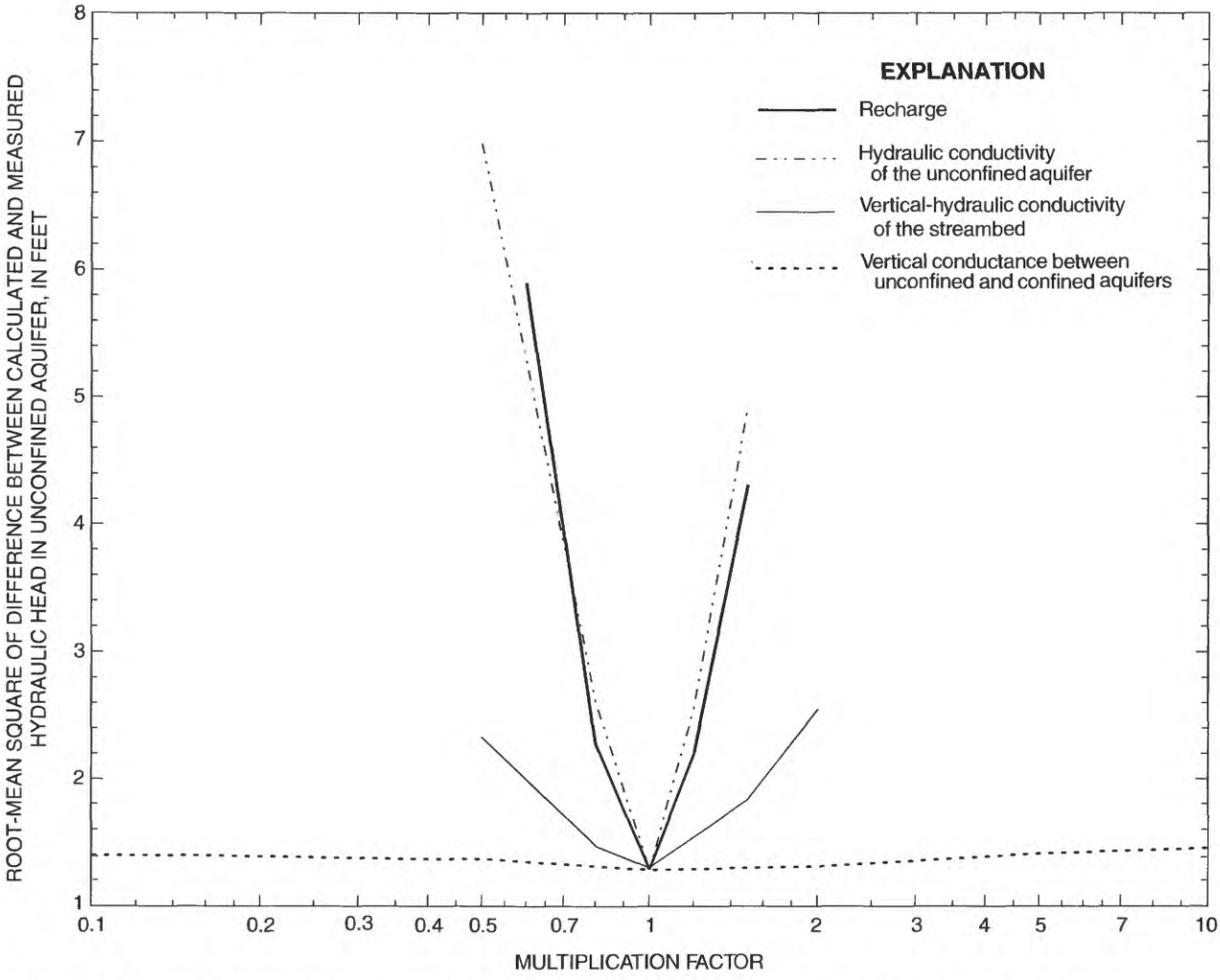


Figure 26. Results of sensitivity analyses for hydraulic head in unconfined aquifer in Cortland, N.Y. study area. (Root-mean squared calculated at 48 model cells containing observation wells.)

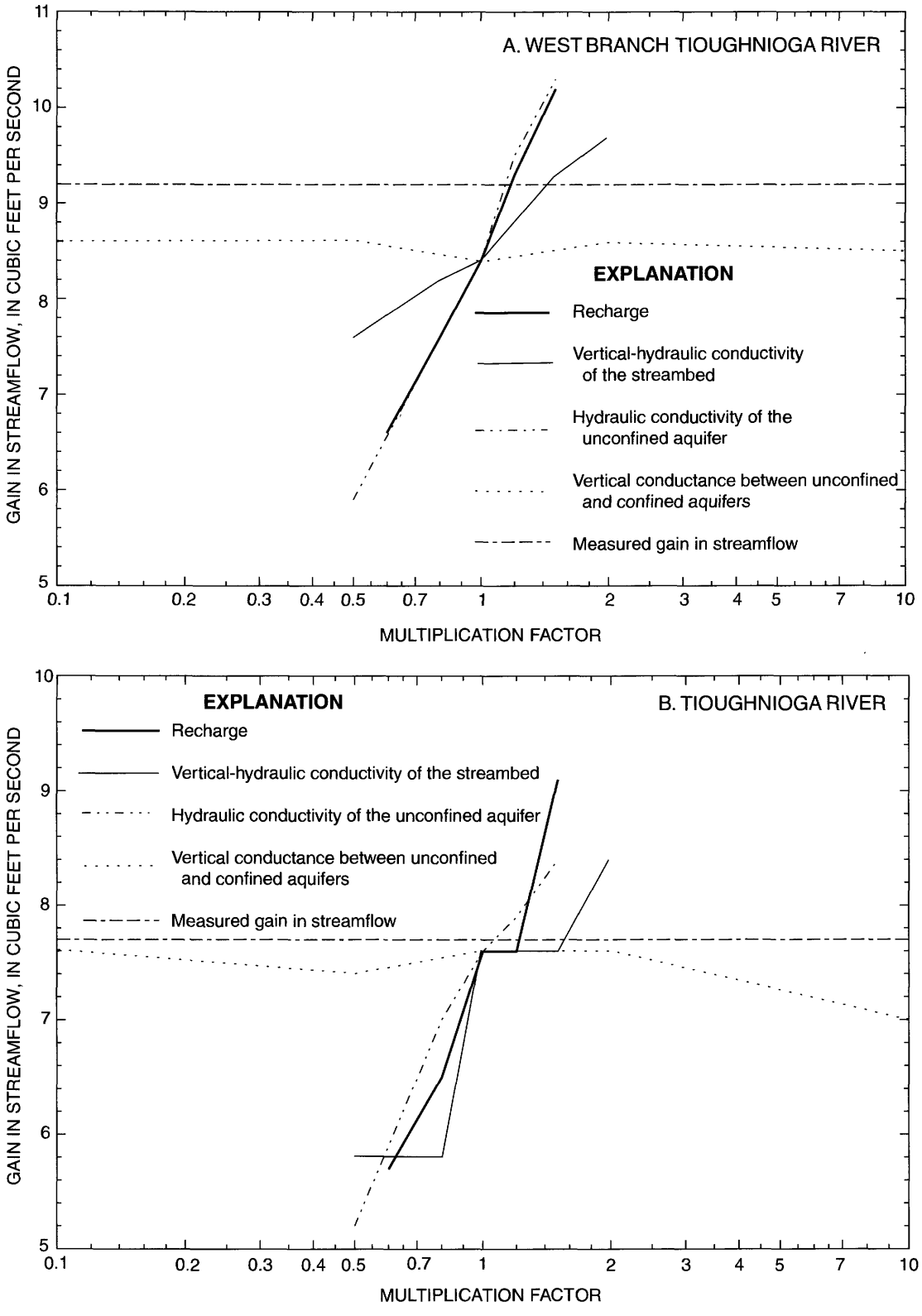


Figure 27. Results of sensitivity analyses for ground-water discharge to major streams during average-recharge conditions in the glacial-drift aquifer in the Cortland, N.Y. study area: A. Reach A of West Branch Tioughnioga River. B. Reaches A and B of Tioughnioga River. (Reach locations are shown in fig. 14.)

(fig. 26). The most sensitive areas in the model are those with low hydraulic conductivity (kame deposits). Neither the vertical hydraulic conductivity of the streambed, nor the vertical leakance between the unconfined and confined aquifers could be measured directly, and both can vary over a wide range of values; therefore, the values of these parameters were tested over a greater range than the others.

Results of the sensitivity analyses for streams (fig. 27) indicated that the ground-water discharge to West Branch Tioughnioga River and to Tioughnioga River was relatively sensitive to changes in recharge, vertical-hydraulic conductivity of the streambed, and horizontal hydraulic conductivity of the unconfined aquifer. The simulated heads and streamflow were relatively insensitive to vertical conductance between the unconfined and confined aquifer.

Model Applications

Delineation of contributing areas to wells by use of numerical flow models has a high potential for accuracy because models can incorporate many of the hydrogeologic factors that affect ground-water flow, such as aquifer geometry, hydraulic conductivity, recharge rate, and pumping rate. Particle tracking provides a simple means of evaluating the advective-transport characteristics of ground-water systems, including computation of the flowpath and traveltimes of the advective phase of contaminants.

Areas Contributing Recharge to Municipal Wells

Pumping large quantities of ground water from an aquifer system causes a drawdown within the aquifer, and the drawdown decreases with increasing distance from the pumping well. The lowering of head that results from pumping causes ground water to flow to the well, and the flowpaths to the well depend on the hydrogeologic characteristics of the flow system, the well location and pumping rate, the system boundaries, and the rate and distribution of recharge to the aquifer system. Factors that affect the areas contributing recharge to wells are described in detail in Reilly and Pollock (1993).

Areas contributing recharge to major pumping wells in the glacial-aquifer system in the study area were delineated for the periods of high, average, and low recharge described previously. The ground-water flowpaths for the three conditions were calculated by the MODPATH program (Pollock, 1989) from the output from MODFLOW (McDonald and Harbaugh, 1988). The simulated areas contributing water to municipal wells and to the recovery well at the typewriter plant are delineated in plates 2, 3, and 4. A porosity of 0.3 for the aquifers and confining unit was used for MODPATH calculations.

The contributing-area analyses indicate that the contributing areas to pumping wells are U-shaped (open end facing upgradient of the well) and extend over most of the unconfined aquifer upgradient from the wells. In general, the contributing areas resulting from the low-recharge simulation were the largest, and those resulting from the high-recharge simulation were the smallest (pl. 2, and 4). The City of Cortland municipal well had the largest contributing area in all three simulations. Recharge from tributaries such as Otter Creek and the unnamed tributary north of Otter Creek were important sources of water to the city well; thus, evaluations of the quality of water pumped by the well need to consider water quality in these two streams. At present, land use in the proximal parts of the contributing area to the city well field is mostly residential and forest, and land use in the distal parts is mostly residential and commercial, with some industry and agriculture. The typewriter plant in the western part of the aquifer was not part of the contributing area to the city well field in any simulations when the purge well at the plant was pumping (pls. 2, 3, and 4), but when the purge well was turned off, the industrial site was part of the contributing area in the high- and average-recharge simulations.

The contributing area to the Town of Cortlandville well field at Terrace Road is relatively small. This well field also receives recharge from a reach of Otter Creek (pls. 2, 3, and 4). Land use within the contributing area is mostly commercial. Chemical spills near the contributing area have come close to contaminating this well field, and, as a result, the Town has installed another municipal well at Lime Hollow Road, which is upgradient of most of the commercial and industrial areas.

The municipal well for the Town of Cortlandville at Lime Hollow Road began pumping in 1991; therefore, the contributing area for this well during high-recharge condition of 1990 was not simulated. The contributing areas for this well under average- and low-recharge conditions extend to the ground-water divide in the southwestern part of the study area and contain several ponds (pls. 3 and 4). Land use within the contributing area is mostly agricultural and forest,

with some residential areas and one industry. This well's contributing area is in the least developed part of the study area and, therefore, should be the least threatened by urban sources of contamination.

Flowpaths to Wells and Streams from Sources of Contamination

The flowpaths and traveltimes of the advective phase of contaminants in the study area were determined through the MODPATH program, which computes paths (tracks) of imaginary "particles" of water moving through a simulated ground-water system and keeps track of their traveltime. Particle tracking provides a simple means of evaluating the advective-transport characteristics of ground-water systems. Advective-flow models cannot be used to compute solute concentrations in ground water because they do not account for the effects of dispersion, adsorption, chemical reactions, or other transport phenomena, but they are useful intermediate step between ground-water flow models and solute-transport models. Chemical dispersion typically cause contaminant plumes to be larger than indicated by advective-flow models. Particles were tracked from the contaminated sites at the typewriter plant in the western part of the study area and at the Superfund site in the southeastern part; and flow velocities were calculated from an average porosity of 0.3.

Typewriter Plant

Movement of particles from the typewriter plant to discharge points was tracked in simulations in which the purge well was pumping to represent conditions during remediation work; the resulting flowpath analyses indicated that the TCE spill is within the contributing area of the purge well. Particles were then tracked in simulations in which the purge well was not pumping, to represent the flowpath of the advective movement of TCE during the several years before the remedial pumping began. Particles were applied to the water table (top face of cell in layer 1) at the cell representing the TCE spill; the resulting flowpaths in the unconfined aquifer during high-, average-, and low-recharge conditions are shown in figures 28A, B, and C. Ground water flows northeastward from the spill area to the center of the aquifer. Flowpaths shifted progressively southward from a northeastward route during high-recharge conditions to more eastward paths during average- and low-recharge conditions, respectively, as a result of differences in the distribution of recharge during those conditions.

The discharge areas of ground water that flows from the TCE spill vary according to recharge conditions. During high- and average-recharge conditions, ground water flows 2.25 mi northeastward, then discharges to the City of Cortland municipal well (fig. 28A, B) and to a small pond near the municipal well. The flowpaths shift slightly to the south during average-recharge conditions, and the traveltime of ground water flowing from the typewriter plant to the municipal well is about 4 years.

Simulated ground-water flowpaths from the TCE spill site shift even farther southward during low-recharge conditions and do not end at the City's municipal well or at the pond, but discharge into the Tioughnioga River (fig. 28C), 3.7 mi northeast of the spill site. Traveltime is about 7 years from the spill site to the Tioughnioga River.

Superfund Site

The movement of particles from the Rosen Superfund site also were tracked from the water table to delineate the flowpath and traveltime of ground water migrating from the site to the discharge area (fig. 28A, B, C). Ground water flows about 1 mi northeastward from the site to the central part of the valley, where it bends to the southeast and discharges into the Tioughnioga River about 1 mi east of the site. Traveltime of ground water from the site to the Tioughnioga River ranges from 3 years during high-recharge conditions to just under 4 years during low-recharge conditions. The flowpaths shift progressively from northeastward paths during high-recharge conditions to more southward traces during average- and low-recharge conditions (figs. 28A, B, C). The particle-tracking analyses indicate that some ground water may also discharge to an industrial well owned by ETL, Inc. on the east side of the river (fig. 28A, B, C). Trichloroethane (TCA) is one of the contaminants found in ground water at, and migrating from, the Superfund site (Blasland, Bouck and Lee, Engineers, 1992); it also was found at the ETL well. A detailed study would be needed to determine whether the TCA at the ETL well comes from the "Superfund" site, the ETL property, or some other source.

Flowpaths that originated in the unconfined aquifer at the Superfund site under the three simulated conditions extended through the model cell that contains USGS test well 332 (local well number 90-

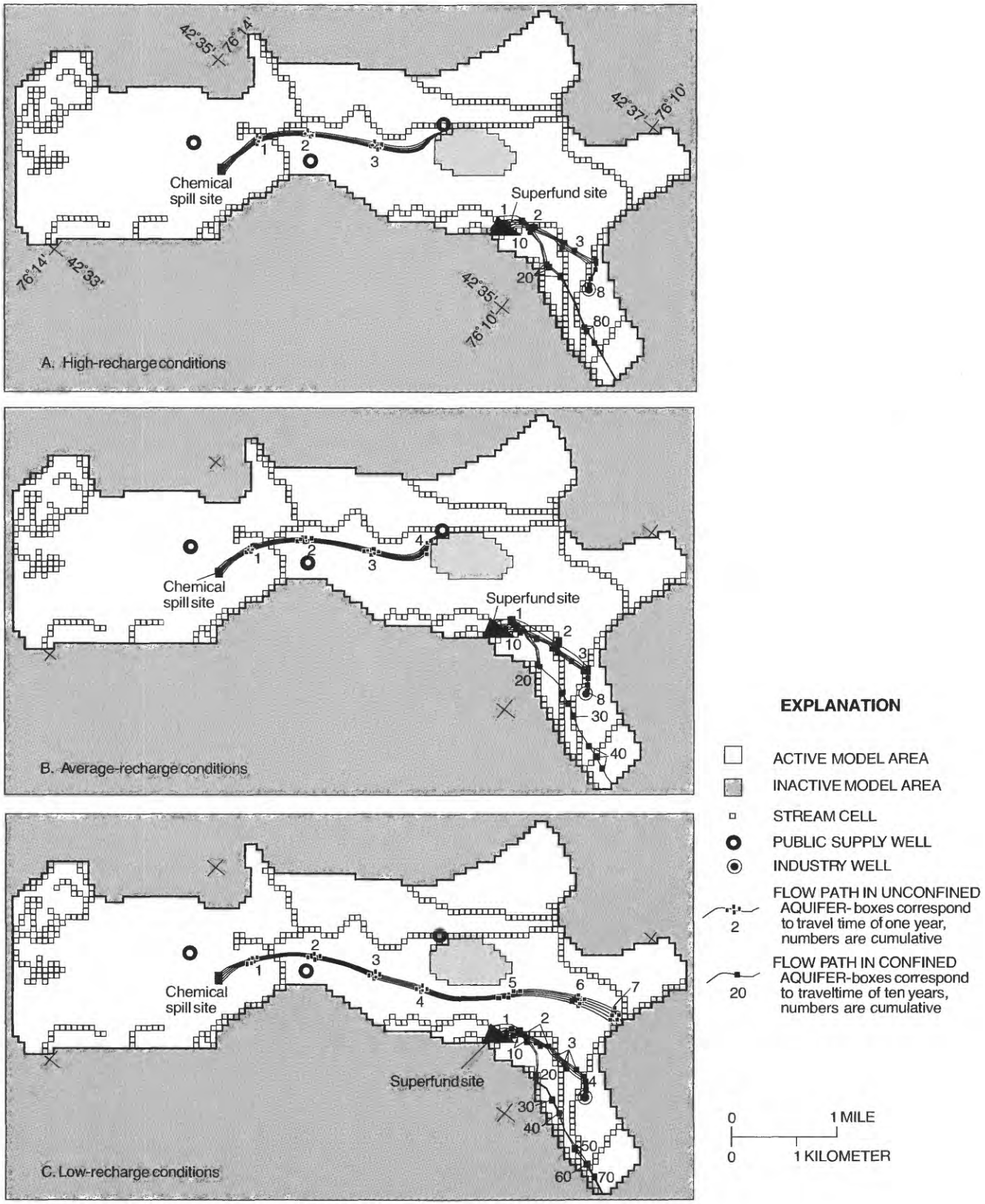


Figure 28. Flowpaths and traveltime of ground water moving from two contaminant sources in Cortland, N.Y. study area: A. Under high-recharge conditions. B. Under average-recharge conditions. C. Under low-recharge conditions. (Location is shown in fig.24.)

1S, pl. 1), in which TCA, TCE, and *trans*-DCE were detected in concentrations of 107, 15.2, and 28.9 µg/L, respectively (appendix 3). Although the particle-tracking analyses indicate that those contaminants have migrated to well 332 and beyond, their origin at the Superfund site is uncertain because the area between well 332 and the Superfund site contains other potential sources of these contaminants.

Particles were then tracked from the bottom of layer 3 at the Superfund site to simulate conditions where the confining layer is absent along the valley wall (layer 3 is in hydraulic connection to layers 1 and 2) and where a DNAPL could readily sink from land surface to the bottom of the layer 3, releasing a dissolved-phase contaminant to ground water. Whether the Superfund site contains a DNAPL is uncertain; therefore this scenario is hypothetical. Particles were not placed in cells of layer 3 where it is confined because contaminants would not move readily through the confining layer. Flowpaths in the confined aquifer initially trend northeastward from the "Superfund" site, then bend to the southeast, where they exit the modeled area as underflow through the Tioughnioga River valley (fig. 28A, B, C). Traveltime from the Superfund site to the eastern edge of the modeled area ranged from 30 years under high-recharge conditions and to more than 70 years under low-recharge conditions.

SUMMARY

Glacial aquifers in the Otter Creek-Dry Creek Valley and in parts of the adjacent West Branch, East Branch, and Tioughnioga River Valleys are the sole source of water for the City of Cortland and surrounding communities. Several parts of the aquifer system have been contaminated by: (1) solvents and degreasers, including trichloroethylene (TCE), trichloroethane (TCA), and dichloroethene (DCE), (2) gasoline from leaking storage tanks at least at two service stations, (3) bacteria from failing septic systems, and (4) leachate from a "Superfund" site. The USGS, in cooperation with the Cortland County Departments of Planning and Health, studied the hydrogeology and water quality of a glacial-aquifer system in Cortland County during 1989-93 and simulated ground-water flow to delineate areas contributing recharge to municipal wells and to the ground-water flowpaths from two chemical-spill sites.

The unconsolidated deposits in the study area were deposited between 10,000 and 23,000 years ago during Late Wisconsinan glaciation. The central parts of the valley contain kames deposits that form a confined aquifer where they are overlain by fine-grained lacustrine sediments. The kame deposits are typically 60 to 170 ft thick in the western and eastern parts of the valley. Kames are overlain by outwash where the confining layer is absent in some places along the edges of the valley.

A large moraine system (Valley Heads Moraine) formed in central and western New York valleys during a major standstill of the ice front 14,000 and 14,900 years ago. The western part of the study area contains a Valley Heads moraine in the Otter Creek-Dry Creek valley; the moraine is a heterogeneous deposit consisting of coarse sand and gravel in the upper part, and till and lacustrine deposits in the lower part.

A proglacial lake formed in valleys of the Tioughnioga River basin during deglaciation. Fine-grained sediments that were deposited within this lake range from 90 ft thick in the eastern part of the study area to 150 ft in the northern and central parts, and to 170 ft in the southwest part. This unit extends throughout the study area except where it pinches out along the edges of the valley.

After the proglacial lake drained from the study area, glacial meltwaters from the Valley Heads ice deposited large amounts of outwash atop the lacustrine unit. The outwash grades from coarse boulder gravel near the ice-front location in the southwestern part of the study area to coarse cobble-and-pebbly sand and gravel in distal reaches in the central and eastern parts.

The glacial-aquifer system consists of 40 to 80 ft of unconfined sand and gravel (mostly outwash) that overlies a confining layer (lacustrine deposits and till), that ranges from 1 to 155 ft thick. This unit, in turn, overlies confined sand and gravel (kame deposit) that ranges from 0 to 170 ft thick. The confining unit impedes ground-water movement between the unconfined and confined aquifers in the middle of the valley, but the two aquifers are hydraulically connected wherever the confining layer is absent along the valley walls.

Hydraulic conductivity of the unconfined aquifer, as determined from aquifer tests at large pumping wells, ranges from 85 to 1,150 ft/d, and hydraulic conductivity of the confined aquifer, as determined from aquifer tests where range from 60 to 65 ft/d at a fish hatchery in the western part of the

study area and from 3 to 140 ft/d at the Superfund site in the eastern part.

Water levels were measured in about 100 wells during three periods–early spring (March 28-29, 1990), late spring and early summer (May 28 through June 4, 1991), and fall (October 7-9, 1991)—to document ground-water levels during high-, average-, and low- recharge periods, respectively. Data from these three periods were used to calibrate the ground-water-flow model. The unconfined aquifer supplies four major pumping centers– (1) the City of Cortland well field in the central part of the study area, (2) the Town of Cortlandville well field at Terrace Road, (3) the Town of Cortlandville municipal well at Lime Hollow Road, and (4) a purge well at a typewriter production plant in the western part. Water in the unconfined aquifer generally moves from the edges of the valley toward the center, then northeastward along the axis of the Otter Creek-Dry Creek valley, where it discharges to pumping wells, West Branch Tioughnioga, and Tioughnioga Rivers. Water in the confined aquifer generally follows the direction of flow in the unconfined aquifer.

The aquifer system receives recharge from three sources under natural (nonpumping) conditions: (1) direct infiltration of precipitation on the aquifer, (2) runoff from unchanneled hillsides that border the aquifer, and (3) seepage from tributary streams that flow over the aquifer. The unconfined aquifer receives additional recharge from two sources under pumping conditions– (1) treated pumped water from the typewriter plant that infiltrates to the aquifer at recharge basins, and (2) induced infiltration from streams and ponds near the major pumping wells. Average annual recharge to the aquifer system from precipitation is 23.0 in.

Most tributary streams in the study area lose water to the aquifer where they flow into the main valley, except for some reaches in Otter Creek. Only part of the streamflow in upland tributaries seeps into the aquifer during high-flow conditions during the spring and during large storms throughout the year, however; the rest flows over the aquifer and discharges into the West Branch Tioughnioga and Tioughnioga Rivers. Most tributary streams lose all their water to the aquifer during low-flow conditions in the summer, fall, and winter, except for Dry Creek, which goes dry only during exceptionally dry periods. Losing streams typically dry up in the upstream direction, whereas gaining streams typically dry up starting at the headwaters.

Ground water discharges from the unconfined aquifer system by (1) seeping into major streams and seasonally into some reaches of Otter Creek; (2) flowing to pumping wells; (3) moving as underflow along the Tioughnioga River valley; and (4) seeping to springs that form the headwaters to the Fall Creek Valley in the western part of the study area. Most water in the unconfined aquifer either discharges into streams or is pumped from municipal wells, and most of the water pumped from municipal wells is eventually treated at the sewage-treatment plant, then discharged into the Tioughnioga River. Ground-water withdrawals from the unconfined aquifer through municipal and industrial wells range from 6.76 to 7.20 Mgal/d. The largest ground-water user is the City of Cortland which, during 1984-92, pumped from 3.9 to 4.3 Mgal/d. The direction of ground-water flow in the confined aquifer generally is similar to that in the unconfined aquifer.

The extent of a TCE plume in the unconfined aquifer was determined for three sampling periods (April 4-5, 1990, September 17-20, 1990, and April 27, 1993); results indicate that TCE has migrated 1.25 mi northeastward from its source at the typewriter plant in the western part of the study area. The extent of the plume was similar during all three sampling periods, indicating that steady-state conditions have been reached. Little or no TCE was detected in the confined aquifer.

TCE concentrations were highest during 1987-88; then decreased slightly from 1989 through mid-1992, and dropped significantly at the end of the 1992, probably in response to removal of contaminated soil and pumping of a recovery well at the source.

The "pump and treat" remedial program at the typewriter plant was expected to significantly lower the TCE concentrations throughout the aquifer by April 1993, but the results of the April 1993 sampling showed the concentrations at most wells in the middle and distal parts of the plume had increased significantly since the preceding fall and were nearly as high as the maximum values in 1987-89. The increase in April 1993 is attributed to desorption of TCE from sediments that had been unsaturated for 10 years, when the water table rose to its highest levels in 10 years in response to above-normal recharge in March and April, 1993.

TCE concentrations at wells within 1,500 ft of the source fluctuated seasonally; they were highest during the spring and lowest during the summer and fall. TCE

concentrations at wells more than 1,500 ft from the source showed little or no seasonal trend.

Detection of a TCE degradation product (*cis*-1,2-DCE) in most wells in the plume indicates biologically mediated reductive dehalogenation. The fate of TCE after biodegradation to *cis*-1,2-DCE is uncertain; other degradation compounds either were not detected (vinyl chloride) or were detected only on rare occasion in trace amounts (1,2-DCA). The end degradation products of TCE are carbon dioxide, water, and chloride.

Ground-water samples were collected from both aquifers during April and September 1990 and analyzed for inorganic and organic chemical constituents; results indicate that the quality of water generally meets New York State drinking-water standards, except for part of the unconfined aquifer that is contaminated by TCE. Elevated concentrations of chloride are generally found in ground water near major roads that are heavily salted. Median concentrations of chloride during the April and September 1990 samplings, were 37 and 39 mg/L, respectively. The trend of increasing chloride concentrations since the early 1940's at the City of Cortland well field, noted by Buller (1978), has continued.

Nitrate concentrations in ground water ranged from 0.1 mg/L to 12.0 mg/L, with a median concentration of 4.3 mg/L. The concentrations were higher in the agricultural areas than elsewhere.

A quasi-three-dimensional, digital ground-water flow model was constructed to simulate hydraulic head, estimate the contributing areas for municipal wells, and delineate the flowpaths of ground water migrating from two sources of contamination. The aquifer system was represented as three layers–the upper two represent the unconfined aquifer, and the third represents the confined aquifer. The resulting areas contributing recharge to wells are U-shaped and extend over most the aquifer upgradient from the pumping wells. The largest contributing areas resulted from low-recharge simulations, and the smallest resulted from high-recharge simulations. The City of Cortland municipal well had the largest contributing area in all three simulations. Otter Creek and an unnamed tributary north of Otter Creek are within the contributing area to the city's wells; thus, their water can affect the municipal ground-water supply.

The contributing area for the Town of Cortlandville well field at Terrace Road is relatively small. The well receives recharge from a reach of Otter Creek. The contributing area for the Town of Cortlandville municipal well on Lime Hollow Road extends to the ground-water divide in the southwestern part of the study area. The contributing area for the well on Lime Hollow Road is in the least developed part of the study area and, therefore, is expected to be only minimally affected by contamination from urban sources.

The flowpaths and traveltimes of ground water moving from two major chemical-spill sites (the typewriter plant in the western part of the study area and the Superfund Site in the southeastern part) were determined through MODPATH, a particle-tracking program. Results indicate that, during high- and average-recharge conditions, ground water from the typewriter plant discharges to the City of Cortland municipal well, 2.25 mi to the northeast. No significant concentrations of TCE (above 5 μg/L) were detected at the municipal well because degradation and volatilization had reduced them below this level within 1.25 mi of their source. Traveltime from the source to the municipal well is about 4 years. During low-recharge conditions, flowpaths shift southward, bypass the municipal well, and end at the Tioughnioga River. Traveltime from the source to the river is about 7 years.

Ground water from the Superfund site flows to the central part of the unconfined aquifer and discharges into the Tioughnioga River about 1 mi to the east. Traveltime from the source to the Tioughnioga River ranged from 3 to 4 years.

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Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area.

[Well locations shown on pl. 1.]

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
3	TH 3	423548	0761155	City of Cortland	08-16-79	1,136	55	--	1,137.67	11.95	08-16-79	75	Test well. 0-25 fine sand, 25-45 gravel, 45-58 sand and gravel, 58-67 ft silty sand and clay.
4	CP 4	423454	0761242	Town of Cortlandville	12-29-75	1,173	63	--	1,173.45	19.50	12-29-75	--	Test well.
5	CP 5	423507	0761309	Town of Cortlandville	03-04-76	1,172	40	--	1,172.64	6.55	03-04-76	--	Well abandoned.
6	TH 6	423545	0761152	City of Cortland	08-29-79	1,136	55	--	1,137.24	11.60	08-29-79	75	Test well.
8	CP 8	423526	0761131	Leonard Barker	1974	1,146	20	--	1,146.2	12.97	02-27-76	--	Test well.
9	CP 9	423527	0761132	Leonard Barker	1976	1,146	20	--	1,146.2	12.13	02-27-76	--	Test well.
10	CP 10	423535	0761140	Curtis	1974	1,149	20	106	1,148.6	14.06	02-27-76	--	--
11	CT 11	423518	0761141	Cortland County	12-04-75	1,154	60	--	1,156.5	20.90	12-15-75	--	0-15 clay and sand, 15-50 pebbly sand, 50-55 sand and gravel, 55-60 gravelly sand, 60-65 clayey sand, 65-75 silty gravel, 75-85 sand and gravel, 85-100 pebbly fine to coarse sand, 100-104 ft gray clay.
13	CP 13	423650	0761140	Cortland County	11-01-73	1,116	25	--	1,116.6	7.80	11-01-73	--	Test well.
15	CP 15	423704	0761108	Cortland County	02-27-76	1,114	--	--	1,114.3	5.57	02-27-76	--	Test well.
20	CT 20	423414	0761428	Cortland County	09-10-76	1,247	160	124	1,247.11	68.20	09-10-76	--	0-11 sand and gravel, 11-16 clay with some gravel, 16-48 sand and gravel, 48-64 clay with some embedded gravel (till?), 64-65 silt and fine sand, 65-72 sand and gravel, 72-85 clay with some gravel, 85-87 sand and gravel, 87-89 clay, 89-94 sand and gravel, 94-97 silty clay with some gravel, 97-118 clay, 118-124 clay with some shale pebbles (till), 124-160 ft shale.
22	CT 22	423429	0761317	Cortland County	09-15-76	1,186	45	--	1,186.38	22.91	09-15-76	--	0-45 ft sand and gravel.
23	CT 23	423346	0761332	Cortland County	09-20-76	1,228	85	--	--	58.30	09-20-76	--	Well destroyed. 0-13 sand and gravel, 13-28 silt with some gravel, 28-85 ft silty sand and gravel.
24	CT 24	423314	0761415	Cortland County	09-28-76	1,270	105	--	--	--	--	--	Well destroyed. 0-100 dirty gravel, 100-105 ft clay. No water encountered during drilling.
33	CP 1	423323	0761403	Monarch Tool Corp.	11-10-75	1,259	209	207	--	58.27	11-10-75	25	0-83 sand and gravel, 83-130 clay and gravel, 130-178 sand and gravel, 178-183 fine sand, 183-187 fine sand and gravel, 187-207 sand and gravel, 207-209 ft shale.
39	CT 1D	423558	0761215	Cortland County	09-29-75	1,155	143	--	1,154.96	17.57	11-24-75	--	--
40	CT 1S	423558	0761215	Cortland County	09-29-75	1,155	44	--	1,155.39	15.06	11-24-75	--	--
47	CT 2D	423548	0761153	Cortland County	10-01-75	1,138	49	--	1,137.38	7.55	10-07-75	--	0-58 sand and gravel, 58-70 ft fine sand and clay.
48	CT 2S	423548	0761153	Cortland County	10-01-75	1,138	25	--	1,137.03	7.15	11-24-75	--	0-25 ft sand and gravel.
102	C-102	423541	0761147	City of Cortland	--	1,137	45	--	1,138.59	7.68	08-30-76	--	USGS water-level observation well.
105	CT 5D	423447	0761306	Gutchess Lumber	10-09-75	1,170	59	--	1,170.89	10.62	12-01-75	--	0-15 sand and gravel, 15-20 clay and gravel (till?), 20-35 sand and gravel, 35-50 sand, 50-65 sand and gravel, 65-75 sandy clay and gravel, 75-80 sand and gravel, 80-82 fine sand, 82 ft clay.
106	CP 6	423522	0761315	Cortland County Airport	1970	1,198	75	--	1,198.43	34.50	02-26-76	--	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
107	CP 7	423528	0761138	Barker, Leonard	1974	1,147	20	--	1,147.0	11.82	02-27-76	--	Test well.
108	CT 8	423251	0761423	Cortland County	10-30-75	1,299	38	--	1,300.77	7.62	12-03-76	--	0-25 clay hardpan, 25-37 fine sandy clayey gravel (no water), 37-40 sand and gravel, 40-67 f sand and gravel, 67-92 silty clay, 92-95 ft sand and gravel.
110	CT 10D	423422	0761409	Cortland County	11-28-75	1,202	99	116	1,201.95	42.16	10-08-91	--	0-20 clayey sand and gravel, 20-25 sand and pebbles, 25-30 fine to medium sand, 30-65 clayey silty sand and gravel (till?), 65-70 fine to medium sand, 70-100 sand and gravel, 100-106 till, 106 ft shale.
112	CT 12D	423518	0761141	Cortland County	12-18-75	1,152	60	--	--	21.30	01-06-76	--	Well destroyed. 0-65 sand and gravel, 65-75 silty sand and gravel, 75-90 sand and gravel, 90-100 pebbly clayey sand, 100-105 sand and gravel, 105-110 silty sand and, 110-115 ft sand and gravel.
113	CT 13	423518	0761141	Cortland County	12-15-75	1,152	63	--	--	18.26	02-04-76	--	Well destroyed.
114	CP-14	423700	0761130	Cortland County	11-01-73	1,120	25	--	1,120.3	10.80	11-01-73	--	--
119	C 19	423539	0761148	City of Cortland	--	1,140	13	--	--	5.97	07-01-67	--	Well destroyed 5-7-76 and replaced by well C-102.
121	CT 21	423440	0761325	Cortland County	09-13-76	1,166	32	--	1,167.38	5.74	09-13-76	--	0-32 ft sand and gravel.
135	--	423305	0761438	Griswold, S.	10-01-65	1,277	254	254	--	96	10-01-65	8	--
138	Well I	423318	0761509	Tunison Fish Hatchery	10-18-62	1,120	52	--	--	6	10-18-62	154	0-43 clay, 43-52 sand and gravel, 52 ft clay.
139	Well R	423318	0761514	Tunison Fish Hatchery	--	1,130	60	--	--	26	09-17-92	--	--
140	Well S	423318	0761516	Tunison Fish Hatchery	10-21-80	1,130	69	--	--	23	11-06-80	100	0-41 clay and gravel, 41-51 sand and gravel, 51-69 sand and gravel, 69-70 ft clay and gravel.
142	Well A	423319	0761459	Tunison Fish Hatchery	05-22-62	1,120	56	--	--	--	--	7	0-6 gravel, 6-16 clay and gravel, 16-20 sandy clay, 20-21 sand and gravel, 21-28 clay, 28-35 fine sand, clay and gravel, 35-56 ft sand and gravel.
143	Well 1	423320	0761459	Tunison Fish Hatchery	05-11-59	1,120	185	--	--	+3.5	05-11-59	--	Well abandoned. 0-35 silt, 35-50 fine to medium sand and silt, 50-70 fine to coarse sand and some gravel, 70-100 fine sand and silt, 100-104 sand and gravel, 104-166 clay, 166-187 fine to coarse sand, 187-200 ft f sand and silt. Pumped 42 gal/min with 7-ft drawdown.
144	Well H	423320	0761509	Tunison Fish Hatchery	10-18-62	1,115	52	181	--	7.5	10-18-72	180	0-12 clay, 12-43 clay and sand, 43-52 sand and gravel, 52-78 clay, 78-108 clay with some gravel (till?), 108-110 clay and gravel, 110-139 clay, 139-142 sand and gravel, 142-181 clay, 181-185 ft shale.
149	Well F	423327	0761457	Tunison Fish Hatchery	1962	1,140	137	--	--	flowing	09-14-62	74	0-20 clay and gravel, 20-30 coarse sand, 30-41 clay and gravel, 41-44 gravel, 44-55 clay and gravel, 55-60 sand and gravel, 60-67 sand, 67-76 gravel, 76-137 ft clay and gravel.
150	Well C	423320	0761517	Tunison Fish Hatchery	1963	1,110	124	--	--	flowing	07-31-62	--	0-5 clay and gravel, 5-30 clay, 30-45 sand, 45-56 sand and gravel, 56-76 gravel with clay, 76-97 sand and gravel, 97-102 clayey gravel, 102-124 ft gravel.
151	Well E	423327	0761458	Tunison Fish Hatchery	1962	1,140	134	--	--	flowing	09-06-62	500	0-30 clay and gravel, 30-32 gravel, 32-52 clay and gravel, 52-62 sand and gravel, 62-66 sand, 66-71 clay and gravel, 71-84 sand and gravel, 84-109 clay and gravel, 109-113 sand and gravel, 113-133 clay and gravel, 133-134 gravel, 134-140 ft clay and gravel. Screen silted up and well was abandoned.
152	--	423329	0761355	Monarch Tool	1966	1,255	79	--	--	--	--	45	--
155	--	423333	0761343	Moser H. F.	1965	1,240	60	--	--	31.8	08-02-67	37	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
163	--	423428	0761452	Armstrong, Roger	1976	1,290	155	30	--	50	1976	4	0-15 gravel, 15-30 till, 30-155 ft bedrock.
167	--	423516	0761152	Abdallah Creamery	1945	1,155	69	--	--	--	--	40	--
168	--	423520	0761115	Lehigh Railroad	1932	1,136	28	--	--	3	--	75	--
170	--	423528	0761130	Mobil Oil	1974	1,147	24	--	--	16.70	07-25-75	--	--
171	--	423533	0760824	Polkville Agway	--	1,096	34	--	--	8	--	35	0-37 ft sand and gravel.
172	PW-4	423542	0761154	City of Cortland	03-01-57	1,138	68	--	--	5	03-01-57	4,500	Public water-supply well. 0-68 sand and gravel, 68-77 ft sand and clay.
173	--	423548	0761015	Brewer Tichener	1944	1,115	155	--	--	8	--	75	--
174	--	423549	0761143	City of Cortland	1917	1,138	16	--	--	9	08-01-65	4,000	Dug well. Former public water-supply well. Currently used for water-level observation well by city of Cortland.
176	--	423602	0761019	Rubbermaid	1923	1,110	185	--	--	3	--	22	Formerly owned by Brockway Motors. 0-35 sand and gravel, 35-130 clay, 130-185 ft sand and gravel.
177	Well 1	423604	0761039	Cortland County	07-09-79	1,117	101	--	1,111.88	15.50	08-16-79	70	0-55 sand and gravel, 55-85 clay, 85-102 ft sand and gravel.
178	--	423606	0761233	Ames, Bob	07-24-77	1,180	158	75	--	34	07-24-77	10	0-5 gravel, 5-15 till, 15-158 ft bedrock.
179	--	423610	0761209	Murray Center	1943	1,150	65	--	--	20.0	04-23-87	150	--
180	--	423610	0761209	Murray Center	1943	1,150	125	75	--	--	--	60	0-75 sand and gravel, 75-125 ft shale.
181	--	423619	0760946	Brewer Tichener	1962	1,105	47	--	--	15.6	02-18-72	310	--
183	--	423631	0761115	Cortland Hospital	05-01-60	1,121	44	--	1,120.84	11	05-01-60	250	--
184	--	423638	0761006	Cortland Ready Mix	08-01-63	1,100	49	--	--	16	08-01-63	100	--
186	--	423657	0761107	Gates, Al	05-01-66	1,115	45	--	--	14	05-01-66	35	--
187	--	423709	0761119	Briggs, Lynn	02-22-66	1,120	195	188	--	--	--	30	0-20 sand and gravel, 20-75 sand and clay, 75-177 clay, 177-188 sand and gravel, 188-195 ft shale.
188	--	423710	0761127	Shultz, Al	1966	1,125	156	148	--	10	--	40	--
203	CP 3	423451	0761244	Town of Cortlandville	02-27-76	1,183	70	--	1,183.44	19.08	02-27-76	--	Test well.
204	CT 4D	423522	0761239	Cortland County	10-07-75	1,149	46.5	--	1,152.15	5.21	10-10-75	--	0-60 sand and gravel, 60-70 pebbly sand, 70-75 ft clay.
205	CT 5S	423447	0761306	Cortland County	10-09-75	1,170	26	--	1,173.14	10.56	12-01-75	--	0-15 sand and gravel, 15-20 clay and gravel (till?), 20-35 ft sand and gravel.
207	CT 7D	423353	0761303	Cortland County	10-24-75	1,232	46	--	1,233.09	26.60	10-08-91	--	0-5 gravel, 5-15 clayey gravel (till?), 15-32 sand and gravel, 32-37 fine sand, 37-41 medium sand, 41-50 fine sand and gravel, 50-54 till.
210	CT 10S	423422	0761407	Cortland County	11-28-75	1,202	42	116	1,201.75	40.5	10-08-91	--	0-20 clayey sand and gravel, 20-25 sand and pebbles, 25-30 fine to medium sand, 30-65 clayey silty sand and gravel (till?), 65-70 fine to medium sand, 70-100 sand and gravel, 100-106 till, 106 ft shale.
214	CT 14	423632	0761051	Cortland County	01-27-76	1,112	24	--	1,114.5	9.23	02-04-76	--	Well removed. 0-7 fill, 7-14 silt, 14-23 sand and gravel, 23-24 ft fine sand.
279	ELM A	423609	0760936	Cortland County	11-09-79	1,100	29	44	1,102.63	10.4	10-08-91	--	0-5 fill, 5-30 sand and gravel, 30-37 medium to coarse sand, 37-44 till, 44-45 ft shale.
280	ELM B	423609	0760942	Cortland County	11-15-79	1,102	34	--	1,103.87	9.4	10-08-91	--	0-45 sand and gravel, 45-50 ft fine to medium sand with some gravel
281	ETL A	423542	0760922	ETL	05-05-80	1,100	45	--	1,102.16	12.3	05-28-91	--	0-5 sand and gravel, 5-47 gravelly medium to coarse sand, 47-60 ft silty clay.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
282	ETL B	423542	0760917	ETL	05-09-80	1,102	50	--	1,105.06	15.6	05-28-91	--	0-15 sand and gravel, 15-52 medium to coarse sand with some gravel, 52-57 silty clayey sand, 57-60 ft silty clay.
291	--	423327	0761458	Tunison Fish Hatchery	1962	1,140	137	--	--	--	--	74	--
303	CT 3S	423518	0761104	Cortland County	10-03-75	1,138	28	--	1,141.03	8.74	12-03-75	--	0-5 fill, 5-30 ft gravel.
304	CT 4S	423522	0761239	Cortland County	10-07-75	1,149	23	--	1,152.22	5.29	12-04-75	--	0-60 ft sand and gravel.
305	Well G	423325	0761456	Tunison Fish Hatchery	10-04-62	1,130	215	197	--	3	10-04-62	25	0-39 clay and gravel, 39-52 clayey gravel, 52-74 clay and gravel, 74-194 clay, 194-197 gravel, 197-215 ft shale.
306	CT 6D	423433	0761333	Cortland County	10-22-75	1,173	255	267	1,173.01	9.51	12-03-75	--	0-100 sandy gravel, 100-105 pebbly sand, 105-130 sand and gravel, 130-150 fine sand, 150-165 sand and gravel, 165-170 clayey sand with pebbles, 170-180 sand and gravel, 180-190 fine sand, 190-267 silty sand and gravel, 267 ft bedrock
307	CT 7S	423353	0761303	Cortland County	10-24-75	1,232	24	--	1,134.72	11.96	12-02-75	--	--
317	PW 3	423551	0761149	City of Cortland	03-21-49	1,137	68	--	--	2.5	03-25-49	3,200	Public water-supply well. 0-68 sand and gravel, 68-77 ft sandy clay.
320	89-1	423350	0761351	Cortland County	11-22-89	1,196	90	--	1,198.43	28.87	12-29-89	--	0-19 sand and gravel, 19-28 pebbly sand, 28-59 sand and gravel, 59-70 sand and gravel, 70-100 ft sand and gravel.
321	--	423527	0761019	Cortland High School	01-05-87	1,200	80	--	1,201.74	72	03-28-90	--	0-80.5 ft silty sand and gravel.
322	--	423438	0761357	Park, David	06-10-81	1,215	273	103	--	--	--	2	0-18 gravel, 18-38 clay, 38-48 dirty gravel, 48-60 hardpan and sand, 60-94 clay and gravel, 94-103 till, 103-273 ft bedrock.
323	--	423244	0761419	McKee, John	10-06-88	1,320	185	75	--	--	10-06-88	7	0-20 hardpan, 20-50 gravel hardpan and clay, 50-53 gravel, 53-75 till, 75-185 ft shale.
324	--	423246	0761420	McKee, John	--	1,315	198	60	--	--	--	--	0-40 hardpan, 40-60 till, 60-198 ft shale.
325	--	423256	0761430	Ostrander, George	11-16-87	1,295	245	191	--	--	--	--	0-10 hardpan gravel, 10-70 cemented hardpan gravel, 70-120 hardpan gravel, 120-155 gravel, 160-191 clay, 191-245 ft shale.
326	90-14B	423416	0761457	USGS	07-02-90	1,240	--	38	--	--	--	--	Test boring. 0-28 coarse cobble gravel with some sand, 28-38 till with silt and clay matrix, 38-40 ft weathered shale.
327	CT 9	423230	0761440	Cortland County	11-17-75	1,242	110	304	1,242.8	63.11	12-03-75	--	0-30 clayey sand and gravel, 30-45 till, 45-130 sand and gravel, 130-300 clay, 300-304 till, 304 ft shale.
328	--	423402	0761457	Kannus	--	1,215	74	--	--	--	--	--	0-40 gravel hardpan, 40-60 sand, 60-74 ft hardpan (probably a dirty gravel since the well was finished at 74 ft).
329	--	423415	0761423	Mueller	--	1,252	150	124	--	--	--	--	0-65 sand and gravel, 65-80 till, 80-100 sand and gravel, 100-124 gravel and hardpan (till? TSM), 124-150 ft shale.
330	89-2S	423548	0761230	Cortland County	11-27-89	1,147	15	--	1,148.10	7.81	12-29-89	--	0-15 ft sand and gravel.
331	89-2D	423548	0761230	Cortland County	11-27-89	1,147	96	114	1,149.72	7.62	12-29-89	--	0-23 sand and gravel, 23-30 pebbly sand, 30-43 sand and gravel, 43-55 silt, 55-75 very fine sand, 75-91 silt and clay, 91-114 sand and gravel, 114-116 ft gray shale.
332	90-1S	423542	0760957	Cortland County	06-12-90	1,114	34	--	1,117.25	17.3	09-27-90	--	0-34 ft sand and gravel.
333	90-11	423526	0761228	City of Cortland	06-29-90	1,148	55	--	1,150.09	12.78	09-27-90	--	0-83.5 sand and gravel, 83.5-84 ft silt and clay.
334	90-1D	423542	0760957	City of Cortland	06-12-90	1,114	98	--	1,117.00	17.2	09-27-90	--	0-64 sand and gravel, 64-107 ft varved silt and clay.
335	90-2	423603	0760946	City of Cortland	06-13-90	1,102	34	66	1,102.03	8.40	09-27-90	--	0-46 sand and gravel, 46-50 f. sand and silt, 50-56 varved silt and clay, 56-66.5 till, bedrock at 66.5 ft.
336	90-10	423524	0761219	City of Cortland	06-28-90	1,158	37	--	1,160.33	23	09-27-90	--	0-39 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
337	90-9S	423531	0761207	City of Cortland	06-28-90	1,138	42	--	1,140.41	8.22	09-27-90	--	0-44 ft sand and gravel.
338	90-9D	423531	0761207	City of Cortland	07-17-90	1,138	217	220	1,141.29	9.7	09-27-90	--	0-52 sand and gravel, 52-203 silt and clay, 203-219 sand and gravel, 219-220 till, 220-222 ft shale.
339	90-3	423623	0761116	City of Cortland	06-14-90	1,118	35	--	1,118.15	9.46	09-27-90	--	0-67 sand and gravel, 67-100 ft varved silt and clay.
340	90-6S	423457	0761305	Cortland County SPCA	06-26-90	1,165	35	--	1,166.28	13.70	09-27-90	--	0-4 silty gravel, 4-12 till, 12-18 sand and gravel, 18-34 medium to very coarse sand, 34-35 ft sand and gravel
341	90-6D	423457	0761305	Cortland County SPCA	07-19-90	1,164	137	--	1,168.14	17.2	09-27-90	--	0-5 topsoil, 5-12 till, 12-37 sand and gravel, 37-60 medium to coarse sand, 60-83 very fine sand and gravel lenses, 83-108 silt and very fine sand, 108-137 ft sand and gravel.
342	90-5	423517	0761157	Cortland County	06-21-90	1,160	52	--	1162.56	28.8	09-27-90	--	0-50 sand and gravel, 50-75 very coarse sand and fine gravel, 75-82 ft sand and gravel.
343	90-7	423440	0761336	Stupke	06-27-90	1,169	24	--	1,171.35	12.3	09-19-90	--	0-25 sand and gravel, 25-30 ft till.
344	90-13	423446	0761239	Cortland County	07-02-90	1,185	31	31	1,187.57	26.6	09-27-90	--	0-7 topsoil and debris, 7-12 silt and gravel, 12-31 silt and gravel, 31 ft gray shale.
345	90-4B	423441	0761309	USGS	06-19-90	1,185	93	--	--	17.9	06-19-90	--	Test boring. 0-18 cobbles, 18-44 till, 44-86 sand and gravel, 86-93 ft fine sand and silt.
346	Kellogg	423528	0760921	Cortland County	07-09-80	1,096	24	--	1,095.94	5.52	09-27-90	--	0-10 clay soil, 10-15 silty gravel, 15-25 sand and gravel, sand with some clay, 35-43 medium to coarse sand with some clay, 43-99 ft varved silt and clay.
347	SPCA	423457	0761303	Cortland County SPCA	--	1,168	--	--	1,167.68	--	--	--	Dug well.
348	MW-1	423352	0761400	Gunzenhauser	07-24-87	1,235	73	--	1,237.37	70.25	09-27-90	--	0-45 sand and gravel, 45-50 fine to coarse sand with some silt, 50-76 ft sand and gravel.
349	MW-2	423413	0761340	Gunzenhauser	07-29-87	1,223	65	--	1,225.64	61.56	09-27-90	--	0-66 ft sand and gravel.
350	--	423430	0761319	Danglier	--	1,185	57	--	--	--	--	30	--
351	--	423429	0761319	Pace	05-12-62	1,185	55	--	--	--	--	30	--
352	--	423430	0761315	Fitts	--	1,185	--	--	--	--	--	--	--
353	--	423450	0761251	Pauldine	--	1,155	--	--	--	--	--	--	--
354	T-103	423452	0761240	Town of Cortlandville	01-13-59	1,184	72	--	--	27	01-13-59	440	0-20 clayey sand and gravel, 20-36 clayey sand, 36-37 gravel, 37-45 coarse sand, 45-55 gravel and clay, 55-72 sand and gravel, 72-76 ft gravel and clay.
355	T-103	423454	0761240	Town of Cortlandville	08-21-75	1,177	63	--	--	29.7	09-11-75	660	0-30 sand and boulders, 30-63 coarse sand and gravel, 63-65 sand and gravel with clay, 65-70 ft gravel hardpan.
356	MW-3D	423528	0761205	City of Cortland	12-11-86	1,143	58	--	1,145.03	4.52	03-28-90	--	0-60 silty sand and gravel, 60.5-61 ft silt.
357	MW-1	423538	0761204	City of Cortland	12-11-86	1,141	48	--	1,142.84	5.34	03-28-90	--	0-48 ft sand and gravel.
358	MW-2	423528	0761223	City of Cortland	12-16-86	1,143	36	--	1,144.99	1.96	03-28-90	--	0-47 ft sand and gravel.
359	Dowzer 1	423523	0761047	Dowzer Corp.	--	1,140	23	--	1,142.3	10.8	05-25-90	--	--
360	Dowzer 2	423524	0761042	Dowzer Corp.	--	1,136	23	--	1,138.9	7.3	05-25-90	--	0-3 fill, 3-7 silt and clay, 7-23 ft fine to coarse sand with some gravel.
361	MW-3S	423527	0761206	City of Cortland	12-18-86	1,142	25	--	1,143.81	5.3	03-28-90	--	0-45 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
362	--	423507	0761251	Pall Trinity Corp.	12-20-86	1,167	67	--	1,169.00	--	--	--	0-67 sand and gravel, 67 ft fine sand. Screened intervals 60-67 ft.
363	Well 1	423502	0761249	Pall Trinity Corp.	12-15-83	1,165	63	--	1,167.69	12	12-15-83	170	0-20 gravel, 20-32 silty gravel, 32-63 ft gravel.
364	Substa	423501	0761253	Pall Trinity Corp.	--	1,168	35	--	1,169.68	12.7	03-13-91	--	--
365	Hess 1	423554	0761003	--	1982	1,130	13	--	1,107.47	9.5	03-28-90	--	--
366	--	423554	0761032	--	--	1,135	--	--	--	--	--	--	--
367	--	423432	0761327	Stupke	--	1,173	--	--	--	--	--	--	--
368	Ames	423458	0761245	--	1986	1,168	24	--	1,170.31	20.3	09-19-89	--	Test well for gasoline spill.
369	--	423551	0761235	Turner Veterinarian	--	1,163	55	--	1,167.67	22.17	03-28-90	--	0-55 ft sand and gravel.
370	MW-4	423613	0761207	Murray Center	02-25-87	1,154	42	42	1,156.64	25.5	02-25-87	--	0-42 sand and gravel, 42 ft shale.
371	--	423602	0761225	Wright	--	1,170	65	25	--	--	--	--	0-25 gravel hardpan, 25-65 ft shale.
372	--	423617	0761254	Hart	--	1,220	195	108	--	--	--	--	0-25 gravel hardpan, 25-38 coarse gravel, 38-68 gravel hardpan, 68-108 gray hardpan, till?, 108-195 ft gray shale.
373	--	423632	0761116	Cortland Hospital	09-07-78	1,121	42	--	1,120.84	10.27	03-28-90	556	0-42 ft sand and gravel.
375	--	423434	0761433	Petrella	--	1,260	115	15	--	--	--	--	0-15 sand and gravel, 15-115 ft shale.
376	--	423411	0761408	Space	--	1,230	52	--	--	--	--	--	0-30 sand and gravel, 30-49 clay and sand, 49-52 ft gravel.
377	--	423512	0761407	Miller	--	1,245	76	21	--	--	--	--	0-15 hardpan gravel, 15-21 gray hardpan gravel (till?), 21-76 ft shale.
378	NW-5D	423423	0761328	Smith Corona Corp.	12-11-86	1,176	69	--	1,179.07	13.8	12-11-86	--	0-78 sand and gravel, 78-80 ft fine sand with little silt.
379	MW-4D	423424	0761313	Smith Corona Corp.	11-21-86	1,208	102	--	1,211.01	47.3	12-03-86	--	0-102 ft sand and gravel.
380	92-1A	423426	0761319	Cortland County	09-26-92	1,192	54	--	1,194.93	27.37	10-06-92	100	0-54 ft sand and gravel.
381	92-1B	423426	0761319	Cortland County	09-26-92	1,192	212	245	1,193.40	27.6	10-06-92	--	0-106 sand and gravel, 106-110 till, 110-175 varved silt and clay, 175-216 sand and gravel, 216-220 silt and clay, 220-245 sand and gravel, 245 ft bedrock (siltstone).
382	--	423232	0761412	Jacobs	--	1,410	100	22	--	--	--	--	0-15 till, 15-22 till and weathered shale, 22-100 ft shale.
383	--	423302	0761436	Williams	09-03-87	1,290	74	--	--	--	--	10	0-16 gravel, 16-48 sand and gravel, 48-72 dry gravel, 72-75 ft gravel.
384	--	423507	0761207	Tutino	--	1,160	45	--	--	--	--	--	0-20 gravel, 20-30 gravel and sand, 30-45 ft gravel.
385	--	423343	0761453	Baker, J.	--	1,190	75	75	--	7	03-31-60	--	0-75 sand and gravel, 75 ft shale.
386	--	423537	0760912	ETL Corp.	07-29-80	1,102	40	--	--	--	--	--	0-20 sand and gravel, 20-25 fine to medium sand, 25-45 sand and gravel, 45-47 fine to coarse sand, 47-56 sand and gravel, 56-106 ft silt, tr clay, very fine sand.
387	--	423439	0761447	Shedd	--	1,360	205	21	--	--	--	--	0-21 till, 21-205 ft shale.
388	--	423441	0761409	Space	--	1,215	330	59	--	--	--	--	0-25 gravel, 25-30 hardpan-gravel, 30-49 clay and sand, 49-52 gravel, 52-59?, 59-330 ft shale.
389	91-2	423524	0761409	Cortland County	05-14-91	1,250	22	33	1,251.95	14.3	05-14-91	--	0-28 sand and gravel, 28-33 till, 33 ft shale.
390	--	423512	0761326	--	--	1,205	198	--	--	53	05-15-86	--	--
391	--	423510	0761323	--	--	1,205	67	--	--	47	06-01-86	--	--

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
392	Well 2	423417	0761321	Smith Corona Corp.	12-15-74	1,212	100	--	--	42.1	12-31-74	1,060	0-70 sand and gravel, 70-100 coarse sand, 100-102 ft clay and gravel.
393	B-1	423520	0761302	Town of Cortlandville	07-01-86	1,158	72	--	--	8.5	07-01-86	--	Test boring. 0-71.5 ft sand and gravel.
394	--	423530	0761253	Cummins	--	1,260	32	--	--	--	--	--	0-32 ft sand and gravel.
395	--	423338	0761302	Bliss	--	1,275	44	29	--	--	--	--	0-5 Topsoil, 5-14 till, 14-28 fine sand, 28-29 sand and gravel, water bearing, 29-44 ft shale.
396	MW-3	423404	0761327	Smith Corona Corp.	1986	1,226	83	--	1,228.06	56.2	12-09-86	--	--
397	--	423520	0760840	Cortland County	07-08-80	1,094	19	--	1,097.45	9	07-08-80	--	0-25 sand and gravel, 25-28 fine to medium sand, 28-47 medium to very coarse sand with gravel, 47-50 clay and gravel, 50-99 ft varved silt and clay.
398	MW-13	423421	0761320	Smith Corona Corp.	09-23-92	1,210	124	--	--	--	--	--	0-104 sand and gravel, 104-107 pebbly sand, 107-110 silty gravel or till, 110-112 silty gravel, 112-116?, 116-120 silt and sand, 120-124 pebbles, 125 ft till.
399	C-15	423611	0761030	Beaudry Wall Paper	--	1,110	82	--	--	--	--	275	--
400	--	423424	0761303	Walmart	--	1,201	75	--	1,202.98	35.23	05-29-91	--	Well destroyed. Former Exxon well.
401	MW-2	423427	0761256	Walmart	02-26-91	1,199	40	--	1,201.23	34.77	05-29-91	--	0-46 ft sand and gravel.
402	MW-1	423428	0761250	Walmart	02-25-91	1,199	37	--	1,201.86	28.5	02-26-91	--	0-40 ft sand and gravel.
403	CT-3D	423518	0761104	Cortland County	10-03-75	1,138	54	--	1,139.37	8.79	12-03-75	--	0-5 fill, 5-30 gravel, 30-35 silty gravel, 35-40 pebbly sand, 40-50 sand and gravel, 50-55 medium to coarse sand, 55-60 sand and gravel, 60-70 fine sand and clay.
404	MW-1	423612	0761208	Murray Center	03-09-87	1,155	34	--	1,156.18	24.9	03-09-87	--	0-34 sand and gravel, 34-37 ft silt and fine sand.
406	CT-6S	423433	0761333	Cortland County	10-22-75	1,173	26	--	1,172.82	10.54	12-03-75	--	--
407	--	423716	0760922	Yellow Lantern	04-06-72	1,105	30	--	--	5	04-26-72	--	0-10 topsoil, 10-22 sandy clay and gravel, 22-25 cemented gravel, 25-30 sand and gravel, 30 ft clay.
408	--	423726	0760925	Sun Pipe Line	04-21-69	1,140	39	--	--	20	04-21-69	--	0-10 gravel, 10-39 ft sand and gravel.
410	91-6S	423528	0761102	Cortland County	10-01-91	1,134	30	--	1,136.64	15.6	10-01-91	--	0-44 ft sand and gravel.
411	--	423709	0761142	--	--	1,150	61	--	--	--	--	--	Finished in sand and gravel.
412	--	423709	0761139	--	--	1,145	121	--	--	--	--	--	Finished in confined sand and gravel aquifer.
413	--	423711	0761137	Edlund	06-09-69	1,138	136	--	--	--	--	--	100-136 ft sand and gravel.
414	C-17	423536	0761024	Cobaco Baking Co.	--	1,122	103	--	--	--	--	--	0-35 sand and gravel, 35-96 silty sand, 96-103 ft hardpan or gravel.
415	--	423504	0761016	Wilcox	--	1,285	75	43	--	--	--	--	43-75 ft shale.
416	--	423635	0760959	--	--	1,102	112	--	--	--	--	--	Test boring. 0-54 sand and gravel, 54-93 silt, 93-108 fine sand and silt, 108-112 ft silt with some sand and gravel.
417	--	423634	0760958	--	--	1,102	112	--	--	--	--	--	Test boring. 0-53 sand and gravel, 53-83 silt, 83-97 sand, with some gravel, 97-102 sand and silt, 102-108 sand, 108-112 ft silt and sand.
418	--	423631	0760944	--	--	1,090	43	--	--	--	--	--	Test boring. 0-18 sand and gravel, 18-28 fine to coarse sand, 28-43 ft sand and gravel.
419	Yaman A	423635	0760926	Cortland County	07-10-80	1,100	24	33	1,101.22	9.84	06-28-90	--	0-10 gravel, 10-11 clay, 11-13 gravel, 13-18 coarse sand and fine gravel, 18-25 clayey sand and gravel, 25-27 medium sand, 27-33 till, 33 ft shale.
420	Yaman B	423636	0760929	Cortland County	07-11-80	1,105	28	--	1,106.64	8.2	05-28-91	--	0-28 ft sand and gravel.

Appendix 1. Records of wells and test borings in the Cortland, N.Y., study area (continued)

USGS well no.	Local identifier	Latitude ° ′ ″	Longitude ° ′ ″	Owner	Date drilled (mo d yr)	Elevation land-surface (feet)	Well depth (feet)	Depth to bedrock (feet)	Elevation of top of casing (feet)	Water level below land surface		Reported yield (gal/min)	Remarks (Numbers refer to depths below land surface.)
										Feet	Date		
421	Well D	423320	0761512	Tunison Fish Hatchery	08-10-62	1,110	126	--	--	-3.0	08-10-62	--	0-20 clay and gravel, 20-27 coarse sand, 27-29 clay and gravel, 29-32 coarse sand, 32-44 fine sand, 44-60 clay, 60-70 clay and gravel, 70-73 gravel, 73-103 clay and gravel, 103-127 sand and gravel, 127-130 ft clay and gravel.
422	W-9	423534	0761021	Blasland & Bouck	02-20-91	1,122	73	--	1,123.57	12.0	05-10-91	--	0-3 fill, 3-17 medium to coarse sand with some gravel, 17-32 sand and gravel, 32-42 fine sand with some silt and gravel, 42-49 sand and gravel, 96-98 ft medium to coarse sand with some gravel.
423	W-15	423534	0761029	Blasland & Bouck	12-30-91	1,123	90	--	1,125.02	13.7	02-10-92	--	0-10 fill, 10-15 sand and gravel, 15-44 fine to coarse sand with little gravel, 44-58 sand and gravel, 58-77 fine sand and silt, 77-90 ft fine to coarse sand with some silt.
424	W-12	423533	0761035	Blasland & Bouck	02-06-91	1,126	50	--	1,127.63	13.3	05-10-91	--	0-35 medium to coarse sand with some gravel, 35-38 sand and gravel, 38-48 medium sand with some gravel, 48-60 ft fine sand.
425	W-11	423534	0761029	Blasland & Bouck	02-04-91	1,123	52	--	1,124.47	11.7	05-22-92	--	0-16 fine to coarse sand with some gravel, 16-30 sand and gravel, 30-50 fine to coarse sand with little gravel, 50-56 silt and sand, 56-58 ft fine sand.
426	W-14	423529	0761037	Blasland & Bouck	02-27-91	1,131	69	--	1,132.19	6.7	02-27-91	--	0-4 fill, 4-6 silt, 6-24 fine to coarse sand with some gravel, 24-29 gravelly silt, 29-39 sand and gravel, 39-70 medium to coarse sand with some gravel, 70-74 sand and gravel, 74-84 ft medium to coarse sand with some gravel.
427	B-5	423531	0761026	Blasland & Bouck	01-30-91	1,126	95	--	--	8.0	01-30-91	--	0-3 fill, 3-8 gravelly silt, 8-28 medium to coarse sand with some gravel, 28-42 sand and gravel, 42-80 medium sand with some gravel, 80-88 sand and gravel, 88-95 ft till.
428	TH-1	423551	0761149	City of Cortland	08-14-79	1,132	55	100	1,134.18	2.8	03-28-90	--	0-60 sand and gravel, 60-100 silt, 100 ft bedrock.
429	91-6D	423528	0761102	Cortland County	10-01-91	1,134	198	270	1,136.99	14.25	10-01-91	--	0-44 sand and gravel, 44-58 silty very fine sand, 58-65 silt and clay, 65-115 silt and very fine sand, 115-150 clay and silt, 150-182 very fine sand, 182-254 sand and gravel, 254-270 till, 270 ft shale.
430	91-1	423542	0760957	Cortland County	01-10-91	1,114	313	313	1,117.22	14.6	01-10-91	--	0-64 sand and gravel, 64-138 silt and clay, 138-149 sand and gravel, 149-180 sand, 180-227 sand and gravel, 227-234 silt and sand, 234-280 pebbly sand, 280-313 gravel, 313 ft bedrock.
431	B-2	423510	0761257	Town of Cortlandville	07-08-86	1,158	96	--	--	8.5	07-08-86	--	0-80 sand and gravel, 80-85 fine to medium sand, 85-90 silt and sand, 90-96 ft fine to medium sand.
432	C-104	423351	0761352	Town of Cortlandville	02-16-88	1,197	90	--	1,198.11	31	05-18-88	1,330	Public water-supply well. 0-90 ft sand and gravel.
434		423420	0761320	Smith Corona Corp.	10-20-89	1,208	92	--	--	--	--	975	Recovery well for TCE. 0-92 ft sand and gravel.
435		423424	0761404	Monarch Tool Corp.	--	1,259	87	--	--	46	08-02-67	150	Drawdown = 29 ft.
446	W2	423647	0761103	Cortland County Highway Department	05-12-86	1,114	14	--	1,115.84	6.7	05-30-91	--	Oil in well
447	28-29b	423738	0761039	N.Y. State Dept.. of Transportation.	--	1,116				--	--		0-40 sand and gravel, 40-52 silt, 52-61 till, 61-68 ft shale.
448	MW-7	423419	0761319	Smith Corona Corp.	12-09-86	1,212	57		1,213.51	47.04	06-11-87	--	0-57 ft sand and gravel
449		423432	0761332	Jebbet		1,172	--	--	--	--	--	--	

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area

[--, no data available; <, less than. All values are in milligrams per liter unless otherwise noted; µS/cm, microsiemens per centimeter. Well locations shown on pl. 1].

A. APRIL 1990 (analyses by Chemistry Department at State University of New York at Cortland)

Well no.	Well depth (feet)	Date (m/d)	Alkalinity	pH, field (units)	Specific conductance, field (µS/cm)	Phosphorus, total	Nitrate, total	Chloride, total	Sodium, total	Potassium, total	Magnesium, total	Calcium, total	Total recoverable (µg/L) Lead	Iron	Copper	Manganese	Zinc
5	36	04/04	185	7.78	513	0.06	6.0	21	12	1.0	13	78	<500	4400	<50	70	40
11	81	04/05	229	7.53	842	0.53	6.0	108	48	2.2	19	97	<500	6100	<50	70	30
22	45	04/03	173	7.45	610	0.03	4.5	69	34	1.9	12	76	<500	600	<50	<30	0
39	143	04/04	111	8.43	258	0.68	0.80	17	8	0.9	24	80	<500	28,500	<50	800	9,500
40	44	04/04	62	8.00	257	0.18	2.2	30	16	1.4	4.2	32	<500	900	<50	<30	80
47	49	04/05	190	7.76	470	1.29	6.3	27	13	0.9	14	80	<500	<200	<50	<30	60
48	25	04/05	194	7.50	514	0.82	6.6	37	19	0.9	13	82	<500	<200	<50	<30	40
105	59	04/05	168	--	--	0.84	4.6	43	17	1.4	14	77	<500	<200	<50	<30	60
106	75	04/03	139	--	--	0.06	5.7	30	8	1.6	9.4	63	<500	37,300	<50	600	800
108	38	04/03	174	7.50	330	0.02	3.0	29	12	1.2	16	72	<500	<200	<50	<30	1,300
110	100	04/03	239	7.56	623	0.02	2.6	35	12	0.8	25	87	<500	<200	<50	<30	2,000
114	--	04/05	216	7.68	539	0.01	2.4	36	16	1.3	16	87	<500	3400	<50	<30	40
121	32	04/04	219	7.61	673	0.82	5.7	56	27	1.8	17	92	<500	2400	<50	<30	40
170	--	04/03	131	--	--	0.13	4.1	50	26	2.6	24	89	<500	16,900	<50	1,000	50
172	69	04/05	196	--	--	0.43	4.8	28	17	1.0	15	79	<500	<200	<50	<30	50
177	92	04/06	190	7.74	1,440	0.65	4.8	274	204	1.8	16	89	<500	1400	70	<30	70
204	42	04/04	192	7.70	513	1.03	8.6	26	14	0.9	15	73	<500	<200	<50	<30	80
205	26	04/05	231	--	--	0.57	3.9	59	31	2.1	16	89	<500	<200	<50	<30	100
210	45	04/03	220	7.64	518	0.05	3.7	15	6	0.8	18	82	2,300	23,000	70	200	9,200
280	34	04/06	222	7.69	802	0.15	4.6	104	45	2.6	22	110	<500	21,400	<50	300	30
303	28	04/06	164	7.30	668	0.65	4.6	93	46	2.5	11	78	<500	16,500	<50	<30	1,300
304	23	04/04	196	7.68	550	0.55	12.0	31	15	1.1	15	79	<500	<200	<50	<30	20
306	255	04/04	168	8.10	412	0.30	1.4	28	6	1.0	25	80	<500	19,100	<50	300	9,800
307	32	04/03	73	7.44	323	0.04	1.8	43	23	2.0	5.8	38	<500	500	<50	<30	3,300
317	68	04/05	184	--	--	0.56	5.3	31	16	1.0	13	73	<500	<200	<50	<30	20
320	90	04/03	129	7.93	344	0.02	0.76	11	5	0.6	12	49	<500	600	<50	<30	20
330	15	04/05	247	7.25	787	1.14	5.9	80	39	2.7	14	105	<500	<200	<50	<30	30

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N. Y. study area (continued)

A. April 1990 (continued)

Well no.	Well depth (feet)	Date (m/d)	Alkalinity	pH, field (units)	Specific conductance, field (µS/cm)	Phosphorus, total	Nitrate, total	Chloride, total	Sodium, total	Potassium, total	Magnesium, total	Calcium, total	Total recoverable (µg/L) Lead	Iron	Copper	Manganese	Zinc
343	--	04/05	195	--	--	0.65	5.6	37	16	1.1	14	76	<500	<200	<50	<30	0
346	24	04/06	253	7.60	814	1.26	2.2	61	46	3.1	41	241	1,400	46,500	150	3,400	200
347	--	04/05	157	--	--	0.71	0.	34	22	1.5	13	52	<500	1,100	<50	<30	200
348	73	04/03	176	--	--	0.15	8.1	19	28	8.3	124	780	<500	2,200	<50	5,700	100
349	65	04/04	210	--	--	0.64	7.4	24	15	2.9	138	572	<500	21,400	<00	4,,100	200
351	55	04/04	146	--	--	0.28	1.5	61	28	1.9	13	63	<500	2,100	70	90	400
352	55	04/03	154	--	--	0.33	2.5	107	37	1.7	12	70	<500	400	<50	<30	100
353	--	04/06	186	--	--	0.33	4.0	38	23	1.2	14	72	<500	8,200	<50	<30	500
354	--	04/06	160	--	--	0.56	3.4	48	26	1.4	11	68	<500	<200	<50	<30	20
355	63	04/03	163	--	--	0.01	2.8	45	27	1.4	10	69	<500	<200	<50	<30	0
356	57	04/05	196	7.63	589	0.48	4.5	44	29	1.3	15	72	<500	<200	<50	<30	20
357	48	04/05	196	7.57	533	0.12	5.1	26	13	0.90	15	79	<500	<200	<50	<30	0
358	35	04/05	203	--	--	0.40	4.5	31	17	1.1	14	79	<500	<200	<50	<30	50
359	23	04/03	122	--	--	0.05	3.2	66	39	1.9	7.8	53	<500	25,700	70	400	4,400
360	--	04/03	90	--	--	0.08	0.26	5	7	1.3	3.2	47	1,200	60,500	70	1,000	3,200
361	25	04/05	194	7.61	608	0.92	4.1	49	32	1.3	13	78	<500	<200	<50	<30	10
362	67	04/05	203	--	--	1.09	4.3	36	22	1.3	15	81	<500	2200	80	<30	400
363	63	04/03	198	--	--	0.85	5.3	56	24	1.6	15	75	<500	<200	<50	<30	40
364	35	04/04	152	--	--	0.44	0.24	42	20	1.5	14	74	<500	3600	<50	<30	10
365	14	04/03	248	--	--	0.12	0.44	90	46	2.7	26	122	<500	29,200	130	400	300
366	--	04/05	227	--	--	0.68	5.1	101	46	1.6	15	88	<500	<200	<50	<30	20
368	--	04/03	265	--	--	0.09	3.2	232	144	4.7	25	141	<500	19,400	80	500	200
375	--	04/05	187	--	--	0.47	7.2	23	11	0.90	12	79	<500	<200	<50	<30	20
376	--	04/03	137	--	--	0.50	0.	19	51	0.15	1.8	0.1	<500	<200	<50	<30	0
403	54	04/06	192	7.71	638	0.29	4.9	68	35	2.6	11	83	<500	<200	<50	<30	300
406	26	04/03	128	7.66	498	0.05	2.3	19	10	1.0	20	70	<500	6,800	100	1,000	7,800
420	--	04/06	238	7.55	616	0.18	5.5	33	16	1.3	16	91	<500	5,100	<50	<30	20
449	--	04/04	152	--	--	0.56	3.7	16	7	0.70	13	61	<500	<200	<50	<30	30
450	--	04/03	139	--	--	0.40	1.8	61	48	2.1	14	64	<500	19,500	<50	1,000	100

Appendix 2.--Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, New York study area, September 1990.

[--, indicates no data available; <, less than; all values are in milligrams per liter unless otherwise noted; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; well locations shown on pl. 1].

B. SEPTEMBER 1990 (Analyses by the U.S. Geological Survey National Water Quality Laboratory)

					Dissolved, in milligrams per liter										
Well number	Well depth (feet)	Date m/d	Specific conduct-ance (µS/cm)	pH (units)	Alkalinity	Nitrite plus nitrate as N	Phos-phorus, ortho as P	Cyanide	Calcium	Magne-sium	Sodium	Chloride	Sulfate	Fluoride	Silica
5	40	09/19	--	--	224	9.9	<0.01	--	--	--	--	40	19	0.1	--
11	81	09/19	--	--	223	5.0	<0.01	--	--	--	--	79	24	0.1	--
22	45	09/20	631	7.8	189	7.6	<0.01	--	79	13	34	--	--	--	6.3
48	25	09/17	568	7.5	220	6.4	<0.01	<0.01	87	14	16	--	--	--	7.4
105	59	09/17	554	7.8	175	4.9	<0.01	--	76	14	18	--	--	--	7.3
106	75	09/19	--	--	166	6.9	<0.01	--	--	--	--	21	17	0.1	--
108	38	09/17	--	--	300	6.0	<0.01	--	--	--	--	38	25	0.1	--
121	32	09/20	546	7.7	181	5.9	<0.01	--	75	14	20	--	--	--	7.2
172	69	09/18	559	7.6	206	5.3	<0.01	--	79	15	14	--	--	--	7.4
177	92	09/19	1,390	7.8	200	4.1	<0.01	--	74	14	170	--	--	--	7.5
204	46	09/17	--	--	197	4.6	<0.01	--	--	--	--	30	24	0.1	--
207	53	09/17	--	--	151	8.3	<0.01	--	--	--	--	29	23	0.1	--
210	45	09/17	413	7.7	--	--	--	--	61	14	4.8	--	--	--	7.5
280	34	09/19	807	7.7	204	4.7	<0.01	--	87	17	56	--	--	--	7.8
303	28	09/17	--	--	214	3.7	<0.01	--	--	--	--	72	25	0.1	--
304	23	09/17	--	--	226	4.0	<0.01	--	--	--	--	34	23	0.1	--
317	68	09/18	558	7.6	205	5.7	<0.01	--	78	15	14	--	--	--	7.6
320	90	09/20	363	8.0	140	1.7	<0.01	--	53	13	4.8	--	--	--	8.7
321	80	09/17	3,850	7.2	271	3.0	<0.01	--	230	39	530	--	--	--	10
330	15	09/17	651	7.4	218	6.5	<0.01	<0.01	89	12	31	--	--	--	6.8

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N. Y. study area (continued)

B. SEPTEMBER 1990 continued.

Well number	Dissolved, in micrograms per liter																
	Arsenic	Barium	Beryl-ium	Cadm-ium	Chrom-ium	Cobalt	Copper	Iron	lead	Mang-anese	Molyb-denum	Nickel	Silver	Stron-tium	Vanad-ium	Zinc	Lithium
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22	--	58	<0.5	<1	<5	<3	<10	33	<10	17	<10	<10	<1	110	<6	4	7
48	<1	29	<0.5	<1	<5	<3	<10	6	<10	1	<10	<10	<1	110	<6	24	7
105	--	49	<0.5	<1	<5	<3	<10	3	<10	2	<10	<10	<1	110	<6	62	8
106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
108	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
121	--	66	<0.5	<1	<5	<3	<10	13	<10	12	<10	<10	<1	120	<6	15	13
172	--	61	0.8	<1	<5	<3	<10	23	<10	15	<10	<10	<1	110	<6	36	9
177	--	57	<0.5	<1	<5	<3	20	12	<10	6	<10	<10	<1	140	<6	35	14
204	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
210	--	73	<0.5	<1	<5	<3	<10	12	<10	42	<10	<10	<1	92	<6	430	7
280	--	87	<0.5	<1	<5	<3	<10	37	<10	2	<10	<10	<1	140	<6	7	10
303	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
304	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
317	--	63	<0.5	<1	<5	<3	50	14	<10	11	<10	<10	<1	100	<6	4	9
320	--	71	<0.5	<1	<5	<3	<10	4	<10	4	<10	<10	<1	91	<6	5	10
321	--	290	2.0	3	15	9	30	11	30	4	30	30	4	400	18	9	23
330	<1	35	<0.5	<1	<5	<3	<10	10	<10	2	<10	<10	<1	120	<6	28	6

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area (continued).

B. SEPTEMBER 1990 continued.

					Dissolved, in milligrams per liter										
Well number	Well depth (feet)	Date mo/d	Specific conduct-ance (µs/cm)	pH (units)	Alkalinity	Nitrite plus nitrate as N	Phor-phous, ortho as P	Cyanide	Calcium	Magne-sium.	Sodium	Chloride	Sulfate	Fluoride	Silica
332	34	09/18	815	7.7	230	0.7	<0.01	--	100	18	35	--	--	--	8.3
333	55	09/18	565	7.7	211	4.2	<0.01	--	77	16	16	--	--	--	7.8
335	34	09/18	854	7.7	255	5.1	<0.01	--	91	18	59	--	--	--	8.5
337	42	09/19	533	7.6	201	6.5	<0.01	<0.01	81	14	11	--	--	--	7.4
338	217	09/19	288	8.9	104	0.1	<0.01	--	13	6	42	--	--	--	0.55
339	35	09/18	584	7.7	200	5.4	<0.01	--	83	14	20	--	--	--	6.5
340	35	09/19	763	7.8	224	3.6	<0.01	--	98	17	34	--	--	--	8.7
341	137	09/19	716	8.0	111	0.1	<0.01	--	32	14	86	--	--	--	1.4
342	52	09/17	610	7.8	176	3.7	0.02	--	72	14	33	--	--	--	7.6
343	24	09/20	662	7.8	252	0.7	<0.01	<0.01	89	19	22	--	--	--	7.8
346	24	09/19	823	7.5	225	1.6	<0.01	--	92	16	52	--	--	--	8.5
347	--	09/20	--	--	193	2.8	<0.01	--	--	--	--	--	--	--	--
348	73	09/18	492	7.9	174	--	--	--	--	--	--	--	--	--	--
349	65	09/18	571	7.7	211	--	--	--	--	--	--	--	--	--	--
351	55	09/20	594	7.8	--	--	--	--	77	13	23	--	--	--	6.4
352	55	09/20	613	7.9	--	--	--	--	56	13	44	--	--	--	3.9
355	63	09/19	505	7.9	158	3.3	<0.01	--	61	10	24	--	--	--	5.7
356	58	09/18	--	--	199	4.0	<0.01	--	--	--	--	--	--	--	--
357	48	09/18	--	--	197	5.3	<0.01	--	--	--	--	--	--	--	--
358	35	09/18	--	--	231	4.4	<0.01	--	--	--	--	--	--	--	--
362	67	09/20	614	7.6	--	--	--	--	79	15	21	--	--	--	7.3
363	63	09/20	--	--	194	4.6	<0.01	--	--	--	--	57	23	0.1	--
364	35	09/20	633	7.7	199	4.7	<0.01	--	83	16	23	--	--	--	7.2
365	14	09/17	820	6.9	312	0.3	<0.01	--	110	17	45	--	--	--	14
366	----	09/20	--	--	209	3.5	<0.01	--	--	--	--	70	22	0.1	--
367	----	09/20	--	--	200	5.5	<0.01	--	--	--	--	--	--	--	--
368	----	09/17	1130	7.2	--	--	--	--	100	14	110	--	--	--	6.9

Appendix 2. Inorganic chemical analyses of ground water from selected wells in the glacial-aquifer system in Cortland, N.Y. study area (continued).

B. SEPTEMBER 1990, continued.

	Dissolved, in micrograms per liter																
Well number	Arsenic	Barium	Beryl-ium	Cadm-ium	Chrom-ium	Cobalt	Copper	Iron	lead	Mang-anese	Molyb-denum	Nickel	Silver	Stron-tium	Vanad-ium	Zinc	Lithium
332	--	75	<0.5	<1	<5	<3	<10	10	<10	790	<10	<10	<1	200	<6	9	16
333	--	50	<0.5	<1	<5	<3	<10	32	<10	250	<10	<10	<1	110	<6	3	9
335	--	69	<0.5	<1	<5	<3	<10	95	<10	270	<10	<10	<1	170	<6	13	11
337	<1	53	<0.5	<1	<5	<3	<10	19	<10	26	<10	<10	<1	110	<6	3	7
338	--	120	<0.5	<1	<5	<3	<10	41	<10	33	<10	<10	<1	400	<6	5	29
339	--	38	<0.5	<1	<5	<3	<10	15	<10	12	<10	<10	<1	120	<6	6	5
340	--	72	<0.5	<1	<5	<3	<10	9	<10	64	<10	<10	<1	150	<6	7	10
341	--	210	<0.5	<1	<5	<3	<10	62	<10	65	<10	<10	<1	390	<6	9	240
342	--	42	<0.5	<1	<5	<3	<10	280	<10	200	<10	<10	<1	110	<6	15	9
343	<1	62	<0.5	<1	<5	<3	<10	5	<10	580	<10	<10	<1	150	<6	16	8
346	--	87	<0.5	<1	<5	<3	<10	17	<10	94	<10	<10	<1	130	<6	8	10
347	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
348	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
349	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
351	--	51	<0.5	<1	<5	<3	<10	6	<10	3	<10	<10	<1	110	<6	72	8
352	--	47	0.6	<1	<5	<3	<10	18	<10	27	<10	<10	<1	100	<6	91	8
355	--	43	<0.5	<1	<5	<3	<10	7	<10	1	<10	<10	<1	85	<6	11	7
356	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
357	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
358	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
362	--	59	<0.5	<1	<5	<3	<10	580	<10	14	<10	<10	<1	110	<6	120	11
363	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
364	--	61	<0.5	<1	<5	<3	<10	730	<10	20	<10	<10	<1	120	<6	4	9
365	--	150	<0.5	<1	<5	<5	40	7900	30	3600	<10	<10	<1	190	<6	210	12
366	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
367	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
368	--	71	0.5	2	<5	<3	<10	17	<10	4	<10	<10	<1	150	<6	8	9

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area.
[Analyses by the U.S. Geological Survey National Water Quality Laboratory; --, no data available; <, less than; Well locations shown on pl 1]

				Concentration (total), in micrograms per liter										
Well number	Well depth (feet)	Sample date yr/mo/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
1	--	90/04/05	--	--	--	0.25	--	--	--	--	--	--	--	--
11	81.0	90/04/05	--	<0.20	0.40	2.0	<0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--
		90/09/19	--	--	0.04	1.4	--	--	--	--	--	--	--	--
22	45.0	90/04/03	--	<0.20	11.0	0.20	<0.20	<0.2	<0.2	<0.2	<0.2	<0.2	5.9	--
		90/09/20	--	--	14.6	0.05	--	--	--	--	--	--	--	3.50
		93/04/27	--	--	6.2	--	--	--	--	--	--	--	--	--
105	59.0	90/04/05	--	--	82.8	--	--	--	--	--	--	--	--	23.8
		90/09/17	--	--	53.9	--	--	--	--	--	--	--	--	16.8
		93/04/27	--	--	54.0	0.01	--	--	--	--	--	--	--	25.0
121	32.0	90/04/04	--	--	101	--	--	--	--	--	--	--	--	34.5
		90/09/20	--	--	66.8	0.20	--	--	--	--	--	--	--	21.0
		93/04/27	--	--	75.0	0.60	--	--	--	--	--	--	--	32.0
172	77.0	90/04/05	--	--	0.02	1.2	0.10	--	--	--	--	--	--	0.20
		90/10/02	--	--	--	0.60	--	--	--	--	--	--	--	--
		90/10/15	--	--	11.4	--	--	--	--	--	--	--	--	0.60
177	92.5	90/04/06	--	0.25	--	--	--	--	0.2	--	--	--	0.3	--
204	46.5	90/04/04	--	--	2.30	0.40	--	--	--	--	--	--	--	1.10
		90/09/17	--	--	1.90	0.30	--	--	--	--	--	--	--	0.80
		93/04/27	--	--	3.4	0.60	--	--	--	--	--	--	--	2.10
205	26.0	90/04/05	--	--	7.00	--	--	--	--	--	--	--	--	1.80
		90/09/17	--	--	24.2	--	--	--	--	--	--	--	--	10.0
		93/04/27	--	--	4.80	0.06	--	--	--	--	--	--	--	1.00
280	34.0	90/04/06	--	--	--	1.6	0.20	0.4	--	--	--	--	--	0.10
		90/09/19	--	--	--	1.5	--	--	--	--	--	--	--	--
304	23.0	90/04/04	--	--	2.70	0.20	--	--	--	--	--	--	--	0.40
		90/09/17	--	--	2.60	1.0	--	--	--	--	--	--	0.2	0.50
		93/04/27	--	--	2.3	0.40	--	--	--	--	--	--	--	0.50
317	68.0	93/04/27	--	--	0.40	0.30	--	--	--	--	--	--	--	0.95
320	90.0	90/09/20	--	--	0.10	--	--	--	--	--	--	--	--	1.20
330	15.0	90/04/05	--	--	--	0.10	2.4	--	0.8	--	--	--	1.0	--
		90/04/05	--	--	--	0.10	2.4	--	0.8	--	--	--	1.0	--
332	34.0	90/09/18	--	--	15.2	107	--	--	--	--	--	--	28.9	--

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Concentration (total), in micrograms per liter										
				Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
333	55.0	90/09/18	--	--	1.10	2.4	--	--	--	--	--	--	--	2.10
335	34.0	90/09/18	--	--	0.10	2.7	--	--	--	--	--	--	--	--
336	37.0	90/09/18	--	--	0.06	0.4	--	--	--	--	--	--	0.3	0.04
340	35.0	90/09/19	--	--	40.2	0.35	--	--	--	--	--	--	--	10.1
		93/04/27	--	--	21.0	0.20	--	--	--	--	--	--	--	5.40
341	137.0	90/07/19	17	0.07	15.9	--	4.0	--	--	--	--	--	--	--
		90/07/19	27	--	35.0	--	10.30	--	--	--	--	--	--	--
		90/07/19	37	--	31.3	--	6.30	--	--	--	--	--	--	--
		90/07/19	47	--	19.6	--	3.30	--	--	--	--	--	--	--
		90/07/19	57	--	13.8	--	3.10	--	--	--	--	--	--	--
		90/07/19	67	--	0.50	--	0.20	--	--	--	--	--	--	--
		90/09/19	--	--	0.04	--	--	--	--	--	--	--	--	0.04
		93/04/27	--	--	0.10	--	--	--	--	--	--	--	--	--
342	52.0	90/09/17	--	--	0.06	1.40	--	--	--	--	--	--	0.3	--
343	24.0	90/09/20	--	--	0.40	--	--	--	--	--	--	--	--	--
346	24.0	90/04/03	--	--	--	6.20	0.50	--	--	--	--	--	--	--
		90/04/06	--	--	--	11.5	1.10	1.4	0.2	--	--	--	--	--
		90/09/19	--	--	--	13.8	--	--	--	--	--	--	0.6	--
347	--	90/04/05	--	--	65.1	--	0.15	--	--	--	--	--	--	12.6
		90/09/20	--	--	30.5	0.10	--	--	--	--	--	--	--	6.90
		90/10/15	--	--	62.8	0.04	--	--	--	--	--	--	--	16.0
		90/11/24	--	--	63.2	--	--	--	--	--	--	--	--	11.3
		90/12/12	--	--	44.2	0.20	--	--	--	--	--	--	--	12.0
		93/04/27	--	--	57.0	0.50	--	--	--	--	--	--	--	20.0
		93/04/29	--	--	59.0	0.40	--	--	--	--	--	--	--	24.0
348	73.0	90/09/18	--	--	--	0.04	--	--	--	--	--	--	0.2	--
351	55.0	90/04/05	--	--	101	--	0.20	--	--	--	--	--	0.2	62.2
		90/09/20	--	--	53.0	0.20	--	--	--	--	--	--	--	35.0
		90/10/15	--	--	59.0	0.15	--	--	--	--	--	--	--	36.0
		90/11/24	--	--	62.0	--	--	--	--	--	--	--	--	33.0
		90/12/12	--	--	61.5	--	--	--	--	--	--	--	--	39.0
		93/04/27	--	--	36	0.20	--	--	--	--	--	--	--	4.80

Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

				Concentration (total), in micrograms per liter										
Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
352	55.0	90/04/04	--	--	15.6	--	--	--	--	--	--	--	--	0.54
		90/09/20	--	--	9.50	0.05	--	--	--	--	--	--	--	0.40
352	55.0	93/04/27	--	--	12	0.06	--	--	--	--	--	--	--	0.90
353	--	90/04/05	--	--	17.2	3.20	1.10	--	--	--	--	--	--	8.50
		90/10/17	--	--	6.90	1.20	--	--	--	--	--	--	--	5.10
355	63.0	90/04/03	--	--	--	0.15	--	--	--	--	--	--	--	--
		90/09/19	--	--	0.20	--	--	--	--	--	--	--	0.3	0.40
356	57.6	90/04/05	--	--	--	6.50	0.60	--	--	--	--	--	--	0.40
		90/09/18	--	--	0.60	3.20	--	--	--	--	--	--	--	0.30
357	48.0	90/04/05	--	--	0.03	0.40	0.20	--	--	--	--	--	--	0.20
		90/09/18	--	--	0.04	0.50	--	--	--	--	--	--	--	0.03
358	35.5	90/04/05	--	--	0.95	1.50	0.20	--	--	--	--	--	--	0.22
		90/09/18	--	--	0.90	0.80	--	--	--	--	--	--	--	0.30
362	67.0	90/04/05	--	2.50	49.1	3.10	--	--	--	--	--	--	--	14.9
		90/09/20	--	3.10	43.2	6.50	--	--	--	--	--	--	--	12.50
		90/10/15	--	--	37.4	6.30	--	--	--	--	--	--	--	10.9
		90/11/26	--	1.00	38.0	2.20	--	--	--	--	--	--	--	13.9
		90/12/12	--	2.90	39.8	4.20	--	--	--	--	--	--	--	11.0
		93/04/29	--	--	36.0	2.40	--	--	--	--	--	--	--	14.0
363	63.0	90/04/05	--	--	45.9	--	--	--	--	--	--	--	--	18.2
		90/09/20	--	--	25.3	0.20	--	--	--	--	--	--	--	10.4
		90/10/15	--	--	30.6	0.50	--	--	--	--	--	--	--	11.0
		90/11/26	--	--	31.5	--	--	--	--	--	--	--	--	9.90
		90/12/12	--	--	31.3	0.60	--	--	--	--	--	--	--	11.5
364	63.0	93/04/29	--	--	26.0	0.40	--	--	--	--	--	--	--	13.0
		90/04/05	--	0.30	53.8	--	--	--	--	--	--	--	--	17.3
		90/09/20	--	--	37.3	0.20	--	--	--	--	--	--	--	15.4
		90/10/15	--	--	49.6	0.40	--	--	--	--	--	--	--	15.4
		90/11/26	--	--	45.0	--	--	--	--	--	--	--	--	12.6
		90/12/12	--	--	44.6	0.30	--	--	--	--	--	--	--	15.4

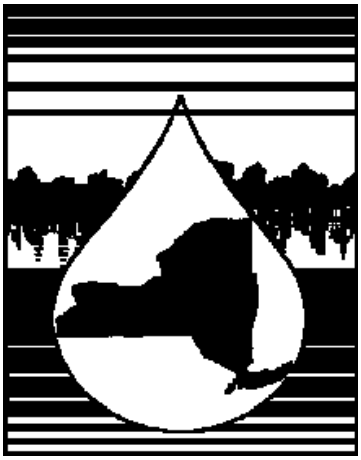
Appendix 3.--Organic chemical analyses of ground water from selected wells in the glacial-aquifer system in the Cortland, N.Y. study area, continued

				Concentration (total), in micrograms per liter											
Well number	Well depth (feet)	Sample date yr/m/d	Sample depth (feet)	Tetra-chloro-ethylene	Tri-chloro-ethylene	1,1,1-Tri-chloro-ethane	1,1-Di-chloro-ethylene	Benzene	Toluene	Xylene	Dichlor-bromo-methane	Methyl-chloride	*trans*-1,2-dichloro-ethene	*cis*-1,2-dichloro-ethene
365	14.0	90/04/03	--	--	--	0.50	0.30	0.2	4.5	2.0	--	--	--	--
		90/09/17	--	--	0.10	0.30	--	--	--	--	--	--	0.4	0.06
		90/10/17	--	--	--	--	--	2.1	42.5	5.3	--	--	--	--
366	--	90/09/20	--	0.50	0.80	0.40	--	--	--	--	--	--	--	--
367	--	90/04/04	--	--	50.3	--	--	--	--	--	--	--	--	6.90
		90/09/20	--	--	19.5	--	--	--	--	--	--	--	--	2.30
367	--	90/10/15	--	--	25.3	--	--	--	--	--	--	--	--	3.10
		90/11/24	--	--	27.4	--	--	--	--	--	--	--	--	--
		90/12/12	--	--	31.7	--	--	--	--	--	--	--	--	4.70
		93/04/28	--	--	31.0	--	--	--	--	--	--	--	--	3.90
368	24.0	90/04/03	--	--	--	--	--	--	0.4	--	--	--	--	--
		90/09/17	--	--	0.06	0.02	--	--	--	--	--	--	0.2	0.20
380	54.0	93/04/27	--	--	17.0	0.08	--	--	--	--	--	--	--	1.90
406	26.0	90/04/03	--	--	0.10	--	--	--	--	--	--	--	--	--
		93/04/27	--	--	4.80	0.06	--	--	--	--	--	--	--	10.0

NEW YORK STATE

SOURCE WATER ASSESSMENT PROGRAM PLAN

FINAL



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Cornell University
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County Soil and Water Conservation Districts
County Water Quality Coordinating Committees
League of Woman Voters of New York State
Miller Environmental Group
New York Conference of Mayors
New York Rural Community Assistance Program
New York State Department of State
New York Environmental Management Councils
New York Farm Bureau
New York Planning Federation
New York Rural Community Assistance Program
New York Rural Water Association
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New York State Association of Regional Councils
New York State Chemical Alliance
New York State Department of Agriculture and Markets
New York State Department of Environmental Conservation
New York State Environmental Facilities Corporation
New York State Legislative Commission on Water Resource Needs of New York State and Long Island
New York State Rural Development Council
New York State Soil and Water Conservation Committee
New York State Water Resources Institute of Cornell University
New York Water Environment Federation
State University of New York at Fredonia
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United States Department of Agriculture, Rural Utilities Service
United States Environmental Protection Agency
United States Geological Survey
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NEW YORK STATE
SOURCE WATER ASSESSMENT PROGRAM PLAN
TABLE OF CONTENTS

Page

Overview i

1.0 Introduction 1
1.1 Program Background 1
1.2 Program Demographics 1
1.3 Program Goals and Outcomes 2
1.4 Program Funding 3

2.0 Source Water Assessment Program Development Process 3
2.1 Existing Activities Related to Source Water Assessment and Protection 4
2.2 Public Participation 6
2.3 Data Collection During Plan Development 8

3.0 New York State's Approach to Source Water Assessments 9
3.1 Source Water Assessment Objectives 9
3.2 State Strategic Approach to Source Water Assessments 10
3.2.1 Type and Extent of Threats 11
3.2.2 Type and Size of System 12
3.2.3 Local Support 12
3.2.4 Setting Priorities 12

4.0 New York's Approach for Conducting Assessments and Reporting Results 14
4.1 Data and Information Collection 14
4.1.1 Collecting Available Information on Public Water Systems 15
4.1.2 Collecting Available Information from Other Data Sources 16
4.2 Delineation of Assessment Areas 17
4.2.1 General Approach for Delineation of Source Water Assessment Areas . 17
4.2.2 Ground Water Delineations 18
4.2.3 Surface Water Delineations 20
4.2.4 Assessment Areas Which Extend Beyond State Boundaries 22
4.2.5 Conjunctive Delineations 22
4.3 Contaminant Inventory 23
4.3.1 Contaminants of Concern 23
4.3.2 Significant Potential Sources of Contamination 24
4.4 Susceptibility Analysis 25
4.4.1 Estimating Contaminant Prevalence from Land Cover 25
4.4.2 Estimating Contaminant Prevalence from Discrete Sources 26
4.4.3 General Description of Susceptibility Zones 26
4.4.4 Estimating Sensitivity and Susceptibility of the Water Supply 27
4.4.5 Susceptibility Review and Refinement 29
4.5 Methodology for Completing Assessments 30

4.6 Assessment Format and Availability . . . 33
4.6.1 Assessment Format . . . 33
4.6.2 Procedures for Making Assessments Available to the Public . . . 37

5.0 Program Implementation . . . 38
5.1 Administration . . . 38
5.1.1 Delegation . . . 38
5.1.2 Coordination . . . 39
5.1.3 Progress Reporting . . . 40
5.2 Schedule . . . 40
5.3 Updating . . . 41

Glossary . . . 43

Figures . . . 51
Figure 1 - Ground Water Delineation Methods . . . 53
Figure 2 - Surface Water Delineation Approach - Nested and Sub-watershed Borders . 54
Figure 3 - Sensitivity Analysis for Ground Water Supplies . . . 55
Figure 4 - Susceptibility Matrix . . . 56
Figure 5 - Methodology for Conducting Assessments . . . 57

Tables . . . 59
Table 1 - GIS Coverages for the Source Water Assessment Program . . . 61
Table 2 - Data Needs to Perform Assessments . . . 64
Table 3 - Criteria for Consideration when Completing Source Water Assessments . . . 68
Table 4 - Potential for Ground Water Contamination Based on Land Cover . . . 70
Table 5 - Potential for Surface Water Contamination Based on Land Cover . . . 71
Table 6 - Potential for Ground Water Contamination from Discrete Sources . . . 72
Table 7 - Potential for Surface Water Contamination from Discrete Sources . . . 73
Table 8 - Evaluation of Contaminant Prevalence Associated with Mapped Land Cover for a Particular Contaminant . . . 74
Table 9 - Evaluation of Containment Prevalence Associated with Discrete Potential Sources of Contamination . . . 75
Table 10 - General Description of Susceptibility Zones . . . 76

References . . . 77

Appendices . . . 81
Appendix A Listing of Local and State Health Department Offices
Appendix B Public Participation Plan
Appendix C List of Source Water Protection Coordinating Committee Members
Appendix D New York State Department of Health Technical References
Appendix E Wellhead Protection Program Delineation
Appendix F List of Contaminants of Concern
Appendix G Hypothetical Source Water Assessments
Appendix H Summary of Comments and Responses on the Public Comment Draft of the SWAP Plan

New York State
Source Water Assessment Program Plan
Overview

Congress amended the Safe Drinking Water Act in 1996 and added a new program that requires states to evaluate the sources of water that are used to supply public drinking water. This new program is called the Source Water Assessment Program. The New York State Department of Health (DOH) is implementing the program for New York State. With help from the New York State Department of Environmental Conservation, County Health Departments, other state and federal government agencies as well as private and public interest groups, the DOH developed a plan to carry out this new program.

The Safe Drinking Water Act requires that each source of water (e.g. well, stream, lake, reservoir) used by a public water system be evaluated to identify possible contaminant threats to the source water quality. This evaluation is called a Source Water Assessment and the elements that will be completed for each source water assessment are described below.

- **Delineate the source water assessment area.** This involves determining where the public drinking water originates. In New York, most public drinking water systems draw water from wells. However, some of New York's largest systems use water from streams, lakes and reservoirs. The assessments will identify an area of land surrounding the well, stream or other water body that likely contributes water to each source of public water.

- **Complete the contaminant inventory.** This involves identifying and listing potential sources of contamination that could adversely affect the quality of the source of water.

- **Conduct a susceptibility analysis.** This involves evaluating the likelihood that a source of public drinking water could become contaminated.

The Source Water Assessment Program is a program to compile and organize information for making better decisions regarding source water protection. The information compiled for the assessments will assist the State in overseeing public water systems and the completed assessments will provide a rational basis to support future local and state source water protection activities. The Source Water Assessment Program does not impose any new mandates or regulations on owners or operators of public water systems. Funding for the Source Water Assessment Program is from a single $5.9 million federal grant which will be spent over four years (1998 - 2001).

Previous Assessment Efforts Related to the Source Water Assessment Program

The Source Water Assessment Program will integrate on-going source water assessment and protection efforts. Federal, state and local pollution prevention regulations provide the baseline protection to public water systems. Some water sources are protected through regional programs such as those for an entire watershed or aquifer. There are also programs aimed at the particular protection needs of an individual source of public water. For the major water sources in the state, source water protection efforts are already underway. The Source Water Assessment Program will document the status of existing source water protection efforts for a particular water source. Some source water assessments, by identifying significant threats of contamination to sources of public water, may help focus source water protection efforts.

New York's Source Water Assessment Program

There are more than 9,000 public water systems in New York that have their own water source. Some public water systems use more than one source of water, therefore, statewide there are more than 14,000 water sources to be evaluated under the Source Water Assessment Program.

About one eighth of New York's public water systems include municipal systems that serve villages, towns and cities. However, the majority of public water systems in New York State are smaller systems that are owned and operated by apartment complexes, mobile home parks, schools, workplaces, and businesses that serve water to the public, such as motels and restaurants.

New York's approach to completing source water assessments will follow a step-by-step process that builds upon existing information to focus the assessments on relevant water quality issues. New York's approach to source water assessments is based on three guiding principals: 1) maximize use of existing information; 2) emphasize use of a statewide Geographic Information System; and 3) emphasize state and local partnerships. The main elements of New York's source water assessment process are summarized below.

1. **Gather Existing Information on the Source of Public Water**
   The DOH will work with County Health Departments, the Department of Environmental Conservation and other local entities to collect the information that already exists for a source of public water. The information will be put into a Geographic Information System (GIS), a computer program that organizes information and displays it on a map. In areas that can provide local support and/or already have assessments or protection efforts underway, the DOH's assessment will complement the ongoing work.

2. **Determine the Area of Land that Contributes Water to the Source of Public Water**
   Sources of public drinking water include surface water bodies (e.g., streams, lakes, rivers or reservoirs) and ground water (e.g., wells or springs). The land that contributes to the source of public water is the assessment area. The area of land that contributes water to a surface water body is defined differently than the area of land that contributes water to a well. Some water sources that supply public water systems have been delineated during previous assessment efforts and the DOH will build on these earlier delineations.

There will be two zones delineated for public water supplies served by wells. These two zones will be the boundaries within which possible contaminant sources will be evaluated. The area immediately surrounding the well is called the Inner Well Zone and the Outer Well is Zone a larger, more broadly delineated area. Defining the area of land that contributes water to a ground water source involves reviewing information about the soil and rock through which water flows. The dimensions of these zones will be determined on the amount of information about the soil and rock in which the well is constructed, as well as the type of water system.

If a source of public water is a surface water body then the assessment area is defined as the topographic boundary of the watershed or sub-watershed. A watershed is a geographical area within which the water drains to a particular river, stream, etc.

3. List the Sources of Possible Contamination

The DOH will identify all significant potential sources of contamination located within the Inner and Outer Well Zones or within the watershed boundaries. A potential source of contamination is considered to be significant if there is a possibility that contamination from that source could reach the area where the public water system takes water into its system, and could pose a threat to people who drink the water. Whether a source of possible contamination is considered significant will vary, depending on several factors. Some of the significant potential sources of contamination that will be evaluated as part of the source water assessment process include:

- sewage treatment plants;
- facilities that store or handle large quantities of chemicals;
- petroleum and hazardous material spills; and
- landfills.

Additionally, information about the ways the land is used in an assessment area will be included in this inventory. Fifteen different types of land use will be evaluated in the assessment process; some examples of land cover types are:

- residential;
- pasture;
- forested; and
- commercial.

For both the individual sources of contamination and different land use categories, the DOH will determine where the sources of contamination exist, as well as the type of contamination likely to be associated with that source or land use. Specific chemicals and other types of contamination (such as viruses and sediment) have been grouped into fourteen different categories. The categories are based on similar properties of the contaminant, common origins, or if the contaminants have similar impact on the source of public drinking water. A rating system was developed to determine the likelihood that a specific type of land cover will contribute to the contamination of a source of water with a specific contaminant. Each type of land cover has been combined with each contaminant category and has been given a rating

of “high”, “medium”, low” or “negligible”. Each category of individual contaminant sources when combined with each contaminant category has been given a rating of “possible” or “not possible”. Land uses and contaminant categories rated as “high” or “medium” are of greatest concern. Individual contaminant sources which are rated “possible” are of greatest concern. This information is used in the next phase of the assessment which is to determine how susceptible a source of water is to contamination.

4. Determine How Susceptible the Source of Public Water is to Contamination

Once the contaminants of concern have been identified and prioritized for a source water assessment area, the DOH will evaluate the likelihood that the source(s) of contamination will affect the public drinking water supply. This will be done by evaluating information about the source water relative to possible sources of contamination. The DOH will determine which source(s) of contamination pose the greatest threat to the source of public water.

This phase of the assessment process will also include a quality check called the Susceptibility Review/Refinement. The results of this assessment quality check, any changes that were made and why they were made will be discussed in this section.

5. Public Availability of the Assessments

Once an assessment has been completed it will be made available to the public. At a minimum, the assessments will be available from the state and local health departments. Where there is interest, the assessments may be made available through other sources, such as local libraries or municipal offices. In addition, a Public Summary of the Source Water Assessment may be created for certain community water systems, such as all municipal public water systems and those systems determined to have a high susceptibility to source water contamination. These summaries can be more widely distributed if there is a particular local interest. The assessments are expected to be completed in 2002 and 2003.

1.0 Introduction

1.1 Program Background

Congress, in the 1996 Amendments to the Safe Drinking Water Act, placed an emphasis on the protection of surface and ground water sources used for public drinking water. To obtain the authority created in the Act to reduce monitoring, states must develop a Source Water Assessment Program and complete assessments of public drinking water sources and make these assessments available to the public. In New York State, the Source Water Assessment Program is being developed and implemented by the New York State Department of Health (DOH) with input from other government agencies and private and public interest groups.

1.2 Program Demographics

In New York State, there are 10,758 public water systems of which over 9,000 have their own sources of water. A water system which provides piped water to the public for human consumption is considered a public water system if it has at least five service connections or regularly serves an average of at least 25 individuals daily for at least 60 days out of the year. These 9,000 public water systems are served by approximately 14,000 sources of water in New York State. The source waters serving a public water system may consist of ground water, surface water, or a combination of both ground and surface water.

There are several different types of public water systems in New York State: community water systems, non-community water systems, and non-transient non-community water systems. There are 3,418 community water systems in New York State. A community water system is a public water system which serves at least five service connections used by year-round residents or regularly serves at least 25 year-round residents. Community water systems include: municipal water systems (1,195 systems in New York State); investor owned water companies which serve residential populations (357 systems); county authorities and major wholesalers (8 systems); and mobile home parks, apartment complexes and permanent residential institutions such as nursing homes (1,735 systems). It is estimated that 87 percent of the population of New York State is served by approximately 151 community water systems.

There are 6,584 non-community water systems in New York State. These non-community systems are further divided into whether they serve regular (non-transient) or variable (transient) consumers. A non-transient non-community water system (e.g., schools, commercial/industrial facilities) maintains its own drinking water sources and regularly serves at least 25 of the same people, four or more hours per day, for four or more days per week for 26 or more weeks per year. There are 756 non-transient non-community water systems in New York State. All other types of non-community water systems are transient, non-community water systems (e.g., restaurants, motels). There are 5,828 such systems in New York State that maintain their own source and provide water to transient populations.

In 1974, the New York State Health Department was granted authority for implementation of the Public Water System Supervision Program established in the 1974 Federal Safe Drinking Water Act. While being centrally administered, the regulatory oversight of the public water supply program in

New York State is provided through 45 local health departments (36 county health departments and 9 state district offices; see Appendix A), located throughout the state. Under the Safe Drinking Water Act and its amendments, national limits on contaminant levels in drinking water have been established to ensure that public drinking water is safe for human consumption. In New York State, drinking water standards are established in 10 NYCRR Section 5-1, State Sanitary Code.

The requirements of the 1996 Safe Drinking Water Act Amendments to complete assessments of source waters serving public water systems applies only to those public water systems which meet the federal definition of a public water system. The federal definition of a public water system, from the Safe Drinking Water Act, is any system that has 15 service connections or regularly serves at least 25 individuals. New York regulates a number of smaller systems which do not meet this definition. The distinction between the state and federal definition of a public water system primarily exists for community water systems which have between 5 and 15 service connections and serve between 15 and 25 individuals. Therefore, formal source water assessments need not be completed for approximately 400 community water systems which meet the New York State public water supply definition, but not the federal definition. These small systems will continue to be assessed through sanitary surveys, which can also identify significant source contaminant threats. Assessments will be completed for all public water systems which meet the federal definition of a public water system, including community water systems (both municipal and non-municipal), transient non-community water systems and non-transient, non-community water systems.

Under federal regulations, transient (e.g., restaurants, motels) non-community water systems are not subject to the Maximum Contaminant Level (MCL) requirement for contaminants with chronic health concerns. However, under New York State regulations, all public water systems are required to meet maximum contaminant levels, including most of those with chronic health concerns. Monitoring by transient, non-community systems for these contaminants is only required at State discretion, that is, where the State believes a contaminant is likely to be present.

1.3 Program Goals and Outcomes

The goal of the Source Water Assessment Program is to complete assessments of the source waters serving New York's public drinking water systems and to make the assessment information available to the public. There are approximately 14,000 raw water sources serving the State's public water systems. Each source water assessment will delineate the boundaries of the assessment area(s), identify significant potential sources of contamination within the assessment area, and assess the susceptibility of the public water system(s) to contamination within the assessment area. Once the Source Water Assessments are complete, information from the assessments will be made available to the public.

This program is not a source water protection program, rather it is a program to compile and organize information in order to make more informed decisions regarding source water evaluation and the delivery of safe public drinking water. The Source Water Assessment Program does not impose any new mandates or regulations for protecting sources of public drinking water. However, information from completed source water assessments may be used to direct local and state protection efforts and oversight of public drinking water systems. The completed assessments will provide a rational basis for future source water protection activities.

1.4 Program Funding

A Drinking Water State Revolving Fund was created in 1996 as a result of New York State's enactment of Chapter 413 of the Laws of 1996 (Clean Water/Clean Air Bond Act) and the passage of the 1996 Amendments to the Safe Drinking Water Act. The Drinking Water State Revolving Fund provides a significant financial incentive for public and private drinking water systems to finance needed infrastructure improvements (e.g., treatment plants, distribution mains, storage facilities). The Drinking Water State Revolving Fund receives funds from federal Safe Drinking Water Act Capitalization Grants and the State's Clean Water/Clean Air Bond Act.

The 1996 Amendments to the Safe Drinking Water Act also authorized the States to take up to 10% of the federal Capitalization Grant for federal fiscal year 1997 to complete assessments of source water areas that serve public water systems. Funding for the Source Water Assessment Program was only available in federal fiscal year 1997, but the monies can be spent over four federal fiscal years. In the *Final Intended Use Plan - Drinking Water State Revolving Fund* dated October 22, 1997, the State proposed to set aside the maximum amount of 10% of the total annual federal Capitalization Grant for federal fiscal year 1997 ($5,916,770) to develop and implement the Source Water Assessment Program. A work plan describing the DOH's intended objectives and expenditures totaling $1,540,620 for the first year of the Source Water Assessment Program (federal fiscal year 1998) was approved by the EPA in May 1998. A work plan describing the objectives and expenditures totaling $1,580,895 was developed for the second year of the program (federal fiscal year 1999) and was approved in July 1999 by the EPA as part of the State's Drinking Water State Revolving Fund Capitalization Grant request for FFY'99 funding. The State has estimated the following expenditures for the remaining two years: $1,600,000 (federal fiscal year 2000) and $1,100,000 (federal fiscal year 2001). Work plans and budgets for these funds will be developed annually.

2.0 Source Water Assessment Program Development Process

This Source Water Assessment Program plan was developed using the *State Source Water Assessment and Protection Programs - Final Guidance* published by the EPA in August 1997. As discussed in Section 2.2, the DOH conducted an extensive outreach effort to gather input for the plan's development. Prior to disseminating a draft plan to the public, a working draft of this document was submitted to the Source Water Protection Coordinating Committee (the Citizen Advisory Committee established by the DOH) and its various technical Working Groups, the DOH and local health unit staff for review and comment. Additional input is being sought at public hearings and in writing during the public comment period. The DOH believes that the process of involving as many parties as possible throughout the state, will result in a plan that serves a variety of purposes, including the improvement of source water protection.

2.1 Existing Activities Related to Source Water Assessment and Protection

Many aspects of source water protection have been practiced in New York State for decades. The authority for State promulgated Watershed Rules and Regulations has existed since 1885. Specific protection programs have been developed for numerous ground water and surface water sources across the state, particularly for the sources serving the largest public water systems. Although specific approaches implemented at the local level have varied throughout the century-long history of Watershed Rules and Regulations, virtually all approaches have included the basic concepts of delineation and inventory of potential contaminant sources.

Source water protection has also been provided by numerous environmental quality programs in New York State, implemented primarily by the New York State Department of Environmental Conservation and county health departments. These programs, including both point and non-point source pollution controls (e.g., waste discharges, solid and hazardous waste, bulk storage, pesticides, etc.), are designed to protect both ground and surface waters of New York State on the basis of their classifications and water quality standards. The water quality standards were developed to protect ground water and surface water used as public drinking water sources. Although these environmental quality programs generally address broader geographic areas than the Source Water Assessment Program, they are a key component of source water protection.

Nassau and Suffolk Counties have a long history of ground water management programs beginning with the Nassau-Suffolk Comprehensive Development Plan (1972) which focused primarily on water quantity, but also examined water quality issues such as salt water intrusion and contamination by heavy metals and other toxics. The 208 Plan (1978) was the first comprehensive attempt at water quality management on Long Island. The 208 Plan delineated eight major hydrogeologic zones on Long Island based on ground water flow patterns and determined which areas contribute recharge to the upper glacial and Magothy aquifers which are used as sources of public drinking water. The Long Island Comprehensive Special Groundwater Protection Area Plan (1992) established nine special groundwater protection areas which were deemed critical for the maintenance of good water quality in the upper glacial and Magothy aquifers.

Various levels of source water assessment have also been completed for ground water sources by the New York State Department of Environmental Conservation. The comprehensive New York State Groundwater Management Program recommended key policies and program initiatives endorsing geographic targeting and critical protection areas on Long Island (1986) and Upstate New York (1987). Principal and primary aquifers were defined and mapped through a cooperative program with the United States Geological Survey. These concepts were forerunners of the Safe Drinking Water Act's Wellhead Protection Program which is a pollution prevention program designed to protect ground water sources that are relied upon by public drinking water systems.

The New York State Department of Environmental Conservation was initially responsible for the implementation of New York's Wellhead Protection Program which was approved by the EPA in September 1990. In 1998, New York's Governor Pataki designated the DOH as the state agency responsible for continued implementation of New York's Wellhead Protection Program. Two key components of the Source Water Assessment Program, delineation and potential contaminant source

inventory, were addressed for public water systems using ground water by the New York State Wellhead Protection Program. Although many of the municipal community public water supplies in New York State made valuable progress under the Wellhead Protection Program (often with the support of county or regional planning agencies, water authorities, or the New York Rural Water Association), the Wellhead Protection Program did not evaluate water supply susceptibility to contamination or provide for public disclosure of the assessments.

The delineation policies of the Wellhead Protection Program established a "baseline" two zone wellhead protection area for all public water systems (community and non-community) using ground water supplies and allowed broad flexibility for locally-initiated refinements or revisions. The baseline delineation policy emphasized regional aquifer management for wells in unconsolidated aquifers, and fixed radius delineations for bedrock wells. Many of the local community refinements utilized an intermediate fixed radius (e.g., one mile) delineation approach and hydrogeologic modeling has been utilized for certain systems.

Although the basic concepts of the Wellhead Protection Program delineation policy (e.g., multiple zones, emphasis on aquifer assessments) can be used in the Source Water Assessment Program, some revisions are needed to make the program more practical. First, our understanding of the significance of microbial contamination and its migration may necessitate an expansion of the first Wellhead Protection Program zone for many systems. Second, in order to conduct a meaningful evaluation of the susceptibility of wells to contamination, the second Wellhead Protection Program zone (regional aquifer) may have to be narrowed, especially where such aquifers may extend for many miles. Finally, delineations outside of New York's Primary Aquifers will need to be clarified because the available aquifer maps are not of sufficient scale or accuracy to support reasonable contaminant source inventories or to provide for public disclosure of the final assessments.

The inventory of potential contaminant sources under the Wellhead Protection Program was undertaken only for selected municipal community water systems, and was generally not completed for non-municipal or non-community water systems (except where they were encompassed within a municipal wellhead protection area). The contaminant source inventories completed for the Wellhead Protection Program were typically more generalized because they were not designed to support the contaminant susceptibility analysis that is a key goal of the Source Water Assessment Program. Although this component of the local Wellhead Protection Program projects will be a useful foundation for the Source Water Assessment Program, the Source Water Assessment Program will need to better focus the contaminant inventories to support susceptibility assessments, and expand the inventories to include all public water systems served by ground water.

In addition to the Wellhead Protection Program, several watershed programs have been established in New York State. These watershed programs are intended to protect surface waters that are used for sources of public drinking water and detailed delineations and contaminant inventories have been completed. Most notable of these watershed protection programs are those addressing the Croton/Catskill/Delaware Reservoirs (New York City), Tomhannock Reservoir (City of Troy), Skaneateles Lake (City of Syracuse), and several other Finger Lakes' sources. Source water assessment and protection activities have also been initiated in some areas by New York's County Water Quality Coordinating Committees, Environmental Management Councils, and county health departments.

The DOH has, over the years, worked with many other programs as well as several state and federal agencies toward protecting drinking water sources. The DOH has actively participated on numerous committees, emphasizing the importance of considering those contaminants which may pose health threats when present in drinking water. The committees include the statewide Non-point Source Coordinating Committee and the New York State Soil and Water Conservation Committee. The Non-point Source Coordinating Committee focuses on coordination among state and local agencies and institutions to improve the management of non-point sources for watershed and aquifer protection. The New York State Soil and Water Conservation Committee developed the *Guide to Agricultural Environmental Management.* Agricultural Environmental Management is a voluntary program which assists farmers in evaluating their farming practices, especially those which may negatively affect drinking water sources. Once identified, Best Management Practices can then be implemented, specifically those which are beneficial for source water protection.

The Upper Susquehanna River Coalition, in conjunction with the Water Resources Institute of Cornell University, initiated a pilot project in the Upper Susquehanna River Basin to conduct source water assessments of several public drinking water systems. The pilot project which was completed in August 1998, included areas both within New York and Pennsylvania. As part of this pilot project, source water assessments were completed in four study areas: Pierce Creek in Binghamton (Broome County, New York); Village of Afton (Chenango County, New York); Ouleout Creek Watershed (Delaware County, New York); and that portion of the river basin known as Great Bend which passes through Susquehanna and Tioga Counties (Pennsylvania). The goal of this pilot project was to implement an integrated watershed management program for the Upper Susquehanna River Basin based on New York's Source Water Assessment Program. The outcome of this pilot project included a one day workshop on August 25, 1998. The workshop included presentations on the results of the source water assessment efforts and integrated the federal, state and local perspectives related to conducting source water assessments.

2.2 Public Participation

The DOH developed an aggressive public participation plan to fully involve the public in the development and implementation of the Source Water Assessment Program plan. The public participation plan (Appendix B) exceeds the requirements of both the Safe Drinking Water Act and the EPA's *State Source Water Assessment and Protection Programs - Final Guidance.* Many elements of the public participation plan are quite innovative. For example, the DOH held focus group meetings, a satellite broadcast and worked with the New York State Department of Environmental Conservation and the New York State Soil Conservation Committee to provide funding for County Water Quality Coordinating Committees (local organizations) to hold public meetings to discuss the Source Water Assessment Program and how it can be integrated into existing programs and local water quality strategy plans. The DOH also established a statewide citizen advisory committee called the Source Water Protection Coordinating Committee. The Committee formed five technical and advisory working groups to provide the DOH with ideas, suggestions and comments on specific aspects of the methodology for conducting assessments and making them available to the public. These and other aspects of the public participation effort for the Source Water Assessment Program are summarized below.

The Source Water Assessment Program public participation effort began in November 1997, with two focus group meetings held in Albany and Ithaca (New York). Each meeting followed a similar format

and was attended by individuals representing various interests, such as public health, agriculture, business, local government, state and federal government and public water suppliers. The purpose of the focus group meetings was to provide the DOH with guidance on: who would use the assessments; how the assessments would be used; how the State should reach different constituencies; and what the conflicting wants and needs were within and between constituencies. Approximately 60 individuals attended the focus group meetings.

In January 1998, the State convened the Source Water Protection Coordinating Committee. The initial goal of this statewide citizen advisory committee was to provide the DOH with advice and guidance on developing the Source Water Assessment Program Plan. After the plan is complete, the committee will provide feedback on the technical guidance documents that will be developed for implementation of the Source Water Assessment Program. The Committee has a broad membership similar to the focus group attendees and meets quarterly. A listing of the Committee's members is included in Appendix C. The Committee first met on January 12, 1998 and has also met on April 1, 1998, June 10, 1998, September 28, 1998, December 10, 1998, June 8, 1999, and September 8, 1999.

At the first Source Water Protection Coordinating Committee meeting, five subcommittees, called working groups, were established to address the following aspects of the Source Water Assessment Program: Delineation Issues, Contaminant Inventory/Significance, Public Participation/Assessment Format, Geographic Information Systems/Data Collection, and Aquifer/Watershed and Inter-jurisdictional Issues. The working groups were tasked with advising the DOH on technical issues and development of the Source Water Assessment Program plan. The working groups have convened a total of 28 meetings and the main sections of this plan are based on discussions and guidance provided to the DOH by the working groups. A listing of working group participants is included in Appendix C.

On June 16, 1998, Cornell University sponsored a video teleconference on the Source Water Assessment Program that was broadcast via satellite to approximately 50 downlink sites. Most of the downlink sites were in New York State; however, some were in other states and at EPA headquarters in Washington, D.C. The purpose of the video conference was to provide local entities with the following information: a description of the Source Water Assessment Program; how the DOH will conduct source water assessments; a historical perspective on past and on-going source water assessment efforts; and an overview of the Source Water Assessment Program's past, present, and future public participation efforts. A video tape of the satellite conference is available for viewing by interested parties.

The DOH publicized the video conference with the help of New York's County Water Quality Coordinating Committees. The County Water Quality Coordinating Committees were asked to sponsor downlink sites and hold public meetings in conjunction with the satellite broadcast. The committees were also asked to provide the DOH with feedback from the participants on the Source Water Assessment Program. The DOH has estimated that approximately 1,000 individuals viewed the satellite broadcast in conjunction with a public meeting to discuss elements of New York's Source Water Assessment Program.

In September 1998, the DOH held regional workshops in five areas of New York State (Albany, Lake Placid, Long Island, Syracuse, Batavia). The purpose of these workshops was to ask the interested public for guidance on specific issues in the plan that needed to be resolved. The plan was revised based on the feedback received during the regional workshops and the September 28, 1998 meeting of the Source Water Protection Coordinating Committee.

The draft plan was distributed for public comment. The public comment period was from November 10 until December 18, 1998. During that time, three public hearings were held, one each in Albany, Rochester and Long Island. Public comments received during the comment period and at the public hearings are included in a responsiveness summary (Appendix H) in this plan. The revised plan will be distributed to all commentors and involved parties. After EPA approval, the final plan will be redistributed to all interested parties and made widely available to the public.

The New York Rural Water Association received an EPA Source Water Assessment Program public participation grant. As part of the grant, the New York Rural Water Association conducted five seminars in November 1998 for small water suppliers, local government officials and educators. The goal of these seminars was to provide these groups with detailed information about the Source Water Assessment Program and encourage the attendees to make comments and suggestions on the draft Source Water Assessment Program plan. The New York Rural Water Association worked closely with the DOH to coordinate these seminars with other program-related public participation activities.

2.3 Data Collection During Plan Development

The DOH plans to use reasonably available information for completing assessments. This will be accomplished primarily by establishing a geographic information system (GIS). Much of the data needed to complete assessments is available in a variety of formats and in many locations across the state. In developing the methodology for conducting assessments, DOH has identified some GIS data coverages (Table 1) which provide at least an introductory level of information for the whole state. Knowledge of what information is readily available helped to drive the contaminant inventory planning. For example, the EPA Region II Land Cover Data Set (covering New Jersey and New York) has recently become available. This gives land use information on the basis of 30 meter pixels, or colored squares on the map. Previously available data was not fine enough to be helpful when determining what types of non-point source contamination might be present. With this data we can estimate what types of contamination may reach an intake based on land use.

The largest amount of data associated with contaminant source identification is available through the New York State Department of Environmental Conservation. The DOH is actively working with the Department of Environmental Conservation to make additional source water assessment data available and to improve the quality of the existing data. A list of data coverages helpful in conducting assessments is included as Table 1. This list is the starting point of data compilation and should not be considered complete. The extent of data across the state is not uniform and some of the data needs to be corrected to improve accuracy. Statewide coverages will be supplemented by local data sets where available. While some locally available data sets have been identified, others will be identified during implementation of the Source Water Assessment Program.

One resource for data acquisition and distribution is the New York State GIS Data Sharing Cooperative. The DOH is a member of this data sharing cooperative and will be able to use any available GIS data to maximize the quality of assessment information. Other members include state and federal agencies, counties, and localities, as well as the state of Vermont. GIS data generated by the DOH will be made available to other members of the cooperative.

3.0 New York State's Approach to Source Water Assessments

3.1 Source Water Assessment Objectives

The EPA's *State Source Water Assessment and Protection Programs Guidance* acknowledges that states may vary assessment efforts based on the objectives set for particular water systems. For example, a state may target some systems for comprehensive protection activities while other systems may be targeted for more focused protection from specific contaminants (e.g., microbial) or situations (e.g., spills). Further, states may target certain systems for alternative monitoring or for maintaining filtration avoidance, and may conduct different levels of assessments for these types of systems. Described below are three overall program objectives, any of which may apply at a particular public water system.

Objective: During the initial assessment determine whether a sophisticated source-specific protection program is needed, taking into consideration whether a protection program already exists or is being formed.

- Efforts will consider the major issue(s) of both the assessment and the local program(s), the level of detail of information (e.g., mapping scale) and roles of all participants. The assessment methodology detailed in Section 4.5 discusses how these factors will be incorporated into the assessment process.

Objective: Contribute to the protection and benefit of source waters through greater public water system operator awareness of contaminant threats (possibly in conjunction with an ancillary effort to provide technical assistance on Best Management Practices) and increased recognition by local governments of the potential threats to drinking water sources.

- Based on the extent and nature of past, locally-driven source water protection efforts, and the overwhelming numbers of small, privately owned drinking water systems, it is likely that most public water systems will not become actively involved in sophisticated source water protection programs such as described in Chapter 3 of the EPA's *State Source Water Assessment and Protection Programs Guidance*. Most water systems are ancillary to the primary business of the operator (e.g., mobile home park, restaurant) and the lack of management capacity of these supplies makes sophisticated protection programs impractical. The remoteness of many systems (these businesses would not have their own source if they were located in developed areas) lessens the need for a sophisticated protection program.

Objective: Increase assessment information for critical drinking water program decisions, especially regarding future regulations.

- The efforts of the EPA, the states and other stakeholders, accentuated by the intent of Congress in the 1996 reauthorization of the Safe Drinking Water Act to base drinking water regulations on public health priorities, affirm the need for informed regulatory decision-making based on source water assessments. The following paragraphs highlight three examples of how these source water assessments may be used in New York State.

  - **Monitoring requirements**: The Safe Drinking Water Act legislation allows states to use source water assessment information to target monitoring requirements. The Source Water Assessment Program will review the existing vulnerability

determinations previously made for a limited number of systems, and will update and refine that information and analysis. The Source Water Assessment Program will also provide a comprehensive review of all systems subject to the monitoring requirements (i.e., community and non-transient non-community water systems), to effectively use the monitoring flexibility allowed by the Safe Drinking Water Act.

- **Future Ground Water Rule**: The EPA has discussed the conceptual basis of the Ground Water Rule with states and other stakeholders for the past five years. The EPA's schedule for promulgation of the Ground Water Rule overlaps the implementation of the Source Water Assessment Program. The EPA plans to propose the Ground Water Rule in the Spring of 2000 and have the final Ground Water Rule promulgated by November 2000. The concepts for the Ground Water Rule being discussed by the EPA, center on a determination of ground water source susceptibility to microbiological contamination. The Source Water Assessment Program may provide preliminary information about this susceptibility.

- **Interim Enhanced Surface Water Treatment Rule:** In November 1997, the EPA reproposed the Interim Enhanced Surface Water Treatment Rule, which included a treatment technique requirement for *Cryptosporidium*, and Stage I of the Disinfection Byproduct Rule. Stage I of the Disinfection Byproduct Rule would lower the maximum contaminant levels for total trihalomethanes from 100 to 80 micrograms per liter (ug/l), set a new maximum contaminant level for total haloacetic acids of 60 ug/l, and set treatment techniques for systems with high levels (over 2.0 ug/l) of total organic carbon. The EPA also requested comments on a schedule for a Long Term Enhanced Surface Water Treatment Rule which may base treatment requirements on the risk of source water contamination to *Cryptosporidium*, and a Stage II Disinfection Byproduct Rule which would set stricter maximum contaminant levels for disinfection byproducts. These rules highlight the need for source water assessments and would help direct the priorities for certain surface water sources. Unfortunately, the evolving nature of this rulemaking activity will affect the Source Water Assessment Program susceptibility determinations, particularly with respect to judging the significance of a potential source of contamination. The Long Term Enhanced Surface Water Treatment Rule and Stage II Disinfection Byproduct Rule will probably not be promulgated until 2002.

3.2 State Strategic Approach to Source Water Assessments

Consistent with EPA's *State Source Water Assessment and Protection Programs Guidance,* New York's approach to source water assessments will be to establish priorities on the basis of factors such as:

- type and extent of threats;
- type, size and management capacity of a public water system; and
- local support for individual source or regional water resource protection.

Resources to determine the level of effort needed to conduct an assessment for each public water system will be apportioned according to these priorities.

New York's approach to the assessments will follow an evaluation process (See Figure 5) that goes through multiple iterations building upon existing information (see Table 3) to narrow the focus of the assessments to major issues related to the protection and benefit of public water systems. The DOH refers to this multi-phase sequential evaluation process as an "iterative priority-based approach." This approach also recognizes the differences among public water systems, their sources and previous assessment efforts. The "iterative priority-based approach" can cost-effectively target Source Water Assessment Program resources, coordinate local protection efforts and provide useful information for all public water systems.

Due to the large number of public water systems for which source water assessments must be created, grouped assessments may be performed to encourage comprehensive resource management within selected watersheds or aquifers. This approach will also lead to a more efficient use of resources. Grouped source water assessments will most likely be performed in areas of high hydraulic sensitivity or where other uniform conditions or situations exist, such as: areas where multiple public water system wells exist close to each other or which draw water from the same remotely recharged aquifer; areas where a strong regional group effort is underway; when there are multiple public water systems with intakes in the same lake; watersheds that contain multiple intakes for public water systems; areas with heavy developmental pressure; and areas where land use is uniform and there is a limited likelihood for potential contaminant sources within the source water assessment area.

3.2.1 Type and Extent of Threats

Existing source water monitoring data can be used to provide an indication of the type and extent of contaminant threats to a public water system, as well as, define susceptibility and quantify the significance of potential sources of contamination. However, threats to source water quality are neither static nor completely predictable based on previous trends and the Source Water Assessment Program will look beyond the present to anticipate potential future source water quality problems. The Source Water Assessment Program will help identify those sources of drinking water that are unusually susceptible and require more extensive assessment, protection and/or drinking water regulatory control on the basis of the following priorities:

- Existing Contamination Problems - Source waters with documented drinking water quality problems (e.g., elevated nitrates) will be given the highest priority and will be addressed first.

- Naturally Sensitive Hydrologic Regime - Source waters which are determined to be naturally susceptible to contamination because of the hydrologic setting will also be given priority under the Source Water Assessment Program (e.g., shallow alluvial wells which are susceptible to microbiological contaminants and volatile organic compounds).

- Potential Land Use Coverage - The Source Water Assessment Program will consider dynamic conditions such as changes in land or chemical use and alterations of hydrologic conditions (e.g., increased pumping of an aquifer). Areas that are experiencing or most probably will experience development pressures or other changes in contaminant generation will also be considered under this priority.

- Potential for Surface Water Contaminants - Surface waters tend to be most susceptible to microbiological contaminants such as *Cryptosporidium* and contaminants which directly or indirectly result in the formation of disinfection byproducts (total organic carbon and phosphorus).

3.2.2 Type and Size of System

As noted in the EPA guidance, the Source Water Assessment Program can employ different assessment approaches for each of the three regulatory classifications of public water systems: community, non-community, and transient non-community (see Section 1.2). The methodology that will be used to perform a source water assessment for public water systems will not vary except with regard to the type of delineation that is conducted (see Section 4.2). The delineation approach utilized will be determined by the type of public water system.

The Source Water Assessment Program will consider differences in the type and size of public water systems for establishing priorities for completing assessments. The type, size and management capacity of a public water system will be a factor with regard to the availability of existing information. The level of detail in an assessment of a larger public water system will most likely be greater than that for a small public water system. Typically, public drinking water sources which serve large populations have been given greater attention by the State and have received more resources for assessment and protection activities. Additionally, the public health significance of possible adverse impacts to a public water system is determined, in part, by the type and size of the water system. More detailed assessments may be completed for public water systems serving larger populations due to the significance of identifying possible health risks within the source water assessment area.

3.2.3 Local Support

In many locations, wellhead and watershed protection efforts are underway. Support for these local and regional source water efforts will be evaluated and, where possible, the DOH will coordinate source water assessments with these ongoing programs. In some cases, public water systems in these areas will have a more detailed assessment. Areas with assessment or protection efforts underway will be given a higher priority for detailed assessments because federal, state and county agencies, and local entities (e.g., local government, volunteer groups) may provide resources and/or assistance to make a more detailed assessment possible.

3.2.4 Setting Priorities

The “iterative, priority-based” approach to assessments will consider the factors discussed in Section 3.2 (i.e., type and extent of threats; system size, type, and management capacity; and local support for individual source or regional protection) to focus on the major issue(s) of probable contamination for a particular public drinking water source.

As noted in the previous discussion on the interaction with the drinking water regulatory program, decisions often need to be made with less than ideally complete information. Professional judgment and experience can help compensate for scientific uncertainty. The advantage that the comprehensive statewide Source Water Assessment Program will have over some isolated assessment efforts will be the perspective gained through the systematic accumulation and organization of available information. This knowledge-based approach could outline general priorities for systems in the state.

It would also suggest an order for assessing particular drinking water sources and the relative distribution of the Source Water Assessment Program resources. This approach is detailed in Section 4.5, Methodology for Completing Assessments.

Assessments of ground water sources will consider potential sources of microbiological contamination as a priority. Current and pending regulations requiring ground water disinfection reflect the concern about the risk from microbial pathogens. Ground water sources are, however, generally afforded greater protection from microbiological contamination than are surface water sources. Filtering and adsorptive characteristics of the soil, as well as longer travel times due to slower-flowing ground water, reduce the transport of viable pathogens.

New York's diverse geology results in an assortment of wells with differing degrees of surface water influence. At one end of the spectrum are the ground water sources determined to be under the direct influence of surface water. These sources are the most sensitive to microbiological contamination, including protozoan contamination. Therefore, assessments for these sources will consider potential sources of *Cryptosporidium*, *Giardia*, bacteria, and viruses as a priority. As surface water influence becomes less likely and there is more opportunity for natural filtration, the likelihood of microbiological contamination of the ground water decreases. As a result, assessments of ground water sources will differ in how high a priority they give microbiological contaminants and their potential sources.

Priorities for specific assessments of ground water sources for community water systems are described in Section 4.2.2. The source water areas for community water systems are primarily contained within the county's jurisdiction. For transient non-community water systems, the major issue will be Ground Water Rule susceptibility determinations. Transient non-community water systems that already disinfect would probably have the lowest overall priority because these assessments are least likely to yield results of public health significance.

Source Water Assessments for surface water sources will focus primarily on microbiological contamination. *Cryptosporidium* will be the central contaminant of concern, because of its severe health ramifications (particularly for immunocompromised populations), the difficulty in effectively treating water contaminated with *Cryptosporidium*, and its persistence in the environment. Although much remains to be learned about the sources and behavior of *Cryptosporidium* in the environment, the greatest concern would be given to rivers with direct sewage discharges located within short travel times of public drinking water system intakes. The next ranking of risk would be assigned to large multi-use lakes. The least concern would be for lakes and reservoirs free of wastewater discharges and manure runoff.

Another major issue which will be used to rank surface water risk is the likelihood that sources of contaminants will reach source waters as disinfection byproduct precursors. Ranking of sources will include those water systems which have disinfection byproducts above the proposed Stage I and II maximum contaminant levels and those on the Priority Waters List because of excessive nutrient levels. In addition, surface water risk will also be ranked based on the presence of detectable chemical contaminants, including sources where intermittent low-levels of pesticides have been detected.

The priorities given to microbiological contaminants and disinfection byproduct precursors in surface water supplies will not necessarily preclude consideration of other contaminants in assessments of surface water sources. Assessments will also give priority to contaminants that have been detected

in the supply, or contaminants with significant potential sources in the assessment area. For example, recent monitoring in New York State has detected pesticides in surface runoff from some agricultural lands at the beginning of the growing season. Based on these findings, surface water assessments will give pesticides and herbicides a high priority when assessment areas include significant cropland cover.

4.0 New York's Approach for Conducting Assessments and Reporting Results

The EPA's Guidance on *State Source Water Assessment and Protection Programs* describes three elements which must be included in a source water assessment for a public water system: a delineation of the source water assessment area; an inventory of significant potential sources of contamination within the delineated area; and a determination of the susceptibility of the public water system to the potential contaminant sources that were inventoried. In performing these tasks, states are charged with collecting all reasonably available information for delineations and utilizing this information to the extent practical for completing the contaminant inventory. Once these elements of the source water assessment are complete, states must evaluate the potential for water systems to draw water that contains contaminants at levels which could pose a public health concern. States are also required to involve the public in the development of their Source Water Assessment Program plan and make the results of completed source water assessments available to the public.

Previous sections of this plan present information on the program background, public participation, plan development, and New York's overall approach to meet the goals set forth in the EPA's guidance document. The purpose of this section of the plan is to present New York's approach for collecting available information, executing the three technical program requirements (delineation, contaminant inventory, and susceptibility determination), and presenting source water assessment results to the public.

4.1 Data and Information Collection

Information that will be used to conduct source water assessments includes: public water system data; natural source water characteristics; source water locations; delineation history; contaminant inventory; regulatory issues; source water protection; and additional information that will be determined during refinement of the susceptibility analysis. The types of data needed to conduct source water assessments are presented in Table 2. Some of the data categories have an asterisk next to them because these pieces of information are considered essential for completing initial source water assessments. The significance of these data types to the assessment process are being further evaluated by the DOH through several pilot projects. Additional data categories may be added or removed from Table 2 as determinations about the most critical data for completing assessments are made.

Available information for the source water assessments can come from many sources. The DOH is planning to work, or in some cases has already started working, with other State agencies and local entities to gather available information. The DOH is aware that at the watershed, county and town level, assessment efforts in many locations have been completed or are underway. The DOH will establish a local point person to coordinate data collection from local sources of information, including public water systems. The coordinator may represent a county or watershed organization. Involvement of local representatives in the collection of data is critical for the completion of accurate and representative source water assessments. The DOH will work with each County and District

Health Department to determine the unique factors that need to be considered when collecting the available information for each county's source waters.

The level of accuracy and completeness of the data will vary because of its many sources. To compensate for this, metadata will be attached to the dataset to note the quality of the data used for the assessment. Metadata is information on where the data came from so that the user can determine how useful it is for a particular project. The DOH will review the quality of data compilation used in assessments for various source waters around the state to ensure consistency and high quality. Depending on the issues which may arise, minor changes may be needed in the way the data is used.

4.1.1 Collecting Available Information on Public Water Systems

The amount and level of detail of the available information will vary for each assessment. This will affect the level of detail that will be completed for an assessment. Initial assessments will be based on available data, and will follow the methodology outlined in Section 4.5 of this plan. At the core of the available information is data from sanitary surveys, vulnerability assessments and public water systems. Sanitary surveys and vulnerability assessments are performed by either the County or District Health Departments.

- Sanitary Surveys - The purpose of a sanitary survey is to evaluate and document the capabilities of a public water system to continually provide safe drinking water and identify any deficiencies related to operation of a particular public water system. The surveys are conducted by County or District Health Departments and include a review of the source water and the presence of activities in the source water area that could adversely affect the drinking water supply. Other aspects of the survey include evaluations of the intake construction, water treatment operation, and the water distribution system. The surveys are an ongoing field review of significant, basic assessment information. Copies of surveys are kept on file in local health departments and key aspects of the surveys are entered into the DOH's Safewater Database. This database is maintained by local health units and the DOH. Some of the information entered into the Safewater Database is reported to the EPA. Some sanitary surveys emphasize a system's source water while others may contain very little detail about the source water. As the DOH moves towards utilizing the EPA's State Safe Drinking Water Information System (SDWIS) database, sanitary survey information will be more readily available.

- Vulnerability Assessments - A vulnerability assessment evaluates factors which could contribute to the contamination of a public water supply by chemicals. A vulnerability assessment is performed by the County or District Health Department in order to determine the monitoring frequency required for a public water system. Vulnerability assessments are performed on systems that have 3,300 or fewer customers. The methodology for conducting a vulnerability assessment for volatile organic chemicals is presented in Appendix D (Technical Reference PWS-72).

- Public Water System Data - Every public water supply is required to monitor for certain contaminants. This monitoring data will be used in the assessments. Additionally, some water sources have had delineations completed under a watershed initiative or the State's Wellhead Protection Program. In such cases, this information will be used when conducting the assessments. To ensure that there are no omissions

or errors, the DOH will provide public water suppliers with an opportunity to review assessments of their system(s) before they are finalized.

Information from the sanitary surveys, vulnerability assessments (where applicable), and the public water system are considered the minimum amount of information necessary to conduct a source water assessment. If this information is not complete, the DOH will work with County and District Health Departments to acquire information about the public water system and source waters.

4.1.2 Collecting Available Information from Other Data Sources

The DOH will be trying to use data that has been collected for purposes other than analyzing a public water supply. For example, the assessments will try to utilize available statewide data which include: land use data; discrete potential contaminant sources; details shown on digitized aerial photographs (i.e., digital orthophotos); topography of the watershed; hydrography information; observed contaminants at the water source; and census data. The DOH will be responsible for collecting and analyzing those databases that are maintained at the State level and which will be useful in conducting assessments.

In some parts of the state, detailed information such as tax map information has been collected which would allow for more accurate assessments. When these information sources are believed to be reliable, they will be used in addition to or instead of the statewide coverages. In cases where there is uncertainty about the reliability of smaller scale data, the statewide coverages would be used. In the event that there is disagreement between the entities involved with the assessment process, the DOH will determine which data sets are appropriate to use.

In some counties, watershed and/or aquifer protection activities may have been initiated for some source waters serving public water systems. Additionally, there may be active County Water Quality Coordinating Committees or other water resource protection groups involved with water quality assessment and/or protection. Information from these existing organizations and efforts may be useful for conducting assessments and the DOH wants to use these resources. However, there is great variation between counties and it would not be efficient to establish one method of collecting local data for the entire state. Throughout the assessment process, the DOH plans to work as needed with local organizations and people who provide information and resources for conducting assessments. These involved parties will have an opportunity to review the assessment before it is finalized to ensure there are no errors or omissions.

Where source water assessments have been completed, for example in the New York City and the City of Syracuse (Skaneateles Lake) watersheds, these assessments will be used to fulfill Source Water Assessment Program requirements. These existing assessments likely exceed the EPA's Source Water Assessment Program requirements for contaminant inventory and susceptibility determinations. Given the extensive state involvement in these protection efforts, the Source Water Assessment Program requirement remaining for these two watersheds would be to assure that the assessment information is made available to the public. However, it should be noted that separate assessments will need to be completed for small public water systems which are nested inside the Skaneateles and New York City watersheds.

The regional aquifer systems on Long Island have been investigated and assessed and many protection and management programs are already in place. The 208 plan (1978) delineated eight major hydrogeologic zones based on ground water flow patterns. Three areas were identified as contributing

to the deep recharge of the Magothy aquifer. The Long Island Comprehensive Special Ground Water Protection Area Plan (1992) was a further refinement toward managing the Long Island aquifers in a comprehensive manner with the establishment of Special Groundwater Protection Areas. The 1992 plan made use of geographic information systems to map the locations of contaminant plumes, wells, land use cover, and other information to facilitate the protection of the drinking water supplies. The Source Water Assessment Program will build on these significant efforts by reviewing these assessment efforts for completeness, and will concentrate on further evaluating the contaminant inventory or susceptibility analysis of a particular contaminant group, such as viruses, and facilitating public access to the vast amount of information already collected.

4.2 Delineation of Assessment Areas

4.2.1 General Approach for Delineation of Source Water Assessment Areas

Consistent with the 1996 Safe Drinking Water Act Amendments, each source water assessment that is completed for a public water system will include the element of delineation. It is important to recognize that the delineated areas will not constitute source water *protection* areas. Since, in many cases, the delineated areas will be based on a minimum amount of available hydrogeological information, the defined assessment areas may not be suitable for establishing a sophisticated source water protection strategy. Rather, the delineated area(s) around any public water supply well(s) or intake(s) will comprise a source water *assessment* area that has been established for the purpose of completing the other required program elements of contaminant inventory and susceptibility analysis. However, consistent with the Source Water Assessment Program principles, the delineations will approximate the source water contributory areas based on reasonably available information. The size and extent of the delineated source water assessment area will vary depending on the source type (i.e., surface water or ground water) among other factors.

For many public water systems, the delineation will be an early step for completing the other required Source Water Assessment Program elements (contaminant inventory and susceptibility). However, in some cases the delineation approach will be determined, in part, by the susceptibility of the public water system to a potential contaminant source. In areas with known source water problems, the accuracy of new delineations will be given special priority. The goals of delineating the boundaries of source water areas are two-fold: (1) define the assessment area for public water systems served by surface waters or ground waters and (2) target the areas that include significant potential contaminant sources that may pose a potential threat to a public water system.

Consistent with the overall guiding principles for New York's Source Water Assessment Program, delineations of assessment areas will maximize use of existing information and emphasize the use of a statewide GIS. Delineations of source water areas completed as part of previous assessment efforts will be reviewed for completeness, and information will be incorporated into source water assessments, as appropriate. GIS-based maps will be developed which identify the boundaries of the source water assessment areas as well as other information (e.g., locations of surface water drainage areas, aquifer recharge areas, public water system intakes and wells, and significant potential contaminant sources) relevant to the source water assessment.

4.2.2 Ground Water Delineations

The DOH recognizes that there is a variety of standard and accepted methods used to delineate zones around a ground water supply well and that each of these methods varies in degrees of complexity, cost, and the level of technical expertise necessary for implementation. Furthermore, the extent and availability of existing hydrogeologic information is a significant factor in determining the type of delineation that will be completed. Where sufficient hydrogeological information exists or delineations have already been completed as part of local wellhead assessment and protection efforts, the source water assessment delineation will attempt to maximize the use of this information.

Previous Assessment Efforts

Prior to completing delineations of source water assessment areas, the DOH will undertake a comprehensive review of reasonably available, existing information to evaluate delineations that have been completed as part of previous assessment efforts for public water systems. New York's Source Water Assessment Program will build upon earlier delineation efforts completed by others including the New York State Department of Environmental Conservation, the United States Geological Survey, local health units, universities, New York Rural Water Association, New York Regional Councils, and others. As a minimum effort, the DOH will review all state and county health department files for well logs and other relevant information. The DOH will also request the same information from public water systems and the other entities listed above. Where appropriate, previous delineation efforts may be expanded or modified. For example, reasonably available information may indicate remote recharge areas for bedrock or confined aquifers, or that an aquifer is under direct influence of surface water.

Wellhead Protection Program: The EPA's *State Source Water Assessment and Protection Programs Guidance* supports continued use of the delineation approach established by the Wellhead Protection Program. The delineation approach established under New York's Wellhead Protection Program recognizes the diversity of geological conditions and aquifer uses across New York State and acknowledges the need for flexibility when selecting ground water delineation approaches to address site-specific conditions. Under the Wellhead Protection Program, the aquifer system on Long Island and bedrock aquifers are treated differently than unconsolidated aquifers elsewhere in New York State.

The delineation approach for the glacial aquifer on Long Island is based on a simplified variable shape, with a radius of 1,500 feet for areas upgradient of a well and a radius of 500 feet for areas downgradient of a well. The delineation approach for the Magothy and Lloyd Aquifers on Long Island is based on the boundaries of the Deep Flow Recharge Area as recognized by the Department of Environmental Conservation and the Suffolk County Sanitary Code.

Upstate, unconsolidated aquifer boundaries have been delineated as part of wellhead protection activities, on a series of maps developed by the United States Geological Survey. These maps serve as the baseline delineation for unconsolidated aquifers in Upstate New York. In some cases, more detailed delineations have been completed. For bedrock aquifers in Upstate New York, the Wellhead Protection Program delineation approach used a fixed radius of 1,500 feet from the wellhead. Chapter 3, "Wellhead Protection Area Delineation", of the 1990 submittal to the EPA on the New York State Wellhead Protection Program is included as Appendix E.

Public Water Supply Permit Program: In New York State, the siting of new public water supply wells must be approved through the New York State Department of Environmental Conservation's Public Water Supply Permit Program. Under this program, specific permit conditions have been developed for the protection of new public water system wells, including the designation of strict protection zones in a delineated area that generally encompasses an area within a minimum radius of 200 feet around the well.

Ground Water Delineation Approach for Source Water Assessment Areas

As indicated previously, where existing information is reasonably available, it will be used to delineate the source water assessment area for a public water system. However, the DOH anticipates that in many cases, especially for non-community water systems, there will be limited information about the ground water resources serving a public water supply well. Furthermore, assessment efforts are made even more difficult, because both the quantity and quality of information will be highly variable among different public water supply wells and regions of the state. The ground water delineation methodologies set forth in this section attempt to address these difficulties, while producing delineations that are reasonably accurate and useful in attaining the goals the Source Water Assessment Program. When appropriate and practical, additional information will be used to enhance the delineation methodologies described in this section to meet the goals of the Source Water Assessment Program.

The two primary considerations in selecting a delineation methodology are the availability of information and the inherent sensitivity of a well's hydrogeologic setting. If a delineation exists that is considered to be scientifically sound and at least as protective as the delineation approaches described in this document, it will be utilized in the Source Water Assessment Program. When there is sufficient evidence that a well (or a group of wells) is located in a sensitive hydrogeologic setting, such as fractured bedrock, the nature of the source water assessment area delineation will rely heavily on the quantity and quality of the available information and professional judgement. Furthermore, available information may indicate the presence of a confining layer and remote hydraulic recharge. In such cases, professional judgement will be the basis for identifying the probable areas which contribute to remote recharge of the well(s) and for defining the source water assessment areas.

In all instances where there is limited information about the local hydrogeological conditions for public water systems using ground water wells, the delineation approach will be based on the type of public water system. This delineation approach builds upon the minimum delineations completed for wells under New York's Wellhead Protection Program and vulnerability determinations as required under the Safe Drinking Water Act. This approach establishes a base level of information from which future source water assessment and protection efforts can be refined.

For public water supplies served by ground water wells, there will be two delineated zones for source water assessments: an area immediately surrounding the well called the Inner Well Zone and a larger, more broadly delineated area called the Outer Well Zone. Schematics of these delineation zones are depicted in Figure 1. These delineations will be the boundaries within which the inventory of potential contaminant sources are completed. Source water assessment area delineations may be modified to include potentially significant contaminant sources which are located near, but not within, areas defined by the ground water delineation methodologies.

Community Water Systems and Non-Transient, Non-Community Water Systems

Inner Well Zone - Calculated Fixed Radius

The delineation for the Inner Well Zone will be consistent with the current approach as outlined in the DOH's Technical Reference 72 (see Appendix D) for determining vulnerability to contamination by volatile organic chemicals. This Technical Reference calculates a radius based on five years' hypothetical pumpage. The pumping rate for a particular well will be estimated based on existing information collected by the DOH's Safewater Database or received from the water supplier. If information about the pumping rate is not available, then the pumping rate will be estimated, consistent with the approach outlined in Technical Reference 72. In all cases, the Inner Well Zone will be assigned a minimum radius of at least 500 feet.

Outer Well Zone - Modified Arbitrary Fixed Radius

A reasonable estimate of the ground water flow towards a supply well will be made using available information. Once the direction of ground water flow has been estimated, a semicircular area upgradient from the public water supply well(s) will be delineated, using a radius of one mile or existing hydrogeologic barriers (e.g., ground water and/or surface water divides, aquifer boundaries), whichever is smaller. The extent of the upgradient area may be modified should information indicate that there are obvious limits to the probable recharge area. If a reasonable estimate of the ground water flow direction towards a supply well can not be made, then the delineation of the Outer Well Zone will be a fixed radius of up to one mile in all directions around the well.

(Transient) Non-Community Water Systems

Inner Well Zone - Arbitrary Fixed Radius of 500 feet

Outer Well Zone - Arbitrary Fixed Radius of 1,500 feet

Delineations of source water areas for springs determined to be solely supplied by ground water, will follow the approach described in Section 4.2.2 for ground water supply wells. However, for springs, any land areas below the spring collection device will be eliminated from the assessment area, unless a remote recharge area has been defined. Delineations for springs influenced by surface water, will follow the approach outlined in Section 4.2.5 for conjunctive delineations.

4.2.3 Surface Water Delineations

Topographic watershed boundary delineation is the only methodology widely used to identify land areas which drain to surface waters. While New York will use this method for all of its source water assessments, subdividing the watershed may also be useful for identifying contaminant sources which have the greatest potential to impact particular public water supply intakes. As in the overall source water assessment effort, the use of existing information and GIS will be emphasized to complete surface water delineations.

Previous Assessment Efforts

Surface water delineations for the Source Water Assessment Program will utilize, to the extent practical, work performed during other surface water assessment efforts in New York State. The state will use the United States Geological Survey watershed Hydrologic Unit Codes and available stream order codes (e.g., reach files), to the extent appropriate, in creating new delineations and in geo-referencing and cataloging source water assessment data. New York's Source Water Assessment Program will utilize information from and share information with the EPA's 305(b) and 303(d) water programs. In New York, these programs are administered by the New York State Department of Environmental Conservation. The 305(b) water program has historically been (and often still is) called the Priority Waters List. This list categorizes and describes use impairments of waterbody segments taking into account both the amount and quality of the available information. Recently, water body segments without problems have been included under the 305(b) program in New York State and the Priority Waters List has become a subset of this listing. The 303(d) water program is a list of the priority waters which are targeted for the development of water quality based effluent limits (also called total maximum daily load analysis). Furthermore, the Source Water Assessment Program will utilize delineations made under the EPA's Clean Lakes Program and other regional and local water quality assessment and management efforts.

Surface Water Delineation Approach for Source Water Assessment Areas

Consistent with the guiding principles for the overall Source Water Assessment Program effort, surface water delineations will rely heavily on existing information. Many of the surface waters in New York State with public water system intakes have already had their watersheds delineated. For the purposes of the Source Water Assessment Program, these delineations will be used in digital GIS format, when they are available. Where delineated watershed borders have not yet been digitized, decisions will be made on a case-by-case basis. In some cases, the GIS-based methodology described below may be used to create new delineations. These decisions will be based on the quality of existing watershed maps, the magnitude of the digitizing efforts required, and the availability of state and local resources to perform this task.

All new watershed delineations created under the Source Water Assessment Program will be based on natural topographic boundaries and take into account water diverted into or outside of the natural watershed. In addition to geographic boundaries, time-of-travel determinations from potential contaminant sources to intake structures will be made where appropriate and practical.

A GIS-based Digital Elevation Model will be used to create new delineations of topographic boundaries. These delineations will then be visually checked for accuracy against topographic contours and the accuracy limitations of this methodology will be noted in the final assessment. Where fine-scale delineations are needed, use of more detailed or additional data coverages such as storm sewer maps and field checks will be necessary. As described above, the final methodology choice will be made on a case-by-case basis.

With the exception of the Great Lakes system described below, the entire watershed of surface water sources will be assessed for significant potential sources of contamination. A surface water assessment area may be further delineated into sub-watersheds when it is necessary to effectively conduct the contaminant inventory portion of an assessment or where needed to focus additional susceptibility determination efforts. Figure 2 depicts a delineation of a surface water watershed and sub-watersheds. In the cases of the Great Lakes, St. Lawrence, and Niagara Rivers, a highly detailed

contaminant inventory will not be developed for the entire watershed. Instead, the DOH will first review available water quality data for the waterbody as a whole and take note of regional characteristics (e.g., topography). Next, a water-supplier survey will be used to identify local potential impacts on source water quality. This survey will identify intake characteristics (e.g., depth, distance from shore), potential sources of water quality fluctuations (e.g., seasonal fluctuations, nearby rivers), and other potential risks (e.g., nearby ports and shipping lanes). Individual assessment area delineations will be tailored to address the concerns of each particular intake.

A similar approach will be used to focus efforts in other watersheds which extend over wide geographic areas and have long detention times, such as the Finger Lakes. In these cases, sub-watersheds within the overall delineated assessment areas will be ranked into higher and lower priority zones. This will be particularly important when additional delineation efforts will be useful to address fate and transport issues.

4.2.4 Assessment Areas Which Extend Beyond State Boundaries

The DOH will make use of reasonably available information when delineating assessment areas that extend beyond its borders. In general, potential contaminant sources in other states are unlikely to impact source waters in New York because most trans-boundary waters flow away from New York. Numerous studies, agreements, organizations, and commissions exist to facilitate the transfer of information across state and international borders when needed (e.g., National Water Quality Assessments for the Hudson and Delaware Rivers and Lake Erie, Lake Champlain Basin Program, Upper Susquehanna Coalition, International Joint Commission, New England Interstate Water Pollution Control Commission, Delaware River Basin Commission). In many cases, trans-boundary delineations and digital hydrologic unit code borders already exist. In addition, the GIS-based methodology for creating new ground water delineations utilized in the Source Water Assessment Program does not depend on GIS coverage information from bordering states.

4.2.5 Conjunctive Delineations

Delineating the zone of surface water and ground water contribution to a public water system is termed "conjunctive delineation". The concept of conjunctive delineations is important to completing a source water assessment that evaluates all possible contributions of contaminants to a public water system. This concept is particularly significant for ground water under the direct influence of surface water. Where information is reasonably available, New York's Source Water Assessment Program may evaluate ground water under the direct influence of surface water, ground water otherwise influenced by surface water, and surface water influenced by ground water which originates from areas beyond the topographical watershed boundary. The latter case is considered to be of less importance in New York, and surface water under the influence of ground water will only be evaluated where the available evidence indicates that there is a significant potential for contamination.

Under the Source Water Assessment Program, efforts to complete conjunctive delineations will be prioritized based on whether the public water supply is currently being disinfected, the proximity of a ground water supply source to surface water(s), the local hydrogeological setting, and the presence of potential significant microbial contaminant sources within the source water area. For example, non-disinfected shallow public water system wells, and those wells in certain geological settings, will be a priority, particularly when surface waters are nearby or existing information suggests that surface and ground waters are hydraulically connected.

Under New York's Source Water Assessment Program, detailed conjunctive surface water delineations will only be created where there is strong evidence that ground water sources are being impacted by surface waters. Where surface water influences are only suspected, the potential surface water impact will only be described in the assessment narrative. These conjunctive delineations will include both ground water and surface water components (as described in Sections 4.2.2 and 4.2.3 of this plan, respectively) for all ground water sources that are known or determined to be under the direct influence of surface water. For those ground water sources where surface water influence determinations have not been made by the time their source water assessment is conducted, the potential for surface water influence will be made on a case-by-case basis. For example, in cases where an inner zone ground water assessment area delineation is intersected by surface water, the potential that these drinking water sources are surface influenced will be evaluated.

4.3 Contaminant Inventory

Consistent with the federal Source Water Assessment Program guidelines, New York State will complete an inventory of significant potential contaminant sources within the delineated source water assessment areas for each public water system. The approach to this effort will be based on two of New York's guiding principles for the Source Water Assessment Program: maximize use of existing information and emphasize use of a statewide GIS system. The focus of this effort will be to identify possible sources of EPA and New York State contaminants of concern that could enter a public drinking water system and pose a subsequent public health threat.

4.3.1 Contaminants of Concern

The contaminants of concern addressed by source water assessments will include those raw water contaminants regulated under the Safe Drinking Water Act (contaminants with a Maximum Contaminant Level, contaminants regulated under the Surface Water Treatment Rule, and the microorganism *Cryptosporidium*) as well as those which the DOH has determined may present a concern to public health. Among these additional contaminants are organic chemicals and other substances currently regulated by New York State's drinking water regulations and the State's ambient water quality standards and guidance values. These compounds comprise most synthetic contaminants of public health concern that are not currently regulated by the Safe Drinking Water Act.

The inclusion of additional contaminants in an assessment will be determined based on the likelihood that the contaminants will affect the particular source water being assessed. Some examples of other additional contaminants that may be addressed in certain situations are: radon, microbes likely to be addressed by the Ground Water Rule, contaminants on the EPA's Contaminant Candidate List, and phosphorus.

In most instances, contaminants will be grouped and addressed by category (e.g., pesticides, protozoa, halogenated solvents). This approach avoids burdensome listing of individual contaminants, yet addresses contaminants that are likely to originate from a common land cover or point of origin. In addition, some contaminants have been grouped based on similar fate and transport characteristics. A list of the contaminants considered in each contaminant category is provided in Appendix F. However, some contaminants will be addressed individually, based on unique contaminant characteristics or particular resistance to conventional drinking water treatment techniques.

Assessments will prioritize contaminants of concern. Contaminant prioritization will be based on the existence of potential sources of contamination and the susceptibility of the source water to

contaminants. Prioritization will depend on the characteristics of individual or regional source water assessment areas. Statewide, there will be a more general prioritization of contaminants based on whether a source is a ground water or surface water source. This dual approach addresses different contaminants, regulatory concerns and different contaminant transport characteristics.

4.3.2 Significant Potential Sources of Contamination

To identify significant potential sources of contamination, New York's Source Water Assessment Program will use a method which uses information that is readily available, pertains to drinking water quality, and is likely to be used during future protection efforts. Initially, New York will use previously collected information to identify locations of potential sources of contamination. Available mapped coverages include Department of Environmental Conservation permitted facilities (RCIS), Toxic Release Inventory (TRI) facilities, solid waste sites, and bulk storage facilities. Table 1 provides a more complete list of mapped coverages currently available for all of New York State. Completeness and access to several additional statewide coverages (e.g., petroleum and hazardous material spill locations) are also being investigated.

New York will also use land cover information to assess potential sources of contamination that could result primarily in what is referred to as "non-point source pollution." Fourteen land cover categories have been mapped for the entire state by the Department of Environmental Conservation. Land use maps consist of pixels representing areas 30 meters square.

Table 4 summarizes the ratings assigned to each land cover category for each contaminant category. These ratings reflect the potential for a particular contaminant category to occur in ground water associated with the area of a particular land cover. These land cover ratings are intended to reflect where contaminants are generated or enter hydrologic systems. Similarly, Table 5 summarizes the ratings assigned to each land cover category based on the potential for a particular contaminant category to occur in surface water. Tables 4 and 5 assign ratings of "negligible", "low", "medium", or "high" to each of the fifteen land use categories for each of the 14 contaminant categories of concern. These ratings reflect the likelihood that a land cover category will be a source of a particular contaminant category. For example, in Table 4 the likelihood of "high intensity commercial" being a potentially significant source of petroleum products in ground water has been assigned a rating of "medium/(high)", whereas the likelihood of petroleum products coming from "evergreen forest" has been rated "negligible". On some occasions, as in the previous example, two ratings will be given for a particular land cover and contaminant category. When this is the case, the rating given in parentheses is considered to reflect the worse case scenario. The rating not in parentheses is considered to be the more common situation. These ratings could be refined as more information becomes available. Tables 4 and 5 differ primarily on the basis of the mobility of the contaminant. Sediment and phosphorus, for example, do not move through ground water as easily as through surface water. Therefore, the ground water table (Table 4) has a lower risk rating for these contaminants than the surface water table (Table 5).

In order to account for the presence of septic systems in an assessment area, it has been assumed that homes included in the "low intensity residential" land use category use septic systems to dispose of their sewage. This generalization overestimates septic system usage since there will be occasions when some of the homes in "low intensity residential" areas will be connected to a public sewage collection system. However, during the assessment process if it appears that there is a significant potential for contamination as a result of failing septic systems, an attempt will be made to collect additional information regarding septic system locations and densities.

Tables 6 and 7 assess whether or not each discretely mapped potential source of contamination other than land use, could be a potential source of a particular contaminant category. Discrete contaminant sources have been assigned a rating of "possible" or "not probable" for each contaminant category. Table 6 addresses the potential for ground water contamination, and Table 7 addresses the potential for surface water contamination.

It should be clearly noted that the ratings provided in Tables 4 - 7 do not refer to the susceptibility of water sources to those contaminant groups. Susceptibility determinations must consider other variables, such as the proximity of the source water to the point or non-point sources of contaminants, and the geological and locational characteristics of the ground or surface water source. The ratings provided in the tables are meant to help narrow down and prioritize the contaminants of concern in an assessment area, independent of the sensitivity of the source water to the contaminants. For example, if an assessment area's land use consists entirely of forest and row crops, and the only discretely mapped location found is a petroleum spill, the presence of chlorinated solvents in the assessment area will probably not be a significant issue.

4.4 Susceptibility Analysis

Once the contaminants of concern have been prioritized for an assessment area, the susceptibility of the water supply to those contaminants will be evaluated. The susceptibility analysis will evaluate the potential for the water supply to draw water contaminated by inventoried sources at concentrations that would pose a human health threat. The susceptibility analysis takes into account hydrologic and hydrogeologic factors, intake or well location and integrity, unique characteristics of the contaminants, and characteristics of potential contaminant sources. In addition, the susceptibility analysis takes into account the prevalence of contaminant sources within the assessment area.

4.4.1 Estimating Contaminant Prevalence from Land Cover

Using the matrices provided in Tables 4 and 5, each of the fourteen land cover categories will be assigned a stated rating for each contaminant category. When two ratings are provided for a given land cover contaminant category combination, the worse case scenario (rating in parentheses) will initially be used.

This approach will allow GIS maps to be generated which depict the relative likelihood of contamination from a particular contaminant category based on the mapped land use. For example, when assessing the potential for protozoan contamination of surface water (Table 5), areas that are "pasture" will be mapped as "high", and areas that are "other grasses" and "woody wetlands" will all be mapped as "medium". In this way, a map of the delineated area could be generated showing the distribution and frequency of land cover which pose low, medium, or high potential for protozoan contamination. Carrying this example further, the map could be used to calculate percentages of land cover within the delineated area which pose low, medium, or high potential for protozoan contamination.

The next step in determining the extent to which land use increases the potential for contamination is to rate the land use based on its frequency and location. Table 8 will be used to assign these ratings. Table 8 may need to be adjusted for different contaminant categories based on differing toxicities and/or fate and transport characteristics. Using Table 8, land covers assigned a "medium" potential for contamination and land covers assigned a "high" potential for contamination will be rated based

on the amount of that land cover within the assessment area(s) and the hydrologic proximity of the land cover to the water source.

When a delineated area contains both land cover assigned a "medium" potential for contamination and land cover assigned a "high" potential for contamination, the approach described above will produce two ratings. When this is the case, the higher rating of the two will be used to characterize the potential for contamination from the particular contaminant category due to land use in the delineated area.

4.4.2 Estimating Contaminant Prevalence from Discrete Sources

Tables 6 and 7 list the discrete potential sources of contamination that will be considered for all source water assessments. Using Tables 6 and 7, each of the discrete potential sources of contamination will be assigned a rating of "possible" or "not probable" for each contaminant category. This will allow an evaluation by GIS to show the possibility of contamination from a particular contaminant category based on the locations of these mapped potential sources. For example, when assessing the potential for protozoan contamination of a surface water source, wastewater treatment plant discharges would be shown on the map, because they are possible sources of protozoan contamination. Petroleum spill locations, on the other hand, would not be shown on this map, because they are not considered probable sources of protozoan contamination.

Mapped potential sources of contamination will vary significantly with respect to the amount of chemical and microbial contaminants and how well such contaminants are contained and/or controlled. Therefore, the procedure for assessing the risk of contamination from each of these discrete sources will have some flexibility. Technical Reference PWS-72 provides an example for assessing the risk of contamination for volatile organic chemicals (including halogenated solvents and petroleum products) in watershed and ground water recharge areas. A general rating system is provided in Table 9 which provides room for judgement about characteristics of discrete sources of contamination. Guidance will be developed for distinguishing between minor and major discrete potential sources of each contaminant category with respect to various source water conditions. For example, the significance of a bulk storage facility as a discrete potential source of contamination will differ depending on the size of the water source.

If the contaminant prevalence rating due to land cover differs from the contaminant prevalence rating due to discrete sources for a particular contaminant category, the higher rating will generally be used to make the susceptibility determination. When this approach results in a "high" contaminant prevalence rating for a contaminant category, the assessment will be considered in greater detail to see whether the "high" rating accurately describes conditions in the assessment area.

4.4.3 General Description of Susceptibility Zones

As is described in Section 4.2, Delineation of Assessment Areas, the source water assessment area for ground water systems may be comprised of two delineated zones. The subdivided assessment areas will constitute the different susceptibility zones. Susceptibility Zone 1 will incorporate the more hydrologically significant area, and Susceptibility Zone 2 will incorporate the larger area of contribution. Table 10 provides a general description of what areas constitute Susceptibility Zone 1 and Zone 2 based on source type and delineation. For example, for many wells, the Inner Well Zone (see Section 4.2) generally has a shorter time-of-travel, less opportunity for natural filtration of contaminants, and less dilution. Therefore, the Inner Well Zone will comprise Susceptibility Zone 1, and potential sources of contamination within this zone will be weighed more heavily when evaluating

the source's susceptibility. Potential sources of contamination in the Outer Well Zone will be considered, but will be weighed less heavily. This area will constitute Susceptibility Zone 2.

When the assessment area of a surface water source is a single delineated watershed, the entire watershed will constitute Susceptibility Zone 1. When the assessment area of a surface water source includes sub-watersheds within a larger watershed area, Susceptibility Zone 1 will contain subwatersheds near the intake that have shorter travel times and a more immediate influence on the water system. Susceptibility Zone 2 will contain the remainder of the watershed. In the susceptibility analysis, Susceptibility Zone 1 and Susceptibility Zone 2 will be mutually exclusive from one another. That is, when contaminant inventories are being compiled for zone 1, they will not be included in the contaminant inventory for Zone 2, and vice versa.

In certain cases, susceptibility zones will be combined in order to compile a single contaminant inventory for multiple sources in close proximity to each other. In situations where a lake has multiple water intakes, some or all of the intakes may fall within a common assessment zone depending on the size of the lake and its accompanying watershed. In these cases, intakes which lie within the same susceptibility zone may be grouped together for assessment purposes. In an aquifer setting, individual wells may be grouped for a susceptibility analysis if there is substantial overlap in their source water assessment area delineations. In a few instances, Inner Well Zones (Susceptibility Zone 1) will overlap when wells are closely clustered and draw ground water from similar depths in the source aquifer. More frequently, several wells may share a common Outer Well Zone (Susceptibility Zone 2) consisting of the aquifer recharge boundary, but each well will have distinct inner well zones (Susceptibility Zone 1).

After completing the steps described above, the following pieces of information will have been generated: (1) contaminant categories of significant concern in the delineated area; (2) land uses with the potential to contribute significantly to the identified contaminant categories; (3) discrete potential sources within these identified contaminant categories; and (4) areas that comprise susceptibility Zones 1 and 2, when applicable.

Ground water sources with significant recharge from surface waters will have a conjunctive delineation. This additionally delineated area will be assessed for contaminants of concern believed to persist in water moving through the watershed, streambank (or lake bottom), and/or aquifer, and that could then enter the well. Nitrates, pesticides and microbiological pathogens (protozoa, bacteria, and viruses) are three contaminant categories where this contamination route has been observed. These situations will be evaluated on a case-by-case basis.

4.4.4 Estimating Sensitivity and Susceptibility of the Water Supply

Ground Water Sources: A key component of an accurate susceptibility analysis is determining the sensitivity of the drinking water source to contamination. Ground water sources in unconfined aquifers or conditions of high hydraulic conductivity (e.g., fractured bedrock, karst geology) are likely to provide less of a physical barrier to contamination, and therefore may be more sensitive, than supplies that are in deep, confined aquifers.

Figure 3 provides a general scheme for determining the sensitivity of a ground water source to contamination. Information that is collected during the early stages of the assessment process will be used to support decision making associated with evaluating a public water supply's sensitivity. Along with considering well characteristics, this approach also addresses the situation when little is known about the hydrogeological characteristics of a well area. When this is the case, the source will be

assigned the rating of "unknown sensitivity". The category of "unknown sensitivity" has been assigned a priority that will fall between "medium sensitivity" and "high sensitivity".

Based on the sensitivity analysis for ground water systems presented in Figure 3, systems that fall into one of the following three categories will be assigned a "high" sensitivity rating:

1) wells in which significant levels of contaminants have been detected;
2) wells that draw from fractured bedrock with no overlying lower permeability layer; and
3) wells that draw from unconfined aquifers of high hydraulic conductivity.

When carrying out a source water assessment of a ground water source, the sensitivity of the source will be characterized using Figure 3. Another factor that will be considered when evaluating the sensitivity of the source to contamination is the integrity of the well(s). Additional guidance will be developed to supplement Figure 3 for evaluating the sensitivity of ground water sources. This sensitivity rating will be used to estimate the susceptibility of the supply to contamination by applying the matrix presented in Figure 4. Figure 4 weighs the sensitivity of the ground water source against the contaminant prevalence in the source assessment area. The prevalence of different contaminant categories will already have been estimated using Tables 9 and 10, using the method described in Sections 4.4.1 and 4.4.2 Areas that have a medium or high potential for contamination will be considered for all ground water sources irrespective of their sensitivity rating.

The DOH has determined that the susceptibility of ground water sources with high sensitivity is worth noting, even if contaminant prevalence in the assessment area is minor. Therefore, water sources assigned a "high" sensitivity rating with assessment areas containing "low" contaminant prevalence will be assigned a susceptibility determination of "medium to high". High sensitivity water sources with only negligible contaminant prevalence in the assessment area will not be assigned a susceptibility determination, but will nonetheless be noted due to the high sensitivity of the water source.

Surface Water Sources: Surface water sources provide fewer physical barriers from contamination than ground water sources. Surface water sources are protected somewhat by dilution, time of travel, settling, volatilization, and contaminant deterioration due to environmental stresses. Contaminant reduction resulting from some of these natural influences is reflected in the ratings assigned to the different land use types in Table 5. Surface water sources do not, however, share the benefits of filtration and adsorption.

Furthermore, as is described in Section 4.2 (Delineation of Assessment Areas), delineations of surface water assessment areas will be made with the intention of identifying the area most likely to directly influence the water source. As a result, the surface water delineation will usually define a zone of contribution to which the supply is highly sensitive.

Therefore, in most assessments, contaminant prevalence in surface water assessment areas will not be adjusted to reflect the amount of physical protection afforded by the water source. Instead, contaminant prevalence ratings obtained by applying Tables 5, 7, 8 and 9 will be adopted as the susceptibility ratings for surface water sources. These susceptibility ratings may be refined by more detailed, contaminant-specific fate and transport analyses.

Sensitivity and Susceptibility of Assessment Areas With Conjunctive Zones: As discussed in Section 4.2, Delineation of Assessment Areas , the evidence for surface water influence on ground water sources can vary. Therefore, the susceptibility analysis will take into account the weight of evidence

when evaluating whether a ground water source could be impacted by potential sources of contamination in the conjunctive watershed. For sources with little information, estimating the likelihood of contamination due to land cover will be general, and based on the sum of estimates made for the 11-digit Hydrologic Unit Codes comprising the upgradient watershed. All upgradient State Pollution Discharge Elimination System (SPDES) permitted discharges, however, will be considered as potential sources of pathogens.

Sources that meet the regulatory definition of ground water under the direct influence of surface water will be considered to behave more like surface water. The evaluation of these sources will consider the surface watershed to be the more hydrologically connected zone and will use the ratings provided in Tables 5 and 7 for the initial contaminant inventories and estimates of contaminant prevalence. In these cases, contaminant properties will be considered with respect to ease of transport through soil or water to the water system well, persistence in the environment, and whether contaminants change after being released into the environment. Additional consideration will be given to the characteristics of potential contamination sources, such as the likelihood that contaminants will be released from the source, the size of the potential contaminant release, and the effectiveness of any pollution prevention measures in place to mitigate the threat.

4.4.5 Susceptibility Review and Refinement

Contaminant prevalence and natural sensitivity of a water source will be combined to determine the potential susceptibility of a drinking water source to a particular contaminant category. A rating will be assigned by the susceptibility matrix as described in Section 4.4.4. At this point in the assessment process, the susceptibility determination will be reviewed to ensure that the objective(s) of the assessment are met. A susceptibility determination will be refined under the following conditions:

1. when contaminant categories rate high in an assessment area;
2. when information is available to allow detailed evaluation of the potential release, fate and transport characteristics of contaminants, and;
3. when refinement would be consistent with the objectives of the assessment.

Using the iterative approach, additional data sets may be used to provide greater detail for the assessment and to refine susceptibility determinations. For example, if an assessment area includes a significant amount of agricultural land, and contaminants that could be of agricultural origin have been detected in the water source (e.g., nitrates, pathogens), then it would be appropriate to use Agricultural Environmental Management data, if available. Agricultural Environmental Management data can provide more detailed information about watershed-wide farm management practices, cropland acreage, and farm animal numbers that could benefit susceptibility refinement. In addition, where pesticides have been detected in large surface watersheds, the pesticide reporting data set can be used to identify areas of greatest concern.

As another example, the “low intensity residential” land cover assumes that the homes contained in this category use septic systems for their waste disposal. Compliance with the future Ground Water Rule may warrant that the DOH take a closer look at sources whose assessment areas contain a substantial amount of “low intensity residential” land cover and which, as a result of the predominance of this land cover in their assessment areas, are determined to be highly susceptible to microbiological contamination. Additional information about septic system location and abundance can be obtained from tax parcel data and census tract information. In such situations, it would be appropriate to consider more detailed information and refine susceptibility determinations.

When a surface water assessment initially yields a high susceptibility determination for a contaminant category, and the assessment area addressed covers a large geographical area, it may be appropriate to refine the susceptibility determination by considering segments of the surface water assessment area more closely. Those geographical portions of the assessment area that are thought to be the origins of most of the contaminant category of concern will be evaluated in greater detail. For example, if the assessment of a river source determines that the source is highly susceptible to phosphorus, and phosphorus contamination in the assessment area most likely originates from one tributary to the river, then the drainage area of that tributary may be evaluated in greater detail to identify potential sources of phosphorus contamination. Existing setback and buffer zone delineations may also be evaluated. This detailed information will help to prioritize protection efforts within the assessment area.

In addition, the iterative approach will utilize a field review process to confirm and refine the data collected (e.g., source data, natural characteristics of the source, location of the source, contaminant inventory, delineations, etc.). As an example, on-going sanitary surveys provide a mechanism to refine and confirm existing data. This will primarily be done when ratings for potential significant sources of contamination are "high".

4.5 Methodology for Completing Assessments

The decision making process associated with the methodology for completing assessments is illustrated in Figure 5. This section describes the steps used to conduct an assessment, as well as indicates where additional information will be used to conduct a more detailed assessment when required. A step by step discussion of the assessment methodology as outlined in Figure 5 is presented below.

Box A - Collect Available Information: The DOH is planning to work with State agencies and local entities to gather available information on water sources. The available data is comprised of information from sanitary surveys, vulnerability assessments, public water systems and statewide GIS coverages. The DOH will also work to gather information that has been collected for purposes other that evaluating public water systems, but that may be useful when conducting the assessments. The DOH plans to work with interested parties throughout the assessment process and to avoid errors and omission, those entities that provide data will have an opportunity to review the assessment before it is finalized. Data collection is discussed in detail in Section 4.1.

Box B - Evaluate System Specifics to Determine Approach: The purpose of this step in the methodology is for the staff working on the assessment to review the available information to determine if an enhanced (i.e., more detailed) assessment is needed. Determining which source waters warrant a more detailed assessment will be based on discussions between the local involved organizations and the DOH. For the majority of assessments this step is too early in the process to make that determination. Box I (Susceptibility Refinement) of this methodology will be the place where the assessment will be reviewed to determine if an enhanced assessment is needed.

However, in certain situations assessments will be completed in greater detail. These determinations will be based on several criteria. The primary criterion that will be used to determine if an enhanced assessment is warranted, is the presence of source contamination. If contamination of high public health significance is found in the source water(s) then an enhanced assessment will be completed, if necessary. Ongoing contamination from human activities will be weighed more heavily than isolated contamination events or the presence of naturally occurring contaminants.

Secondary criteria that will be considered to support an enhanced assessment are as described below.

- Ground water sources that are hydrogeologically sensitive may be considered for enhanced delineation efforts because they inherently have a greater risk of becoming contaminated.

- Where on-going local efforts to protect sources of drinking water may be leveraged, enhanced assessments will be considered. Local support from government agencies and volunteers can provide the resources and assistance necessary to complete more thorough assessments.

- The rate of development in an area will be considered during the assessment process. While source water assessment information alone may not be detailed enough to plan source protection efforts, it can provide advance warning to local decision makers about the potential susceptibility of drinking water sources within their jurisdictions.

- Assessment information will be used to set monitoring requirements under drinking water regulations. Drinking water program decisions, of greater public health significance, such as those related to the future Ground Water Rule, the Long Term Enhanced Surface Water Treatment Rule, and the Disinfection Byproduct Rule can be aided by the source water assessments. The DOH or County or District Health Department will work with the owner/operator of public water systems to gather more information to refine these regulatory decisions. Proposed changes to existing Watershed Rules and Regulations or promulgation of new locally drafted drinking water source protection rules would also be indications that more detailed assessments may be warranted.

The majority of public water system sources serve transient, non-community systems. Most of these systems have no recorded contamination, are located in remote areas, are privately owned, and operate only to support the primary business (such as a restaurant). Well log and detailed information about the aquifer(s) will most likely not be available. Detailed assessments will not be performed for these sources.

Box C - Determine Delineation Method: After the assessment level is determined, the delineation method will be selected. For ground water sources, the delineation will be based on detailed information where available, or the standard delineation procedure described in Section 4.2.

For surface water sources, the size of the system, the size of the source water body, the detention time of the water body, and the location of the intake will be used to decide whether to select a multiple zone delineation (i.e., nested watershed) or to make a single delineation of the entire watershed. Section 4.2.3 describes the process for delineating surface water source areas.

The decisions made in Boxes D, F and G will be made concurrently with those decisions made in Box E.

Box D - Delineate Source Water Assessment Area: The source water assessment area delineation method will be selected based on the criteria described in Box C. Delineations will be completed to the extent possible, based on available information. A delineation may be revised at any time during the assessment process if more detailed information becomes available.

Box E - Sensitivity Analysis: A key component of an accurate susceptibility analysis is determining the sensitivity of the drinking water source to contamination. Figure 3 provides a general scheme for determining the sensitivity of a ground water source. Hydrogeological factors and well characteristics are considered. This sensitivity analysis tends to be protective, since it ranks sources where little information is available as having sensitivities between "medium" and "high". If further investigation provides the appropriate information, the sensitivity of these sources can be reevaluated and reclassified.

Surface water sources provide fewer physical barriers to contamination than ground water sources. Therefore, in most assessments, surface water sources will be considered to be highly sensitive to contamination.

Once the sensitivity of a source has been determined, that sensitivity rating will be used, along with the contaminant prevalence rating (see Box G), to determine the susceptibility of the source to contamination.

Box F - Contaminant Inventory: Two groups of available information will be used to carry out most contaminant inventories of assessment areas. A GIS database containing land cover information will be used to map out land cover in assessment areas. The rating systems provided in Tables 4 and 5 assign ratings to the different contaminant categories for each type of land cover. These ratings refer to the likelihood that a land cover will be associated with a particular contaminant category.

The second group of information that will be used are the GIS databases listing discrete potential sources of contamination. The rating systems provided in Tables 6 and 7 assess whether or not each of these discrete sources could be a potential source of a particular contaminant category.

Once the land cover and discrete potential sources of contamination have been mapped for an assessment area, the contaminant categories associated with those land covers and discrete sources will receive higher priority during the assessment. These contaminant categories will comprise the assessment area's contaminant inventory.

Box G - Determine Contaminant Prevalence: Using the contaminant categories that have been identified and given priority in an assessment area, GIS maps will be generated to determine the prevalence of the potential sources of those contaminant categories. Contaminant prevalence will be determined by considering percent land cover that is likely to contribute contamination (using Table 8) and by considering the location and abundance of discrete potential sources of contamination (using Table 9) in the assessment area.

Box H - Susceptibility Matrix: The susceptibility matrix (Figure 4) uses the results of the sensitivity analysis (Box E) and the results of the contaminant prevalence determination (Box G) to determine the susceptibility of a drinking water source to a particular contaminant category. The susceptibility matrix will be used to develop susceptibility ratings for the drinking water source for the contaminants that have been assigned a high priority within the assessment area of that water source (see Box F).

Box I - Susceptibility Refinement: At this point in the process, there may be a need to review and refine a susceptibility determination to ensure that the objective(s) of the assessment are met. The susceptibility determination will be refined under the following conditions:

1) when contaminant categories rate high in an assessment area;

2) when information is available to allow detailed evaluation of the potential release, fate and transport characteristics of contaminants; and

3) when refinement would be consistent with the objectives of the assessment.

Additional data sets may be used to provide greater detail for the assessment and to refine susceptibility determinations. In addition, the iterative approach will utilize a field review process to confirm and refine the data collected.

Box J - Summary of Significant Findings: After the refinement step is completed (Box I), information from the assessment process will be compiled to emphasize the significant assessment findings. Those contaminant categories ranked as having a medium or high potential to impact the drinking water source from either the land use or discrete source categories will be summarized for the source water assessment. The summary of significant findings for each assessment will include a source area map to present the key assessment information.

4.6 Assessment Format and Availability

One of the overall objectives of State Source Water Assessment Program, as outlined in the 1996 amendments to the Safe Drinking Water Act is the emphasis of strong public involvement and support for the protection of public drinking water system source water areas. Source water assessments will be completed for all public water systems in the State and made available to the public. In addition, a Public Summary of the Source Water Assessment may be created for certain community water systems, such as all municipal public water systems and those systems determined to have a high susceptibility to source water contamination. A discussion of the format and contents of the Source Water Assessment and the Public Summary, as well as the proposed methods for dissemination of these documents, is provided below.

The overall level of detail for a particular assessment will depend on the type of system, the type and extent of threats, and the level of local interest. In most cases, source water assessments for non-community water systems will be reported by town or by a watershed area. These reports could also include information on community water systems located within the specified jurisdictional/watershed area. The presentation of assessment information in a single report will highlight source water protection issues for local decision makers and will facilitate the report generation process.

4.6.1 Assessment Format

The purpose of this section is to provide a description of the format and content of the Source Water Assessment and the Public Summary. The DOH realizes that not all source water assessments will be able to conform to one specific format. The presentation of this basic information may vary for an assessment of a complicated system (i.e., multiple sources).

Source Water Assessment

A Source Water Assessment will be a technical document that will include information that was determined to be significant as a result of conducting the assessment. Portions of the document will be presented in a narrative format and portions will be displayed as charts, tables, or graphs to depict the data used in conducting the assessment. The Source Water Assessment will include an *Assessment Summary, Methodology Description, Description of Appendices,* and *Appendices.*

Assessment Summary: This section will be presented in a narrative format and will summarize the information gathered during the assessment process. For those public water systems where a Public Summary has been prepared, it will generally be used as the Assessment Summary. In all other cases, the summary of significant findings (Box J) will be used as the Assessment Summary.

Methodology Description: This section will be in a narrative format and will describe the DOH's methodology for conducting this Source Water Assessment (the methodology is described in detail in Section 4.5 of this plan). Each step of the assessment that was performed will be discussed in adequate detail to inform the reader of what was completed and why it was done. Each assessment will contain a description of the delineation approach taken, why it was taken and the confidence level associated with how well it represents the contributory area, and an evaluation of the reliability of the contaminant source inventory, based on any recent field verification.

Description of Appendices: The assessment process will require the use and generation of a significant quantity of raw data which will be included as an Appendix to the Source Water Assessment. This section will give a narrative description of each Appendix, summarize the information used, and describe how that information was used to complete the assessments.

It should be noted that the data included in the Appendices may not be standard for all assessments, but will be dependent on the assessment's level of detail. Standard appendices for inclusion in the Source Water Assessment include: *List of Available Information, Contaminant Inventory, Susceptibility Summary, and Maps.* Descriptions of the standard appendices are detailed below.

- List of Available Information - A list of the available information the DOH used to compile the assessment.

- Contaminant Inventory - This appendix will present the results of the contaminant inventory in a matrix format and will also include a table listing the discrete contaminant sources within the assessment area.

- Susceptibility Summary - This appendix will describe the susceptibility analysis that was completed for the potential contaminant sources, as well as the information that was reviewed as part of the susceptibility review and refinement. Much of the assessment process will be automated; however, each assessment will go through a quality check called the Susceptibility Review/Refinement. The results of this assessment quality check, any changes that were made and why they were made, will be discussed in this section.

- Maps - Land cover maps will be generated, and pertinent maps will be included in the Source Water Assessment.

Public Summary

The Public Summary will be used to present the most important aspects of the assessment in an easily understandable manner. The findings presented in each Public Summary will highlight areas where additional information can be obtained from the assessment. The Public Summary for a source water assessment will include the following sections: *Introduction*; *What is the Source of Your Drinking Water?*; *Map of Source Water Assessment Area; Source Water Quality and Water Treatment Information*; *Evaluation of Significant Potential Sources of Contamination*; *Ongoing Watershed Protection Activities*; *Source Water Protection Needs*; and *How to Obtain Additional Information.* The information included in the *Evaluation of Significant Sources of Potential Contamination* section will be presented in a tabular format while the remaining sections will be presented in a narrative format. To the extent possible, each Public Summary will be no longer than three pages (two pages of text and a one page map). Three hypothetical source water assessments (one depicting a large surface water source, one depicting a small ground water source, and one for a small system where little information is available) are presented in Appendix G. A description of the proposed contents for the Public Summary is presented below.

Introduction: The language included in the *Introduction* will be standard for all assessments. The *Introduction* will include a statement indicating why the source water assessment is being completed and the name of the parties who have performed the assessment. This section will explain the purpose of the assessment while emphasizing that the purpose of the assessment is to evaluate source water, not tap water. A reference will also be made to the public drinking water system's Consumer Confidence Report (Annual Water Quality Report) including how one can be obtained.

What is the Source of Your Drinking Water?: This portion of the Public Summary will include a description of the drinking water source (e.g., ground water, surface water), the population served by the system, and a description of the source water assessment area (e.g., watershed, aquifer). Information presented in this section may include: size of watershed; drainage patterns; size of population within the watershed; depth of groundwater well(s); geologic conditions associated with well(s); the location of the water intake; the location of the wellhead(s); how much water is withdrawn from the source per day; and a description of the land use within the delineated watershed/wellhead area. This section will also include a reference to a map of the assessment area.

Map of Source Water Assessment Area: Each source water assessment Public Summary will be accompanied by a map of the source water area being assessed. Information depicted on the map will include the delineated source water assessment areas (e.g., watershed boundaries or well delineations) and may also include the intake or well location(s), the aquifer recharge area(s), land cover types and contaminant sources.

Source Water Quality and Water Treatment Information: This section will begin with a general statement explaining how and why the water is treated (e.g., disinfected, filtered, not treated). This statement will be followed by a summary of any significant finished water sampling results for the past twelve months, a discussion of any exceedances of any maximum contaminant levels during this time period, and the presence or absence of other significant unregulated source water contaminants (i.e., Cryptosporidium, radon).

Evaluation of Significant Potential Sources of Contamination: The language for the first paragraph of this section will be standard in all assessments. This paragraph will begin with a general statement explaining that the assessment focuses on evaluating the susceptibility of the public water system to

those contaminants which may enter the water source. This will be followed by a statement indicating that the contaminants being evaluated are those regulated under the federal Safe Drinking Water Act as well as those which the DOH has determined may present a concern to public health. The remainder of this paragraph introduces the *Significant Potential Sources of Contamination Table* and will briefly explain that contaminant sources in the assessment area have been analyzed and prioritized (negligible, low, medium, and high) in accordance with their potential to impact the water supply. Although all contaminant sources will be included in the source water assessment, the *Significant Potential Sources of Contamination Table* will only address potential sources of contamination which have been assigned a medium or high priority.

This table will include the following four columns: Potential Sources of Contamination, Contaminants of Concern, Description, and Potential Impact to the Water Supply. The Potential Sources of Contamination column will list land use areas and/or discrete sources of potential contamination. Where applicable these areas/sites will be exhibited on the map. The Contaminants of Concern column will include a description of the contaminants of concern associated with each land use and/or discrete source listed in the previous column. For example, gasoline stations (potential source of contamination) would have petroleum hydrocarbons and solvents listed as the contaminant of concern. The description column will include any reasonably available information about the potential source. Using the gasoline station example, this column may include a location of the gasoline station in reference to the source water area, a description of the station's underground storage tanks (e.g., age, size, contents), and reference to any spills or remedial actions which may have taken place at the gasoline station. The final column in this table, Potential Impact to the Water Supply, will provide a rating of the contaminant source's potential to impact the water supply from medium to high. This rating will be derived from the Susceptibility Analysis methodology described in Section 4.4 of this plan and will take into account hydrologic and hydrogeologic factors, intake or well location, fate, transport and toxicity characteristics of the contaminants, and the characteristics of the potential sources of contamination.

The table will be followed by a more detailed description of the contaminants of concern and the likely potential sources of contamination. This section may also discuss the relative health significance of the contaminants of concern. For example, if Cryptosporidium is listed as a contaminant of concern this section would include information on the risks associated with Cryptosporidium for specific at-risk populations and the general population and measures that at-risk populations may take to protect themselves.

The *Evaluation of Significant Potential Sources of Contamination* section will conclude with a description of other potential sources of contaminants that were evaluated as part of the source water assessment, but were not determined to pose a significant threat to the public drinking water source. The purpose of this paragraph is to assure the public that all potential sources of contamination located within the assessment area have been evaluated.

Ongoing Watershed Protection Activities: A section may be added that would begin with a concise statement explaining the federal and state watershed protection programs applicable to the watershed area. The section may also include other local watershed protection activities in place such as a local watershed management plan, Agricultural Environmental Management practices, overlay zoning, or the presence of Watershed Rules and Regulations.

Source Water Protection Needs: A section may be added that would contain a brief discussion regarding the need for additional source water protection efforts based on the findings of the source water assessment. Examples of additional source water protection needs may include: development

of a wellhead protection program, public education programs, the names of agencies and organizations which could assist with source water protection efforts, or the evaluation of particular pollution prevention facilities or management practices. The purpose of this section is to identify areas where source specific protection may be needed, not design a program to implement protection.

How to Obtain Additional Information: A description of how the public can obtain additional information regarding the source water assessment will be included in this portion of the Public Summary. This section will also reference the New York State DOH Source Water Assessment Program telephone number and website address. It may also reference a telephone number for a local health department, a local municipal office, and/or the water supplier, as well as the location of the nearest document depository (i.e., local library). Additionally, a reference will be made to the availability of the Source Water Assessment.

4.6.2 Procedures for Making Assessments Available to the Public

The purpose of this portion of the plan is to describe the procedures for making the Public Summary and Source Water Assessment available to the public. The DOH solicited public comments on this matter during the Focus Group meetings held in November 1997, the Cornell Cooperative Extension June 16, 1998 Source Water Assessment Satellite Broadcast Video-Conference, and from the Public Participation/Assessment Format Working Group and the Source Water Protection Coordinating Committee.

Source Water Assessment

Source Water Assessments will be available at local health departments and the New York State DOH's Central Office in Albany, New York. Source Water Assessments will be distributed based on local needs and by the least expensive method that provides the greatest number of people with access to the document. The County Water Quality Coordinating Committees were asked to gather local input regarding the appropriate depositories for the Source Water Assessments. Possible depositories include: local municipal offices, Association of Regional Council offices, Soil and Water Conservation District offices, public libraries or State Document depositories.

Public Summary

The methods used to distribute the Public Summaries will consider several avenues. The Consumer Confidence Report rule, promulgated by the EPA in August 1998, requires community water systems to include a brief summary of the susceptibility of the drinking water sources, using language provided by the primacy agency (or water operator). In addition, a public summary of the source water assessment may be created for certain community water systems, such as all municipal public water systems and those systems determined to have a high susceptibility to source water contamination. The DOH will provide a copy of each Public Summary to the appropriate local health department. Public Summaries will also be kept on file at the DOH's Central Office in Albany, New York. In addition, the DOH may use one or more of the following methods to distribute the Public Summary to interested parties: availability through local municipal offices, local water suppliers, Regional Council offices, Soil and Water Conservation District offices, public libraries and State Document depositories; posting in a public area; the DOH and other websites; and publishing in the local media.

5.0 Program Implementation

Implementation of the Source Water Assessment Program in New York State will result in numerous benefits, both directly and indirectly related to the protection and benefit of public water systems. In the development of this plan, New York State has strived to create a functional framework which will produce tangible products that will assist water suppliers, local officials, and citizens in their efforts to protect the source waters from which they drink. Also, during the creation of this plan (and implementation of this program) numerous relationships have been forged between organizations and individuals which will ultimately facilitate inter-agency information transfer and unification between environmental and public health programs.

5.1 Administration

5.1.1 Delegation

The State will delegate Source Water Assessment Program efforts to qualified and willing County Health Departments as it does for the drinking water regulatory program. County Health Departments are partially reimbursed for drinking water program activities according to a state aid agreement. County Health Departments participate in County Water Quality Coordinating Committees which have developed water quality strategies for implementing non-point source controls and other source water protection efforts. The state does not contemplate delegating Source Water Assessment Program responsibilities to public water systems, although it will welcome partnerships for conducting these assessments.

A memorandum of understanding exists between the DOH and the Department of Environmental Conservation to enable the organizations to work cooperatively to share the Source Water Assessment Program duties, resources, and information. The State also plans to allocate a portion of its Source Water Assessment Program set-aside funds to contract with local, regional and national interests to develop, assemble and analyze information for the Source Water Assessment Program. These partnerships will increase the effectiveness of the Source Water Assessment Program for the protection and benefit of public water systems. However, the DOH will retain the ultimate responsibility for completing the source water assessments. To maximize coordination with local efforts, the Source Water Assessment Program will consider each partner's information, opinions and suggested approaches, but to maintain consistency for state needs in priority setting and regulatory decision making, the DOH working in conjunction with delegated County Health Departments, will have final discretion.

5.1.2 Coordination

The DOH will continue to work with its partners as the Source Water Assessment Program is implemented, to encourage ongoing work towards source protection. These partners include many federal and state agencies, regional and local governmental agencies, as well as voluntary organizations at the local and regional levels. The DOH's partnership with several federal agencies is further strengthened by the implementation of the Clean Water Action Plan, which establishes a cooperative approach among several federal agencies to assess, restore and protect drinking water quality within an integrated watershed framework.

Several federal agencies, including the United States Geological Service and the National Resource Conservation Service, are represented on the Source Water Protection Coordinating Committee. The DOH also coordinates activities with these agencies and other federal and state agencies through ongoing participation on the Department of Environmental Conservation's Water Management Advisory and Nonpoint Source Coordinating Committees, the New York State Soil and Water Conservation Committee, and its subcommittee, the Agricultural Environmental Management Steering Committee.

The DOH is currently working with the Natural Resources Conservation Service of the United States Department of Agriculture on a pilot project to apply the National Agricultural Pesticide Risk Analysis model to two drinking water watersheds in western New York State. The model evaluates the likelihood of pesticide run off after application under local soil and precipitation conditions for those pesticides likely to be used in the study areas. The results of the model will be used by crop consultants in selecting pesticides for agricultural use on land within the watersheds. Such information and the general results of the assessments will be provided to the New York State Department of Environmental Conservation for consideration in development of statewide management plans for certain pesticides.

Data from the United States Geological Survey, Natural Resources Conservation Service and the EPA will be important to completing source water assessments. Some of the data is currently available through the Internet, but other data sets will be compiled during implementation of the Source Water Assessment Program. As many of these data sets are dynamic, they will be accessed at the time that an assessment or group of assessments is completed to ensure that the most recent data is used.

For certain regulatory programs, where New York State does not have primacy, the EPA is the lead agency for program implementation and regulatory oversight within the state. One such regulatory program is the Underground Injection Control program for which the EPA is the lead agency in New York State. The DOH will coordinate information and data collection efforts that are relevant to the Source Water Assessment Program with the appropriate EPA program representatives. Certain types of underground injection control wells, known as Class V wells, may pose a particular concern to shallow ground water systems. The EPA is in the process of establishing a regulatory framework and evaluating additional data to identify various types of Class V underground injection wells that pose a high risk to ground water (e.g., large capacity septic systems, motor vehicle waste disposal wells). For New York State, the EPA has established inventories of underground injection well locations and closures and has also initiated efforts to identify those underground injection wells which pose a high risk for soil and ground water contamination. The DOH has already initiated efforts to coordinate information collection with the EPA on the locations and types of underground injection wells in New York State. This information will be evaluated as assessments are developed.

As described previously, some assessment work will be delegated to local partners which may include County Health Departments, other county agencies, watershed associations, the New York Rural Water Association, and other groups, as appropriate. Agreements to complete assessment work will be made on a case by case basis. In addition to the local expertise available through delegation of assessment activities, such as an understanding of local hydrogeological conditions, ensuring local involvement in the assessment process will enhance overall source water protection efforts. The DOH will encourage broad outreach from the delegated agencies to ensure genuine local involvement.

The DOH extended several invitations to all of the American Indian tribal organizations to participate with development of the Source Water Assessment Program through the Focus Group Meetings and the Source Water Protection Coordinating Committee. In New York State, there has been no formal involvement by tribal organizations in the process of developing the Source Water Assessment Program Plan. Data collected for the purpose of the Source Water Assessment Program will be made available to the interested tribal organizations. Where available, the DOH will incorporate relevant information from tribal organizations related source water assessment areas which extend on or near tribal lands.

5.1.3 Progress Reporting

The DOH will report relevant progress on program implementation to the EPA in the Performance Status Report as required under the terms and conditions of the Capitalization Grant as well as through the Biennial Wellhead Protection Program Reports. This reporting will include information about the number of public water systems, categorized by type of source and a summary of the number and types of public water systems with completed delineations, contaminant source inventories, and susceptibility determinations. The number of completed assessments which have been made available to the public and how this was accomplished will also be reported. In addition, the report will include information about the number of systems with designated source water protection areas and the populations served by those systems.

5.2 Schedule

The DOH submitted a workplan as part of the Drinking Water State Revolving Fund's Intended Use Plan to the EPA in October 1997 for initial work on the Source Water Assessment Program. Most of the Source Water Assessment Program efforts to produce assessments (i.e., delineation, containment inventory, initial susceptibility analysis) will occur during the years 2000 and 2001. The two-year timetable requirement for completion, after the EPA's approval of the State Source Water Assessment Program plan will not be adequate for review and refinement of the assessments before public release. Thus, New York State is requesting the eighteen month extension through May 2003.

Furthermore, coordination of New York's Source Water Assessment Program approach with locally-driven or other source water protection programs requires the longer time frame of three and one half years allowed by the Safe Drinking Water Act to fully complete those assessments. For those sources for which a more detailed assessment will be performed, the Source Water Assessment Program will produce an interim assessment that would suffice for targeted monitoring requirements and may be applicable for other regulatory decisions (e.g., monitoring waivers). The interim assessments would be finalized within the extension period.

5.3 Updating

The completion of the Source Water Assessment Program is anticipated to establish a framework for information exchange that continues independently between the various stake holders. The Source Water Assessment Program should be a bridge between national databases (the EPA's Index of Watershed Indicators, Basins, and Surf Your Watershed) and local databases. The Source Water Assessment Program will have an interactive role with the Department of Environmental Conservation efforts for Clean Water Act reporting (305(b), 304(d) and Priority Waters Listing). Other Safe Drinking Water Act activities such as capacity development, water resource allocation, and regulatory programs will benefit from the systematic collection of information under the Source Water Assessment Program and will also contribute towards providing updated source water assessment information. The DOH may update the assessments (and make them available to the public) as necessary to meet the originally defined or evolving objectives of the assessment for each public water system source.

The Unified Watershed Assessment Report, issued October 1, 1998, under the lead of the New York State Department of Environmental Conservation and the United States Department of Agriculture Natural Resource Conservation Service, with input from the DOH and other conservation partners, is part of a continuing process. Although it categorizes eight digit Hydrologic Unit Codes and lists certain watershed priorities for restoration, it reflects New York stakeholders input in recognizing the importance of protecting other watersheds. It envisions further refinement and specifically presents a five year schedule to develop aquifer protection strategies for the Long Island ground water system and each of the eighteen primary aquifers upstate. The New York State Department of Environmental Conservation will work with the DOH to coordinate development of the strategies with the Source Water Assessment Program.

Additionally, the DOH is working with other advisory members of the New York State Soil and Water Conservation Committee to develop a comprehensive watershed management strategy which will attempt to integrate local watershed planning and water quality management actions into the overall scope of local, regional, state or national watershed concerns. The Source Water Assessment Program will provide the framework for updating assessments of drinking water concerns on a watershed basis for assembling with other natural resource concerns.

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Glossary

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Glossary

Agricultural Environmental Management (AEM). An environmental initiative developed by farmers, farm conservation professionals, and government officials to protect or improve water quality in New York State. It consists of an environmental assessment, planning and implementation process that farmers undertake voluntarily, with help and support from a team of agricultural and environmental professionals.

Annual Water Supply Statement. An annual report to consumers on the current quality of their drinking water which is required by New York State Public Health Law for all community water systems serving 1,000 or more service connections. The reports must contain analytical testing results of source water samples and tap water, and list violations. Information regarding water treatment, conservation practices, water use restrictions, capital improvements and a discussion of the risks associated with *giardia* and c*ryptosporidium* are also included in reports.

Aquifer. A geologic formation composed of rock, till, sand, gravel and/or sediment that is capable of storing and transmitting water in usable quantity to a spring or well.

Biosolids. The fecal and urinary defecations of livestock and poultry (manure), or humans (treated sewage sludge). Biosolids are typically spread upon or tilled into the soil to improve fertility.

Community Water System. A public water system with at least 5 service connections used by year-round residents of the system or which regularly serves at least 25 year-round residents. Examples include municipal water systems, mobile home parks, and private water supply companies.

Confined Aquifer. An aquifer saturated with water and bounded above and below by a soil layer or rock formation that restricts the passage of ground water.

Consumer Confidence Report. The Safe Drinking Water Act mandates that all community water systems provide an annual report to consumers on the source and quality of their drinking water beginning in October, 1999. The reports must contain technical definitions, listings of all violations, and information on possible health effects from contaminants such as radon and *cryptosporidium*.

Contaminant Source Inventory. A list of possible contaminant sources with the delineated source water assessment area(s). The inventory process includes: reviewing existing data on the locations of potential contaminant sources, of identifying likely sources for further information, and verifying the accuracy and reliability of data sets.

County Water Quality Coordinating Committee. A committee composed of volunteers that advise the water quality and pollution control programs of various county, state, and federal agencies on coordinated and comprehensive approaches to water issues at the county level.

Cryptosporidium. Short for *Crypto-sporidium parvum*, a parasitic protozoan that can be transmitted to humans via contaminated drinking water. The organism can cause an intestinal illness called *cryptosporidiosis* which may be life threatening to people with weak immune systems. The most common symptom is watery diarrhea but there may also be cramps, fever, nausea, vomiting, and loss of appetite. There is no specific medical treat-ment for *cryptosporidiosis*.

Data Coverages. Describes the manner in which data sets are used in a Geographic Information System (GIS). Different types and sources of data are shown as individual

"layers". These layers of data can be stacked over other data layers to show how the different data sets relate to each other.

Delineation (delineate). The process of defining or mapping a boundary that approximates the areas that contribute water to a particular water source used as a public water supply. For surface waters, the land area usually consists of the watershed for a reservoir or stream. For groundwater sources, the boundary typically approximates the surface area that contributes water to the aquifer.

Discrete Source. A discernible contamination source such as a landfill, hazardous waste site, or conveyance such as a pipe or drainage ditch from a facility. Discrete sources can be mapped as clearly defined points or areas.

Drinking Water State Revolving Fund. A Drinking Water State Revolving Loan Fund was created in 1996 as a result of New York State's enactment of Charter 413 of the Laws of 1996 (Clean Water/Clean Air Bond Act) and passage of the 196 Amendments to the Safe Drinking Water Act by the U.S. Congress. This program provides a financial incentive for public and private water systems to undertake needed infrastructure improve-ments (e.g. treatment plants, distribution mains, storage facilities).

Geographic Information System (GIS). A computerized database/mapping system that may be used to store, retrieve, and analyze information based on geographic location.

Giardia. Short for *Giardia lamblia*, a parasitic protozoan that can be transmitted to humans via contaminated drinking water. The organism can cause an intestinal illness called *giardiasis* of which the main symptom is mild or severe diarrhea. *Giardia* can be treated with anti-parasitic drugs.

Ground Water. Water that has reached an underground zone where all the openings in the soil or rock are filled with water.

Ground Water Rule. A proposed federal regulation that will address technical issues related to disinfection of public water systems that use ground water as a source of drinking water. Under section 107 of the Safe Drinking Water Act Amendments of 1996, the statute reads, ". . . the Administrator shall also promulgate national primary drinking water regulations requiring disinfection as a treatment technique for all public water systems, including surface water systems, and, as necessary, ground water systems."

Hydrologic Unit Code. A geographic, numbering system developed by the United States Geological Survey to identify and differentiate particular watersheds. The numbering system is somewhat akin to zip codes in that digits are added to further refine location (i.e., an eleven digit code denotes a much smaller watershed area than an eight digit code). Hydrologic Unit Codes are often referred to simply as "HUC" codes.

Inner Well Zone. An area immediately surrounding a well or well field of a public water supply that has been defined for the purpose of determining the susceptibility of a well to contamination. Potential sources of contamination within the inner well zone are given a higher level of scrutiny when determining the overall susceptibility of a well source.

Local Health Department. A state funded district health office or county health department that provides oversight of public drinking water systems.

Maximum Contaminant Level (MCL). In the Safe Drinking Water Act, a MCL is defined as "the maximum permissible level of a contaminant in water which is delivered to any user of a public water system."

Metadata. Simply defined, metadata is "data about data." Metadata describes the origins of

a dataset and discuss the changes made to the dataset by any user of the data for a particular application. For digital geospatial data, metadata can be used to provide background information about the origin, content, quality, condition and availability of a particular dataset.

Monitoring. To systematically sample and analyze public drinking water to ensure that the water meets New York State standards for drinking water quality. Monitoring can also be used for watching trends in water quality.

Non-community Water System. A public water system that provides water to people in places other than their residences (i.e., places of business, schools, restaurants, and motels).

Nonpoint Source Pollution. Pollution that enters a water body or aquifer from diffuse origins on the land surface. This in contrast to a discrete source, where there is a discernible contamination source such as a landfill or conveyance such as a pipe or ditch.

Non-Transient Non-Community Water System. A public water system that does not serve a resident population but serves at least 25 of the same persons, four hours or more per day, for four or more days per week, for 26 or more weeks. Examples of non-transient non-community systems include schools, offices, and businesses which have their own drinking water source.

Outer Well Zone. An area surrounding the inner well zone which has been delineated for the purpose of determining the susceptibility of a public water supply well to contamina-tion. Ground water within the outer well zone is assumed to take a longer period of time to reach the wellhead than the ground water within the inner wellhead zone.

Pesticide. Any synthetic or naturally occurring substance or mixture of sub-stances that is used to destroy, repel or mitigate any pests, including insects, weeds, nematodes, fungi, bacteria and rodents.

Priority Waters List. This list categorizes and describes use impairments to water body segments taking into account both the amount and quality of available information. The New York State Department of Environmental Conservation and other state agencies use the rankings to allocate funding for pollution prevention projects and set watershed management strategies.

Public Drinking Water System. A community, non-community, or non-transient non-community water system which provides piped water to the public for human consumption. The system must have at least 5 service connections or regularly serve at least 25 individuals daily for at least 60 days.

Recharge area. A section of land that receives precipitation and allows it to infiltrate an aquifer.

Safe Drinking Water Act. The federal law which authorizes the U.S. Environmental Protection Agency and states to oversee public water systems and set standards for drinking water.

Sensitivity. The existing hydrogeologic conditions of a drinking water source and the integrity of the water system's well(s) or intake(s) which makes a particular drinking water system susceptible to influence by contamination.

Significant Potential Source of Contamination. A facility or activity that has the potential to release contaminants in sufficient amounts to a public drinking water source as to contravene water quality standards.

Source Water or Water Source. Any aquifer, surface water body, or watercourse from which water is taken either periodically or continuously by a public water system for drinking or food processing purposes.

Source Water Assessment. A source water assessment provides information on the potential contaminant threats to surface and ground water sources that are used to supply

public water systems. Each source water assessment consists of a delineation of the source water assessment area, an inventory of possible contamination sources, and an evaluation of the susceptibility of the water supply to contamination.

Subwatershed. A topographic boundary that is the perimeter of the catchment area of a tributary of a stream.

Surface Water(s). Lakes, ponds, streams, rivers, and other water bodies which lie on the surface of the land. Surface waters may be partially or fully supplied by groundwater.

Surface Water Treatment Rule. The rule specified maximum contaminant level goals for *Giardia lamblia*, viruses and *Legionella,* and promulgated filtration and disinfection requirements for public water systems using surface water sources or ground water sources under the direct influence of surface water. The regulations also specified water quality, treatment, and watershed protection criteria under which filtration may be avoided.

Susceptibility Analysis. An evaluation of conditions in the source water area to determine the potential for contaminants to impact water quality.

Total Maximum Daily Load (TMDL). The sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources that a waterbody can receive and still meet water quality standards. The calculation must include a margin of safety to ensure that the waterbody can be used for the purposes the State has designated (e.g., swimming, fishing, drinking) and must also account for seasonable variation in water quality.

Transient Non-Community Water System. A public water system that serves 25 or more transient consumers per day for fewer than 26 weeks per year; examples of transient non-community systems include restaurants, parks, and motels that have their own drinking water source.

Treatment Technique. A process intended to remove contaminants or improve the taste, odor, or clarity of drinking water before it reaches the consumer.

Unconsolidated Aquifer. An aquifer that is comprised of loosely formed geologic materials, such as sand and gravel. Unconsolidated aquifers can occur near the ground surface or at depth.

Unconfined Aquifer. A shallow aquifer that occurs immediately below the ground surface. Also known as a water table aquifer because the upper boundary of the saturated portion of the aquifer is formed by the ground water table.

Watershed. The geographic region within which water drains to a particular river, stream, or body of water. Large watersheds may be composed of several or many subwatersheds.

Watershed Approach. A watershed approach is a coordinating framework for environmental management that focuses public and private sector efforts to address the highest priority problems, taking into consideration both ground water and surface waters.

Watershed Rules and Regulations. Public Health Law that authorizes the New York State Department of Health to make rules and regulations to protect water sources used for public water systems within the state from contamination.

Wellhead Protection Area. The surface and subsurface area surrounding a well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach a well or well field.

Wellhead Protection Program. A state implemented program for protecting ground water resources that are used for public drinking water as mandated under section 1428 of the Safe Drinking Water Act. New York State received EPA approval in 1990 for its Wellhead Protection Program

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Figures

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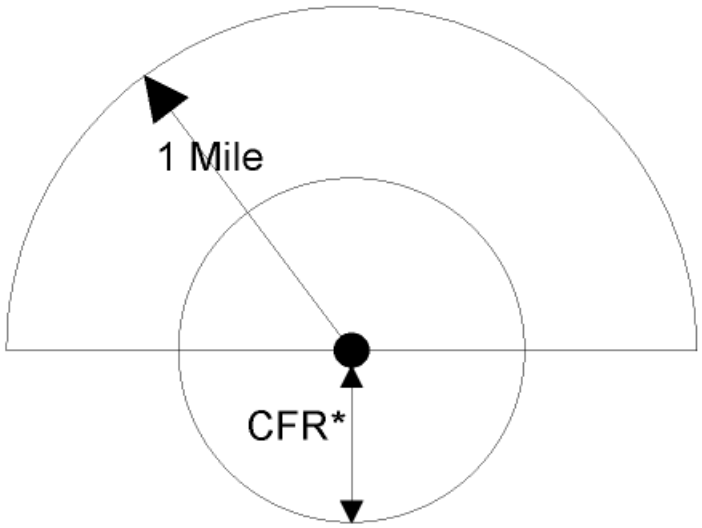
Figure 1: Ground Water Delineation Methods

Community Water Systems and
Non-Transient Non-Community Water Systems



*Calculated Fixed Radius
(minimum distance 500 feet)

Transient Non-Community Water Systems

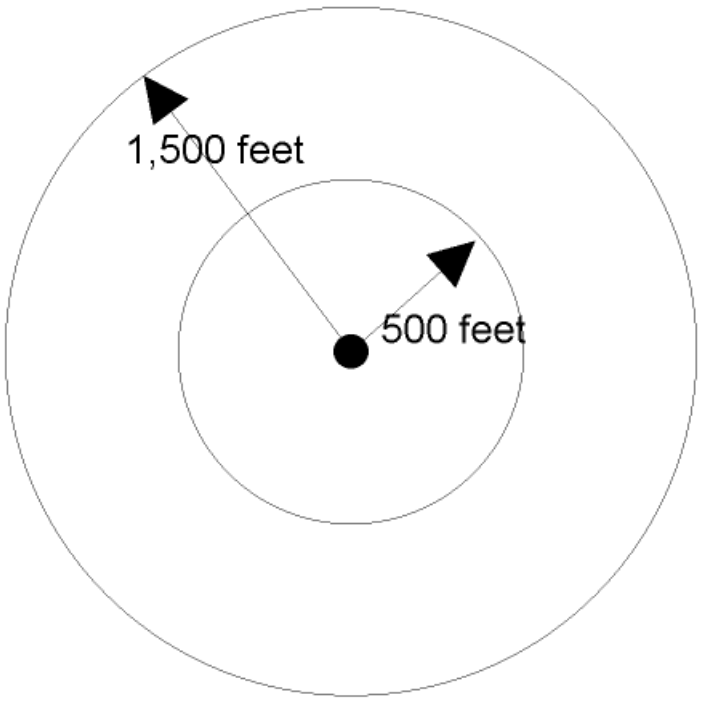


Figure 2 - Surface Water Delineation Approach - Nested and Sub-watershed Borders

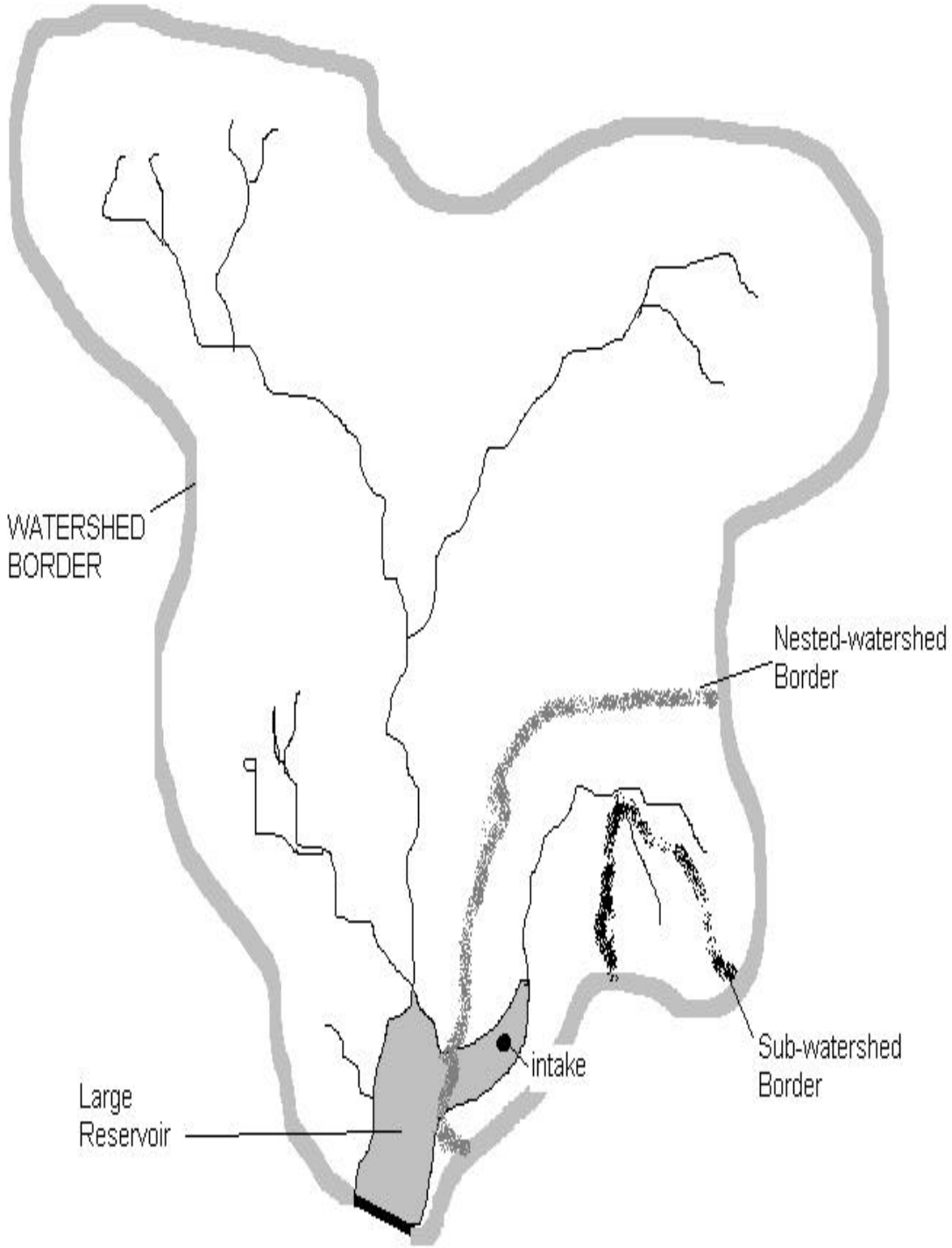


Figure 3 - Sensitivity Analysis for Ground Water Supplies

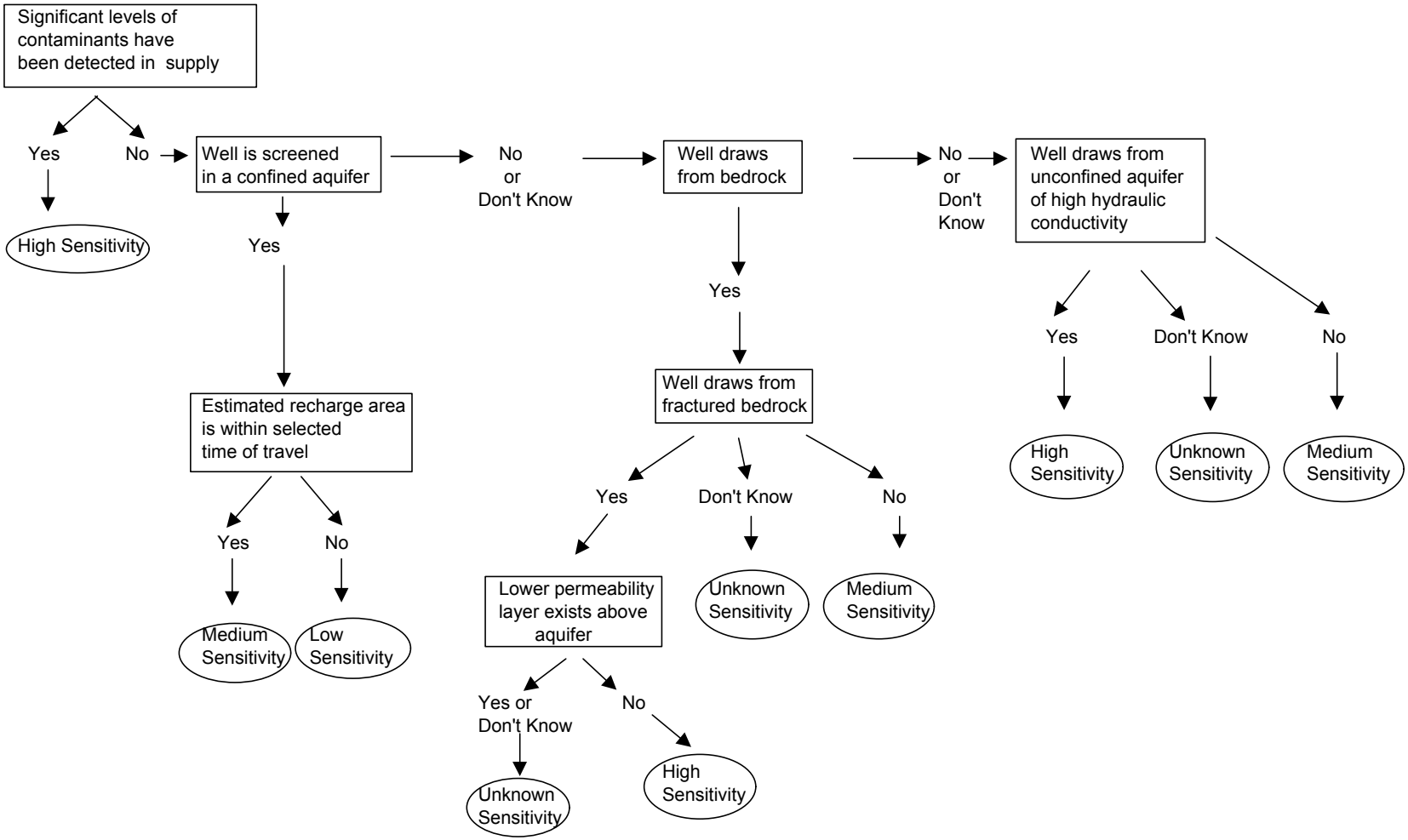


Figure 4 - Susceptibility Matrix

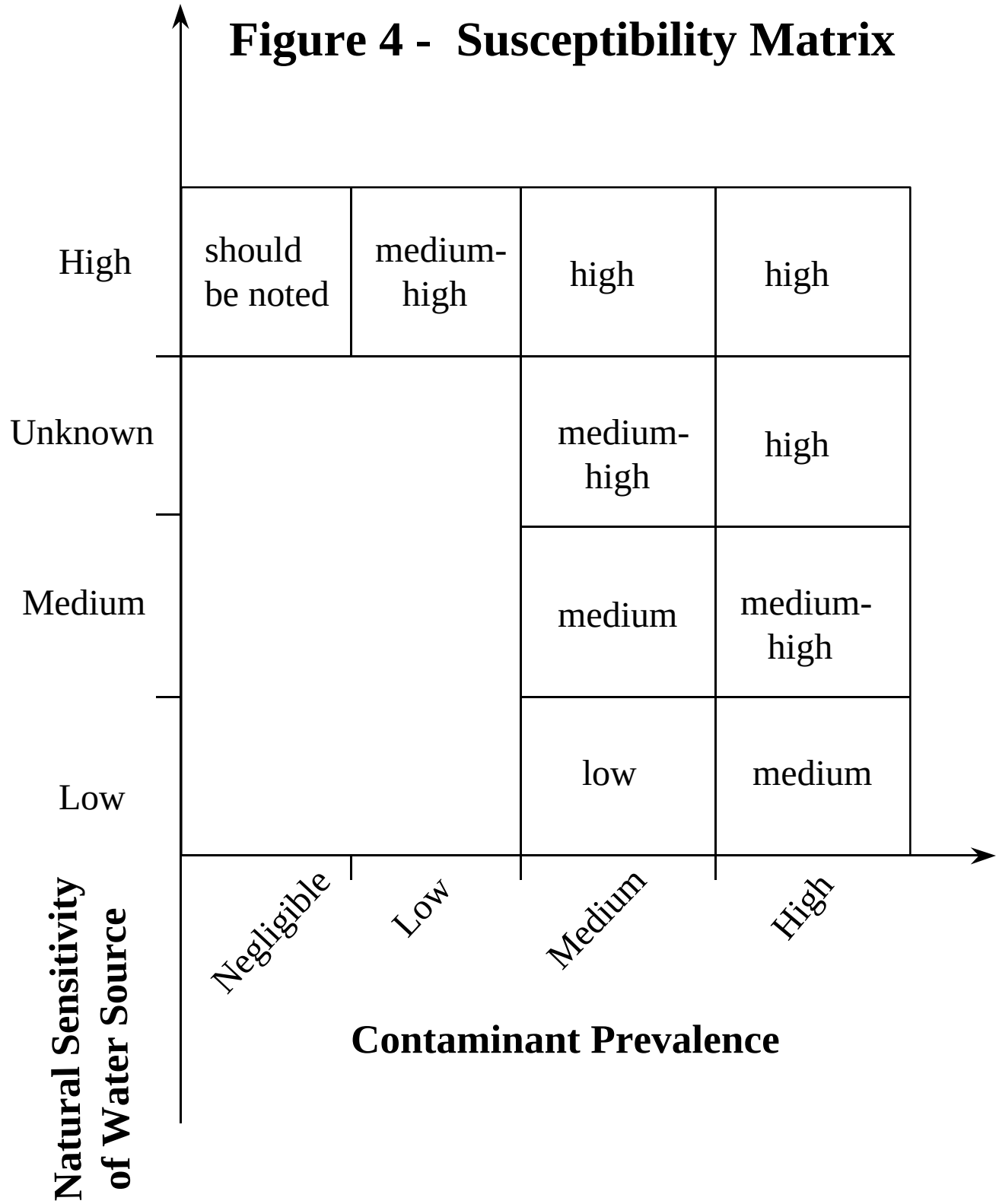
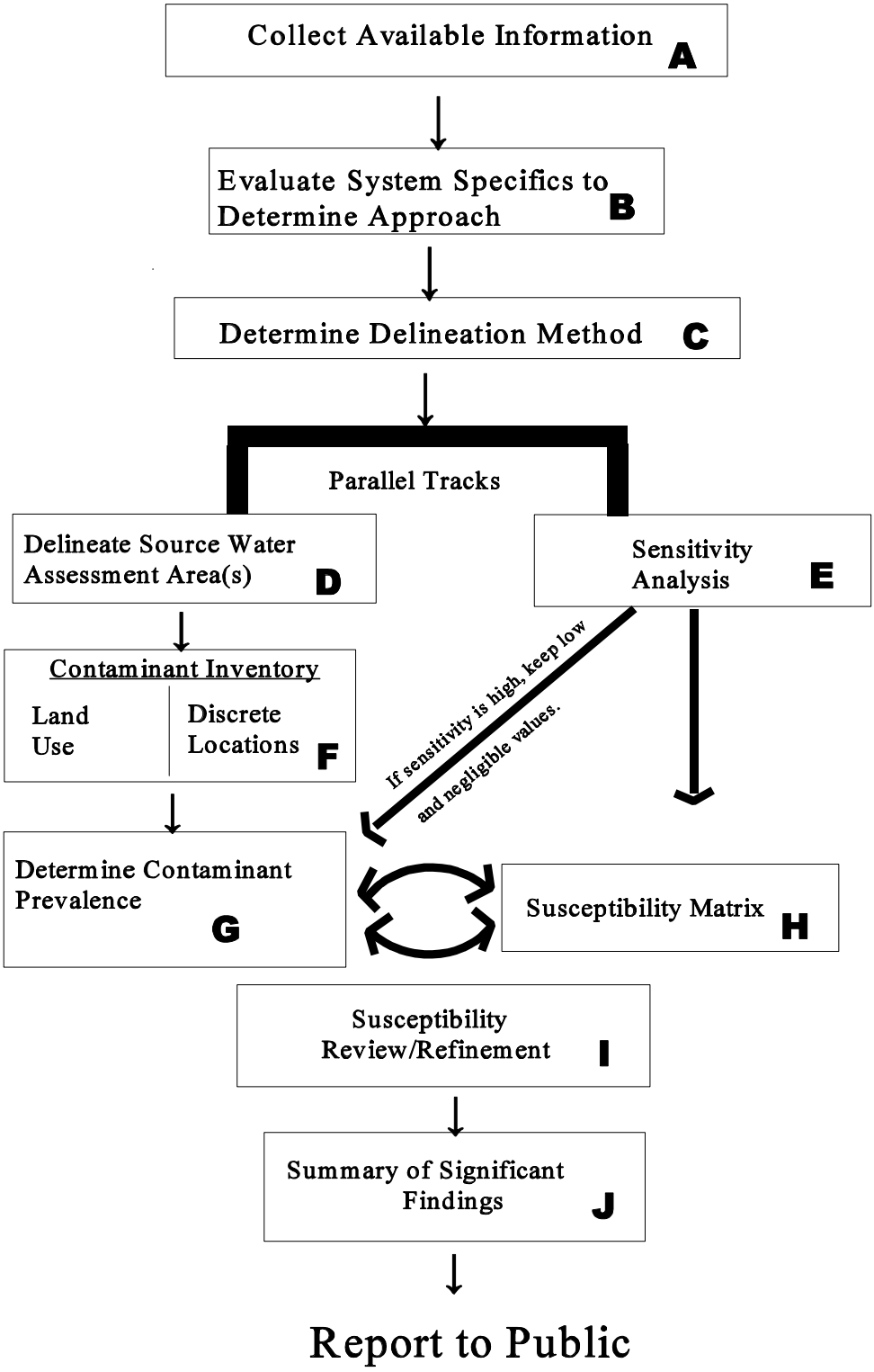


Figure 5 - Methodology for Conducting Assessments



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Tables

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Table 1 - GIS Coverages for the Source Water Assessment Program[1]					
Data File	**Source**	**Spatial Type**	**Coordinate System**	**Scale**	**Coverage Availablity**
Agricultural Districts	Cornell Univ.	Polygon	None	1:24,000	Not Yet
Aquatic Pesticide Permits	DEC	Point	None		Not Yet
Census Tracts	US Census Bureau				Available
Chemical & Petroleum Spills[2]	DEC/DOH	Point/Polygon	None		Limited
Chemical Bulk Storage (Aboveground)	DEC	Point	NYTM[3]	1:24,000 (GPS)	Available
Chemical Bulk Storage (Underground)	DEC	Point	NYTM[3]	1:24,000 (Geocode)	Available
Digital Orthophotos (aka Digital Orthophoto Quarter Quadrangles, DOQQs)	DEC/US Geological Service				Forty counties available, others pending
Digital Elevation Models	DEC			1:24,000	Not Yet
Geology from United States Geological Survey (USGS) and NY State Files	USGS/ NYSGS	Point	Lat/Long	Variable	Available
Drainage Basin, unconsolidated aquifer	DEC/USGS	Polygon	Lat/Long		8-digit HUC Available, 11-digit Not Yet
Hazardous Waste Treatment, Storage & Disposal Facilities (RCIS)	DEC	Point	Lat/Long		Limited
Hydrography Data	DEC	Line	NYTM[3]	1:24,000	Not Yet
Inactive Hazardous Waste Sites	DEC	Point	Lat/Long	1:250,000	Available (Draft)
Land Application & Composting Facilities, including Sewage Sludge Facilities	DEC	Point	None	Variable	Not Yet
Landfills(Active)	DEC	Point	NYTM[3]	Variable	Not Yet
Land Cover Data Set 1988-1993 Landsat	USEPA/ USGS	Polygon	NYTM[3]	30 meter pixels	Available
Natural Heritage Program (Significant plant/wildlife areas)	DEC	Point/Polygon	NYTM[3], Lat/Long	1:24,000	Available
Mines	DEC	Point/Polygon	Lat/Long	1:24,000	Available

Table 1 - GIS Coverages for the Source Water Assessment Program[1]					
Data File	**Source**	**Spatial Type**	**Coordinate System**	**Scale**	**Coverage Availablity**
NYSDOH Public Water Supply (PWS) Database, PWS Intake locations, Local HD PWS Data, Sanitary Surveys, Monitoring Waiver Data	DOH	Point		Variable	Some areas complete, others limited or not yet
Oil and Gas Wells (Active)	DEC	Point	Lat/Long	1:24,000	Available
Petroleum Bulk Storage	DEC	Point	NYTM[3]		NY City only (geocoded) others in progress
Primary Aquifers	DEC	Point/Line/ Polygon	Lat/Long	1:24,000	Available
Priority Water List	DEC	Line/Polygon	None		Available
Radioactive Materials Discharge Permits (RCIS)	DEC	Point	None		Not Complete
Regulatory Compliance Information Systems (RCIS)	DEC	Point	NYTM[3]	1:24,000	Available
River Water Quality Monitoring	EPA/USGS	Point	Lat/Long		EPA STORET
Soil Surveys	NRCS/Local	Polygon	Some are digitized	1:12,000	Some areas
				1:250,000	Statewide
SPDES Permitted Discharge Facilities including Publicly Owned Sewage Treatment Works	DEC	Point	Lat/Long		Some, coverage improvement underway
State GIS Data Sets (Adjacent States)	NY GIS Data Cooperative, States				Not Yet
Tax Assessment Maps	Office of Real Property Services	Polygon			Some, except Warren and Westcheste r Counties
Toxic Chemical Release Inventory[2] (TRI)	DEC/DOH	Point	Lat/Long		Available
Underground Injection Wells	EPA	Point			Not Yet

Table 1 - GIS Coverages for the Source Water Assessment Program[1]					
Data File	**Source**	**Spatial Type**	**Coordinate System**	**Scale**	**Coverage Availablity**
United States Geological Survey Quadrangles	USGS	Image	Lat/Long	1:24,000	Available
USGS Well Data	USGS	Point	Lat/Long	Variable	Limited
Waste Oil Storage, Reprocessing, and Rerefining Facilities	DEC	Point		Variable	Not Yet
Other locally available coverages: These include county, regional, and local data sets		Pt/Line/Poly	Varies	Variable	Not Yet

Notes: 1 These data coverages are considered helpful in conducting assessments. They are a starting point of data compilation and should not be considered complete. The extent of data is not consistent across New York State. Some coverages need correction to improve accuracy. The Coverage Availability column indicates whether "Available" (with no warranty of completeness or accuracy), whether coverage is "Limited" to certain areas of the state, or whether it is "Not Yet" available. Some coverages not now available, are currently being corrected and should be available for use during the SWAP program.

2 Data coverages partially or wholly created at NYSDOH or NY Local Health Units

3 NYTM= New York Transverse Mercator Projection

Table 2 - Data Needs to Perform Assessments
*Standard Assessment Data Indicated by **
System Data
*Whether purchased, if so, whether system has own reservoir
*Category of system, (e.g., Community; Non-transient or transient non-community)
Population served
*Production capability and actual production
*Disinfection use and type
*Any known quality violation
*Any known contamination
Ownership
*Whether Source Water Protection in place, kind of protection
Whether owner has jurisdiction over some or all of the source areas
Public perceptions of water source quality and contaminant source impacts
*Date of last sanitary survey/inspection
*Significant findings from sanitary survey/inspection
*Monitoring waiver in force
*Disinfection waiver in force
*Justification for monitoring waiver(s)
*Justification for disinfection waiver(s)
Type and availability of more detailed information
Natural Characteristics of the Source
An initial determination would be made as to what kind of source it is, then further decisions would follow from there.
*Ground water source
*Surface water source
*Ground water source under the direct influence of surface water
Ground water source otherwise affected by surface water
Surface water source directly impacted by ground water
Location of Well/Ground Water Sources
Aquifer source
Consolidated or unconsolidated aquifer
Confined or unconfined aquifer
*Other known geological, soils, or aquifer characteristics data
What is the hydraulic conductivity of hydrogeologic units
Well production capacity
Actual production of the well/how much water is used
*Proximity of other wells (within the cone of influence of the system well)
Depth to aquifer
Depth of screen, if any
Ground Water Sources Influenced by Surface Water
Is the influence direct
How confirmed
Characteristics of the contributing surface water body(ies)
Proximity of well to surface water body

Table 2 - Data Needs to Perform Assessments
*Standard Assessment Data Indicated by **
Surface Water Sources
*Source flow data- quantity, direction of flow, time-of-travel
*Source type, name
*Intake location relative to water body
*Source water quality data
Detention time
Delineation History
Ground Water
*Has source been delineated
Has delineated area been digitized
Whether single or multiple aquifers
Type and accuracy of delineation
Surface Water
*Has watershed been delineated
Scale of delineation
Known time of travel from parts of watershed
Delineations done by DOH
Surface Water
Criteria for area of Great Lakes watershed or other large watershed (bigger than 1 8-digit HUC code)
Delineation process used
Ground Water
Delineation method selected and why selected
Whether done as conjunctive delineation
Whether regional delineations were used
Whether this delineation is lumped into a larger delineation
Contaminant Inventory (*Note: Inventory Categories found in the delineated water source assessment area(s) will be considered in each inventory, not all categories will be present in each)*
*LandUse/Land Cover Data (Landsat) - statewide or more specific
Septic Use Data Source - how proportioned
More detailed information on septic use available
*Toxic Release Inventory - facility location
*Agriculture Environmental management data available
Type of potential contaminants present
Whether known contaminant releases and where
*Solid Waste/Biosolids Sites
Known release of contaminants
Size of facility
Year of operation

Table 2 - Data Needs to Perform Assessments
*Standard Assessment Data Indicated by **
Contaminant Inventory (continued)
*Wastewater Treatment Plants
Size of facility
Discharge quantity and quality requirements
Types of contaminants permitted
Any data indicating significant noncompliance with permit conditions
*Other State Pollution Discharge Elimination System (SPDES) Permitted Facilities
Size of facility
Discharge quantity and quality requirements
Types of contaminants permitted
Any data indicating significant noncompliance with permit conditions
*Bulk Storage Facilities
Type of product stored
Type of contaminant
If release is known - when did it occur, type of material and quantity released
*Petroleum or Hazardous Material Spills
Type of contaminant
Quantity spilled
Remediation efforts completed
Known problems related to spill
*New York State Inactive Hazardous Waste Disposal Sites
Type and quantity of contaminants present
Whether contaminants migrating from site
Status of remediation
Whether site is a known to have contaminated a source of public drinking water
*Comprehensive Environmental Response Compensation Liability Act (CERCLA) Information System sites
Type and quantity of contaminants present
Whether contaminants migrating from site
Status of remediation
Whether site is known to have contaminated a source of public drinking water
*Major Transportation Routes: Roads, Railroads, Water Transport Routes, Pipelines
Known significant contaminant materials transported via transportation route
Significant storage or use of fertilizers
Known quantity and composition
Underground Injection Well Locations
Activity Status
Years Utilized
Known Chemical Composition of Injected Material
If release is known - when did it occur, type of material and quantity released
Regulatory Issues
Whether there are any of particular relevance to the system
Monitoring Waivers granted
Ground Water Rule
Long Term Enhanced Surface Water Treatment Rule/Disinfection Byproduct Rule
Source Protection
*Watershed rules and regulations in effect/proposed
Ongoing source protection activities
Type of organization for source protection, municipal, voluntary, etc.
Whether source protection would reduce a particular threat to the source

Table 2 - Data Needs to Perform Assessments
Susceptibility Review/Refinement Location of contaminant sources relative to drinking water source Likelihood/Timing of Release Effectiveness of pollution prevention activities Special impacts of local soils/geology (Soil infiltration groups A- D) Karst or fractured rock Presence/sources of Spring(s) Potential of local vegetation to affect contaminant transport Steepness of slopes Contaminant Fate and Transport issues of persistence and mobility

Table 3 - Criteria for Consideration when Completing Source Water Assessments
Source Type Surface Water Ground Water Ground Water Under Direct Influence of Surface Water Ground Water Otherwise Influenced by Surface Water Surface Water influenced by Ground Water (i.e. gaining streams)
Natural Sensitivity of Source Aquifer permeability/confinement Time-of-Travel Contributory Area
Source Characteristics Aquifer Type (unconfined, confined, bedrock, consolidated, unconsolidated) Surface Water Body Type (e.g., river, lake, reservoir)
Extraction Characteristics Well location and depth Intake location and depth Extraction type: well, caisson, infiltration gallery, spring Integrity of extraction device (e.g., well casing, intake structure)
Existing Assessment Information Accuracy/timeliness Completeness Level of detail
Water System Classification Type: Community Non-Transient Non-Community Water System Transient Non-Community Water System Size
Type of Ownership Municipal Investor-Owned Utility Private/Ancillary
Management Capacity Whether source water protection in place Whether source water area within system owner jurisdiction
Jurisdiction of Source Water Assessment Areas Coincides with Municipal Public Water System Town/County where Public Water System is located Multiple municipalities

Table 3 - Criteria for Consideration when Completing Source Water Assessments
Land Use Past Current Near-term change Projected/Anticipated (e.g., zoning) Percent ownership by supplier Percent ownership by governments
Multiple Use Waterbodies Human Wildlife Industrial/Commercial
Locations of Major Sources of Contamination Local Regional Transboundary
Public Perceptions Water Quality Land Use Contaminant Sources
Existing Source Water Protection/Management local (public water system, town, non-governmental organization) regional water resource (county, coalition, state, etc.)
Potential for Upgrading Source Water Protection local regional
Safe Drinking Water Act Regulatory Issues Monitoring Flexibility Ground Water Rule Long Term Enhanced Surface Water Treatment Rule/Disinfection Byproducts Rule

Table 4 - Potential for Ground Water Contamination Based on Land Cover								
Contaminant Category	**Land Cover Types**							
	Water	Low Intensity Residential	High Intensity Residential	High Intensity Commercial	Pasture	Row Crops	Other Grasses	Evergreen Forest
Halogenated Solvents	N	L(M)	L(M)	M (H)	N (L)	L	L	N
Petroleum Products	N	L	L(M)	M (H)	N (L)	L	L	N
Pesticides/Herbicides	N	L (M)	M	M	L	M	L	N
Other Industrial Organics	N	L	M	L (M)	N (L)	L	L	N
Metals	N	L	L	M	N (L)	L	L	N
Nitrates	N	M	M (H)	M	L (M)	M (H)	L	N
Phosphorus	N	N	N	N	N	N	N	N
Sediments/Turbidity	N	N	N	N	N	N	N	N
Protozoa	N	M	M (H)	L (M)	M	L (M)	L (M)	L
Enteric Bacteria	L	M	M (H)	L (M)	M	L (M)	L (M)	L
Enteric Viruses	L	H	M (H)	L (M)	M	L	L (M)	L
Cations/Anions (Salts, Sulfate)	N (L)	L (M)	M (H)	M (H)	L	L	L	N
Industrial Radionucleides	N	N	N (L)	N (L)	N	N	N	N
Disinfection Byproduct Precursors	N	N	N	N	N	N	N	N

Contaminant Category	**Land Cover Types**						
	Mixed Forest	Deciduous Forest	Woody Wetlands	Emergent Wetlands	Barren (Quarries, mines, pits)	Barren (Bare rock and sand)	Barren (Transitional, clearcut)
Halogenated Solvents	N	N	N	N	N	N	N
Petroleum Products	N	N	N	N	L	N (L)	N (L)
Pesticides/Herbicides	N	N	N	N	N	N	N
Other Industrial Organics	N	N	N	N	N	N	N
Metals	N	N	N	N	N	N	N
Nitrates	N	N	N	N	L	L	L
Phosphorus	N	N	N	N	N	N	N
Sediments/Turbidity	N	N	N	N	N	N	N
Protozoa	L	L	L	L	L	L	M
Enteric Bacteria	L	L	L	L	L	L	M
Enteric Viruses	L	L	L	L	L	L	M
Cations/Anions (Salts, Sulfate)	N	N	N	N	L	L	L
Industrial Radionuclides	N	N	N	N	N	N	N
Disinfection Byproduct Precursors	N	N	N	N	N	N	N (L)

Definitions:

Negligible (N): Land use type results in minimal, if any, presence of the contaminant category

Low (L): Land use type results in detections that are expected to be rare and, if detected, contaminant concentrations are expected to be below levels of concern for drinking water.

Medium (M): Land use type results in detections that are expected to be uncommon but, if detected, contaminant concentrations could be expected to be at or above levels of concern for drinking water.

High (H): Land use type results in detections that may occur frequently at levels of concern for drinking water.

Notes:

When two ratings are given, the rating in the parentheses "( )" is considered to reflect the worse case scenario, and the rating not in the parentheses is considered to be the more common situation.

Table 5 - Potential for Surface Water Contamination Based on Land Cover								
Contaminant Category	**Land Cover Types**							
	Water	Low Intensity Residential	High Intensity Residential	High Intensity Commercial	Pasture	Row Crops	Other Grasses	Evergreen Forest
Halogenated Solvents	N	N (L)	L	M	N	N	N	N
Petroleum Products	N (L)	L	L	M	N	N	N	N
Pesticides/Herbicides	N	M	M (H)	M (H)	M	H	M	L
Other Industrial Organics	N	L	M	M (H)	L	L	L	N
Metals	N	L	M	M (H)	L	L (M)	L	N
Nitrates	L	L	M	M	L (M)	M (H)	L	N
Phosphorus	L	M	M (H)	M (H)	M	M (H)	L	N
Sediments/Turbidity	L (M)	M	M (H)	M (H)	L	L (M)	N	N
Protozoa	L	M (H)	H	M (H)	H	M (H)	L (M)	L
Enteric Bacteria	L	M	H	M (H)	M (H)	M (H)	L (M)	L
Enteric Viruses	L	M	H	M (H)	M (H)	M (H)	L (M)	L
Cations/Anions (Salts, Sulfate)	N	L	M	M	L	L	L	N
Industrial Radionucleides	N	N	L	M	N	N	N	N
Disinfection Byproduct Precursors	L (M)	M	M (H)	M	M (H)	M (H)	L	L (M)

Contaminant Category	**Land Cover Types**						
	Mixed Forest	Deciduous Forest	Woody Wetlands	Emergent Wetlands	Barren (Quarries, mines, pits)	Barren (Bare rock and sand)	Barren (Transitional, clearcut)
Halogenated Solvents	N	N	N	N	N	N	N
Petroleum Products	N	N	N	N	N	N	N
Pesticides/Herbicides	N	N	L	L	N	N	N
Other Industrial Organics	N	N	L	L	N	N	N
Metals	N	N	N (L)	N (L)	N	N	N
Nitrates	N	N	L	L	N	N	L
Phosphorus	N	N	L	L	L	L	M (H)
Sediments/Turbidity	N	N	L	L	M	M	H
Protozoa	L	L	L (M)	L (M)	L	L	M (H)
Enteric Bacteria	L	L	L (M)	L (M)	L	L	M (H)
Enteric Viruses	L	L	L (M)	L (M)	L	L	M (H)
Cations/Anions (Salts, Sulfate)	N	N	L	L	L	L	L
Industrial Radionuclides	N	N	N	N	N	N	N
Disinfection Byproduct Precursors	N (L)	N (L)	L (M)	L (M)	N	N	L (M)

Definitions:

Negligible (N): Land use type results in minimal, if any, presence of the contaminant category.

Low (L): Land use type results in detections that are expected to be rare and, if detected, contaminant concentrations are expected to be below levels of concern for drinking water.

Medium (M): Land use type results in detections that are expected to be uncommon but, if detected, contaminant concentrations could be expected to be at or above levels of concern for drinking water.

High (H): Land use type results in detections that may occur frequently at levels of concern for drinking water.

Notes:

When two ratings are given, the rating in the parentheses "( )" is considered to reflect the worse case scenario, and the rating not in the parentheses is considered to be the more common situation.

Table 6 - Potential for Ground Water Contamination from Discrete Sources								
Contaminant Category	**Discrete Sources**							
	TRI Facilities	Solid Waste Sites	WWTPs	Other SPDES Facilities	Bulk Storage Facilities	Petroleum Spills	Hazmat Spills	CERCLIS
Halogenated Solvents	P	P	P	P	P	NP	P	P
Petroleum Products	P	P	P	P	P	P	P	P
Pesticides/Herbicides	P	P	P	P	P	NP	P	P
Other Industrial Organics	P	P	P	P	P	P	P	P
Metals	P	P	P	P	P	NP	P	P
Nitrates	P	P	P	P	P	NP	P	P
Phosphorus	P	P	P	P	P	NP	P	P
Sediments/Turbidity	NP	NP	NP	NP	NP	NP	NP	NP
Protozoa	NP	P	P	P	NP	NP	NP	NP
Enteric Bacteria	NP	P	P	P	NP	NP	NP	NP
Enteric Viruses	NP	P	P	P	NP	NP	NP	NP
Cations/Anions (Salts, Sulfate)	P	P	P	P	P	NP	P	NP
Industrial Radionuclides	P	P	P	P	P	NP	P	P
Disinfection Byproduct Precursors	P	P	P	P	P	NP	P	P

Definitions

Possible (P): Potential contamination source is considered a possible source of the contaminant category, irrespective of aquifer or watershed characteristics

Not Probable (NP): Potential contamination source is not considered a probable source of the contaminant category, irrespective of aquifer or watershed characteristics

Table 7 - Potential for Surface Water Contamination from Discrete Sources								
Contaminant Category	**Discrete Sources**							
	TRI Facilities	Solid Waste Sites	WWTPs	Other SPDES Facilities	Bulk Storage Facilities	Petroleum Spills	Hazmat Spills	CERCLIS
Halogenated Solvents	P	P	P	P	P	NP	P	P
Petroleum Products	P	P	P	P	P	P	P	P
Pesticides/Herbicides	P	P	P	P	P	NP	P	P
Other Industrial Organics	P	P	P	P	P	NP	P	P
Metals	P	P	P	P	P	P	P	P
Nitrates	P	P	P	P	P	NP	P	P
Phosphorus	P	P	P	P	P	NP	P	P
Sediments/Turbidity	P	P	P	P	P	P	P	P
Protozoa	NP	P	P	P	NP	NP	P	NP
Enteric Bacteria	NP	P	P	P	NP	NP	P	NP
Enteric Viruses	NP	P	P	P	NP	NP	P	NP
Cations/Anions (Salts, Sulfate)	P	P	P	P	P	NP	P	P
Industrial Radionuclides	P	P	P	P	P	NP	P	P
Disinfection Byproduct Precursors	P	P	P	P	P	NP	P	P

Definitions

Possible (P): Potential contamination source is considered a possible source of the contaminant category, irrespective of aquifer or watershed characteristics

Not Probable (NP): Potential contamination source is not considered a probable source of the contaminant category, irrespective of aquifer or watershed characteristics

Table 8 - Evaluation of Contaminant Prevalence Associated with Mapped Land Cover for a Particular Contaminant

Percent Land Cover	Land Cover with Contaminant Category Rated "Medium"		Land Cover with Contaminant Category Rated "High"	
	Susceptibility Zone 1	Susceptibility Zone 2	Susceptibility Zone 1	Susceptibility Zone 2
100%				
75 %	**Medium**	**Medium**	**High**	**High**
50%		**Low**		**Medium**
40%	**Low**		**Medium**	
30%				
20%				
10%				
5%				**Low**
			Low	

Table 9 - Evaluation of Contaminant Prevalence Associated with Discrete Potential Sources of Contamination		
Characteristics of Contaminant Source	**Location of Discrete Contaminant Source Relative to PWS Source**	
	Susceptibility Zone 1	**Susceptibility Zone 2**
Major	**High**	**Medium**
Minor	**Medium**	**Low**
None Present	**Negligible**	

Table 10 - General Description of Susceptibility Zones		
	Susceptibility Zone 1 (more hydrologically connected zone)	**Susceptibility Zone 2 (broader area of contribution)**
Ground Water		
Wells (unless known to be remotely recharged)	Inner well zone (see Section 4.2.2)	Outer well zone (see Section 4.2.2)
Remotely recharged wells	If available, hydrologically established recharge area or best estimate of remote recharge area based on available information	To be determined based on available information
Springs	Topographic catchment area	To be determined based on available information
Surface Water		
Surface water sources with significant travel times	Catchment areas within the immediate vicinity of the intake	Remainder of watershed
Other surface water sources	Entire watershed	Not applicable

References

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References

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New York State Department of Health. *Final Intended Use Plan - Drinking Water State Revolving Fund*, October 22, 1997.

New York State Department of Health, Center for Environmental Health. *Technical Reference; Item No. PWS184; Guidance for Conducting Sanitary Surveys* (7/20/93).

New York State Department of Health, Center for Environmental Health. *Technical Reference; Item No. PWS72; Determining Vulnerability to Contamination by Volatile Organic Chemicals* (6/25/90).

United States Environmental Protection Agency, Office of Water. *State Source Water Assessment and Protection Programs - Final Guidance* (EPA816-R-97-009), August 1997.

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Appendices

Appendix A
Listing of Local and State Health Department Offices

Listing of Local and State Health Department Offices

County Health Departments		
County	Address	Phone
Albany	S. Ferry & Green Streets, Albany, NY 12201	518/447-4620
Allegany	Court House, Belmont, NY 14813	716/268-9254
Broome	1 Wall Street, Binghamton, NY 13901-2795	607/778-2887
Cattaraugus	1701 Lincoln Ave., Suite 4010, Olean, NY 14760	716/373-8050
Cayuga	PO Box 219, 160 Genesee St., Auburn, NY 13021	315/253-1405
Chautauqua	Health & Social Services Bldg., Mayville, NY 14757	716/753-4481
Chemung	103 Washington St., PO Box 588, Elmira, NY 14902	607/737-2019
Chenango	County Office Bldg., Norwich, NY 13815	607/337-1673
Clinton	133 Margaret Street, Plattsburgh, NY 12901	518/565-4870
Columbia	71 North Third St., Hudson, NY 12534	518/828-3358
Cortland	PO Box 5590, 60 Central Ave., Cortland, NY 13045	607/753-5035
Dutchess	County Office Bldg., 387 Main Mall, Poughkeepsie, NY 12601	914/486-3472
Erie	Rath Office Bldg., 95 Franklin St., Buffalo, NY 14202	716/858-7677
Genesee	3837 W. Main Street, Batavia, NY 14020	716/344-8506
Livingston	2 County Campus, Mt. Morris, NY 14510	716/243-7280
Madison	County Office Bldg., Wampsville, NY 13163	315/366-2526
Monroe	111 Westfall Road, Rochester, NY 14692	716/274-6067
Nassau	240 Old County Road, Mineola, NY 11501	516/571-3691
Niagara	Shaw Bldg., 5467 Upper Mountain Rd., Lockport, NY 14094	716/439-7444
Oneida	520 Seneca Street, Utica, NY 13502	315/798-5064
Onondaga	PO Box 15190, Syracuse, NY 13215-0190	315/435-6623
Orange	124 Main St., Goshen, NY 10924	914/291-2332
Orleans	14012 Rt. 31 West, Albion, NY 14411	716/589-3251
Oswego	70 Brunner Street, Oswego, NY 13126	315/349-3567
Putnam	4 Geneva Road, Brewster, NY 10509-9809	914/278-6130

Listing of Local and State Health Department Offices

County Health Departments (continued)			
County	Address		Phone
Rensselaer	1600 Seventh Ave., Troy, NY 12180		518/270-2664
Rockland	Sanatorium Road, Pomona, NY 10970		914/364-2609
Schenectady	107 Nott Terrace, Suite 306, Schenectady, NY 12308-3170		518/386-2818
Schoharie	PO Box 667, 342 Main Street, Schoharie, NY 12157		518/295-8382
Seneca	31 Thurber Drive, Waterloo, NY 13165		315/539-5331
Suffolk	415 Oser Avenue, Suite 3, Hauppauge, NY 11788		516/853-2251
Tioga	231 Main Street, Owego, NY 13827		607/687-8566
Tompkins	401 Harris B. Dates Drive, Ithaca, NY 14850		607/274-6688
Ulster	300 Flatbush Ave., PO Box 1800, Kingston, NY 12401		914/340-3010
Westchester	145 Huguenot Street, New Rochelle, NY 10801		914/637-4901
Wyoming	338 North Main Street, Warsaw, NY 14569		716/786-8894
New York City Health Departments			
New York	125 Worth Street, New York, NY 10013		212/788-4646
New York	2 Lafayette Street, 11th Floor, New York, NY 10013		212/676-1520
New York State Department of Health			
Albany	Center for Environmental Health 2 University Place Albany, NY 12203		518/458-6400 or 800-458-1158
District Offices			
Counties	State District Offices	Address	Phone
St. Lawrence	Canton	58 Gouverneur Street Canton, NY 13617-3200	315/386-1040
Ontario, Wayne, Yates	Geneva	624 Pre-Emption Road Geneva, NY 14456-1334	315/789-3030
Saratoga, Warren, Washington	Glens Falls	77 Mohican Street Glens Falls, NY 12801-4429	518/793-3893
Fulton, Herkimer, Montgomery	Herkimer	5665 State Rt. 5 Herkimer, NY 13350	315/866-6879

Listing of Local and State Health Department Offices

District Offices			
Counties	State District Offices	Address	Phone
Schuyler, Steuben	Hornell	107 Broadway Hornell, NY 14843-0430	607/324-8371
Sullivan	Monticello	50 North Street, Suite 2 Monticello, NY 12701-1171	914/794-2045
Delaware, Greene, Otsego	Oneonta	28 Hill Street, Suite 201 Oneonta, NY 13820-9804	607/432-3911
Essex, Franklin, Hamilton	Saranac Lake	11-15 St. Bernard Street Saranac Lake, NY 12983-1839	518/891-1800
Jefferson, Lewis	Watertown	317 Washington Street Watertown, NY 13601-3741	315/785-2277
State Regional Offices			
Western (2 offices)	584 Delaware Ave., Buffalo, NY 14202 Bevier Bldg., 42 S. Washington Street, Rochester, NY 14608		716/847-4530 716/423-8069
Metropolitan	5 Penn Plaza, 4th Floor, New York, NY 10001-1800		212/613-2442
Capital	2 University Place, Rm. 410, Albany, NY 12203		518/458-6731 or 458-6445
State Field Offices			
Syracuse	217 South Salina Street, 3rd Floor, Syracuse, NY 13202		315/426-7608

Appendix B
Public Participation Plan

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Source Water Assessment Program

Public Participation Plan for Development of the Source Water Assessment Program Plan

Final

1. Wellhead Protection Coordinating Committee Video Conference

Purpose: Meet with the committee to talk about the Source Water Assessment Program, the Source Water Assessment Program public participation plan and the idea of a focus group meeting(s).
Completed: May 22, 1997

2. County and District Health Departments' Conference

Purpose: Meet with the city, county and district Department of Health (DOH) staff to discuss the Source Water Assessment Program, the Source Water Assessment Program public participation plan and the outcome of the Wellhead Protection Coordinating Committee meeting.
Completed: September 16, 1997

3. Focus Group Meetings

Purpose: To provide the DOH with guidance on who will use the assessments, how they will use them and how the DOH should conduct outreach activities so that we obtain comments from the affected public prior and during the development of the Source Water Assessment Program plan.
Completed: November 19 & 20, 1997

4. Convene Source Water Protection Coordinating Committee

Purpose: The committee's first task is to provide the DOH with input on the Source Water Assessment Program plan development. The committee's membership has a broad based representation. There are five working groups to help develop different sections of the plan. The working groups are: public participation/assessment format; delineation; GIS/data collection; contaminant inventory/significance; and aquifer/watershed and interjurisdictional perspectives. The Committee meets quarterly.
Completed: January 12, April 1, June 10, September 28, and December 10, 1998
June 8, September 8, 1999

4a. Establish and begin discussions with working groups

Purpose: Each working group will provide the DOH with input on the Source Water Assessment Program plan contents as it pertains to their specific working group topic.
Completed: February 1998

4b. Write discussion draft of the Source Water Assessment Program plan.

Completed: April 1, 1998

4c. Set-up Listserve

Purpose: Provide participants of the Source Water Protection Coordinating Committee and affiliated working group members with an avenue to exchange information regarding source water assessment and protection.

Completed: April 7, 1998

4d. Consult with Source Water Protection Coordinating Committee and review initial draft of the Source Water Assessment Program plan.

Completed: April 17, 1998

5. Put Source Water Assessment Program information on NYS DOH Web Site

Purpose: Provide citizens with access to information about the Source Water Assessment Program and a mechanism to ask the NYS DOH questions about the program.

Completed: September 10, 1998

6. Work with County Water Quality Coordinating Committees

Purpose: Involve active local entities in the development of the Source Water Assessment Program Plan.

6a. NYS Soil & Water Committee Water Quality Symposium

Purpose: Conducted a session at the symposium to inform and educate local groups that we would like to work with at the local level. The session covered: overview of Source Water Assessment Program, historical perspective, state and local approach to Source Water Assessment Program and how the public can be involved.

Completed: March 5, 1998

6b. Cornell Cooperative Extension Source Water Assessment Program Satellite Telecast

Purpose: Provide local interested parties information about the Source Water Assessment Program, how they can be involved in developing the program plan and receive feedback on specific planning questions. Downlinks of the broadcast in almost each county with meetings on the Source Water Assessment Program held in conjunction with the broadcasts. Provided each facilitator with a packet of information to help support setting up, holding and running these meetings. Provided multiple copies of fact sheets, public summaries of the plan and questions to guide the meeting discussion.

Completed: June 16, 1998

6c. Update of County Water Quality Strategies

Purpose: Integrate the Source Water Assessment Program into each County's Water Quality Strategy Document.

Ongoing

6d. Review responses from the meetings held in conjunction with the satellite broadcast.
Completed: August 1998

7. Distribute a draft of the Source Water Assessment Program plan to workshop attendees.

Purpose: Distribute the draft and an overview of the workshop questions to prepare people for the workshops.
Completed: August 26, 1998

8. Hold Regional Workshops

Purpose: Refine draft plan and gather comments from different areas of the state on issues related to implementing the Source Water Assessment Program.
Completed: September 10, 14, 18, 22 & 23, 1998

9. Distribute public comment draft of the Source Water Assessment Program plan.

Purpose: As required in the Safe Drinking Water Act, the Source Water Assessment Program plan will go through a public review and comment period.
Completed: November 10 - December 18, 1998

9a. Hold public hearings on the plan.

Purpose: As required in the Safe Drinking Water Act, public hearings were held for the Source Water Assessment Plan.
Completed: November 23, December 1 & 3, 1998

9b. Prepare a responsiveness summary

Purpose: Address the comments that were received from the public on the draft plan.
Completed: February 6, 1999

9c. Revise document

Purpose: Based on the comments received during the public comment period, the draft plan was revised as necessary.
Completed: February 6, 1999

10. Submit plan to the Environmental Protection Agency.

Completed: February 4, 1999

10a. Revise draft as needed

Purpose: To address significant EPA review comments as appropriate.

10b. Receive EPA approval of plan

Completed: November 6, 1999

Appendix C

List of Source Water Protection Coordinating Committee Members

LIST OF SOURCE WATER PROTECTION COORDINATING COMMITTEE MEMBERS

Name	Affiliation	Committee Member, Alternate or Working Group Member*
Albeck, Dale	Broome County Health Department	Working Group Member
Ash, Albert	NYS Department of Environmental Conservation	Working Group Member
Babbitt Myers, Kyle	Cornell Cooperative Extension of Sullivan County	Working Group Member
Babcock, Kirk	Miller Environmental Group	Working Group Member
Banks, Eric	Southern Tier AIDS Program Inc.	SWPCC Alternate
Boria, William	Chautauqua County Health Department	Working Group Member
Breiten, Jessica	Herkimer-Oneida Regional Planning	Working Group Member
Brink, Ron	Broome County Health Department	Working Group Member
Brown, Diane	Southern Tier AIDS Program	SWPCC Member
Brown, Craig	U.S. Geological Survey	Working Group Member
Burns, Laurie	Council of Community Services	SWPCC Member
Cavalcoli, Mona	NY Section American Water Works Association	Working Group Member
Chartier, Gerry	NYS Environmental Facilities Corp.	SWPCC Member
Church, David	NY Planning Federation	SWPCC Member
Denz, Robert	Conference of Environmental Health Directors	SWPCC Member
DePinto, Joe	Great Lakes Program	Working Group Member
Dirlam, H. Kier	Southern Tier West Regional Planning & Dev. Board	SWPCC Alternate
DiTella, Katrie	TXA Water Quality Program	Working Group Member
DuBois, Marilyn	Leg. Comm. on Toxic Substances & Hazardous Waste	SWPCC Alternate
Eckhardt, David	U.S. Geological Survey	Working Group Member
Esser, Anthony	U.S. Department of Agriculture (NRCS)	Working Group Member
Fais, Jennifer	Southern Tier Central Regional Planning & Development	SWPCC Alternate
Ferrara, Rocco	Capital District Regional Planning Commission	SWPCC Alternate
Ford, Libby	NY Water Environment Organization	SWPCC Member
Fullmer, Jeff	Citizens Campaign for the Environment	Working Group Member
Garry, James	NYS Department of Environmental Conservation	Working Group Member
Gilberto, Donna	NYS Conference of Mayors & Municipal Officials	SWPCC Member
Goodale, Bruce	Rural Community Assistance Program	SWPCC Member
Grantham, Deborah	Cornell University	Working Group Member
Guerin, Thomas	NYS Association of County Health Officials	SWPCC Member
Hanle Younge, Lee	NYS Association of Environmental Mgmt Council	SWPCC Member
Hayes, Gary	NYS Association of Regional Councils (NYSARC)	SWPCC Member
Heinz, Erica	Leg. Comm. on Toxic Substances & Hazardous Waste	SWPCC Member
Heminway, Diane	Citizens Environmental Coalition	SWPCC Alternate
Hinchcliff, Diana	Alliance of Chemical Industries of NYS	SWPCC Member
Hoffman, Rick	NYS Department of State	Working Group Member
Hoxsie, Ed	Dutchess County Soil and Water Conservation District	Working Group Member
Hullar, Ted	Cornell Center for the Environment	SWPCC Member
Jones, Barbara	Council of Community Services of NYS, Inc.	SWPCC Alternate
Karimipour, Shohreh	NYS Department of Environmental Conservation	Working Group Member
Kauffman, Kevin	Intermunicipal Water Commission	Working Group Member
Kay, David	Upstate Chapter - American Planning Association	SWPCC Member
Kendall, Dan	NYS Department of Environmental Conservation	Working Group Member
Kendall, Barbara	Local Cornell Cooperative Extension Agents	SWPCC Member
Kepple, Dan	Federation of Lake Association	SWPCC Member
Landre, Betsy	Finger Lakes-Lake Ontario Watershed Protection Alliance	SWPCC Member
Lee, Cara	Scenic Hudson	SWPCC Member
Letourneau, Patrick	AIDS Network of Western New York Inc.	SWPCC Member
Lewis, Rich	NYS Soil and Water Conservation Committee	SWPCC Alternate
Lubin, Rebecca	NY Planning Federation	SWPCC Alternate
MacBeth, Lee	City of Syracuse Water District	Working Group Member
Mapstone, Greg	Ulster County Health Department	Working Group Member
Markussen, Ken	NYS Department of Environmental Conservation	Working Group Member
McCardell, Jim	NYS Soil and Water Conservation Committee	SWPCC Member
Medd, David	NY Water American Water Company	SWPCC Member

LIST OF SOURCE WATER PROTECTION COORDINATING COMMITTEE MEMBERS

Name	Affiliation	Committee Member, Alternate or Working Group Member*
Medovich, Mike	Southern Tier East Regional Planning Development Board	SWPCC Alternate
Meyland, Sarah	Citizens Campaign for the Environment	SWPCC Member
Miklasz, Cally	NYS Soil and Water Conservation Committee	Working Group Member
Miller, David	Rural Utilities Service	Working Group Member
Miller, Todd	U.S. Geological Survey	SWPCC Alternate
Milligan, Michael	State University of New York - Fredonia	SWPCC Alternate
Mirando, John	Long Island Water Corporation	SWPCC Member
Mithen, Lori	Association of Towns of the State of New York	SWPCC Member
Moore, L. Grady	U.S. Geological Survey	SWPCC Member
Morse, Rick	Legislative Commission on Water	SWPCC Alternate
O'Mally, Pam	NYS Association of Regional Councils	Working Group Member
O'Neil, Charles	New York Sea Grant	SWPCC Member
Ortiz, Lisa	Long Island Water Corporation	SWPCC Alternate
Ossont, Jack	Citizens Environmental Coalition	SWPCC Member
Pacenka, Steve	Water Resources Institute - Cornell University	Working Group Member
Patterson, Joseph	Herkimer-Oneida Regional Planning	Working Group Member
Pike, Howard	NYS Department of Environmental Conservation	Working Group Member
Pokalsky, Kenneth	Business Council of NYS	SWPCC Member
Porter, Mary Jane	NYS Water Resources Institute	Working Group Member
Porter, Keith	NYS Water Resources Institute	Working Group Member
Posten, Steve	NYS Chemcial Alliance	Working Group Member
Rabe, Ann	Citizen's Environmental Coalition	SWPCC Member
Rice, Gary	Tioga County Health Department	SWPCC Alternate
Robbins, Sy	Suffolk County Department of Health	Working Group Member
Rowe, Don	New York State Association of County Health Officials	Working Group Member
Rynkiewicz, Peter	Cortland County Health Department	Working Group Member
Scalera, Pat	NY Rural Water Association	Working Group Member
Schrantz, Brian	Southern Tier West	Working Group Member
Silberstein, Barry	NYS Chemical Alliance	Working Group Member
Simroe, Theodore	New York City Department of Environmental Protection	SWPCC Member
Skaley, James	Tompkins County Planning Department	Working Group Member
Smith, Steve	Cornell University GIS Program Leader	Working Group Member
Smith, Kevin	Tug Hill Commission	SWPCC Member
Smith, Libby	NYS Department of Environmental Conservation	Working Group Member
Soderberg, John	Farrell, Fitz, Caemmerer, Cleary, Barnosky	SWPCC Member
Squires, Joy	Statewide Association of Citizen Advisory Council	SWPCC Member
Stack, Keith	NYS Department of State	SWPCC Member
Stallman, Claudia	NYS Association of Environmental Mgmt. Council	SWPCC Alternate
Stewart, Kyle	NY Farm Bureau	SWPCC Member
Stoner, Scott	NYS Department of Environmental Conservation	Working Group Member
Swenson, Richard	U.S. Department of Agriculture (NRCS)	SWPCC Member
Their, Audrey	Environmental Associates	Working Group Member
Vahue, David	NYS Rural Development Council	SWPCC Member
Wagenet, Linda	Cornell University	Working Group Member
Waivada, Teri	Hudson Valley Regional Council	SWPCC Alternate
Waldron, Steve	Central New York Health Systems Agency, Inc.	SWPCC Member
Washington, Val	Environmental Advocates	SWPCC Member
Webb, William	Northeast Rural Community Assistance Program	SWPCC Alternate
Whalen, Mildred	League of Women Voters of NY State	SWPCC Member
Williamson, Karen	NYS Soil and Water Conservation Committee	Working Group Member
Wilson, Mike	State University of New York – Fredonia	SWPCC Member
Winkley, Steven	NY Rural Water Association	SWPCC Member
Young, Walter	Lake Champlain-Lake George Regional Planning	SWPCC Alternate
Zimmerman, Rich	NY Farm Bureau	SWPCC Alternate
Zorn, David	Genesee/Finger Lakes Regional Planning Council	Working Group Member

*Some members are on the Coordinating Committee and a working group. In these cases the member will only be identified as being a member (or alternate) on the Coordinating Committee.

Appendix D
New York State Department of Health Technical References

The New York State Department of Health does not have an electronic copy of Appendix D. If you would like to receive a hard copy, please contact:

New York State Department of Health
Center for Enviromental Health
Source Water Assessment Program
Flanigan Square, Room 400
547 River Street
Troy, NY 12180-2216
518-402-7713
1-800-458-1158 ext. 2-7713

Or send e-mail to: bpwsp@health.state.ny.us

Appendix E
Wellhead Protection Program Delineation

The New York State Department of Health does not have an electronic copy of Appendix E. If you would like to receive a hard copy, please contact:

New York State Department of Health
Center for Enviromental Health
Source Water Assessment Program
Flanigan Square, Room 400
547 River Street
Troy, NY 12180-2216
518-402-7713
1-800-458-1158 ext. 2-7713

Or send e-mail to: bpwsp@health.state.ny.us

Appendix F
List of Contaminants of Concern

List of Contaminants of Concern

Halogenated solvents

bromochloromethane (3)
bromomethane (3)
carbon tetrachloride (1, 3)
chlorobenzene (1, 3)
chloroethane (3)
chloromethane (3)
2-chlorotoluene (3)
4-chlorotoluene (3)
dibromomethane (3)
1,2-dichlorobenzene (1, 3)
1,3-dichlorobenzene (3)
1,4-dichlorobenzene (1, 3)
dichlorodifluoromethane (3)
1,1-dichloroethane (3)
1,2-dichloroethane (1, 3)
1,1-dichloroethene (1, 3)
cis-1,2-dichloroethene (1, 3)
trans-1,2,-dichloroethene (1, 3)
dichloromethane (1,3)
1,2-dichloropropane (3)
1,3-dichloropropane (3)
2,2-dichloropropane (3)
1,1-dichloropropene (3)
cis-1,3-dichloropropene(3)
trans-1,3-dichloropropene (3)
hexachlorobutadiene (2, 3)
methylene chloride (1, 3)
1,1,1,2-tetrachloroethane (3)
1,1,2,2-tetrachloroethane (3)
tetrachloroethene (1, 3)
1,2,3-trichlorobenzene (3)
1,2,4-trichlorobenzene (3)
1,1,1-trichloroethane (1, 3)
1,1,2-trichloroethane (1, 3)
trichloroethene (1, 3)
trichlorofluoromethane (3)
1,2,3-trichloropropane (3)
vinyl chloride (1,3)

Petroleum products

benzene (1, 3)
bromobenzene (3)
n-butylbenzene (3)
sec-butylbenzene (3)
tert-butylbenzene (3)
cis-1,2-dichlorobenzene (3)
ethyl-teriary-butyl-ether (ETBE) (3, 4)
ethylbenzene (1, 3)
isopropylbenzene (cumene) (3)
4-isopropyltoluene (p-cymene) (2, 3)
methyl-tertiary-butyl-ether (MTBE) (2, 3)
naphthalene (2, 3)
n-propylbenzene (3)
tert-amyl methyl ether (TAME) (3, 4)
toluene (1, 3)
1,2,3-trichlorobenzene (3)
1,2,4-trichlorobenzene (3)
1,2,4-trimethylbenzene (3)
1,3,5-trimethylbenzene (3)
m-xylene (1, 3)
o-xylene (1, 3)
p-xylene (1, 3)

Other Industrial Organics

acrylamide (1,3)
benzo(a)pyrene (3)
2,4-dichlorophenol (2)
2,4-dinitrophenol (2)
2,4-dinitrotoluene (2)
2,6-dinitrotoluene (2)
1,2-diphenylhydrazine (2)
ethylene glycol (3)
epichlorhydrin (1, 3)
hexachlorocyclopentadiene (3)
p-isopropyltoluene (3)
4-nitrophenol (3)
PAHs (benzo(a)pyrene) (1,3)
PCBs (1, 3)
propylene glycol (3)
styrene (1, 3)
2,3,7,8-TCDD (dioxin) (1, 3)
2,4,6-trichlorophenol (2)

Pesticides

List of Contaminants of Concern

acetochlor (2, 3)
alachlor ESA (2, 3)
alachlor (1, 3)
aldicarb (2, 3)
aldicarb sulfone (2, 3)
aldicarb sulfoxide (2, 3)
aldrin (2, 3)
atrazine (1, 3)
benfluralin (3)
bromacil (3)
butachlor (3)
carbaryl (3)
carbofuran (1,3)
captan (3)
chlordane (1, 3)
chlorpyrofos (3)
2,4-D (1, 3)
dalapon (1, 3)
daminozide (3)
DCPA mono-acid & di-acid degradates (2,3)
DDE (2, 3)
diazinon (2, 3)
dibromochloropropane (DBCP) (1, 3)
dicamba (3)
1,2-dichloropropane (3)
dieldrin (2, 3)
dinoseb (1, 3)
di(2-ethylhexyl) adipate (1,3)
di(2-ethylhexyl)phthalate (1,3)
diquat (1, 3)
disulfoton (2, 3)
diuron (2, 3)
endosulfan sulfate (3)
endothall (1,3)
endrin (1, 3)
EPTC (2, 3)
ethofumasate (3)
ethylene dibromide (EDB) (1, 3)
fonofos (2, 3)
glyphosate (1, 3)
heptachlor (1, 3)
heptachlor epoxide (1, 3)
hexachlorobenzene (HCB) (3)
3-hydroxycarbofuran (3)
imidacloprid (3)
isofenphos (3)
lindane (1, 3)

Pesticides (continued)

linuron (2, 3)
mancozeb (3)
maneb (3)
mecoprop dimethylamine (MCPP) (3)
metalaxyl (3)
methyl bromide (2, 3)
methomyl (3)
metolachlor (2, 3)
methoxychlor (1, 3)
metribuzin (2, 3)
molinate (2, 3)
nitrobenzene (2, 3)
organotins (2, 3)
oxamyl (Vydate) (1, 3)
pendimethalin (3)
pentachlorophenol (3)
pichloram (1, 3)
prometon (2, 3)
propachlor (3)
propoxur (3)
RDX (2, 3)
simazine (1, 3)
2,4,5-TP (Silvex) (1, 3)
tetrachloroterephthalic acid (TPCA) (3)
terbacil (2, 3)
terbufos (2, 3)
toxaphene (1, 3)
triazines (& degradation products) (2, 3)
trifluralin (3)
1,2,3-trichloropropane (3)

Metals

antimony (1, 3)
arsenic (1, 3)
barium (1, 3)
beryllium (1, 3)
boron (2)
cadmium (1, 3)
chromium (1, 3)
copper (1, 3)
iron (3)
lead (1, 3)
manganese (2, 3)
mercury (1, 3)
nickel (2, 3)
selenium (1, 3)

Metals (continued)

silver (3)
sodium (2, 3)
thallium (1, 3)
vanadium (2, 3)

zinc (3)

Nitrate

nitrate (1, 3)
nitrite (1, 3)
nitrate/nitrite (1, 3)

Phosphorus

phosphorus, total (4)
orthophosphate (4)

Cations/Anions

fluoride (1, 3)
chloride (3)
cyanide (1, 3)
perchlorate (2, 3)
sulfate (2, 3)

Sediments/turbidity

total suspended solids (3)
turbidity (3)

Industrial Radionucleides

Ra-226 (1, 3)
Ra-228 (1, 3)
gross alpha (1, 3)
beta particle (1, 3)
photon radioactivity (3)
Uranium (2)

Enteric viruses

Caliciviruses (2)
Echoviruses (2)
Coxsackieviruses (2)
Adenoviruses (2)

Protozoa

cryptosporidium (1)
giardia (1, 3)
microsporidia (2)

Enteric Bacteria

Aeronomas hydrophila (2)
total coliform (1, 3)
E. coli. (1, 3)
Helicobacter pylori (2)
Legionella (1)

Disinfection by-product precursors

total organic carbon (4)
UV254 (4)
THMs (1, 3)

Footnotes:
(1) Federally regulated
(2) Contaminant Candidate List (or scheduled for federal regulation)
(3) NYS regulated
(4) Not directly regulated

Appendix G
Hypothetical Source Water Assessments

SOURCE WATER ASSESSMENT PUBLIC SUMMARY
CITY OF BIGTOWN - PUBLIC DRINKING WATER SYSTEM
REVISED JUNE 1998

INTRODUCTION

The New York State Department of Health (DOH) is completing assessments of the contaminant threats to all public drinking water sources. The New York State and Strong County Health Departments have prepared this *Source Water Assessment Public Summary* to provide information to support local and state efforts to protect the City of Bigtown's public drinking water sources. The information contained in this assessment pertains to the source(s) of water delivered by the City of Bigtown Water System. The emphasis of this assessment is on "source" (river water) water rather than "tap" water. Information on tap water quality is available in the City of Bigtown's *Annual Water Supply Statement* which can be obtained from the Bigtown Water Department by calling (555) 555-1233.

WHAT IS THE SOURCE OF YOUR DRINKING WATER?

The source of water for the City of Bigtown is surface water drawn from the Meandering River. An average of 15 million gallons of water is withdrawn from the river per day. The water system serves a population of 100,000 residents. The location of the city's intake on the Meandering River is shown on the attached map. The map also depicts the boundaries of the watershed, which is composed of 2,000 square miles and drains to the Meandering River north of Bigtown. Approximately fifty percent of the watershed area is forested, forty-five percent is used for agriculture (pasture and crops for dairy), and five percent of the area is developed for residential, commercial or industrial uses. There are approximately 1,800 farms raising 120,000 cattle in the watershed area. The estimated population of the Meandering River watershed is 150,000.

WATER QUALITY AND WATER TREATMENT INFORMATION

Water withdrawn from the Meandering River is filtered and disinfected with chlorine prior to distribution to consumers. Water quality testing performed by the City of Bigtown indicated that results of tap water sampling done in 1997 were all within the limits set by the DOH. For further information regarding the quality of the system's finished (tap) water, please refer to the *Annual Water Supply Statement*.

EVALUATION OF SIGNIFICANT POTENTIAL SOURCES OF CONTAMINATION

This assessment evaluates contaminants that **may** enter the water drawn directly from the Meandering River before treatment. The contaminants addressed in this assessment include those regulated under the federal Safe Drinking Water Act as well as those which the DOH has determined may present a concern to public health. A description of the **significant potential** sources of contamination associated with the Meandering River watershed are provided below. Each significant potential source of contamination has been analyzed and prioritized (low, medium, and high) according to its potential to impact the water supply. Potential sources of contamination of medium and high priority are summarized below.

Potential Sources of Contamination	Contaminants of Concern	Description	Potential Impact to Source Water Quality
Treated sewage discharges (see map)	Pathogens, including Cryptosporidium.	• Wastewater generated from most homes and businesses the in watershed is discharged to a municipal sewage collection system. • Total permitted discharge represents about 1% of the average flow in the Meandering River; however, during droughts they could contribute up to 20% of river flow.	Medium to high
Farm animal manure.	Pathogens, including Cryptosporidium.	• Approximately 1,800 farms raise 120,000 cattle or other large farm animals.	Medium to high.

As indicated above, treated sewage discharges, farm animal manure, and to a lesser degree, wildlife, are significant sources of pathogens (germs) that can cause waterborne diseases. The combination of filtration and disinfection removes and/or destroys most of these pathogens. A concern remains about Cryptosporidium of which about ninety-nine percent can be removed by filtration. Although much is unknown about Cryptosporidium it is known to cause an intestinal disease (cryptosporidiosis) which can be very serious for people with weak immune systems, such as chemotherapy, dialysis or transplant patients, and people with Crohn's disease or HIV infection. People with weakened immune systems should discuss with their health care providers the need to take extra precautions to minimize the chance for exposure to Cryptosporidium, such as using a certified bottled water or a specially approved home filter, or boiling tap water.

Watersheds like the Meandering River with sewage discharges and farm animals are considered higher risk for containing Cryptosporidium than watersheds without these sources. The occurrence is also is believed to vary seasonally with weather extremes, such as high precipitation or drought. The method for measuring Cryptosporidium contamination in water is not always reliable; and it is difficult to know how much is present at any time.

Other potential sources of contamination (and contaminants of concern) that were evaluated as part of the Source Water Assessment included: agricultural activities (pesticides and nitrates), on-site septic systems (pathogens), waste sites (leaking small amounts of solvents and metals), and commercial/industrial activities (solvents and petroleum). However, based on an evaluation of these potential contaminant sources, as part of this assessment, the DOH concluded that they do not pose a significant threat to the drinking water source for the City of Bigtown.

ONGOING WATERSHED PROTECTION ACTIVITIES

Direct discharge of contaminants in this watershed are addressed by state and federal regulations. More diffuse contamination from farms is being addressed by voluntary cooperation among farmers and government agencies. Local groups are also preparing a water management plan to address drinking water and other water quality issues.

SOURCE WATER PROTECTION NEEDS

Based on the evaluation that was completed as part of this Source Water Assessment, the DOH has determined that existing state and local programs should provide adequate protection of this drinking water source. Emphasis should be placed on the effectiveness of controls for Cryptosporidium. Better understanding of the risks associated with Cryptosporidum may result in the need to enhance protection (or treatment).

HOW TO OBTAIN ADDITIONAL INFORMATION

This *Source Water Assessment Public Summary* was completed in June 1998. Individuals interested learning more about this water system and watershed can contact the City of Bigtown at (555)555-1234 or the Strong County Health Department at (555)555-3344. Additional information can be obtained from the New York State Department of Health's Source Water Assessment Program at (518) 458-6793. This document is also available on the DOH's "webpage" at WWW.HEALTH.STATE.NY.US (select "Information for Consumers"; "Environmental and Occupational Health"; "Source Water Assessments"). A *Full Length* (more detailed version) of this *Source Water Assessment* is available for review at the Strong County Health Department and the Strong County Library.

SOURCE WATER ASSESSMENT PUBLIC SUMMARY
VILLAGE OF SMALLTOWN - PUBLIC DRINKING WATER SYSTEM
REVISED JUNE 1998

INTRODUCTION

The New York State Department of Health (DOH) is completing assessments of the contaminant threats to all public drinking water sources. The New York State and Little County Health Departments have prepared this *Source Water Assessment Public Summary* to provide information to support local and state efforts to protect the Village of Smalltown's public drinking water sources. The information contained in this assessment pertains to the sources of water delivered by the Village of Smalltown Water System. The emphasis of this assessment is on "source" (well/spring) water rather than "tap" water. Information on tap water quality is available in the Village of Smalltown's *Annual Water Supply Statement* which can be obtained from the Smalltown Water Department by calling (555) 555-1233.

WHAT IS THE SOURCE OF YOUR DRINKING WATER?

The Village of Smalltown water system serves a population of 1,000 residents. The Village of Smalltown has two sources of drinking water as shown on the attached map: a well located within the village limits and a spring located on a hillside approximately two miles west of the well. The spring flows constantly to the water distribution system and provides about 60,000 gallons per day, but somewhat less during droughts. The well is pumped to provide 50,000 gallons per day.

An investigation performed in 1993 revealed that the spring collection pipes were not adequately sealed against penetration from water that had flowed across the surface of the land. The collection pipes were reconstructed to assure that the water entering the pipes had percolated through the ground for some considerable but unknown distance. To be sure to include any possible sources of contamination, it was estimated that the spring draws water from an area extending to the top of the hill, as shown on the attached map. Most of this land is forested and owned by the village. Small sections in private ownership are cleared for pasture. There are no buildings in the area.

The well is 55 feet deep and draws groundwater from a ten-foot deep layer of sand and gravel called an aquifer. The land area (approximately two square miles) that contributes water to the well is depicted on the attached map. This contributory area is composed of land located inside and outside of the village limits. Within the village, this area is used for residential and commercial activities, although the village owns and controls the land immediately surrounding the well (a 200 foot minimum radius). The area outside of the village is composed of mostly agricultural land used to grow corn.

WATER QUALITY AND WATER TREATMENT INFORMATION

The water withdrawn from the well and the spring is not disinfected prior to distribution. Water quality testing performed by the village indicated that results of sampling done in 1997 were all within the limits set by the DOH. However, sampling of the well did indicate an increase in the levels of nitrate and the presence of organic solvents. Although detected, both the nitrate and organic solvent levels were within the state drinking water standards. For further information regarding the quality of the system's finished (tap) water, please refer to the *Annual Water Supply Statement*.

EVALUATION OF SIGNIFICANT POTENTIAL SOURCES OF CONTAMINATION

This assessment evaluates contaminants that **may** enter the water drawn directly from the well or spring. The contaminants addressed in this assessment include those regulated under the federal Safe Drinking Water Act as well as those which the DOH has determined may present a concern to public health. A description of the **significant potential** sources of contamination associated with the watershed is provided below. Each significant potential source of contamination has been analyzed and prioritized (low, medium, and high) in accordance with their potential to impact the water supply. Potential sources of contamination of medium and high priority are summarized below.

Potential Sources of Contamination	Contaminants of Concern	Description	Potential Impact to Water Supply
Gasoline Stations (see map)	Petroleum hydrocarbons and solvents	• Two gasoline stations (each with 4 underground gasoline storage tanks) are located within 500 feet of the wellhead. • A spill at one gasoline station was controlled and a remedial action plan is in place.*	Medium
On-site septic systems	Pathogens and nitrates	• Approximately 22 homes and businesses located within the contributory area to the well, use septic systems. • Four septic systems are within the two year time of travel to the well. These systems were installed before modern design standards and their integrity is unknown.	Medium
Sanitary sewers	Pathogens and nitrates	• All of the buildings within the village are connected to sanitary sewers which discharge to the village's wastewater treatment plant (see map). • Sanitary sewers were last tested in 1978 for leaks and found to be marginally acceptable.	Medium
Industrial waste site (see map)	Solvents	• An abandoned industrial paint manufacturing facility is located approximately 750 feet from the wellhead. • Low levels of solvents have been detected in monitoring wells located at the abandoned facility.* • No further environmental remediation is being required at this site.	Medium
Agricultural Activities	Nitrates and pesticides	• Fertilizer, a source of nitrate, is used on the cropland within the well's contributory area.* • Elevated nitrate levels have been observed in the well.	Medium-High
* References are present in the *Full Length Source Water Assessment Report* (see below).			

The spring is believed to be adequately protected from pathogen contamination since the entry of nearby surface water has been excluded. Low level concentrations of inorganic chemicals have been detected at the spring; however, these chemicals are probably the result of naturally occurring minerals.

Because the water from the well is not disinfected, the sanitary sewers and septic systems are potential sources of pathogen contamination which could cause waterborne disease. The presence of nitrates in the

well water is suspected to be the result of fertilization of farmland within the assessment area. Septic systems and over fertilization of lawns may also be contributing to the nitrate levels. The low levels of organic chemical solvent in the well originated at the nearby abandoned paint manufacturing facility. No further environmental remediation is being required at the former paint manufacturing site.

Other potential sources of contamination (and contaminants of concern) that were evaluated as part of the Source Water Assessment of the well included: other commercial activities (solvents and petroleum); residential activities (pesticide application); naturally occurring minerals; and radioactivity. However, based on an evaluation of these potential contaminant sources as part of this assessment, the DOH concluded that they do not pose a significant threat to the Village's well. No significant sources of contamination to the spring were identified.

ONGOING WATERSHED PROTECTION ACTIVITIES

The Smalltown aquifer has been added to the State Priority Aquifer List, a statewide list of water quality information used to determine the need for additional investigation. The nitrate contamination is being addressed by a voluntary cooperative effort among farmers and government agencies to limit fertilizer application to the amount that could be used by crops. Pesticides and other potential sources of contamination are also being addressed under this voluntary cooperative effort. Elevated nitrate levels also affect private wells located outside of the village. Local groups are in the process of organizing a aquifer/watershed management plan to address drinking water and other water quality issues.

SOURCE WATER PROTECTION NEEDS

An aquifer protection program should be developed for the Village of Smalltown well. Preferably, the protection plan should be developed for the entire Smalltown aquifer and the surrounding watershed with the cooperation of neighboring towns, county and state agencies. For example, the protection program may include the distribution of education materials, describing fertilizer application and household chemical storage, use and disposal, to village and town residents. Similar types of materials could also be provided to area businesses. The integrity of the septic systems and sanitary sewers may also need to be evaluated. A future federal rule may require the source water to be disinfected prior to distribution.

HOW TO OBTAIN ADDITIONAL INFORMATION

This *Source Water Assessment Public Summary* was completed in June 1998. Individuals interested in learning more about this water system and aquifer/watershed can contact the Village of Smalltown at (555)555-1234 or the Little County Health Department at (555)555-3344. Additional information can be obtained from the New York State Department of Health's Source Water Assessment Program at (518) 458-6743. This document is also available on the DOH's "webpage" at WWW.HEALTH.STATE.NY.US (select "Information for Consumers"; "Environmental and Occupational Health"; "Source Water Assessments"). A *Full Length* (more detailed version) of this *Source Water Assessment* is available for review at the Little County Health Department and the Little County Library.

SOURCE WATER ASSESSMENT PUBLIC SUMMARY
RUMBLING BROOK MOBILE HOME PARK - PUBLIC DRINKING WATER SYSTEM
JUNE 1998

INTRODUCTION

The New York State Department of Health (DOH) is completing assessments of the contaminant threats to all public drinking water sources. The New York State and Sunny County Health Departments have prepared this *Source Water Assessment Public Summary* to provide information to support local and state efforts to protect the Rumbling Brook Mobile Home Park's public drinking water source. The information contained in this assessment pertains to the source of water delivered by the Rumbling Brook Mobile Home Park water system. The emphasis of this assessment is on "source" (well) water rather than "tap" water. Information on tap water quality is available in the Rumbling Brook Mobile Home Park's *Consumer Confidence Report* on drinking water quality which is prepared annually by the operator of the mobile home park and posted on the bulletin board located in the management office.

WHAT IS THE SOURCE OF YOUR DRINKING WATER?

The Rumbling Brook Mobile Home Park water system serves a population of 100 residents. The source of the drinking water is a well located on the northeastern corner of the Property (see attached map). Based on topography, ground water in the assessment area is believed to flow in a southerly direction.

The well is approximately 40 feet deep and is pumped to provide 20,000 gallons per day. Because there is no record of its construction, it is unknown at what depth water is withdrawn from the well. The land area that was assessed as possibly contributing water to the well has been estimated as one mile north, east, and west (uphill) and 700 feet south (downhill). For the purpose of this source water assessment this area has been defined as the assessment area and is depicted on the attached map. The land area uphill of the well is primarily composed of privately owned forested land and a few cleared pasture areas. Rumbling Brook separates the forested area from the pasture land and flows in a southerly direction approximately 300 feet west of the well. The land area downhill of the well is owned by the mobile home park and is occupied by thirty mobile home units, and the park's septic system leach field. Ten mobile home units and the park's septic system leachfield are located within the 700 foot radius downhill of the well.

WATER QUALITY AND WATER TREATMENT INFORMATION

The water withdrawn from the well is not disinfected prior to distribution to the homes. Water quality testing performed by the mobile home park and the DOH in 1997 indicated that the water does not need to be treated because no contamination was detected above the limits set by the DOH. For further information regarding the quality of the system's finished (tap) water, please refer to the *Consumer Confidence Report* posted on the bulletin board in the mobile home park management office.

EVALUATION OF SIGNIFICANT POTENTIAL SOURCES OF CONTAMINATION

This assessment evaluates contaminants that **may** enter the water that is drawn from the well. The contaminants evaluated in this assessment included those regulated under the federal Safe Drinking Water Act and those the DOH has determined may present a concern to public health. A review of land uses located within the assessment area revealed the following possible contaminant sources: mobile home park septic system leach field, Rumbling Brook, pasture land used for livestock grazing, fuel storage tanks associated with individual mobile home units, and a nearby oil/gas well. A discussion of each of these potential contaminant sources is provided below.

The mobile home park's septic system leach field, a potential source of pathogens (germs), is located approximately 500 feet south of the well. However, since the septic system is located downgradient (downhill) of the well it is unlikely to cause contamination of the well. Rumbling Brook, another possible source of pathogens, is located approximately 300 feet west of the well. Water from the brook may reach the well because when the well pumps it may draw water from the brook through the ground and into the well. However, Rumbling Brook does not appear to be a significant source of pathogens or other contaminants, because there are no sources of sewage in the area that drains to Rumbling Brook, drainage from pasture lands (including pathogens) within the assessment area are on clay soils and would enter Rumbling Brook downstream of the well, and the potential for contamination from wildlife appears to be negligible.

Approximately one-third of the housing units in the mobile home park are heated with fuel oil. Four aboveground fuel oil tanks (each having a 200-gallon capacity) are located within the source water assessment area. These fuel tanks are a potential source of petroleum contamination. These fuel oil tanks are not considered to be a significant source of contamination since they are in good condition and there was no evidence of leaks or spills observed during the DOH's May 1998 visit to the Rumbling Brook Mobile Home Park. Additionally, the tanks are located downhill of the well and a spill from these tanks would most likely not affect the well.

Another potential source of petroleum contamination is from an oil/gas exploration well approximately one mile east of the drinking water well. However, this oil/gas exploration well is not considered a significant potential source of contamination since a release from the oil/gas well would most likely flow in a direction parallel to the drinking water well.

SOURCE WATER PROTECTION NEEDS

A future federal rule may require the source water to be disinfected prior to distribution. This may entail additional monitoring and demonstration that the septic system discharge to ground water could not flow to the drinking water well. To protect the drinking water well, the mobile home park operator and residents should be prudent in handling and storage of hazardous substances at the mobile home park because they could contaminate the water. Hazardous materials should not be stored within a 200 foot radius of the well. Property maintenance staff may wish to perform periodic inspections of on-site fuel oil storage tanks to verify that releases or spills have not occurred.

HOW TO OBTAIN ADDITIONAL INFORMATION

This *Source Water Assessment Public Summary* was completed in June 1998. Individuals interested in learning more about this water system and aquifer/watershed can contact the Rumbling Brook Mobile Home Park at (555)555-1234 or the Sunny County Health Department at (555)555-3344. Additional information can be obtained from the DOH's Source Water Assessment Program at (518) 458-6743. This document is also available on the DOH's "webpage" at WWW.HEALTH.STATE.NY.US (select "Information for Consumers"; "Environmental and Occupational Health"; "Source Water Assessments"). A *Full Length* (more detailed version) of this *Source Water Assessment* is available for review at the Sunny County Health Department and the Sunny County Library.

Appendix H
Summary of Comments and Responses
on the Public Comment Draft of the SWAP Plan

Summary of Comments and Responses on the Public Comment Draft of the SWAP Plan

On November 10, 1998, the New York State Department of Health (DOH) issued a public notice about the availability of the Draft Source Water Assessment Program Plan for public review and comment. Notice of the public comment period and availability of the Draft Plan was published in the Business and the Environment and the State Register and was also posted on the DOH web page. The Draft Source Water Assessment Program Plan was mailed to approximately 760 people who had previously expressed an interest in the Source Water Assessment Program. An additional 108 copies of the Draft Plan were mailed to owners and operators of small public water systems and other interested parties who attended the New York Rural Water Association Source Water Assessment Seminars in early November. Also, owners/operators of community public water systems serving greater than 5000 people were mailed a copy of the Public Summary of the Draft Plan. The public comment period on the Draft Source Water Assessment Program Plan ran from November 10, 1998 through December 18, 1998. During the public comment period, public hearings were held in Albany, Rochester and Long Island. Two individual hearing sessions were held at each location, one in the afternoon and one in the evening.

This summary of comments and responses was developed from testimonies provided at the public hearings as well as written comments that were submitted to the DOH during the public comment period. For this summary, similar comments were combined and comments associated with common topics were grouped together. All comments refer to the November 10, 1998 version of the Draft Source Water Assessment Program Plan. Revisions to the Plan based on these public comments are reflected in the November 1999 Final Source Water Assessment Program Plan.

Data Collection

Comment 1
Section 4.1.1. discusses how the DOH will work with local health departments to acquire information about public water systems. The wording concerning sanitary surveys and vulnerability assessments is vague.

Response
This section has been modified to clarify how these ongoing activities are integrated into the Source Water Assessment Program. As stated in Section 4.1.1, all public water systems undergo periodic sanitary surveys and as stated in Section 4.4.5, sanitary surveys will be updated as part of the effort to field verify information from other sources (e.g., GIS). We plan to include a periodic verification of susceptibility as part of the sanitary survey documentation.

For public water systems that have undergone a source water assessment, the DOH or local health department will be completing vulnerability determinations for certain contaminants as part of alternative monitoring requirements as permitted by the Safe Drinking Water Act . However, the EPA

has yet to finalize regulations as to what will be permitted as part of alternative monitoring.

Comment 2
Ninety-four percent of water suppliers who attended the New York Rural Water Association Source Water Assessment Seminars in November 1998, indicated that they are willing to assist the DOH by verifying and supplying additional data as well as reviewing draft assessments.

Response
The DOH welcomes the opportunity to work with water suppliers on the source water assessments. As indicated in Section 4.2.2, the DOH considers water suppliers as one of the most important sources of information for the assessments. The Source Water Assessment Program Plan has been modified to involve owners/operators of public water systems with data verification and other involved partners.

Comment 3
The DOH should send the draft assessments to water suppliers for their review before they are made available to the public.

Response
The DOH agrees that involving the water systems and other partners in the review process is a good idea and involved partners will be provided with an opportunity to verify the data used in the assessment, as indicated in Sections 4.1.1 and 4.1.2 of the Source Water Assessment Program Plan.

Comment 4
All water suppliers should receive a copy of source water assessments. Assessments for non-community water systems can be "packaged" by town, aquifer or watershed area as long as the water system receives an individual assessment as well.

Response
Grouped assessments of non-community water systems will include specific information about each water system's susceptibility to contamination within the defined source water assessment area. As indicated in Section 4.6.2 of the Source Water Assessment Program Plan, all owners/operators of community water systems will receive a summary which is adequate to support the reporting requirements of the Consumer Confidence Reports.

Comment 5
The Plan does not have a consistent data collection methodology and use of widely differing data collection methodologies could lead to questions about the scientific integrity of the data.

Response
As part of the guidance document that will provide assistance to people conducting assessments, a quality assurance plan will be developed. Also the metadata that will be attached to the GIS information will let the user know the level of confidence associated with that data set.

Delineation of Assessment Areas

Comment 6
The current Department of Environmental Conservation permitting process for new public water supply wells requires a 200 feet minimum radius protective zone and assessments based on this criteria may be wholly inadequate.

Response
As indicated in Section 4.2.2 of the Source Water Assessment Program Plan, a minimum delineation of 500 feet will be used for all public water system supply wells.

Comment 7
All source water areas should be modeled.

Response
The methodology outlined in the Source Water Assessment Program Plan relies on a simplistic model to evaluate a public water system's susceptibility to significant potential sources of contamination within the defined source water assessment area. The DOH can not undertake groundwater or surface water modeling for each public water system as part of the assessment effort. The information needed for source water modeling is not reasonably available for all systems and initiating such an effort is beyond the scope of the Source Water Assessment Program. However, as noted in Section 4.2.2. of the Source Water Assessment Program Plan, professional judgement will be used in evaluating the hydrogeologically sensitive areas, which may involve the use of analytical models.

Comment 8
A disclaimer or other similar statement should be widely used to indicate that the defined assessment area is not appropriate for sophisticated protection programs such as land use regulation, land acquisition, etc.

Response
The DOH acknowledges that the proposed methodology for delineating source water assessment areas for public water systems where there is little or no information, may not be a suitable basis for establishing sophisticated protection programs. The text in Section 4.2.1 of the Source Water Assessment Program Plan has been revised to reflect this concern. As indicated in Section 4.6.1. of the Plan, the format of the source water assessment will include "a description of the delineation approach taken, why it was taken, the confidence level associated with how well it represents the contributory area, and an evaluation of the reliability of the contaminant source inventory, based on field verification". The issue of including qualifiers in the assessments about the delineated source water assessment area will be raised with the Source Water Protection Coordinating Committee's

Delineation Issues Working Group during development of the implementation guidance document.

Comment 9
Funding for an expanded delineation process beyond those delineation efforts proposed as being minimally acceptable in the draft plan should be of immediate public concern, especially in those areas designated as high priorities under the Source Water Assessment Program and the Department of Environmental Conservation Unified Watershed Assessment Report (October 1, 1998).

Response
For those public water systems where there is no information to support a more detailed delineation, the approach outlined in the Source Water Assessment Program Plan will be the basis for the first iteration of the source water assessment. If, during the assessment process (i.e., contaminant inventory and susceptibility refinement), the available information indicates the need to support completing a more detailed delineation, then additional efforts could be undertaken to do so. Resources, in addition to available Source Water Assessment Program funding, will likely be necessary to enhance delineations of source water assessment areas that are completed for public water systems under the Source Water Assessment Program.

Contaminant Inventory

Comment 10
The contaminant inventory does not take into account potential sources of contamination arising from accidents associated with railroads, highways and ships.

Response
The category of "Major Transportation Routes: Roads; Railroads; Water Transport Routes; Pipelines" has been added to Table 2 ("Data Needs to Perform Assessments) under the heading "Contaminant Inventory". The source water assessment will include information about the potential of a source to be affected by a hazardous materials spill, based on available information and professional judgement. Local input and knowledge of this type of information will be extremely valuable in finalizing the assessment. Information on transportation routes can also be supplemented locally or from state GIS coverages. Vulnerability of a specific public water source due to its location near a major transportation route will be evaluated in the susceptibility review and refinement phase of the assessment process. Susceptibility to potential contamination along transportation corridors will be addressed in the guidance document(s) for completing assessments.

Comment 11
How will the DOH account for sources of contaminants that are not included in the draft Source Water Assessment Program plan? Specifically, how will contaminants associated with fertilizers or from activities such as road spraying and land spreading of septage and sewage treatment plant sludge be evaluated? How will situations due to poor infrastructure which allow contaminants to enter a system be addressed?

Response

The potential sources of contaminants identified in the draft plan were compiled from existing databases. Table 2 (Data Needs to Perform Assessments) has been revised to include Biosolid sites under the heading "Contaminant Inventory." Sources of fertilizer contamination will also be evaluated as part of the contaminant inventory (see Table 2). Other sources of contaminants, from activities such as road spraying, or land spreading of septage, may be evaluated in the "Review and Refinement" step in the source water assessment process. Issues related contamination of source water(s) due to infrastructure will be addressed during the initial data gathering effort as part of the information reviewed from sanitary surveys. Local issues and concerns not previously identified can be evaluated and integrated into the final assessment.

Comment 12
Underground injection wells are not listed in Table 2 (Data Needs to Perform Assessments).

Response
Underground injection wells have been added to Table 2.

Comment 13
Section 4.3 does not contain a discussion of how the DOH will identify contaminants of concern. Specifically, how was the list of pesticides in Appendix E chosen? How will agricultural pesticide use be evaluated?

Response
The pesticides included on the List of Contaminants of Concern in Appendix E (now Appendix F) were compiled primarily from three existing sources: pesticides federally regulated by the EPA as drinking water contaminants; pesticides regulated and monitored for by New York State as drinking water contaminants; and those pesticides that appear on the EPA's Contaminant Candidate List. The pesticides on the Contaminant Candidate List were included because of new concern. The criteria used during the Contaminant Candidate Lists identification process included: chemicals of public concern; chemicals of international interest and global concern; chemicals of known occurrence; chemicals of known toxicity; high release chemicals; high production chemicals; pesticides with high leaching potential/high run-off potential;endocrine disruptors. In addition, the information presented in the Department of Environmental Conservation Annual Pesticide Sales and Use Data Report was reviewed and several additional pesticides with high sales in New York State have been added to the List of Contaminants of Concern.

To evaluate agricultural pesticide use, the DOH will use many databases which contain relevant pesticide data. The U.S. Department of Agriculture is a major source for pesticide use data and has developed databases to provide statistical estimates of fertilizer and pesticide use on crops. The DOH will also work with the Cornell Cooperative extension, the United States Geological Survey and the New York State Department of Environmental Conservation to determine which pesticides pose threats to ambient water quality. The DOH will be utilizing all readily available databases, including those developed by the U.S. Department of Agriculture, to complete the assessments. As noted in Section 5.1.2 of the Source Water Assessment Program Plan, the DOH is working with the Natural Resource Conservation Service of the U.S. Department of Agriculture on a pilot project to apply the

National Agricultural Pesticide Risk Analysis model to two drinking water watersheds in western New York State. This partnership, as well as others, will provide valuable data on pesticide use throughout New York State.

Comment 14
MTBE and other additives which may be added to gasoline should also be included on the List of Contaminants of Concern.

Response
MTBE is included in the List of Contaminants of Concern (which is now Appendix F in the Plan) under the heading, "Petroleum Products." Two additional gasoline additives, ethyl-tertiary-butyl-ether (ETBE) and tert-amyl-methyl-ether (TAME) have also been added to this listing.

Comment 15
Propylene glycol and ethylene glycol should be specifically identified as a "Contaminants of Concern"**.**

Response
Propylene glycol and ethylene glycol have been added to the List of Contaminants of Concern under the heading of "Other Industrial Organics" of the Source Water Assessment Plan. The List of Contaminants of concern is now included in Appendix F.

Comment 16
Sources of contamination should be geocoded so they can be located on a GIS map.

Response
The DOH will be primarily using information from the New York State Department of Environmental Conservation regarding possible contaminant sources. Much of this data already exists in the form of databases that can be accessed using a Geographic Information System (GIS). The DOH and the New York State Department of Environmental Conservation are committed to reviewing the data to assure that it is accurate.

Comment 17
When chlorinated water is put on or in the ground, it percolates through the soil and forms trihalomethanes, which then enter the ground water as recharge.

Response
The DOH will compare the levels of trihalomethanes in an individual public water supply wells with the levels of trihalomethanes in the finished water that are formed through disinfection. Based on this evaluation, the DOH will review the level of public health concern and determine whether the contribution of triaholomethanes from the ground water source is significant.

Comment 18
Hundreds of old, buried residential oil tanks may be rusting and leaking, thereby causing contamination of the groundwater and this threat needs to be addressed.

Response
After several decades of monitoring public water system wells for contaminants that are representative of fuel oil, there are very few cases where fuel oil contaminants have been detected in public water supply sources. The majority of these cases are associated with commercial establishments and not homes. However, Table 4 has been revised to reflect an additional rating of "medium" due to the potential for groundwater contamination by petroleum products and halogenated solvents in areas characterized as "high intensity residential".

Comment 19
The glossary should be expanded to include the definition of "pesticides" from the Environmental Conservation Law, to clarify the distinction between these chemicals and others on the Contaminant Inventory list.

Response
The glossary has been expanded to include a definition of "pesticides" similar to that defined in the Environmental Conservation Law.

Susceptibility Analysis

Comment 20
Figure 3 in the Source Water Assessment Program Plan needs more detail to be useful. First, only source water contamination above or approaching the maximum contaminant level should immediately trigger high source sensitivity. Second, the DOH needs to outline how it will define a confined aquifer, a lower permeability layer, and an aquifer of high hydraulic conductivity. Sources with unknown sensitivity should be assigned a medium sensitivity priority unless it can be proven that there are extenuating circumstances.

Response
Addressing source waters with contamination not above the maximum contaminant level and how to define a confined aquifer, a lower permeability layer, and an aquifer of high hydraulic conductivity will be addressed in the guidance document for implementation of the Source Water Assessment Program. The DOH's approach to characterizing sensitivity considers that the uncertainties associated with the absence of information (e.g., no well log) is a valid basis for a more protective estimate of sensitivity. Furthermore, such data gaps do not allow confirmation of the natural contaminant protection assumed in the DOH's susceptibility approach for ground waters with a "medium" sensitivity.

Public Participation

Comment 21
There should be broad public participation in all aspects of the assessment process. In Section 4.5, "public input meetings" should be added to the requirements. These meetings should be held in each watershed to gather comments on the condition of the watershed.

Response

The DOH will develop a guidance document for individuals conducting the assessments, and the document will include ways to obtain information from people outside of government that are interested in the source. The amount of public participation in conducting assessments will vary from source to source depending on the interest local people have in their source of public drinking water and existing organizational structures for protecting water resources.

Comment 22
There must be a significant amount of publicity and information on the results of the Source Water Assessment Program once they are available. If the Source Water Assessment Program is to have a meaningful value, it is essential that a major effort must be made to publicize the results of the assessments.

Response
Information from the source water assessments is required to be included in the Consumer Confidence Reports. These reports will be published annually by all community water systems and will be widely distributed using a variety of methods based on the size of the water system. In addition, the Source Water Assessment Program guidance document will have other suggested methods for local entities to use to provide a broader dissemination of the assessment information. At a minimum, the assessments will be available to the public through the DOH and local Health Departments.

General Comments

Comment 23
The assessment should provide direction and assistance to a community in carrying out appropriate follow-up actions. Source water protection needs enumerated in the source water assessments should be adequately described so as to give direction to future source water protection efforts, yet not so prescriptive as to be perceived as regulatory requirements.

Response
The completed source water assessments are designed to guide source water protection planning at the local level. The contaminant inventory that is completed as part of the assessment process will provide specific information about potential contaminant sources of concern and the susceptibility analysis will provide part of the basis for setting priorities for state and local protection. The involvement of local officials with the Source Water Assessment Program will provide a link to future community involvement in watershed and source protection.

Comment 24
Source Water Assessments should be linked to protection.

Response
The Source Water Assessment Program is a prelude to protection in that the all available information will be assembled and reviewed to determine where protection of source waters needs to be enhanced. The Source Water Assessment Program will also have relevance to other state and local pollution

prevention programs. The Source Water Assessment Program provides another opportunity to look at these issues from a public health aspect and will also provide a mechanism for responding to emerging contaminants of concern, such as MTBE and viruses.

Comment 25
Smaller systems need to be given a higher priority on the completion of the assessments.

Response
The Source Water Assessment Program Plan has been revised to delete the reference indicating that higher population water systems will have a higher priority.

Comment 26
The DOH should note in the objectives of the Plan that the Source Water Assessment Program will benefit systems by providing them with critical information about sources of drinking water.

Response
This issue has been addressed in Section 1.3 and Section 3.1 of the Plan.

Comment 27
Long Island has been doing assessment-type work for many years. How will the Source Water Assessment Program help Long Island?

Response
The Source Water Assessment Program will provide an opportunity to improve the public's understanding of Long Island's unique geologic regime and source water protection needs. The New York State Department of Environmental Conservation and the DOH plan to work with local partners to update the ground water protection strategy for Long Island as part of the Unified Watershed Assessments.

Comment 28
Will the assessments only list items that are resolvable through future funding or will they list all potential contaminant concerns, even if difficult to solve?

Response
The Source Water Assessment Program will address all potential contaminants of concern to drinking water sources. In many cases, the issue of resolvability goes beyond basic assessment efforts and requires strategic planning for source protection. For standard assessments, the DOH will discuss issues of resolvability if it is readily apparent that there is ongoing contamination for which there are demonstrated management practices (e.g., nitrate contamination of an aquifer that could be resolved through nutrient management).

Comment 29
The DOH should provide more detail on how monitoring flexibility will result from the Source Water Assessment Program.

Response
The EPA- approved vulnerability determination protocol (e.g., DOH Technical Reference PWS 72) will be used for granting waivers for systems serving fewer than 10,000 people. Additional monitoring flexibility is allowed in the Safe Drinking Water Act, even though the EPA has not issued the final regulations as required by the 1996 Amendments. When these regulations are available, State procedures, which are based on susceptibility analysis conducted as part of the Source Water Assessment Program, will be submitted to the EPA for approval.

Comment 30
The Source Water Assessment Program information is required as part of the Consumer Confidence reports. However source water assessments are a one-time snapshot of the water supply's source. The DOH should ensure that a mechanism exists for updating assessments after their initial completion.

Response
The portion of the source water assessment information that will be included in the Consumer Confidence Reports is something that the DOH will update as needed. Section 5.3 of the Source Water Assessment Program Plan also addresses the issue of updating source water assessment information.

Comment 31
The DOH has not and should work out the details internally on who will be completing the assessments.

Response
Local health departments will be directly involved with the assessment process, and in many cases may be the lead agency for conducting the assessments. The extent of other agency involvement will be determined once the Source Water Assessment Program plan is final. We anticipate that the level of involvement by local partners during the source water assessment process will vary considerably within each county, however, in some cases will be quite extensive.

Comment 32
Drought conditions and flooding should not be overlooked when assessing sources of water.

Response
Each assessment includes determining the susceptibility of a source of water, and this analysis will evaluate whether drought or flood conditions could adversely affect source water quality.

Comment 33
Does the State have sufficient resources to implement the Source Water Assessment Program?

Response
The Plan's design is based on the funds budgeted for the program, as outlined in Section 1.4.

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Water Supply Assessment

Town of Cortlandville

Prepared by

Cortland County Soil and Water Conservation District

October 2013

TABLE OF CONTENTS

PAGE

1. Introduction 1

2. Description of Cortlandville's Public Water Supply 1

2.1 Otter-Dry Creek Aquifer 1
2.2 Permitted Water Use 3
2.3 Current and Projected Water Use 3
2.4 Well Descriptions 5
2.5 Current Operations 5

3. Current Capacity under Extreme Dry Conditions 7

4. Natural Recharge Rates and Sustainable Yield 9

5. Potential for Adverse Impacts 14

5.1 Otter Creek 14
5.2 Wetlands 14
5.3 Other Large Withdrawal Wells 16
5.4 Residential Wells 16
5.5 Regional Water Management 16
5.6 Re-direction of Groundwater Contamination 17

6. Alternative Water Supply Locations in Cortlandville 17

6.1 Primary Alternatives 17
6.2 Secondary Alternatives 20

7. Water Conservation and Aquifer Level Monitoring 22

7.1 Water Conservation 22
7.2 Monitoring Aquifer Levels 23
7.3 Artificial Recharge 23

8. Inter-municipal Water Sharing 24

8.1 Cortlandville and the City 24
8.2 Cortlandville and Homer 25
8.3 The City and Homer 25

9. Conclusions 26

10. Recommendations 27

11. Definitions 29

TABLE OF CONTENTS (continued)

PAGE

FIGURES

1 Well Locations 2
2 Historical Pumping 4
3 Well Specifications 6
4 Recharge Areas (Source Areas) for the Town's Supply Wells 12
5 Groundwater Levels at Chicago Bog 15
6 Primary Groundwater Exploration Areas 19
7 Secondary Groundwater Exploration Areas 21

TABLES

1 Land Area of Recharge Areas 13
2 Natural Recharge Rate and Sustainable Yield 13

APPENDICES

A Cross-sections through the Lime Hollow and Terrace Road Wells

Water Supply Assessment for the Town of Cortlandville

1. Introduction

The Town of Cortlandville currently supplies water to the community from wells at Lime Hollow and Terrace Road (see Figure 1). The town is experiencing growth, which can lead to increased demand for water. As a result, the town wants to better understand the availability of water in order to better plan for the future. This report describes an evaluation of the town's water supply system, and includes:

- A general description of the water supply wells and source of water,
- An analysis of the capacity of the existing supply wells during an extended dry period,
- An evaluation of potential capacity based on natural recharge,
- An evaluation of potential adverse impacts resulting from aquifer withdrawals,
- An assessment of other possible locations for a water supply well,
- Discussion of water conservation and aquifer level management,
- An assessment of opportunities for inter-municipal sharing of water, and
- Conclusions and Recommendations

2. Description of Cortlandville's Public Water Supply

2.1 Otter-Dry Creek Aquifer

The Otter-Dry Creek Aquifer is the source of water for the town. The town has supply wells at two locations: Lime Hollow Road and Terrace Road. Other large withdrawals in the aquifer include the City of Cortland (3 supply wells), Pall Trinity, Gutchess Lumber, and Tunison Laboratory of Aquatic Science. These well locations are shown on Figure 1.

The Otter-Dry Creek Aquifer is a high-yielding outwash sand and gravel formation. It is a shallow, unconfined aquifer, with a saturated thickness ranging from about 40 to 70 feet. Depth from the land surface to the water table can be just a few feet in the northern part of the aquifer, to over 50 feet in the southern part. Seasonally, the elevation of the water table rises and falls about 10 to 15 feet, but extremely wet or dry years can cause the seasonal range to be larger.

Below the unconfined aquifer is a layer of lacustrine (lake) deposits composed of fine sand, silt and clay. These deposits do not readily transmit water, and are not suitable for water supply purposes.

Below the lacustrine deposits is a confined aquifer composed of kame deposits (poorly sorted silt, sand and gravel). Less is known about the confined aquifer, but it appears to be generally thinner, less productive than the unconfined aquifer. Water in the deep aquifer may have higher natural mineral content, and be less desirable as a drinking water source. The ability of the confined aquifer to provide a large, high quality supply of water for the town is questionable.

Appendix A contains cross-sections that show the unconfined aquifer and upper lacustrine formation in the vicinity of the town's wells. A map is included showing the locations of the cross-sections.

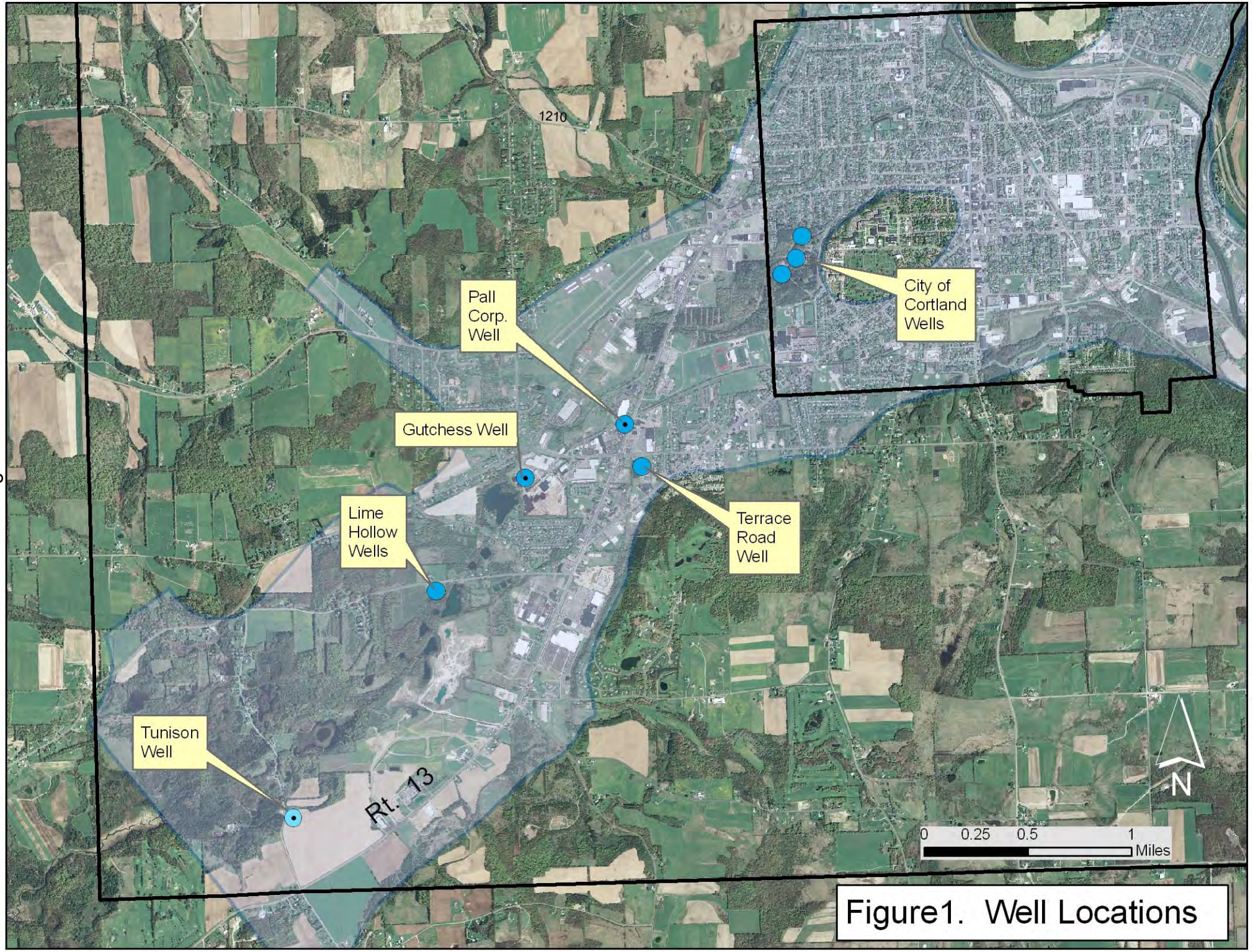


Figure1. Well Locations

2.2 Permitted Water Use

NYS DEC and the Susquehanna River Basin Commission (SRBC) have a coordinated approach to permitting withdrawal of water from the aquifer. The DEC permit allows for a total withdrawal by the town of one million gallons per day (1 MGD). The DEC permit also allows for purchase of 53,600 gallons per day (0.0536 MGD) from the City of Cortland. As described in Section 8, the city currently cannot pump into the town's distribution system without infrastructure improvements.

2.3 Current and Projected Water Use

The town provides water to about 4,000 of the approximately 9,000 residents in the town, as well as to numerous businesses. About 41% of total demand is for residential use, about 58% for commercial/industrial use, and about 1% for public services. During 2012, the town pumped an average of about 640,000 gallons of water per day (gpd), or 0.64 MGD. On occasion the town pumped slightly more than one million gallons in a single day.

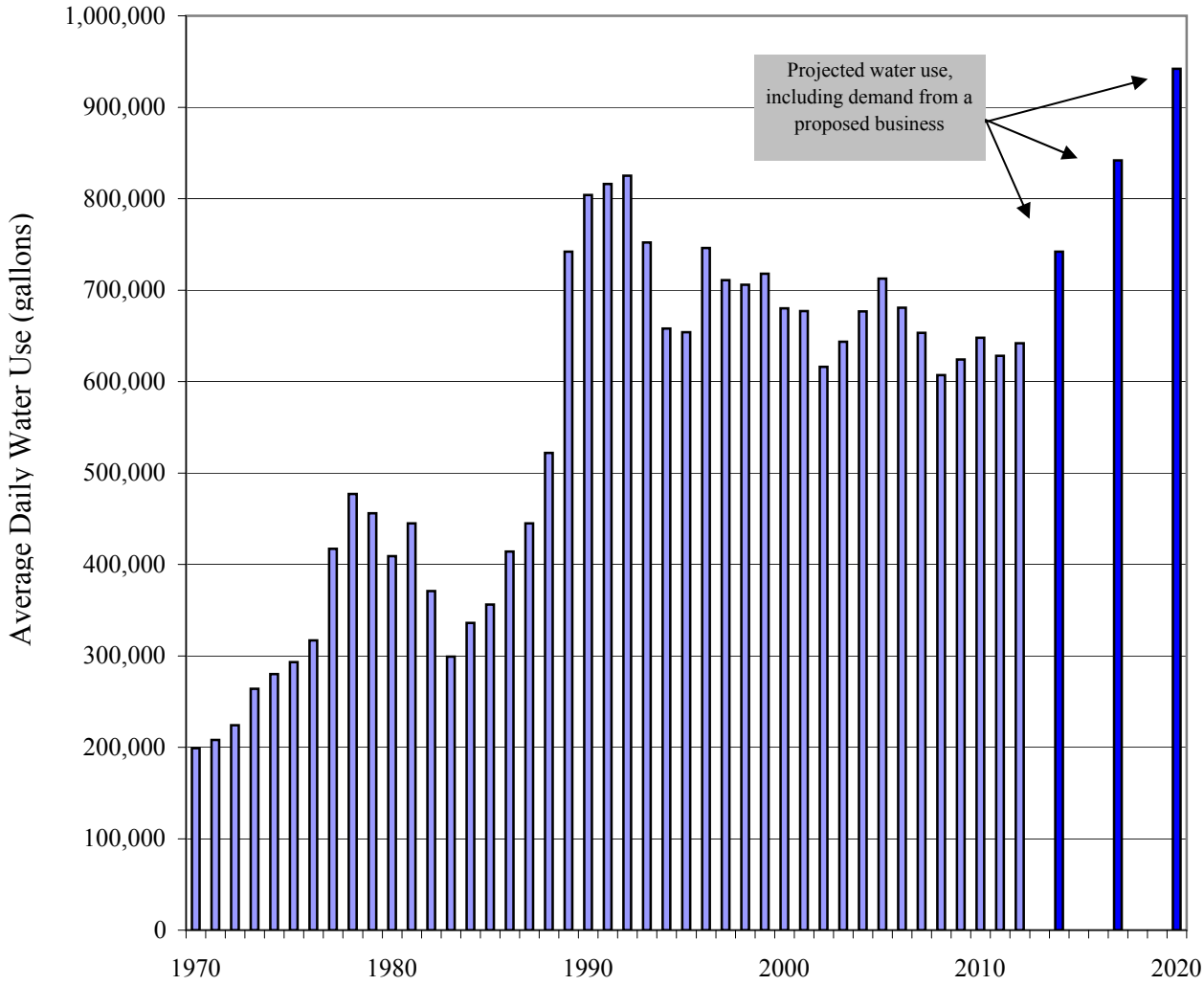
Figure 2 shows town water use over time. Current pumpage is about 20% lower than the peak years of the early 1990s. The reason for the decrease in pumpage may be at least partly related to the town's efforts to find and repair leaks in the distribution system. Some unaccounted-for losses are inevitable. The town's loss rate fluctuates over time, and in recent years has generally been in the vicinity of 10% of total demand. This is a relatively low loss rate, and is less than the SRBC regulation that losses be less than 20%.

A 2002 analysis by the county Health Department predicted that water use in Cortlandville would grow to about 0.95 MGD by 2012, and to about 1.2 MGD by 2025. However, water demand has been fairly stable over the past 10 years, remaining well below Health Department projections.

The approved Byrne development project in Cortlandville would reportedly use about 0.3 MGD at full build out, which would result in a 47% increase in demand (from 0.64 to 0.94 MGD). Since the project is being constructed in phases, it may be as much as 10 years before demand increases to 0.94 MGD. Figure 2 shows this projected increase in demand.

At full build-out of the Byrne project, the town would still be within their DEC permit limit of 1 MGD. Other growth in the town could add to demand over the coming years. From a planning perspective, it seems reasonable to assume that the town's demand for water could reach the Health Department projection of 1.2 MGD in the next 10 to 15 years.

Figure 2. Historical and Projected Water Demand for the Town of Cortlandville



2.4 Well Descriptions

Figure 3 shows the configurations of the two wells at Lime Hollow, and the well at Terrace Road. Each well is described below.

Terrace Road Well

At the Terrace Road location, the town currently uses one 12-inch diameter well with a 60 HP motor. The well is about 78 feet deep with a two-part screen that has a total length of about 25 feet. The pump intake is located between the upper and lower sections of the screen.

The Terrace Road well can pump at a rate of about 700 gallons per minute (gpm), or about one MGD. The rate can vary somewhat depending on various factors, including aquifer levels and pressure in the water distribution system.

Lime Hollow Well No. 2

Well No. 2 is a 12-inch diameter well, with a 100 HP motor. It is about 87 feet deep with a 22.6-foot long screen. The pump intake is located at the top of the screen. During 2012, Well No. 2 generally pumped at a rate of about 1,000 gpm (1.44 MGD), depending on conditions.

Lime Hollow Well No. 7

Well No. 7 is a 16-inch diameter well, with a 125 HP motor. It is about 80 feet deep with a 25.8-foot long screen. The pump intake is located one foot above the top of the screen. During 2012, Well No. 7 generally pumped at a rate of about 1,200 gpm (1.7 MGD), depending on conditions.

2.5 Current Operations

The town typically pumps either the Terrace Road well or one of the Lime Hollow wells on any given day. They do not currently operate more than one well at a time. The town regularly alternates pumping between the wells. Terrace Road is generally pumped 4 days per week, and one of the Lime Hollow wells is pumped the other three days. The town also generally alternates pumping for the two Lime Hollow wells.

The supply wells pump into the town's water distribution system, providing water for public use, but also filling the storage tanks on Blue Creek Road and Rt. 215. Each tank is 92 feet in diameter and 20 feet high. Each can hold up to one million gallons (MG) of water, but are generally filled to 19 feet maximum (about 0.95 MG).

Pumping is triggered by water levels in the tanks. On days the Terrace Road well is in use, pumping starts when the tank levels are between 17 and 18 feet. On days when one of the Lime Hollow wells is in use, pumping starts when the tank level is about 16 feet. In either case, pumping stops when the tank levels reach 19 feet. Between the two tanks, there is generally between about 1.6 and 1.9 MG of water stored in the tanks at any given time.

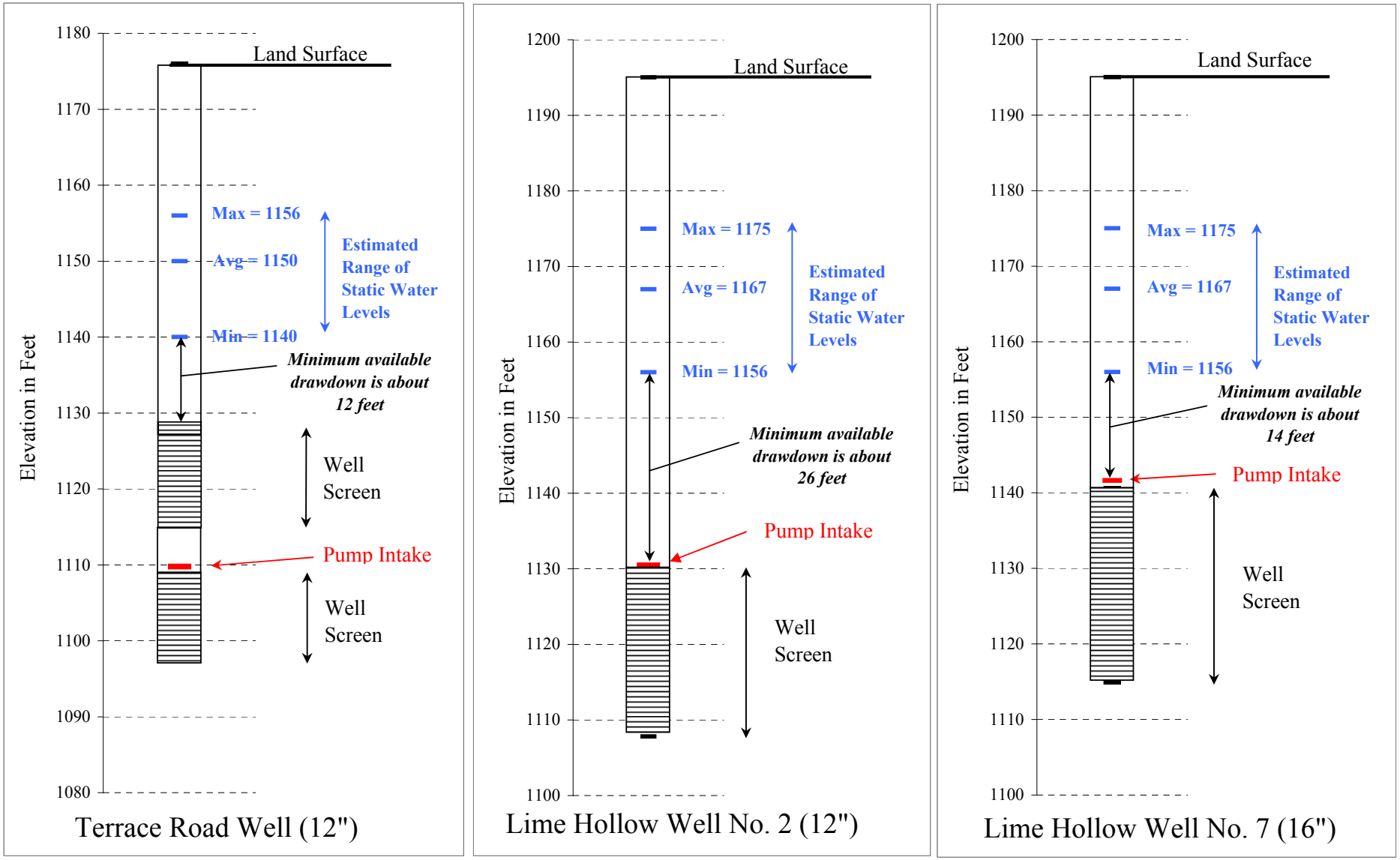


Figure 3. Available Drawdown for Town of Cortlandville Supply Wells

It generally takes Lime Hollow Well No. 2 about 7 to 10 hours to fill the storage tanks. It generally takes Lime Hollow Well No. 7 about 6 to 7 hours to fill the tanks. Because of its lower capacity, the Terrace Road well generally takes about 18 to 24 hours to fill the tanks.

The amount of water actually pumped on any given day depends on how much water the community is using, and when the pumping cycle begins. While the average daily water use is about 0.64 MG, actual daily pumping can range from about 0.5 to 1.0 MG.

3. Current Capacity under Extreme Dry Conditions

Historically, any one of the town's wells has been capable of producing more water than is currently needed. A question remained as to whether this was true under an extended dry period. This analysis was intended to estimate how much water each well can safely produce under drought-like conditions. Note that this analysis assumes that the town is pumping exclusively from one existing well.

One factor affecting pump capacity is the static water level in the aquifer, which varies with hydrologic conditions. When a well is pumped it creates drawdown, which is the difference between the non-pumping aquifer level (static level) and the water level in the well during pumping.

Drawdown cannot fall below the pump intake. And it is generally recommended that drawdown not fall below the top of a well screen because of the damage it can cause (accelerated corrosion and incrustation of the screen, air entrainment, reduced well yield, and erosion of pump components). Some guidelines recommend that maximum drawdown be no more than 5 to 10 feet above the top of the screen.

To estimate capacity under drought-like conditions, we used the specific capacity of each well combined with historically low aquifer levels. Specific capacity (SC) is the unit pumping rate per foot of drawdown. For example, a well pumping at 1,000 gpm with 10 feet of drawdown has an SC of 100 gpm per foot of drawdown (gpm/ft). If during a drought there were only 5 feet of available drawdown, the well could not continuously pump at 1,000 gpm without adverse impacts.

The SC value obtained just after a well is drilled and properly developed is typically the highest value that will be attained. SC is best determined at the end of a 24- to 48-hour pump test, after drawdown has stabilized. Evaluation of the town's daily pumping and drawdown records can also be used to estimate SC, but is not as reliable because stabilized conditions may not be reached.

SC can vary over time, generally decreasing as well screens wear, or become encrusted with minerals present in groundwater. SC also can vary with pumping rate, decreasing at higher pumping rates as well efficiency decreases. For this analysis, we used available information and best judgment to estimate specific capacity for each well.

Terrace Road Well (12-inch diameter)

There is no known pump test available for the Terrace Road well. We used recent pumping and drawdown records to estimate SC. On August 27, 2013, the well was pumped at about 715 gpm for 16.5 hours. Drawdown at the end of this time was 4.5 feet, resulting in an SC value of about 160 gpm/ft. Since it is unclear if drawdown had fully stabilized, and since SC generally decreases over time, we assumed an SC value of 120 gpm/ft for this analysis.

Figure 3 shows a range of static water levels at the Terrace Road location. This range is based on review of USGS and county records, as well as records kept by the town. The minimum static elevation is about 1140 feet above mean sea level (MSL). This represents a low static aquifer level that occurs fairly infrequently.

The pump intake for this well is below the top of the screen. We assumed that a safe drawdown elevation is the top-of-screen elevation of 1128.41 feet. This provides for about 11.6 feet of available "safe" drawdown during a drought-like condition. And this translates into a potential pumping rate of about 1,400 gpm, or about 2.0 MGD.

The Terrace Road well can only pump at about 1 MGD, about half the theoretical rate determined from SC calculations. Therefore, the well should be able to continuously provide up to 1 MGD, even under extended dry periods.

Lime Hollow Well No.7 (16-inch diameter)

In April 2001, a 48-hour pump test was conducted at Well No. 7. Stabilized drawdown was 13.1 feet for a constant pump rate of 1,450 gpm, resulting in an SC value of about 110 gpm/ft. During normal pumping on August 25, 2013, drawdown at this well was 7.8 feet after pumping at about 1,350 gpm for 6 hours. This translates into an SC value of about 170 gpm/ft, although it is unclear if drawdown had stabilized. We believe the SC value from the pump test is more reliable. To be conservative, we have assumed a 25% decrease in SC over time, resulting in value of 90 gpm/ft for this analysis.

A range of static water levels at Lime Hollow is shown in Figure 3. As with the Terrace Road site, the static water levels are based on review of USGS and county records, as well as records kept by the town. The minimum static elevation is about 1156 feet.

The pump intake elevation for Well No. 7 is 1141.63 feet, and the top-of-screen elevation is one foot lower at 1140.63 feet. We have assumed that a safe drawdown elevation is the pump intake, providing for available drawdown of about 25.4 feet. This results in a potential withdrawal rate of about 2,300 gpm (3.3 MGD), even when aquifer levels are very low.

Well No. 7 can only pump at about 1.9 MGD, about 60% the theoretical rate determined from SC calculations. This well can probably reliably produce 1.9 MGD a day under the current practice of alternating pumping between Lime Hollow and Terrace Road. But as described in Section 4, if Well No. 7 is pumped every day, its sustainable capacity may be more in the range of about 1 MGD.

Lime Hollow Well No. 2 (12 inch diameter)

We have no available pump test for this well, and since water levels are not recorded in the well itself, there are no data to directly determine SC. Alternatively, we estimated SC for Well No. 2 by comparing well characteristics to the nearby Well No. 7.

Screen length generally affects SC significantly, while screen diameter has a lesser affect. Screen length for Well No. 7 is about 26 feet compared to about 23 feet for Well No. 2. Well No. 7 also has a larger diameter screen (16-in compared to 12-in). We have assumed the SC of Well No. 2 to be 80% that of Well No. 7, or 72 gpm/ft.

The minimum static aquifer elevation for Well No. 2 is about 1156 feet. We have assumed that a safe drawdown elevation is the pump intake and top-of-screen, which are at the same elevation (1130.43 feet). This results in a safe drawdown of about 25.6 feet, and a potential withdrawal rate of about 1,840 gpm (2.7 MGD) when aquifer levels are very low.

Well No. 2 can only pump at about 1.4 MGD, about half the theoretical rate determined from SC calculations. This well can probably reliably produce 1.4 MGD a day under the current practice of alternating pumping between Lime Hollow and Terrace Road. But as described in Section 4, if Well No. 2 is pumped every day, its sustainable capacity may be more in the range of about 1 MGD.

4. Natural Recharge Rates and Sustainable Yield

A particular well and pump configuration can physically pump at a specific rate. But to pump at that rate continuously, the aquifer must be able to provide that much water over seasonally changing hydrologic conditions.

Sustainable yield can be defined as the use of groundwater in a manner that can be maintained for an indefinite time without causing unacceptable impacts. These are generally related to temporary or permanent declines in the groundwater table. A lowering of the water table can potentially:

- cause a reduction in pumping capacity of wells,
- cause excessive drawdown during pumping, leading to premature failure of wells and pumps,
- adversely affect water quality, and
- cause adverse impacts on nearby streams or wetlands by reducing flow and/or water levels.

The natural recharge rate for an aquifer is the long-term average amount of precipitation that reaches the aquifer. Groundwater mining occurs when pumping exceeds the natural recharge rate. Continued over-pumping results in a continuing decline in the water table, and can lead to supply problems. While aquifer levels may be restored if pumping is reduced, it might take years to recover fully.

A temporary decline in the water table usually occurs seasonally, usually in late summer when recharge is low. A drought is an extreme example. This is a natural occurrence, but pumping can intensify the effect. This has little adverse impact if an aquifer has excess storage that can be drawn

upon during dry periods. The Otter-Dry Creek Aquifer has a significant amount of storage, and there does not appear to be any seasonal adverse impacts under current conditions.

Recharge starts with precipitation. On average about 40-42 inches of precipitation falls annually in the Cortland area. In the Cortland area, evapotranspiration returns about half of this to the atmosphere, before it can recharge the aquifer or run off to surface waters.

USGS data indicate an annual average recharge rate of about 23 inches per year in Cortland, which corresponds to the average annual flow at the Tioughnioga River streamflow gage divided by the area of the watershed at that point. We have assumed that the natural recharge rate in the Otter-Dry Creek Aquifer is 23 in/yr.

Pumping a well at the natural recharge rate over the long term is theoretically possible, but physically difficult to accomplish from a single well. Pumping at this rate would use all available water, and would likely cause impacts to natural resources and other water users.

A more realistic approach is to estimate a sustainable yield, using a percentage of the natural recharge rate. This accounts for seasonal differences in recharge, droughts, and water allocated to natural resources or other users. While each site is unique, studies have reported values ranging from 10% to 70%. We have assumed that sustainable yield is 50% of the natural recharge rate.

Figure 4 shows the recharge zones for the Lime Hollow and Terrace Road wells. Table 1 shows the land area in square miles for these recharge zones.

Natural recharge rates were estimated by applying 23 in/yr of recharge to the land area of the recharge zones. Sustainable yield was then determined as 50% of natural recharge. Table 2 lists theoretical maximum yields based on natural recharge, as well as estimated sustainable yields.

Available Water based on Natural Recharge Rates - The Terrace Road location has a greater potential yield than Lime Hollow because of the larger source area. In theory, close to 5 MGD could be withdrawn at this location. Based on natural recharge, the Lime Hollow location could in theory produce about 1.9 MGD. This is about the capacity of Lime Hollow Well No. 7.

Sustainable Yield – The Terrace Road location has an estimated sustainable yield of about 2.6 MGD, more than double the current capacity of the well located there. Note that because of possible physical constraints of aquifer permeability and saturated thickness, it might be difficult or impossible to design a well that could produce 2.6 MGD.

At Lime Hollow the estimated sustainable yield is about 1 MGD, which is less than the current capacities of the wells located there. Defining sustainable yield as 50% of natural recharge is a somewhat conservative factor of safety. It is possible that further investigation could justify reducing the factor of safety, resulting in a higher estimate of sustainable yield.

Overall, the sustainable yield analysis suggests that:

- Each of the town's wells can individually provide water for the town's current demand of about 0.64 MGD, even during extended dry periods.
- The existing Terrace Road well can sustainably and continuously pump at its current capacity of about 1 MGD, even during an extended dry period.
- It is likely that the Terrace Road location can sustainably produce more than 2 MGD, if a well could be designed to extract that much water.
- Either of the Lime Hollow wells should be able to provide 1 MGD sustainably, but higher withdrawal rates might result in seasonal drawdown problems.
- Continuous pumping at Lime Hollow of 2 MGD or more could potentially cause long term declines in the aquifer.

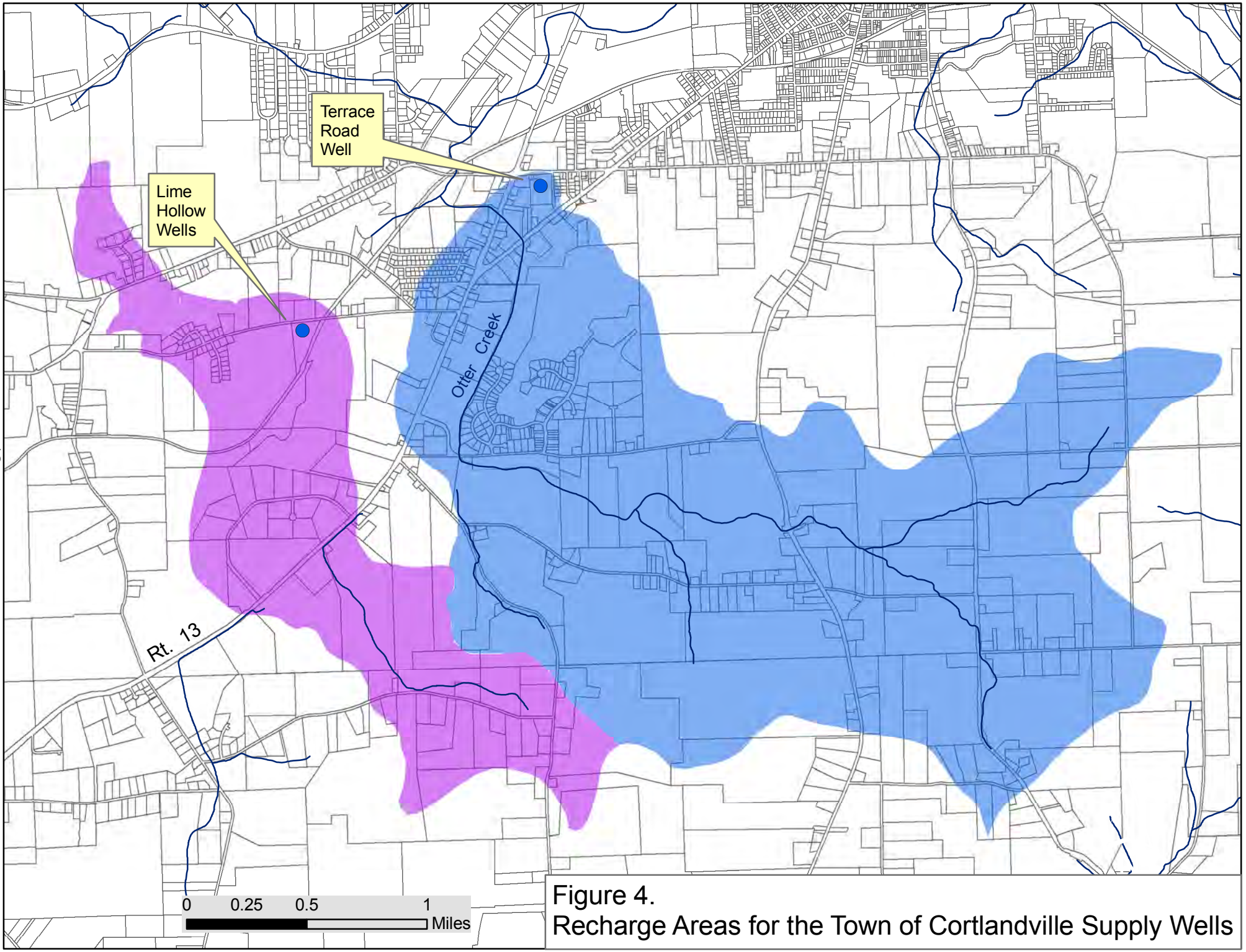


Figure 4.
Recharge Areas for the Town of Cortlandville Supply Wells

Table 1. Recharge Areas (square miles)

	Terrace Rd. Well	Lime Hollow Wells *
Zone 1A	0.28	0.37
Zone 1B	0.18	0.44
Zone 2	4.24	0.90
Total Recharge Area	4.7	1.7

* Applies to the location, and not any specific well at that location.

Table 2. Natural Recharge Rate and Sustainable Yield

	Terrace Rd.	Lime Hollow
Natural Recharge Rate (MGD)	5.1	1.9
SustainableYield (MGD) **	2.6	0.93

** Sustainable yield is assumed to be 50% of natural recharge, to account for seasonal low recharge periods, drought, and to avoid adverse impacts to natural resources

Note: The average annual recharge rate is assumed to be 23 inches per year, based on USGS studies.

5. Potential for Adverse Impacts

This section discusses how town water supply withdrawals might potentially impact natural resources or other water users.

5.1 Otter Creek

Otter Creek is unlikely to be impacted by town water supply withdrawals. Under most conditions, the streambed of Otter Creek is above the water table, meaning the creek is hydraulically disconnected from the aquifer. Therefore, increased pumping cannot induce stream losses, and cannot adversely impact the creek. Seasonally, there may be short periods when the creek is hydraulically connected, but under these high recharge conditions, adverse impacts are less likely.

5.2 Wetlands

There are wetlands in the uplands of both the Lime Hollow and Terrace Road source areas. These are not directly over the aquifer. Pumping from the aquifer would not affect the hydrology of the uplands, and therefore, these wetlands are not affected by town pumping.

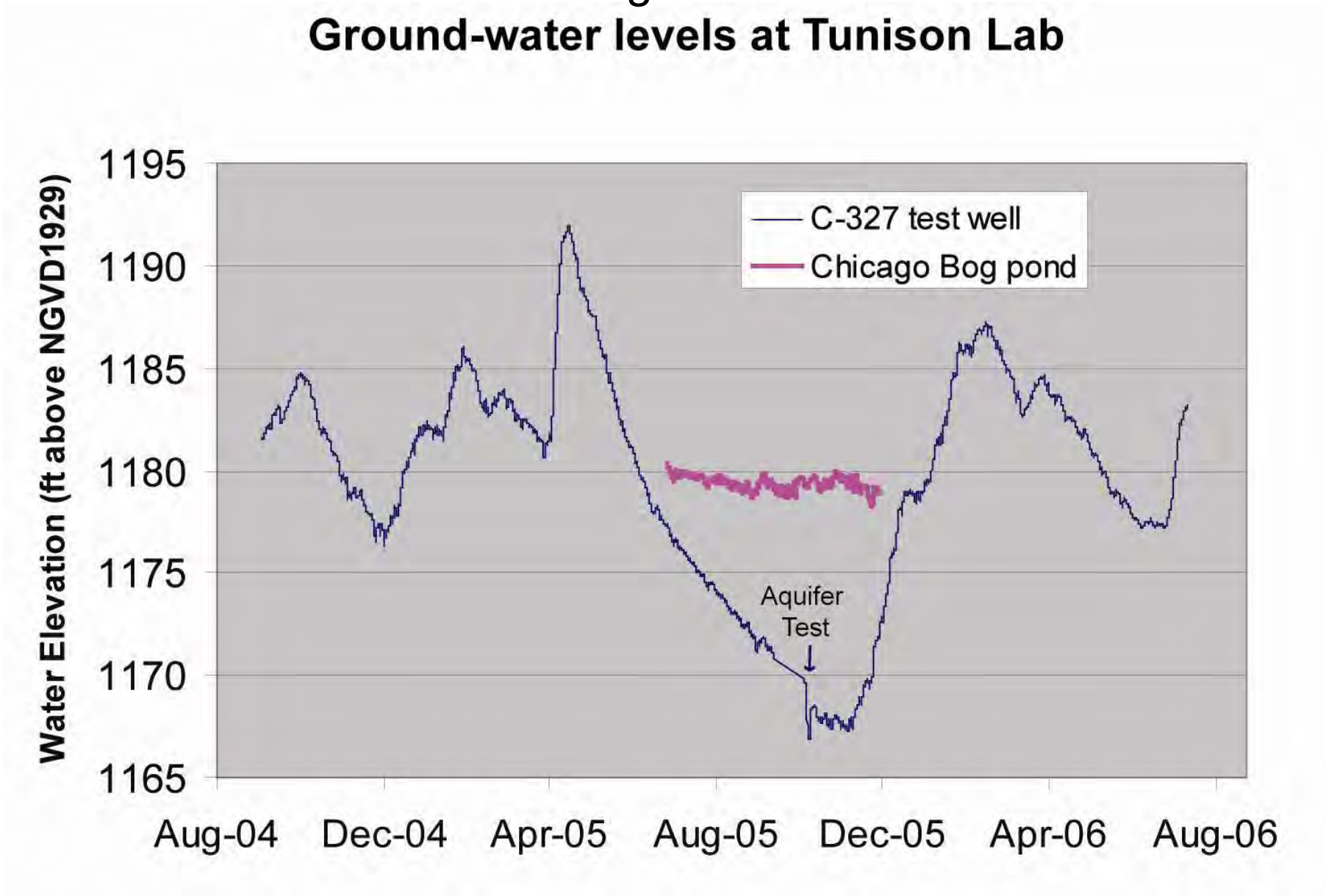
There are a number of small ponds in the vicinity of the Lime Hollow supply wells that are classified as wetlands. These are located over the aquifer. Most of these are known to "dry up" periodically. Based on a review of topography and aquifer levels, these ponds are hydraulically disconnected from the aquifer much of the time. In that sense they are similar to Otter Creek, and the potential for adverse impacts is limited most of the time. If pumping from the Lime Hollow wells increases to beyond the natural recharge rate, and groundwater mining starts to occur, these wetlands might be impacted.

Chicago Bog is an important resource located south of the Lime Hollow supply well, and warrants special consideration. USGS evaluated water levels in Chicago Bog in the summer of 2005 when they conducted a pump test for a new high-yield well for their Tunison facility. This period was relatively dry. As shown in Figure 5, aquifer levels declined throughout the summer, but the bog water level remained relatively constant. The bog water level reportedly does not change significantly, either seasonally, or from year to year (pers. comm. Glenn Reisweber, Lime Hollow Center for Environment and Education).

Available data suggest that Chicago Bog is hydraulically disconnected from the aquifer for much of a typical year. The bog remains "perched" above the water table due to a thick layer of relatively impermeable bottom sediments. When the water table is high, however, there may be a hydraulic connection between the bog and the aquifer. Section D-D' in Appendix A illustrates this.

It seems likely that direct precipitation and runoff from the surrounding land are the main sources of water to Chicago Bog. The aquifer may not be a significant source of water, but the seasonal high aquifer levels may help the bog retain water in some way. If pumping in the Lime Hollow area increased significantly, and resulted in a permanent decline in the water table, it is possible that Chicago Bog could experience some impact. We believe any potential impacts would be negligible, but a significant increase in pumping at Lime Hollow warrants monitoring of the bog.

Figure 5.


Ground-water levels at Tunison Lab
Water Elevation (ft above NGVD1929)
1195
1190
1185
1180
1175
1170
1165
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
C-327 test well
Chicago Bog pond
Aquifer Test

5.3 Other High-Yield Wells

The Gutchess Lumber, Pall Trinity and City of Cortland wells are located a long distance downgradient from the town's wells. All have large recharge areas relative to their withdrawal rates. We believe these wells are unlikely to be impacted by any foreseeable increase in pumping by the town.

The Tunison well is located about 5,000 feet south of the Lime Hollow wells. While it is in a hydrologically connected aquifer, it is on the opposite side of a regional groundwater divide (see Section D-D' in Appendix A). Over-pumping at either location could result in declines in the water table, potentially affecting both wells. The current Tunison pump rate of 325 gpm appears to be sustainable, based on an estimate of the well's recharge zone. It does not appear that the current Tunison pumping rate would adversely impact the aquifer or the town's supply wells. Lime Hollow pumping would probably have to increase to 2 MGD or more to have an impact on the Tunison well.

5.4 Residential Wells

Residences in the vicinity of the Terrace Road well appear to be connected to public water, and would not be affected by increased pumping. But because the Terrace Road pumping rate is so much lower than aquifer capacity, any residence that did have a private well is unlikely to be affected by increased pumping.

There are a number of residences within 2,000 feet of the Lime Hollow wells (Lime Hollow Rd, Gunzen Dr. and Forest Dr.). Based on town water distribution mapping, it appears these residences would have their own wells. We believe relatively deep residential wells are unlikely to be impacted by any future pumping scenario. We believe pumping at Lime Hollow would have to increase significantly beyond current projections before shallow wells could potentially be affected.

5.5 Regional Water Management

The town is not the only user of the Otter-Dry Creek Aquifer. While increased town withdrawals could potentially have impacts on others, the opposite is true as well.

Private residential withdrawals are small, and are largely returned to the aquifer by way of on-site septic systems. These are not expected to be a concern from a water quantity perspective. The large water withdrawals are generally lost to the sanitary sewer system (municipal public supplies, Pall Corp.), or to evaporation (Gutchess,), or to Beaver Creek (Tunison). These types of withdrawals have the potential to impact aquifer levels.

Total large-scale water withdrawals from the Otter-Dry Creek Aquifer are currently estimated to be about 3 to 4 MGD. This is well below the natural recharge rate for the aquifer, estimated to be in the range of about 20 MGD. At one time, however, the City of Cortland was pumping over 4 MGD, before losing one or more large industrial users. There is evidence to suggest that the aquifer levels in the vicinity of the City Water Works have increased since City withdrawals decreased.

Current water withdrawals from the overall aquifer do not appear to be a concern. The total recharge available to the aquifer, however, supplies streams, ponds and wetlands, in addition to uses for human activities. Any new, large withdrawal that does not recharge back to the aquifer could cause localized impacts to supply wells or natural resources. Over the long term, more local oversight of new withdrawals from the aquifer may be warranted.

5.6 Re-direction of Contaminated Groundwater

Increased pumping can alter groundwater movement, and potentially cause polluted groundwater to move toward a well. The Smith-Corona TCE plume is the only known significant contamination that persists in the critical areas of the aquifer. Based on computer modeling used to delineate wellhead protection areas for the town, we believe there is a low likelihood that TCE plume movement would be significantly altered by a foreseeable increase in pumping. If the town does significantly increase pumping, however, it would be prudent to monitor the TCE plume to ensure no impacts occur.

A review of the NYS DEC Environmental Remediation List indicates there are no other known groundwater contamination sites in the Otter-Dry Creek Aquifer.

6. Alternative Water Supply Locations in Cortlandville

The town can currently meet its water demand with any one of the existing Lime Hollow or Terrace Rd. wells, even with a projected increase of 0.3 MGD (for a total demand of about 0.94 MGD). If demand increases up to about 2 MGD, the town could still potentially meet demand by pumping the Lime Hollow and Terrace Rd. wells simultaneously. This would require an increase in the DEC permit limit for withdrawals. It would also leave the water supply more vulnerable, because if a problem arose at either location, the town would not be able to meet demand.

If future water demand requires the town to pump the Terrace Road well and one of the Lime Hollow wells simultaneously, a third water supply location would leave the town less vulnerable. This section describes possible alternative locations for a third supply well. This should be considered a screening assessment rather than a recommendation to explore specific locations. We describe pros and cons for the various alternatives based on available information. But further evaluation of the feasibility of any of these sites would be necessary before proceeding.

6.1 Primary Alternatives

Blodgett Mills

The town installed an 8-inch test well at the park in Blodgett Mills. The well is located just west of a railroad line, and about 480 feet west of the Tioughnioga River. There is a seasonal stream running adjacent to the well. The well is about 40 feet deep. There are relatively impermeable deposits down to about 20 feet, and these are possibly floodplain deposits. Below the floodplain deposits is a 20-foot thick sand and gravel layer. This appears to be a confined, or semi-confined, aquifer.

The town conducted two separate 24-hour pump tests in the past couple of years. For each test, the well was pumped at 200 gpm, and water levels stabilized during the test. Water quality testing was conducted at the end of both pump tests, and the results were good.

A report prepared by the town indicates that "an ultimate well capacity of up to 1,000 gpm may be possible" at the Blodgett Mills location. Because the site is over two miles from the nearest town transmission main, this location "would not be practical as a source of water unless a yield of 600-700 gpm can be obtained".

Pros – The land is owned by the town, and the initial investigations have been completed. There is relatively little development in the area. There does not appear to be an existing groundwater pollution problem. The confined nature of the aquifer makes it less susceptible to pollutants introduced at the land surface.

Cons - The site is relatively distant from the town's distribution system. The site is in a floodplain, but it appears that a raised facility is feasible. There are outstanding questions about "groundwater under the influence of surface water" that need to be addressed. Data obtained during the pump test suggest that it is not, but further testing might be required. A review by the Health Department would be required, and if the site proves to be under the influence of surface water, it would likely not be economically feasible. It is possible that a high-yielding well at this location could adversely impact nearby private wells. On the other hand, a well at this location could expedite public water service to residents in the area.

Otter –Dry Creek Aquifer

The Otter-Dry Creek Aquifer is the most productive groundwater source in the town. Unfortunately, development and groundwater contamination limit the choices available for a water supply. Figure 6 shows three different areas that might be suitable for further investigation of a water supply. Also shown are the aquifer boundary, the most productive parts of the aquifer, the approximate limits of the Smith-Corona TCE plume, and town-owned parcels.

The blue-shaded area in Figure 6 represents what are believed to be areas with the highest combination of permeability and saturated thickness, and are more likely to produce high yielding wells. Because of the inherent variability of aquifers, it's possible that high-producing sites exist outside this zone, or low-producing sites exist within it.

The red shaded area represents the approximate maximum boundary of TCE contamination from the Smith-Corona facility. The boundary is based on historical measurements of TCE that were above the drinking water standard of 5 parts per billion. Many of these measurements were made about 20 years ago, and the current extent of the "5 ppb" plume may be smaller.

The south and west parts of the aquifer are most suitable for avoiding highly developed areas, and avoiding known or potential groundwater contamination. Pros and cons for each of these areas are described below.

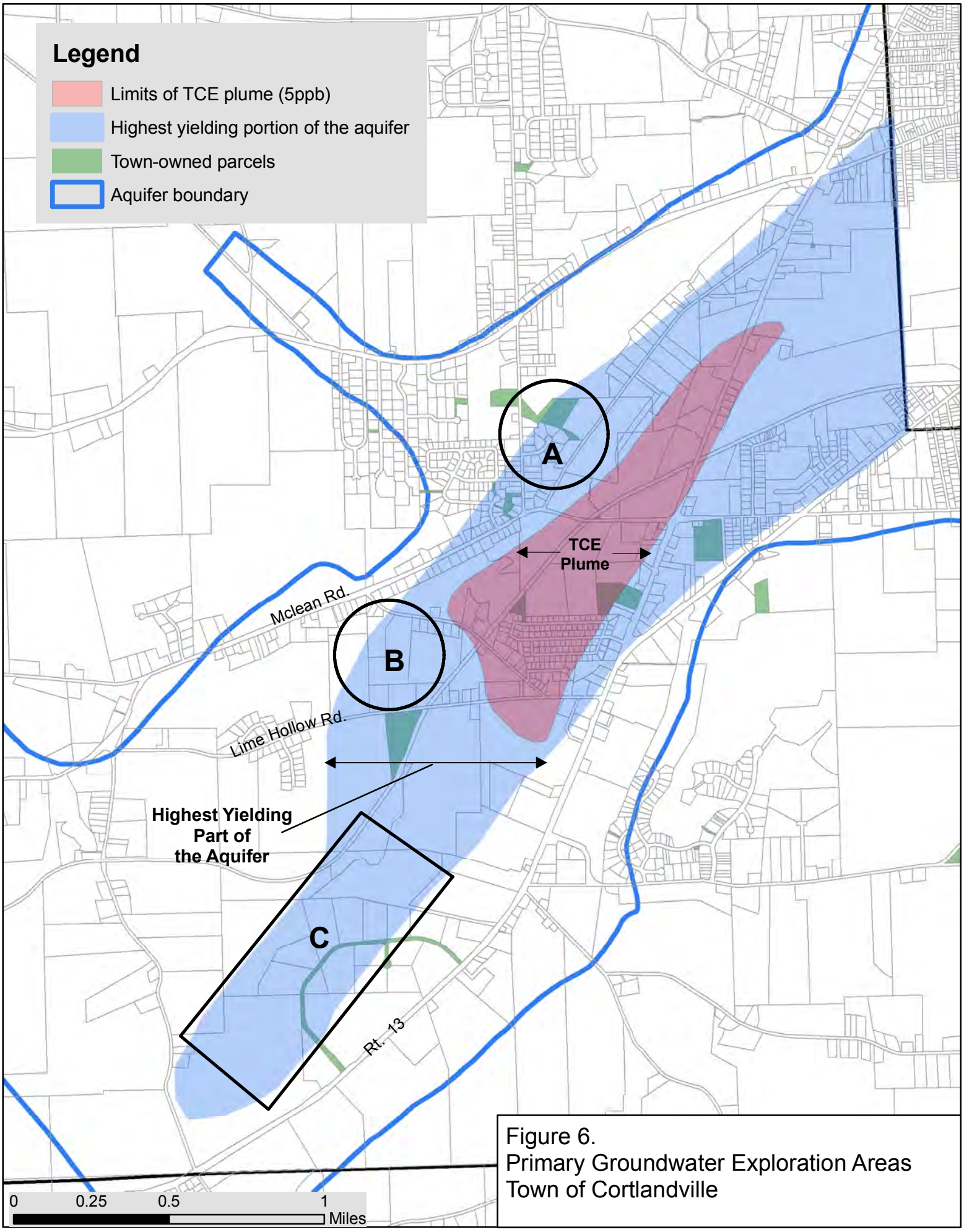


Figure 6.
Primary Groundwater Exploration Areas
Town of Cortlandville

Area A – Fairview Drive/Luker Road – The town owns land in this area, and a well could potentially be sited there. The site is centrally located relative to the existing town infrastructure. Based on groundwater flow patterns, it appears that TCE contamination could be avoided. Further assessment of the TCE plume extent would be recommended to ensure that it will not be a problem.

There is a large upland recharge area at this location, and so if a high-producing well can be sited, it would likely have a high sustainable yield as well. But there is some uncertainty in achieving a high-yielding well because of limited deep well logs in the immediate vicinity. One or more test wells would be needed to determine feasibility.

The residential area to the south (Bowling Green, Cedar Crest) has on-site septic systems which could present a water quality concern. Water testing on Luker Road in 2007-08, however, indicated groundwater quality is good (nitrate, an indicator of septic waste, had decreased from about 8 mg/l to 2 mg/l in the previous 20 years).

Area B – North of Lime Hollow Road – This general location could potentially produce a well with a yield comparable to or larger than the existing Lime Hollow wells. There are several, large, wooded and privately-owned parcels in the area. The source area for a well at this location would be relatively undeveloped. Groundwater flow is to the north, and it appears promising that a well could be sited that would not be impacted by TCE contamination.

Test wells would need to be drilled to determine feasibility. Land would have to be purchased if initial investigations identified a suitable site. The source area for a well at this location would overlap with that of the existing Lime Hollow wells, and an assessment of combined sustainable yield would be recommended before investing too much effort in this area.

Area C – South of Lime Hollow – A high-producing well could probably be sited somewhere in this area, but it is close to the regional groundwater divide, and sustainable yield might be significantly lower than what a pump test might indicate. Some of the area is also within the current source area for the Lime Hollow wells, and so they would be "competing" for the same water to some extent.

6.2 Secondary Alternatives

Figure 7 shows three aquifer areas within Cortlandville that are outside the Otter-Dry Creek Aquifer. These areas could potentially serve as a new water source, but less is known about them. Available information suggests they have smaller saturated thickness, and are likely to be less productive. We consider these to be areas that might be further investigated if other locations were not feasible. A brief description of the areas is presented below.

Area 1 – North along Rt. 81, Rt. 11 and Rt. 281 Corridor – The Cortland Country Club and Casey Fields cover much of the north part of this area. The County Fairgrounds and a church on Fisher Ave. cover much of the south part. There are two large, undeveloped parcels south and east of the Country Club. Much of the rest of the area is residential or commercial. There is a hazardous waste site along Rt. 11, east of the Country Club. Available data indicate the saturated thickness of the aquifer is only about 20 to 40 feet in this area, with the thickest part east of the West Branch Tioughnioga River (Casey Fields).

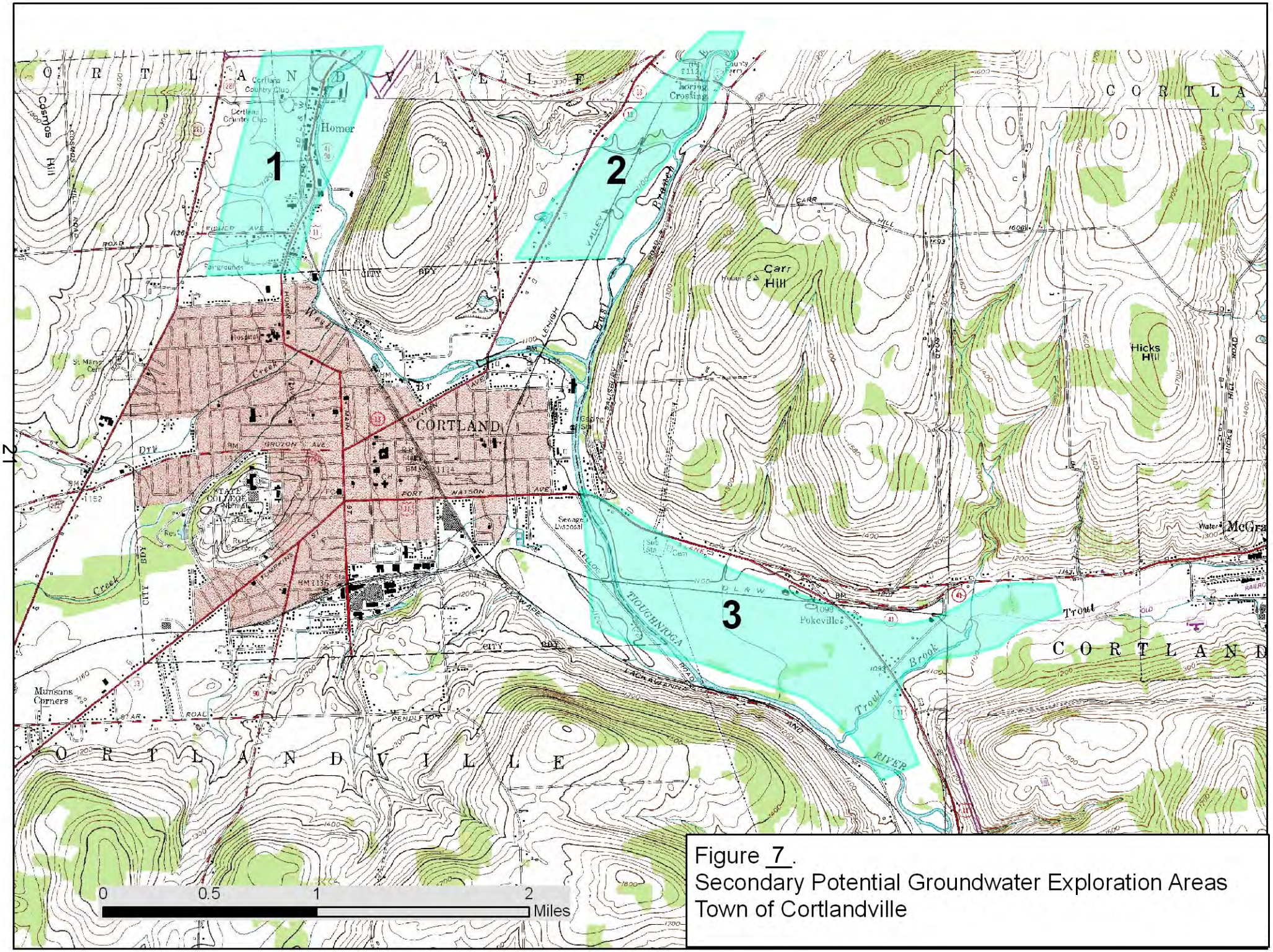


Figure 7.
Secondary Potential Groundwater Exploration Areas
Town of Cortlandville

Area 2 – North along Rt. 13 and East Branch Tioughnioga River – The area contains farmland, BOCES, Suit-Kote, and the Country Music Park, as well as other businesses and residences. There is very little information pertaining to the aquifer. A 50-foot deep well located in the City of Cortland, about 1,500 feet south of the town line, reportedly yields 100 gpm. A high-yielding well might be possible in this area, and at some point in the future it might be worth drilling a test well.

Area 2 – Polkville – The area is largely commercial/industrial and agriculture, with Suit-Kote and its gravel mine pond being the largest presence. Available information indicates that a sand and gravel formation in this area is about 50 feet thick, with a saturated thickness of about 40 feet. There is reportedly a high-yielding well associated with cleanup of a TCE spill at the site of a former boat manufacturer (now Intertek). This well is adjacent to the Tioughnioga River, and its high yield could be aided by induced recharge from the river. While a high-yielding well might be feasible in this area, the widespread presence of commercial and industrial facilities would seem to make it less desirable at this time.

7. Water Conservation and Aquifer Level Monitoring

7.1 Water Conservation

Currently the town's management of its water system is adequate to meet its needs, but water conservation is always a good idea.

- Leaks/unaccounted-for-water – The town has a strong leak detection and repair program. We believe there is relatively little room for improvements that would further reduce losses significantly. Continuation of this program will be a good practice, as leaks are an ongoing concern.

- Sanitary sewer infiltration and inflow (I/I) - I/I occurs when groundwater infiltrates into sewers, or surface runoff enters sewers through manholes or illegal connections. This water is carried to the Cortland Wastewater Treatment Plant (WWTP) and lost from the aquifer. I/I can be significant, and is generally impractical to eliminate entirely. I/I at the Cortland WWTP (from the city, Cortlandville, and the villages of Homer and McGraw combined) can be more than several MGD, especially during high groundwater periods.

  For a municipal sewer system, I/I less than 2,500 gpd, per inch diameter of pipe, per mile of pipe (gpdim) is not considered excessive. We are aware that the town has taken steps to identify and eliminate I/I. We recommend that the town consider an assessment of current I/I rates to evaluate how well the system is performing compared to the 2,500 gpdim guidance value.

- Education/Outreach – Periodically "getting the message out" about water conservation can be a cost-effective way to get the public to help keep water demand down. Brochures, or an item in the town's annual "Water Quality Report", are possible ways to achieve this. Some research, however, suggests that television and newspaper spots are more effective.

7.2 Monitoring Aquifer Levels

As the town's water demand grows over time, being able to predict an impending water supply problem may become important. Aquifer levels rise and fall relatively slowly. Regular monitoring of aquifer levels will allow the town to identify a problem in advance.

Currently, water department staff maintain a log of daily water levels. The water levels are manually recorded, along with an indication of whether the pump was on or off. If feasible, we suggest recording two water levels daily, or at least weekly:

1. Static water level (aquifer level when the pump is off). Ideally this measurement would be taken just before a pump kicks on so that the aquifer will have recovered as fully as possible from the previous pumping cycle.

2. Pumping level (water level in the well when the pump is on). Ideally this measurement would be taken just before the pump kicks off, so that the maximum drawdown in the well is recorded.

These water levels can be used to identify when declining aquifer levels are a cause for concern, and when there is a risk that drawdown will fall below acceptable levels.

Because the pumping schedule is dictated by water levels in the storage tanks, it would be impractical to manually record water levels coordinated to pump start and stop times. The town has a computerized SCADA (supervisory control and data acquisition) system that measures aquifer levels in the Terrace Road well, in Lime Hollow Well No. 7, and in a monitoring well located about 5 feet from Lime Hollow Well No. 2. It may be possible to configure the SCADA system to automatically record and store key water level data.

Automated water level sensors have gotten more reliable over the years, but they should be field checked periodically to ensure they are working properly. The sensor in the monitoring well adjacent to Lime Hollow No. 2 can be easily field checked. It is currently much more difficult, or impossible, to field check the other two sensors directly. But it may be possible to field verify these sensors by correlating measurements with a nearby monitoring well.

USGS recorded aquifer levels in the City Water Works for over 50 years until the station was abandoned several years ago. At that time SWCD installed an automated data logger to continue the record, and installed another logger in a well at the SPCA on McLean Rd. Data from these loggers can supplement data collected by the water department.

7.3 Artificial Recharge

Artificially recharging an aquifer is a strategy used in some regions, where water supplies are drastically low relative to demand. One strategy is "recycling" of wastewater by infiltrating it at the headwaters of the aquifer. Another possible approach would be to artificially recharge the aquifer from a nearby source, for example, by pumping water from the Tioughnioga River. Either of these strategies would be costly, have to undergo permitting, and may prove to be controversial. In the near term, this does not appear to be something the town needs to consider.

8. Inter-municipal Water Sharing

The water distribution systems of Cortlandville, the City of Cortland and the Village of Homer are physically inter-connected, either directly or indirectly. Water sharing is a possibility, but there are various issues that limit this ability. Some of these are discussed below.

8.1 Cortlandville and the City

There are currently about a dozen connections between the two systems. The most recent is in Polkville, where the City provides a relatively small amount of water to about 6 or 7 users in Cortlandville. The Polkville distribution system is owned by the town, but is separate from the rest of the town's system.

Cortlandville can physically pump into the City's distribution system. The City cannot currently pump into the town system because of a pressure difference in their systems (apart from Polkville, which is a gravity delivery). A booster station would need to be installed for the City to pump into the town's distribution system.

The City currently pumps about 2 to 2.4 MGD, depending on whether the college is in session. The City can pump at least 5 MGD, and can theoretically provide the entire Cortlandville water demand (if a booster station were installed).

With its current system, Cortlandville can provide only a small fraction of the City's water demand and still meet its own demand. If Cortlandville were to pump from the Terrace Road and Lime Hollow wells simultaneously, it could potentially provide about half the City's demand while still meeting its own.

Other issues include:

- Disinfection contact time could be an issue with any potential inter-municipal water sharing.
- Permitted withdrawals for the town might need to be increased.
- Valves at existing connections are not exercised (opened and closed) regularly for various legitimate reasons. These connections are essentially "dead ends". When valves are eventually opened, turbidity, disinfection and water meter clogging problems can result. Un-exercised valves also have a tendency to develop operational problems over time.
- An air stripper at the City Water Works is a safeguard to treat TCE contamination, or other volatile organic contamination. Fortunately, the City has never had to use this unit. However, recent alterations to the City's operations have rendered the air stripper ineffective because it is not properly integrated with the system. If the City needed to put the air stripper into emergency operation, it would need to modify its system, and this might result in further issues related to inter-municipal water sharing between the city and town.

8.2 Cortlandville and Homer

The town has two connection points with the village; an 8-inch main on Rt. 281 and a 6-inch main on Rt. 11. The town can and has provided water to the village. Because of the town's high system pressure, the village cannot pump into the town system, unless a booster station is installed. The village currently pumps 0.45 to 0.5 MGD. The village can reportedly produce about 0.9 MGD with one pump, and about 0.7 MGD with the other. Pumping both wells, the village can reportedly produce over 1 MGD.

If the need arose, the village could potentially provide about 0.5 MGD to the town while still meeting its own demand requirements. This would be about 80% of current town demand and about 50% of projected demand. The town could potentially provide the full current village demand of about 0.5 MGD, while still meeting its own demand requirements. In either case, each community would need to pump from more than one well simultaneously, and a booster station would need to be installed to allow the village to pump to the town. There might also be other issues, such as adequate disinfection and increasing allowable regulatory withdrawals.

8.3 The City and Homer

The city and village water systems are not directly connected, but they have a common link through the Cortlandville system. The City could theoretically pump into Cortlandville's system, and Cortlandville could supply water to Homer through connections at Rt. 281 or Rt. 11. Alternatively, Cortlandville could potentially isolate a portion of their distribution system and the City could pump more directly into the Homer system. In either case, a booster station would be required for the City to pump into Cortlandville's system. There might also be disinfection issues to resolve. The village could potentially provide water to the city in a similar manner, but could at best supply about 25% of current City demand.

9. Conclusions

In the near term, Cortlandville is well-equipped to meet the public's demand for water. Our assessment indicates that each of the town's three wells can sustainably meet the entire demand, even with a projected 47% increase over the next several years (from 0.64 MGD to 0.94 MGD). The town currently only pumps from one of its three wells on any given day. This redundancy in service capability limits vulnerability to supply shortages in the event of an unexpected problem with any one well.

Even if the town's water demand increased beyond current expectations, the town could easily produce 1.5 to 2 MGD by pumping from Terrace Road and Lime Hollow simultaneously. In the short term, this would preclude the need to make any modifications to the system. But under this scenario the system would be more vulnerable in the sense that a problem at either location might prevent the town from meeting demand.

Current Capacity and Sustainable Yield

Currently the Terrace Road well can physically pump a little over 1 MGD, and we believe this well could be pumped continuously (every day) at that rate without consequence. Based on available recharge, this location could sustainably produce 2 MGD or more, but designing a well that can produce that much water might be difficult.

Lime Hollow Well No. 2 and Well No. 7 are physically capable of pumping at rates of about 1.4 MGD and 1.9 MGD respectively, even during historically low aquifer levels. However, the wells have never been pumped every day for long periods. Continuous pumping might cause aquifer levels to drop below those that have been recorded in the past. Our assessment indicates that occasional drawdown problems might occur if the wells are pumped continuously (every day) at more than about 1 MGD. (Note: As described in Section 4, a large safety factor has been applied; and further study might find that sustainable yield at Lime Hollow is higher than 1 MGD).

Potential for Adverse Impacts due to Increased Pumping

Excessive pumping can potentially impact natural resources or other water users. We believe projected water withdrawals over the next 10 years are unlikely to result in any adverse impacts, either to streams and wetlands, or to others who withdraw water from the aquifer. The town's water demand would probably need to increase from the current 0.64 MGD to as much as 2 MGD in order to raise possible concerns about adverse impacts. Based on historical growth, it might take decades for town water requirements to reach 2 MGD.

Other Potential Water Supply Locations

There is no urgent need for Cortlandville to develop a third water supply location, but recent growth trends support the idea of planning for the future. An ideal location would be able to produce a large sustainable yield, have a relatively undeveloped source area, avoid parts of the aquifer known to have water quality issues, and be strategically located in terms of existing infrastructure. Unfortunately, meeting all these criteria is challenging.

We identified several potentially promising locations, but each would require further investigation to determine if they are feasible. One is in Blodgett Mills (the town has already begun investigations at this location). The others are located in the Otter-Dry Creek Aquifer. We also identified several other general areas in town where it might be feasible to develop a water supply. But they are either less likely to produce a high-yielding well, or too little is known to recommend them at this point. All of these locations are described in more detail in Section 6.

10. Recommendations

The following are recommendations resulting from this assessment. These are general recommendations that might need to be defined in more detail if implemented.

1) Developing a new water supply can be costly and time consuming. Future increased water demand may require the town to pump simultaneously at Lime Hollow and Terrace Road. When/if this happens, it would be a good idea to have a third supply in place to better handle an emergency situation. The town has been exploring new water supply locations over the past several years, and we recommend they continue this process.

2) We recommend the town consider developing an operator's manual for water department staff that would document basic information about the system, provide guidance on when and how to respond to common issues, and serve as a means of passing on system information to future staff. Included might be:

    a) Basic information on well and pump specifications,
    b) General procedures for daily operations,
    c) Development of a water level monitoring procedure, as described in Section 7.2,
    d) Development of "action levels" for static aquifer levels and drawdown levels that indicate impending conditions that could impact the town's ability to supply water. For example, an action level might signal a need to monitor aquifer levels more carefully because of a steadily declining aquifer. Another action level might signal a need to alter pumping schemes because of excessive drawdown, or signal the town to initiate water use restrictions.

3) While it does not appear that sewer system infiltration and inflow (I/I) are currently a significant source of lost water from the aquifer, I/I can increase over time and can result in increased wastewater treatment costs. We recommend that the town consider performing an assessment of I/I rates in the town's sewers that would allow a comparison to acceptable rates for municipal systems, as described in Section 7.1. This would provide a better understanding of how I/I is affecting town sewer flows, and provide a benchmark to compare to future conditions.

4) The ability to share water between the town, the City of Cortland, and the Village of Homer could be valuable in an emergency. While the systems are inter-connected, there are various technical issues that significantly limit the ability to convey water between the systems, as described in Section 8. We recommend the town work with the other communities and the county Health Department to explore ways to resolve these issues.

5) The groundwater plume associated with TCE contamination from the former Smith-Corona facility persists more than 25 years after it was discovered. The plume generally coincides with the most productive part of the Otter-Dry Creek Aquifer, and effectively eliminates promising sites for a new water supply well. TCE persists, but concentrations have declined over time. We recommend that the town consider an investigation to better define the current limits of the plume. There are some recent data that would be useful in this exercise, but additional monitoring might be needed to better define the current plume.

6) The Otter-Dry Creek Aquifer currently has the capacity to supply the various public and private entities that withdraw water from it, and maintain adequate water levels for natural resources. It is unclear how much additional water can be withdrawn from the aquifer without beginning to see local or widespread impacts. New large withdrawals that recharge back to the aquifer are less likely to have impacts. Large private withdrawals that discharge to the sewer system, or otherwise do not recharge the aquifer, can cause impacts.

   Large withdrawals are regulated by DEC and SRBC, but it might be advisable to have more local control, or at least involvement, in the permitting of new or increased aquifer withdrawals. The town's Aquifer Protection District code requires a special permit for a "use that anticipates an average daily on-site water consumption exceeding 50,000 gpd". But the special permit is more targeted to pollutants than water quantity.

   We recommend that the town explore the possibility of modifying its code to take a more proactive role in managing new or increased aquifer withdrawals. This might require legal review to ensure compatibility with water rights and water law.

   We further recommend the town consider exploring ways to initiate local review and comment on DEC and SRBC permitting of water withdrawals, to ensure that local concerns are considered. This might be accomplished at either the municipal or county level.

11. Definitions

Aquifer - A formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Aquifer test - A test to determine hydrologic properties of the aquifer involving the withdrawal of measured quantities of water from or addition of water to a well and the measurement of resulting changes in head in the aquifer both during and after the period of discharge or additions.

Aquitard (or confining unit) - A formation with low permeability that retards but does not prevent the flow of water to or from an adjacent aquifer. It does not readily yield water to wells or springs, but may serve as a storage unit for ground water.

Area of influence of a well - The area surrounding a pumping or recharging well within which the potentiometric surface has been changed.

Artificial recharge - Recharge at a rate greater than natural, resulting from deliberate or incidental human activities.

Cascading water - In reference to wells, groundwater that trickles or pours through cracks or perforations down the casing or uncased borehole above the water level in the well.

Cone of depression – For an unconfined aquifer, a depression of the water table in the shape of an inverted cone that develops around a well which is being pumped. For a confined aquifer, it is a depression in the potentiometric surface.

Confined – A condition in which the potentiometric surface is above the top of the aquifer.

Confined aquifer - An aquifer bounded above and below by confining units of distinctly lower permeability than that of the aquifer itself.

Drawdown is the distance the water level is lowered in a well during pumping. It is the difference between the static water level and the pumping water level.

Gaining stream - A stream or reach of a stream whose flow is being increased by inflow of groundwater.

Groundwater - That part of the subsurface water that is in the saturated zone, where all pore spaces are completely filled with water.

Groundwater discharge - Flow of groundwater from the zone of saturation, usually meaning flow into a surface water, but also flow from a well.

Groundwater divide - A ridge in the water table or other potentiometric surface from which groundwater moves away in both directions away from the ridge line**.**

Permeability - The property of a porous medium to transmit fluids under a hydraulic gradient.

Potentiometric surface - an imaginary surface defined by the level to which water in wells would rise in a confined aquifer. This is analogous to the water table of an unconfined aquifer.

Pumping level - the water level in the well during pumping

Recharge - The process of addition of water to the saturated zone (groundwater).

Recharge area - An area in which water reaches the zone of saturation by surface infiltration.

Saturated zone - Those parts of the subsurface in which all pore space is filled with water.

Specific capacity is yield of the well per unit of drawdown, usually expressed as gallons per minute (gpm) per foot of drawdown. It is the pumping rate divided by the drawdown. For example, if the pumping rate is 1000 gpm and the drawdown is 10 feet, the specific capacity of the well is 100 gpm per foot of drawdown.

Static water level is the water level in a well when it is not pumping.

Transmissivity - The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Unaccounted-for-water includes unmetered water put to beneficial use as well as water losses from a distribution system, such as leaks. Beneficial unmetered uses include firefighting, main flushing, process water for water treatment plants, landscaping of public areas, etc.

Unconfined - A condition in which the upper surface of the zone of saturation forms a water table under atmospheric pressure.

Unconfined aquifer - An aquifer which has a water table, and is not subject to pressure greater than atmospheric.

Unsaturated zone - The zone between the land surface and the water table, where pore spaces are partially or wholly filled with air.

Water table - The upper surface of groundwater at which the water pressure is atmospheric (i.e., not confined by an overlying impermeable zone).

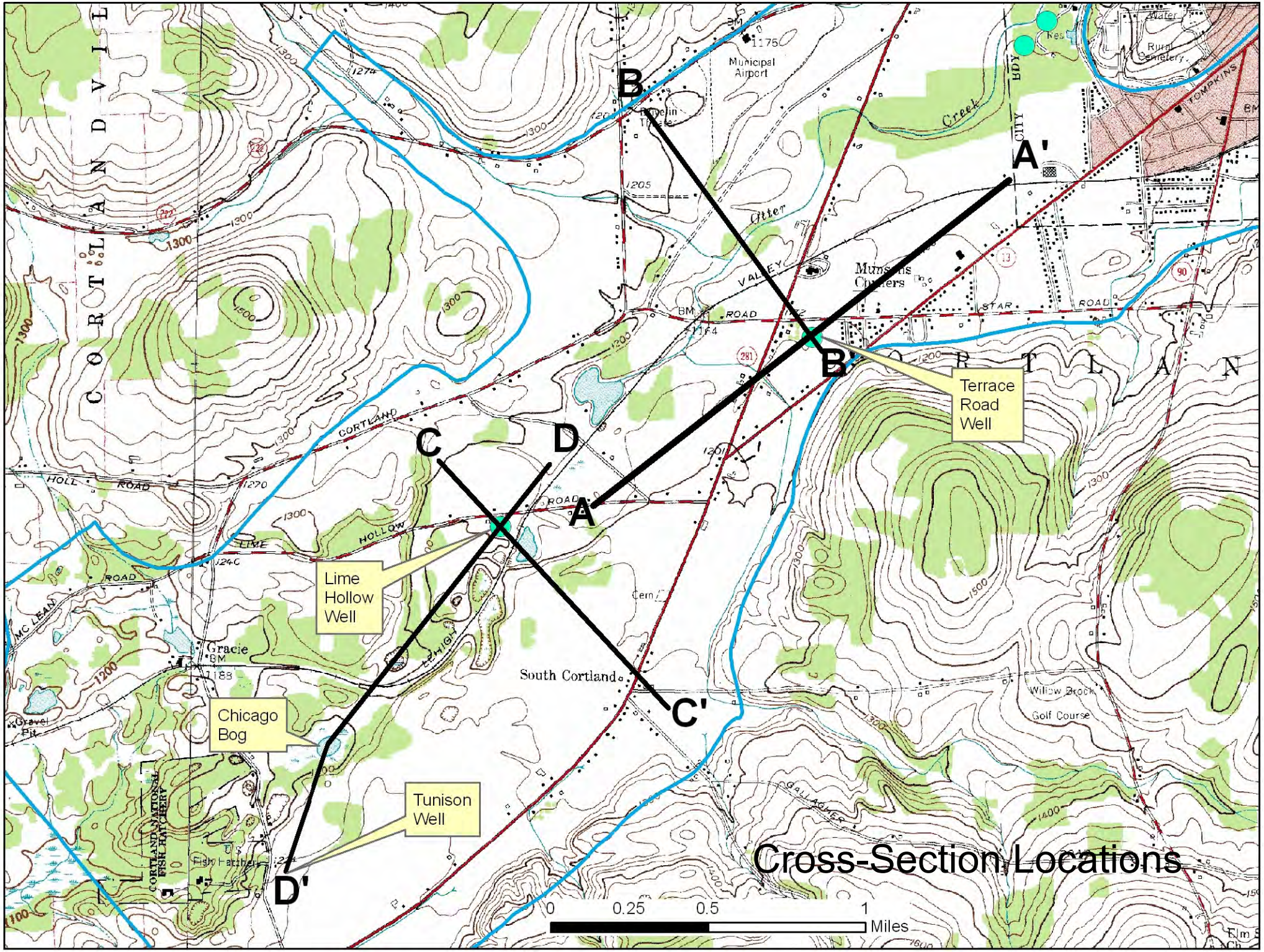
Well capacity or yield - The volum of water per unit of time discharged from a well, usually measured as the pumping rate in gallons per minute (gpm).

Well development is the process of using mechanical or chemical methods to clean the openings or enlarges passages in the water-bearing sand and gravel so that water can enter the well freely.

Well efficiency - The ratio of the theoretical drawdown in the aquifer to the actual drawdown in the well. Drawdown in the well is typically greater, and the difference is caused by frictional energy losses as water moves from the aquifer into the well.

Appendix A

Cross Sections



Cross-Section Locations
A
A'
B
B'
C
C'
D
D'
Terrace Road Well
Lime Hollow Well
Chicago Bog
Tunison Well
Municipal Airport
Otter Creek
Munsons Corners
South Cortland
Gracie
Willow Brook Golf Course
Rural Cemetery
Cortland National Fish Hatchery
Gravel Pit
Fish Hatchery
Cortland
Lime Hollow Road
Holl Road
Mc Lean Road
Lehigh
Valley Road
Star Road
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Gallagher
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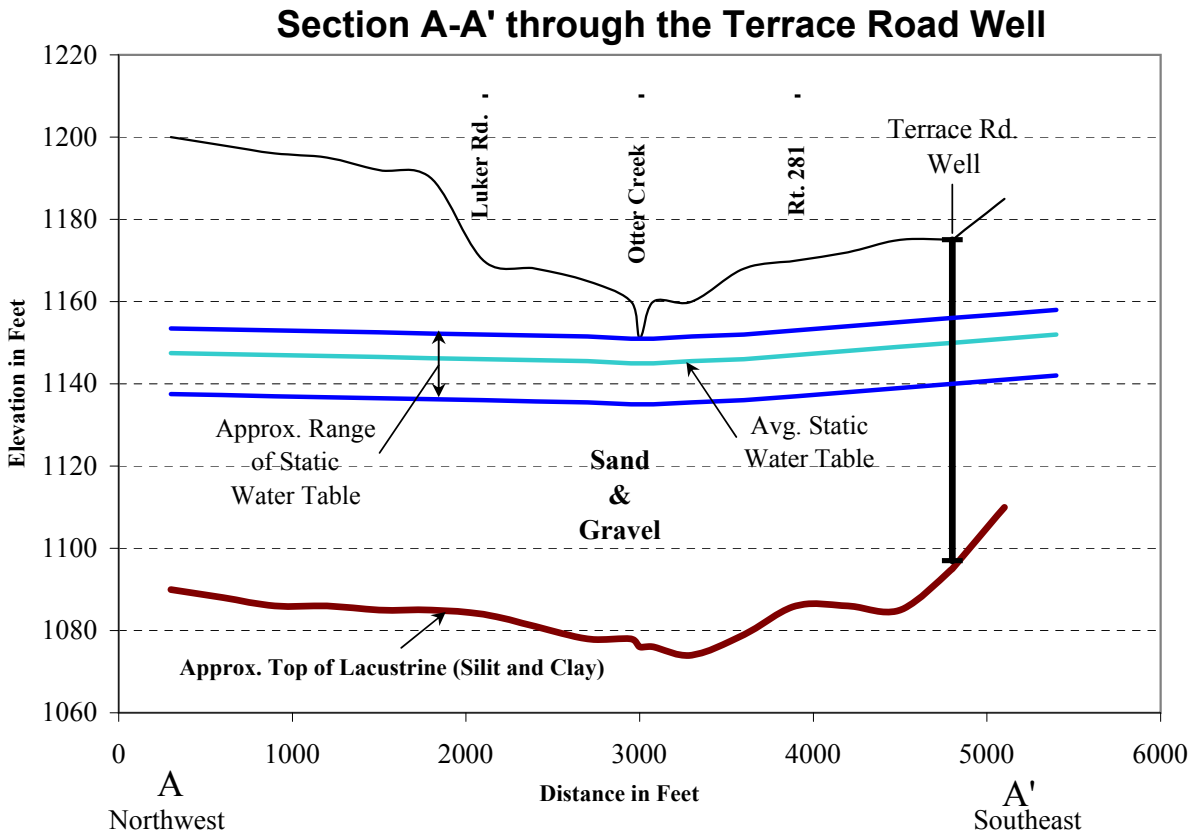
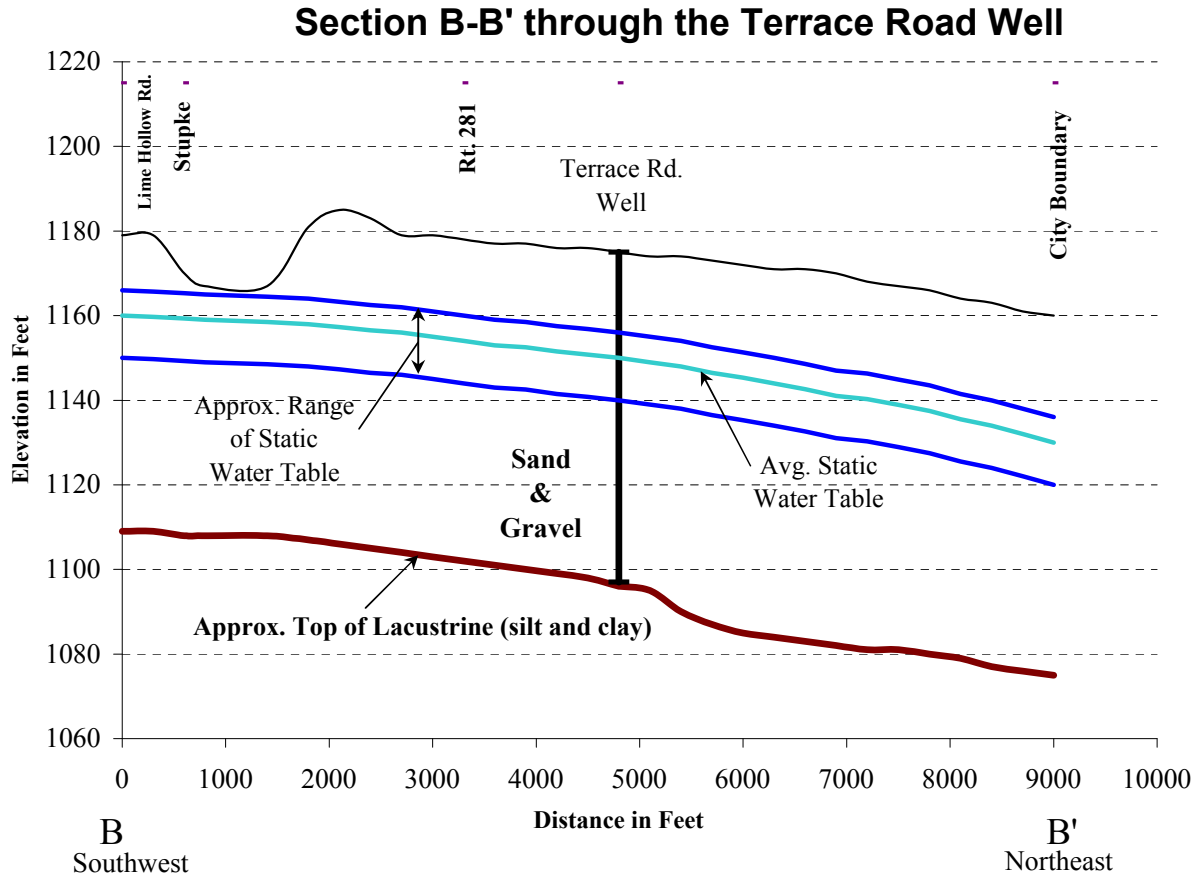
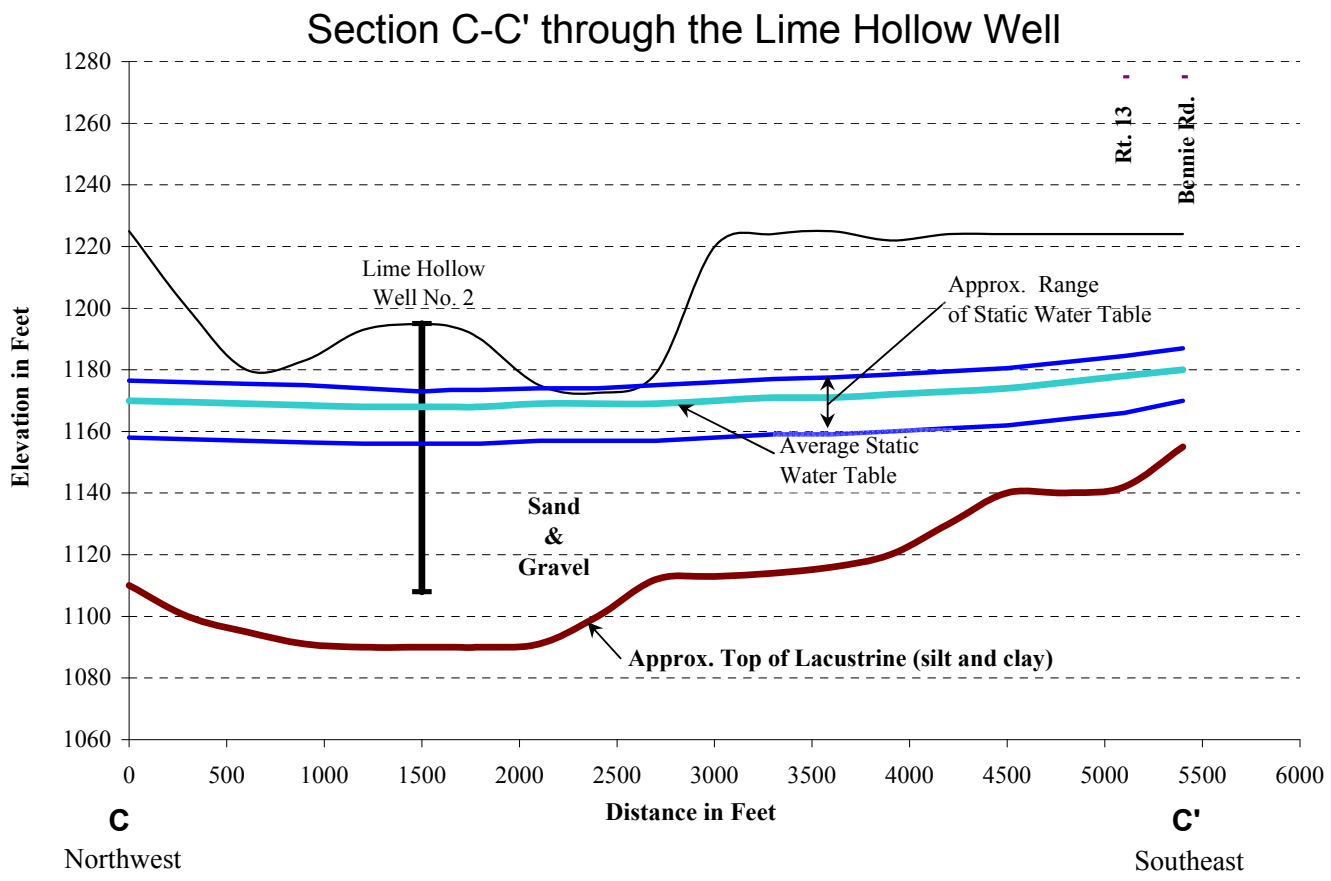
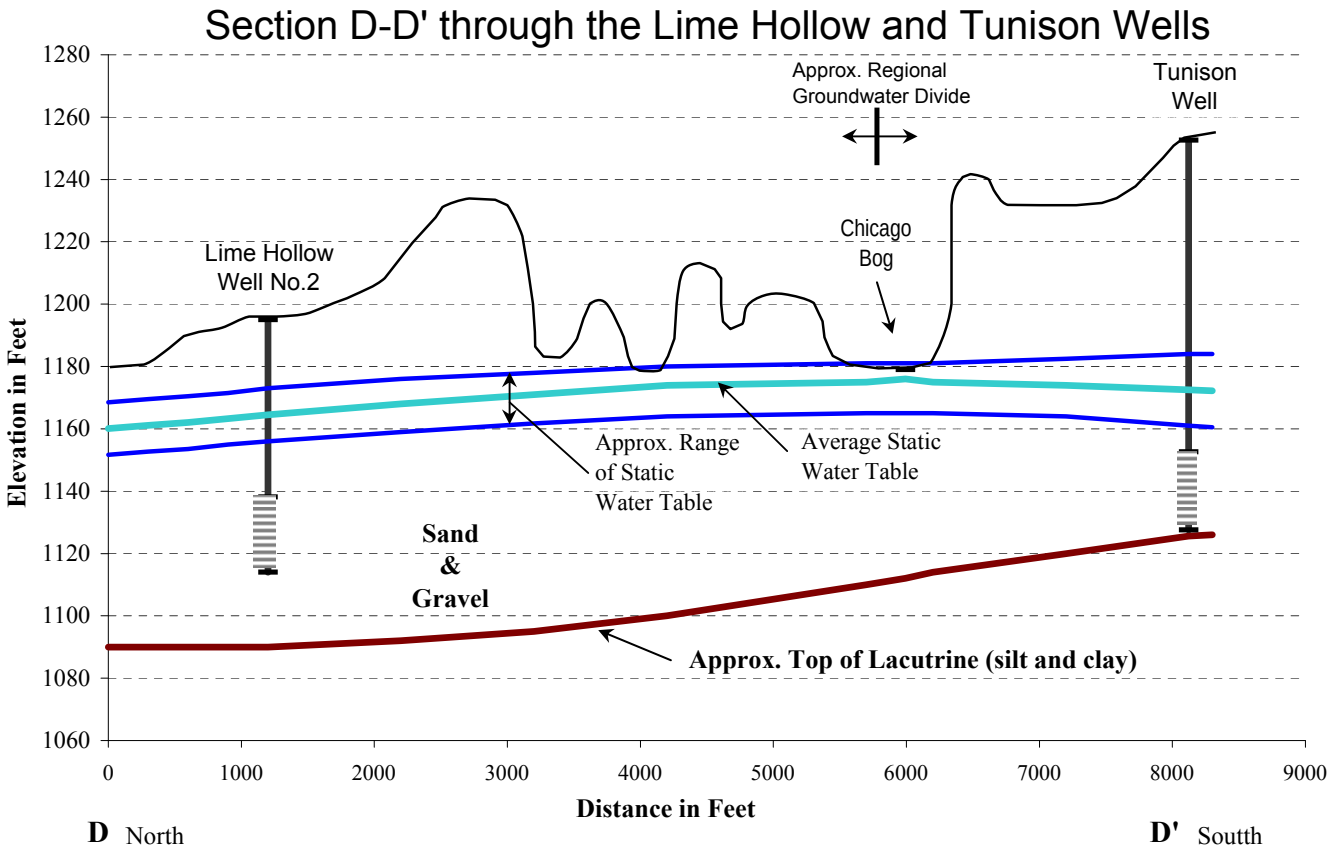
0.25
0.5
1
Miles


Section A-A' through the Terrace Road Well
Elevation in Feet
1220
1200
1180
1160
1140
1120
1100
1080
1060
Luker Rd.
Otter Creek
Rt. 281
Terrace Rd.
Well
Approx. Range
of Static
Water Table
Avg. Static
Water Table
Sand
&
Gravel
Approx. Top of Lacustrine (Silit and Clay)
0
1000
2000
3000
4000
5000
6000
A
Northwest
Distance in Feet
A'
Southeast


Section B-B' through the Terrace Road Well
Elevation in Feet
1220
1200
1180
1160
1140
1120
1100
1080
1060
Lime Hollow Rd.
Stupke
Rt. 281
Terrace Rd.
Well
City Boundary
Approx. Range
of Static
Water Table
Avg. Static
Water Table
Sand
&
Gravel
Approx. Top of Lacustrine (silt and clay)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
B
Southwest
Distance in Feet
B'
Northeast


Section C-C' through the Lime Hollow Well
Elevation in Feet
1280
1260
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
Rt. 13
Bennie Rd.
Lime Hollow
Well No. 2
Approx. Range
of Static Water Table
Average Static
Water Table
Sand
&
Gravel
Approx. Top of Lacustrine (silt and clay)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
Distance in Feet
C
Northwest
C'
Southeast


Section D-D' through the Lime Hollow and Tunison Wells
Elevation in Feet
1280
1260
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
Approx. Regional
Groundwater Divide
Tunison
Well
Chicago
Bog
Lime Hollow
Well No.2
Approx. Range
of Static
Water Table
Average Static
Water Table
Sand
&
Gravel
Approx. Top of Lacutrine (silt and clay)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Distance in Feet
D
North
D'
Southh

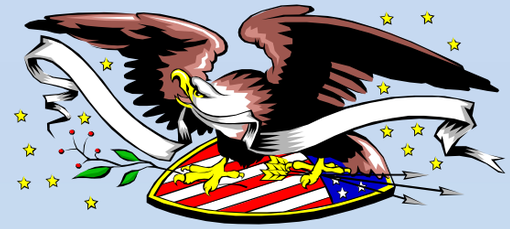


The security of water systems around the country continues to be a concern. The FBI does not consider contamination of water supplies with deadly biological agents a probable or effective threat given dilution and treatment barriers, but cautions that greater threat involves disruption of treatment processes or delivery of service. The Town of Cortlandville has implemented a number of security measures since the tragedy of 9/11. Security lighting, alarm systems and more frequent inspections of our facilities are just a few of the measures that have been taken. Letters have also been sent to local law enforcement requesting that patrols be increased around our facilities whenever possible. If you live by a water tank or pump station and notice suspicious activity occurring around these facilities, please report it to the authorities immediately.

The Cortlandville Water Department would like to reassure everyone that through the efforts of the Cortland County Health Department, local Law Enforcement, the FBI and the watchful eye of the public, everything possible is being done to protect our water supply.

Frequently Requested Information from the Town of Cortlandville.

7.4 pH (mg/l)
211 Hardness, average (mg/l).
42-48 Water temperature range from tap (deg F).
Chlorine: This is the only thing added to the water supply and its purpose is for disinfection.
0.5 Chlorine residual level average (mg/l).



TOWN OF CORTLANDVILLE
WATER DEPARTMENT
2021
Annual Water Quality Report For The Year 2020

3577 Terrace Road
Office: 607-756-9637
Fax: 607-758-9637
www.cortlandville.org
Emergency (after hours) 607-756-9637

Public Water Supply Number
NY1101755

TOWN BOARD MEMBERS

Tom Williams, **Supervisor**
Councilmen
Theodore Testa
Jay Cobb
Jeff Guido
Douglas Withey

Town Attorney
John DelVecchio

Town Clerk
Kristin Rocco- Petrella

Report Prepared By:
Peter Alteri Jr.

Serving Cortlandville for Sixty-Two Years 1959-2021

Town of Cortlandville Water Facts and Figures

The Cortlandville Water System serves approximately 4,000 people through 1,400 service connections. The total water produced in 2020 was **286,655,644** gallons. The daily average of water treated and pumped into the distribution system was **785,000** gallons per day. The amount of water delivered to customers in 2020 was **207,054,127** gallons (This figure also includes pool fills and system flushing activities). This leaves an unaccounted for total of **79,601,517** gallons of water or **28 percent** of the total water pumped.

Our water source is from two ground water wells at separate locations. At one location, water is drawn from a 92' deep drilled well utilizing a 100H.P. motor. This well will produce approximately 1,100 gallons per minute. The second well location draws groundwater from a drilled well that is 62' deep and a 60H.P. motor powers a pump that yields approximately 725 gallons per minute. The water is treated with 3 lbs. of gaseous chlorine for every 750,000 gallons produced prior to distribution.

During 2020, our system was in compliance with applicable State drinking water operating, monitoring and reporting requirements. We also did not experience any restrictions or violations of our water system.

Our water comes from the Otter-Creek Aquifer. An aquifer is a saturated bed formation or group of formations, which yields water in sufficient quantity to be economically useful. To be an aquifer a geologic formation must contain pores or open spaces that are filled with water. These spaces must be large enough to transmit water toward wells at a useful rate. Cortlandville has a large, yet vulnerable, water supply. The Otter/Dry Creek Aquifer has been designated as a "Sole Source Aquifer" serving both the City of Cortland and the Town of Cortlandville.

Water/Sewer Rates

Water Rates	
0 to 6,000 gal.	$24.05 Minimum
6,001 & Up	$4.11 per 1,000 gal
Industrial	$3.35 per 1,000 gal

Sewer Rates	
0 to 6,000 gal.	$28.00 Minimum
6,001 & Up	$5.60 per 1,000 gal.
Industrial	$2.90 per 1,000 gal.

** Based on water consumption.

The Cortlandville Town Board meets twice a month on the first Wednesday at 5:00pm and the third Wednesday at 5:00pm at 3577 Terrace Road, Town Hall. Please call ahead to confirm.

The Cortlandville Water Department works together with the Cortland County Health Department in providing the safest water possible. For more information on water quality and the effects of contaminants and microorganisms, visit your local Health Department at 60 Central Avenue, Cortland, New York 13045 or call 607-753-5035.



If you have received this report as manager of a business or multi-family dwelling, please post it in a prominent place so that the information will be available to employees' and/ or residents. If you would like additional copies of the report, have comments, or would like to offer suggestion for future reports, please contact the Cortlandville Water Department at 607-756-9637.

Properties of Water-

LIQUID ODORLESS OXYGEN SOLVENT TASTELESS POLARITY

SOLUTION SPECIFIC HEAT SURFACE TENSION BOILING POINT

BUOYANCY CAPILLARY ACTION HYDROGEN TRANSPARENT

T	I	R	A	L	O	P	D	I	U	Q	I	L	A	O	X	Y	G	E	P
H	O	T	Q	T	I	M	W	A	T	E	R	L	E	S	S	H	S	S	O
E	S	M	L	R	E	C	Y	C	L	E	T	O	N	E	R	Y	S	H	L
S	U	R	F	A	C	E	T	E	N	S	I	O	N	R	O	D	E	I	A
O	R	G	Y	N	I	C	Y	O	U	F	I	M	E	V	N	R	L	R	R
L	F	E	E	S	D	C	O	L	D	T	I	E	O	X	Y	G	E	N	I
V	A	T	Y	P	N	G	U	J	U	N	D	E	N	S	O	L	T	E	T
E	C	L	A	A	S	E	T	L	I	Q	U	I	K	A	L	A	S	G	Y
N	E	S	Y	R	N	P	O	L	A	R	L	C	A	P	I	L	A	O	L
T	T	O	M	E	M	S	P	E	C	I	F	I	C	H	E	A	T	R	O
N	U	I	G	N	O	X	Y	G	O	B	U	I	Y	A	N	C	I	D	C
B	B	L	M	T	N	I	O	P	G	N	I	L	I	O	B	B	M	Y	E
I	E	Y	S	S	E	L	R	O	D	O	O	Y	T	N	E	T	E	H	C
T	I	C	C	A	P	I	L	L	A	R	Y	A	C	T	I	O	N	P	I

Our Mission

Water is essential to all and the public water supply should be safe for all to drink and because individuals vary in their susceptibility and responses to substances as well as in the amount of water they consume. It is our belief that the public water supply should never be used to deliver any product, substance, device, element, medicine or agent with the intent or for the purpose of affecting the physical or mental functions of the body of any person or persons consuming such water. We, the employees of the Town of Cortlandville Water Department, are dedicated to delivering to our customers, in a professional and courteous manner, a quality product at sufficient pressure, in sufficient volume, at a reasonable price and containing only those chemicals necessary to make the water safe. Customer safety and satisfaction is our number one concern.

As the State regulations require, we routinely test your drinking water for numerous contaminants. These contaminants include total coliform, turbidity, inorganic compounds, nitrate, nitrite, lead and copper, volatile organic compounds, disinfection byproducts and synthetic organic compounds which include: perfluorooctanesulfonic acids.

TERMS YOU NEED TO KNOW

Maximum Contaminant Level (MCL): The highest level of contaminant that is allowable in drinking water. MCLs are set as close to the MCLGs as feasible.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below, which there is a known or expected health risk. MCLGs allow for a margin of safety.

Non-Detect (ND): Laboratory analysis indicates that the constituent is not present.

Milligrams Per Liter (mg/l): Corresponds to one part of liquid to one million parts of liquid (parts per million-ppm). One part per million (1mg/l) is the same as: One cent in $10,000, one bad apple in 2,000 barrels, one minute in two years or one inch in 16 miles.

Micrograms Per Liter (ug/l): Corresponds to one part of liquid to one billion parts of liquid (parts per billion-ppb). One part per billion is the same as: One cent in $10 million, one bad apple in 2 million barrels, one second in 32 years or one inch in 16,000 miles.

Action Level (AL): The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

Picocuries per liter (pCi/l): The measure of radioactivity in water.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below, which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

Lead & Copper Sampling Is Performed Every 3 Years.
(Based on 20 samples)

Lead: Sampling during 2019 revealed a range of lead detection from ND to a high of 6.0 ug/l. We had no samples at the 90th percentile above the AL (action level) of 15 ug/l. The 90th percentile sample was 2.4 ug/l. No violation.

Copper: Sampling during 2019 revealed a range of copper detection from a low of 16 ug/l to a high of 172 ug/l. We had no samples above the AL (action level) of 1,300 ug/l and the 90th percentile was 99 ug/l. No violation.

The 90th percentile is equal to or greater than 90% of the values detected at your water system.

Radon

Radon is a naturally occurring radioactive gas found in soil and outdoor air that may also be found in drinking water and indoor air. Some people exposed to elevated radon levels over many years in drinking water may have an increased risk of getting cancer. The main risk is lung cancer from radon entering indoor air from soil and under homes.

In 2011 we collected two representative water samples (one from each well house) that were analyzed for radon. The average of the two samples was 561.0 picocuries/liter (pCi/l).

For additional information call your state radon program (1-800-458-1158 or call EPA's Radon Hotline (1-800-SOS-Radon) or the Cortland County Department of Environmental Health at 753-5035.

SYSTEM IMPROVEMENTS



In 2020, at our second well site, we installed approximately 650' of 30" piping that will allow additional chlorine contact time (CT) with the pumped water. The increased contact time will kill any harmful pathogens in the pumped water before it enters the distribution system.

We also installed approximately 500' of piping to connect Blue creek rd. water line to the Fisher ave. water line. This connection will give the system better flow and help to maintain more consistent chlorine residuals.

As the Town continues to grow, we are always looking towards the future and the need to increase our supply of water so that we can comfortably meet the demands of our resident and business users.

The Town is currently weighing its options for installing another production well in addition to our current well sites.

COVID-19

The COVID-19 virus has not been detected in drinking water supplies and, according to the EPA, based on current evidence; the risk to water supplies is low.

Please help stop the spread of COVID-19 by wearing a face covering, washing hands, practice social distancing and refrain from large social gatherings. ***Together we will stop this virus!!***

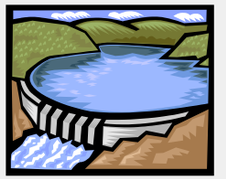
Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling EPA's Safe Drinking Water Hotline at (1-800-426-4791).

Some people may be more vulnerable to disease causing microorganisms or pathogens in drinking water than the general population. Immunocompromised persons with cancer undergoing chemotherapy, persons who have undergone transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk for infection. These people should seek advice from their health care provider about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium, Giardia and other microbial pathogens are available from the Safe Drinking Water Hotline at (1-800-426-4791).

The sources of drinking water (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and in some cases, radioactive material, and can pick up substances resulting from the presence of animal or from human activities. Contaminants; pesticides and herbicides; organic chemical contaminant; and radioactive contaminants. In order to ensure that tap water is safe to drink, the State and the EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems. The regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Source Water Assessment



Source Water Assessment Summary.

The NYS DOH has completed a source water assessment for our system, which rates the susceptibility of our wells to potential contamination. The rating does not mean that the water delivered to consumers is or will become contaminated. As mentioned previously, our water is derived from two wells. The source water assessment has rated these wells as having a medium-high to high susceptibility to microbial, nitrate, industrial solvent, petroleum product, metal, pesticide/herbicide, cation/anion other industrial contaminants. These ratings are due primarily to the highly permeable aquifer from which the water source is derived as well as due to the close proximity to the wells and assessment area of specific land types and activities.

Ongoing Source Water Protection.

The Town's wells are located in the Cortland-Homer-Preble Sole Source Aquifer System. This means that Cortlandville relies completely on this aquifer for drinking water and has no other source for its water supply. The Town of Cortlandville has an aquifer protection district, which includes the Town's wells. This district requires permitting of most new, non-residential developments and provides land use restrictions for these developments within two aquifer zones. The Town is also in the process of implementing a wellhead protection district to provide greater controls within the contribution areas of the well sources. The Town has sought public input for this district.

A copy of the Source Water Assessment or Aquifer Protection District specifics can be obtained by contacting the Town or the Cortland County Health Department.

As State regulations require, Cortlandville Water Department routinely tests your drinking water for numerous contaminants. Those contaminants detected are listed below. (A) Well #1 (B)Well #2

Contaminant	Units	MCLG	Regulatory Limit	Well Site	Violation Yes / No	Sample Date	Level Detected	Source In Drinking Water	Health Effects Language
Inorganics									
Antimony	ug/l	6	6	B	No	3/4/2020	0.7	fire retardants; ceramics; electronics; solder	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
Barium	ug/l	2,000	2,000	A	No	3/3/2020	44.8	Discharge of drilling waste; Discharge from metal refineries; Erosion of natural deposits.	Some people who drink water containing Barium in excess of the MCL over many years could experience an increase in their blood pressure.
				B	No	3/4/2020	45.6		
Chloride	mg/l	N/A	250	A	No	Avg. 2020	49.55	Naturally occurring or indicative of road salt contamination.	No health effects. The MCL for chloride is the level above which the taste of water may become objectionable. In addition, to the adverse taste effects, high chloride concentration levels in the water contribute to the deterioration of domestic plumbing and water heaters. Elevated chloride concentrations may also be associated with the presence of sodium in drinking water.
						Range	49.1-50.0		
				B	No	3/4/2020	138		
Nitrate	mg/l	10	10	A	No	3/3/2020	2.23	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
				B	No	3/4/2020	1.84		
Sulfate	mg/l	N/A	250	A	No	Avg. 2020	17.8	Naturally occurring.	High concentrations of sulfate in drinking water have three effects: (1) water containing appreciable amounts of sulfate tends to form hard scales in boilers and heat exchangers; (2) sulfates cause taste effects; and (3) sulfates can cause laxative effects with excessive intake. The laxative effect of sulfates is usually noted in transient users of a water supply because people who are accustomed to high sulfate levels in drinking water have no adverse response. Diarrhea can be induced at sulfate levels greater than 500 mg/l but typically near 750 mg/l.
						Range	17.4-18.2		
				B	No	3/4/2020	10.1		
Sodium	mg/l	N/A	N/A	A	No	Avg. 2020	17.9	Naturally occurring; Road salt; Water softeners; Animal waste.	Water containing more than 20 mg/l of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/l of sodium should not be used for drinking by people on moderately restricted sodium diets.
						Range	17.1-18.7		
				B	No	Avg. 2020	69		
						Range	62.9 - 75.2		
Zinc	ug/l	N/A	5000	A	No	5/19/2020	6.5	Naturally occurring; Mining waste.	Zinc has no health effects unless detected in very high concentrations. The presence of zinc may result in an undesirable taste in drinking water.
				B	No	3/4/2020	10.3		
Radiologicals									
Gross Beta	pCi/L	0	50	A	No	3/6/2019	0.341	Decay of natural deposits and man-made emissions..	Certain materials are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.The State considers 50 pCi/l to be the level of concern for beta particles.
				B	No	4/10/2019	0.759		
Gross Alpha	pCi/L	0	15	A	No	3/6/2019	0.797		Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
				B	No	4/10/2019	0.728		
Combinded Radium 226- 228	pCi/L	0	5	A	No	3/6/2019	0.701	Erosion of natural deposits.	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
				B	No	4/10/2019	0.94		
Disinfection Byproducts				(Samples taken from the system, farthest from the chlorine injection point.)					
Total Trihalomethanes (TTHMs – chloroform, bromodichloromethane, dibromochloromethane, and bromoform)	ug/l	N/A	80	Fisher Ave	No	7/9/2020	16.97	By-product of drinking water chlorination needed to kill harmful organisms. TTHMs are formed when source water contains large amounts of organic matter.	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
				Walden Oaks	No	7/9/2020	6.99		
Haloacetic Acids (mono-, di-, and trichloroacetic acid, and mono- and di-bromoacetic acid)	ug/l	N/A	60	Fisher Ave	No	7/9/2020	10.5	By-product of drinking water disinfection needed to kill harmful organisms.	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer
				Walden Oaks	No	7/9/2020	3.33		

5 Microbiological samples were taken each month in 2020

For terms relating to this contaminant table, please refer to the section of this report titled, ***" TERMS YOU NEED TO KNOW".***

Appendix 1.1.A: 2017 NYSDEC Mine Permit Modification Application (H2H Geoscience Engineering, PLLC)

NYSDEC MINE PERMIT MODIFICATION

NYSDEC PERMIT # 7-1122-00043/00008
NYSDEC MLF# 70436

ROUTE 13 ROCKS, LLC
CORTLANDVILLE SAND & GRAVEL MINE
TOWN OF CORTLANDVILLE
CORTLAND COUNTY, NEW YORK

Prepared on behalf of:

Cortlandville Sand & Gravel Mine
765 State Route 13
Cortlandville, New York 13045

Prepared by:

H2H Associates, LLC
179 River Street
Troy, New York 12180

April 2017

TABLE OF CONTENTS

1.0 INTRODUCTION 2
2.0 EXISTING CONDITIONS 2
2.1 Project location 2
2.2 General description of the property 2
2.3 GROUNDWATER AND SURFACE WATER 2
2.4 Geology 3
2.5 General Description of the EXCAVATION Area Affected Land 3
3.0 CURRENT PERMIT CONDITIONS 3
3.1 Current Permit Area (66.8 acres) 3
3.2 Description of Mining Method 3
3.3 Drainage 3
3.4 Pollution Control and Prevention of Environmental Impacts 3
3.4.1 Preservation of Wetlands 3
3.4.2 Visual Buffer 3
3.4.3 Dust 4
3.4.4 Noise 4
3.4.5 Waste Management 4
3.4.6 Site Access 4
4.0 MINE PLAN MODIFICATIONS 4
4.1 Lateral expansion 4
4.1.1 SOUTHEASTERN EXPANSION 4
4.1.2 NORTHERN EXPANSION 5
4.1.3 REMOVAL OF ACREGE FROM LOM AREA 5
4.2 Vertical Expansion 5
5.0 PROPOSED MINING SEQUENCE 5
6.0 RECLAMATION 6
6.1 Reclamation Method and Current Reclamation Activity 6
6.2 Concrrent reclamation 6
6.3 Final Reclamation 6
7.0 COMPLAINTS, ENFORCEMENTS, AND OTHER IMPACTS 6

FIGURES

Figure 1 Site Location Map
Figure 2 Existing Mine Plan Map
Figure 3 Proposed Mine Plan Map
Figure 4 Proposed Reclamation Plan Map
Figure 5 Water Level Graph

TABLES

Table 1 Water Level Elevations (1982-2017)
Table 2 Monthly average Water Level Elevations (1982-2017)

APPENDICES

Appendix A NYSDEC Mine Permit Application
Appendix B NYSDEC Organizational Report
Appendix C NYSDEC SEQR Full Environmental Assessment Form

1.0 INTRODUCTION

The purpose of this application is to modify the approved Mined Land Use Plan ("MLUP") to extend the Life of Mine Boundary both laterally and vertically. Cortlandville Sand & Gravel (Cortlandville S&G) is proposing to expand northerly by approximately 2.5 acres and to the southeast by approximately 9.4 acres. 0.4 acres of the southeastern expansion area are located within the 120 acre parcel mining is currently taking place on, the reaming 9.0 acres of land are located within the adjacent tax parcel #105.00-03-06.200 (also owned by Christopher Henry Holdings, LLC. owner of Cortlandville S & G). The new tax parcel to be included in the mine permit area is located in the southeast corner of the mine site, and is currently an open field (Figure 2 & 3). Cortlandville S&G is also proposing to expand the vertical limit of the current and proposed excavation area by mining ~100 feet into the water table. The NYSDEC Mine Permit Application Form has been included as Appendix A. An Organizational Report has been included as Appendix B; the SEQR Full Environmental Assessment Form is included as Appendix C.

2.0 EXISTING CONDITIONS

2.1 PROJECT LOCATION

Cortlandville Sand & Gravel Mine (site) is located in the Town of Cortlandville, Cortland County, New York. The mine site is located on State Route 13 seven hundred feet south of the intersection of State Route 123 and NYS Route 13 (Figure 1). The surrounding parcels are zoned Agricultural, Industrial, and Business.

2.2 GENERAL DESCRIPTION OF THE PROPERTY

The site is composed of a 66.8 acre life-of-mine facility (LOM) on a 120 acre parcel of land. The LOM is comprised of a sand & gravel pit, material stockpiles, scale house, and the stripped area to be mined in the coming mining seasons. The site is sparsely vegetated except where reclaimed due to the majority of the site being mined. A hedge row has been left in place around the perimeter of the site; the hedge row is comprised of smaller trees and shrubs. The site is relatively flat, ranging in elevation from 1240 feet amsl in the southeast corner of the site to 1170 feet amsl in the northeast corner of the site. The portion of the site that has been excavated is ~1190 feet amsl, and is flat with the exception of aggregate stockpiles. The northern and western area of the property outside of the LOM has wetlands mapped by the National Wetlands Inventory. Mining will not occur within the buffer zone around the mapped wetlands. The 9.0 acre area proposed to be incorporated into the LOM area is an open field, not being used at this time. Currently the scale, and scale house are the only permanent structures on site. The processing plant has been disassembled, and mobile crushers are currently in use.

2.3 GROUNDWATER AND SURFACE WATER

Two groundwater monitoring wells (MW-1 / MW-2) were installed on site in 1989. Monthly water levels have be collected (in the two monitoring wells) intermittently from 1989-2011 and consistently from 2011-2017 (Table 1 & Figure 5). MW-1 is located along the southern property boundary, and MW-2 is located along the northeast LOM boundary. MW-1 bottom elevation is 1161.8 feet amsl and MW-2 bottom elevation is 1157.5 feet amsl. The water table on site ranges from 1173 feet amsl in the south to 1166 feet amsl in the north indicting ground water on site flows to the north. The average water table elevation on site is 1170 feet amsl; consistent with surface water bodies in the surrounding area (Table 2).

The drainage on site is designed to be directed into the existing pit. With the site being relatively flat, and given the high permeability of the material in the floor, stormwater is controlled entirely within the open excavation area. Currently the scale, and scale house are the only permanent structures on site. The processing plant has been disassembled, and mobile crushers are currently in use.

2.4 GEOLOGY

The site is situated on a gravel terrace mapped as the Howard gravelly loamy. The Howard consists of glaciofluvial deposits. The material found on site is typical of the Howard ranging from a very gravely loam near the surface to an extremely gravelly sand near the floor. The lateral expansion areas are composed of the same material that is currently being excavated.

2.5 GENERAL DESCRIPTION OF THE EXCAVATION AREA AFFECTED LAND

The affected area consists of excavation area; stripped area, scale house, and a small area adjacent to the scale house where equipment is parked. The affected area is entirely within the LOM boundary. The NYSDEC approved LOM boundary is illustrated on Figure 2.

3.0 CURRENT PERMIT CONDITIONS

Cortlandville Sand & Gravel is currently permitted to excavate and process sand & gravel from a 66.8 acre LOM area over the permit term.

3.1 CURRENT PERMIT AREA (66.8 ACRES)

The total acreage controlled at this location is 120 acres; within this area, 66.8 acres have been permitted to be mined to elevation 1174 feet amsl (based on the mean high groundwater elevation). The current mining permit will expire on June 30, 2020.

3.2 DESCRIPTION OF MINING METHOD

The Cortlandville S&G operation is currently excavating material from the northern section of the site by advancing an east/west trending ~ 30 foot tall mine face in a northerly direction. The floor elevation across the site is relatively level ranging from 1180-1190 feet amsl the currently permit maximum depth of excavation is ~1174 feet amsl based on the mean high groundwater elevation. The site has been excavated to the LOM boundary along the southern, eastern, and the majority of the western boundaries. Currently material is excavated and loaded into a haul truck using a front-end loader. A mobile processing plant is in use on site allowing the site manager to process material closer to the mine face reducing the haul distance.

3.3 DRAINAGE

The site is sloped so that stormwater is directed into the pit, and be completely contained on site. Due to the high permeability of the material in the floor of the pit stormwater that is ponded percolates into the groundwater. There is no offsite discharge from the permit area.

3.4 POLLUTION CONTROL AND PREVENTION OF ENVIRONMENTAL IMPACTS

3.4.1 Preservation of Wetlands

No excavation will be done in wetlands or within the buffer zone established by the NYSDEC.

3.4.2 Visual Buffer

A hedge row will be left along the perimeter of the site to act a visual buffer. The majority of the mining activities will be taking place below the surrounding grade greatly reducing any visual impact.

3.4.3 Dust

Access roads and haulage ways are sprayed with water to reduce dust. The access road to NYS Route 13 is paved, and kept free of material to limit the amount of dust produced from commercial trucks leaving the site. These factors along with the site being mostly below grade help control dust and contain it onsite.

3.4.4 Noise

The site is located in a high traffic commercial area. The location of the site below the surrounding grade, and the high ambient sound level of the surrounding commercial area help minimize sound produced onsite from reaching nearby receptors.

3.4.5 Waste Management

All waste (oil, rags, pallets, tires, etc.) is sent to the proper permitted facilities.

3.4.6 Site Access

Site access is via an access road off of New York State Route 13. A chain with a lock is used to control unauthorized vehicle access to the site.

4.0 MINE PLAN MODIFICATIONS

The proposed modification to the permit is as follow:

- Incorporate 9.0 acres of Tax Parcel #105.00-03-06.200 into the Life of Mine area.
- Allow mining to take place into the water table (~100') to a maximum depth of 1050 feet amsl (Figure 4).
- Modify the mining method to the use of a wireline dredge once mining proceeds into the water table.
- Expand the Life of Mine Area in the northern portion of the site by 2.5 acres. The expansion will be within existing 120 acre parcel that mining is currently taking place in.
- Remove 0.4 acres from the Life of Mine Area in the Northwestern portion of the site.

4.1 LATERAL EXPANSION

4.1.1 SOUTHEASTERN EXPANSION

The proposed southeastern lateral expansion will increase the Life of Mine area by a total of 9.4 acres. 0.4 acres of the area are located within the 120 acre parcel of land mining is currently taking place on, the remaining 9.0 acres of land are located within tax parcel #105.00-03-06.200 (Figure 1 & 2). The current mining method for material above the water table will not change at this location.

The 9.0 acre southeastern expansion area (tax parcel #105.00-03-06.200) is not within the 120 acre parcel of land mining is currently taking place in. The parcel is held by Christopher Henry Holdings, LLC. (same land holder as 120 acre parcel); the parcel is, currently zoned Industrial 2 (I-2) by the town of Cortlandville. Under section 178-40.4. of Cortlandvilles Zoning Regulations Sand and gravel mining is a permitted use subject to site plan approval and conditional permit.

The 9.4 acre area of proposed expansion is of the same vegetation, topography, and geology as the adjacent land that has been previously approved for mining. The area is not in a mapped wetland, threatened or endangered species habitat.

The proposed LOM boundary in this area shows a 100' buffer zone from any adjacent property line per town zoning regulations. Stormwater collected in this area will be directed into the existing pit as is currently done onsite. The top 10 inches of arable soil in the proposed LOM area will be stripped and remain on site for reclamation purposes. Expanding the LOM boundary in this location would not affect any of the adjacent properties from a visual, sound, and dust perspective based on the mitigating factors discussed in section 3.4

4.1.2 NORTHERN EXPANSION

The 2.5 acre northern expansion area is within the 120 acre parcel of land where mining is currently taking place in. The area of proposed expansion is of the same vegetation, topography, and geology as the adjacent land that has been previously approved for mining. The area is not in a mapped wetland, threatened or endangered species habitat. Expanding the LOM boundary in this location would not affect any of the adjacent properties from a visual, sound, and dust perspective based on the mitigating factors discussed in section 3.4.

4.1.3 REMOVAL OF ACREGE FROM LOM AREA

0.4 acres of land will be removed from the LOM area in the northwest corner of the site; the area has not been affected (Figure 1 & 2.)

4.2 VERTICAL EXPANSION

The proposed vertical expansion will be to allow mining in the water table and to increase the maximum excavation depth to 1070 feet amsl (Figure 4). The proposed vertical expansion would be across the existing and proposed LOM area. Once mining occurs into the water table, excavation will be done using a long stick excavator to establish a working face. When a well-established working face is developed, excavation will be done using a wire line dredge. The working and final excavated area will resemble a pond.

Excavation into the water table will have very little effect on the water table elevation in the surrounding area. We expect a 2-3 foot increase in the average ground water elevation at MW-2 and a 2-3 foot decrease in the average ground water elevation at MW-1 placing the water level at ~1170 feet amsl in both wells when the final reclamation grades have been reached. The expected elevation of the pond is 1170 +/- 5 Feet amsl. The lake will hydraulically connect each monitoring well; the water level in each well should mirror each other.

5.0 PROPOSED MINING SEQUENCE

Excavation of the current permit area will continue laterally mining the northern active face to the northern LOM boundary. During this period stripping of the topsoil and removal of the vegetation will occur in the newly proposed excavation area to the north and southeast. Stripping will occur from the active mining area outwards to the permitted limit in advance of the excavation activities. Once the southeastern expansion area has been stripped excavation will start in this area. Excavation may take place in the northern and southeastern areas of the site at the same time. Once the majority of the material above the water table is excavated, excavation into the water table will begin.

Excavation below the water table will likely begin in the northern section of the site preceding laterally east and west reaching reclamation grades before moving south across the site. Once excavation occurs below the water table, excavation will be completed to the final reclamation grades before mining can proceed in the adjacent areas.

6.0 RECLAMATION

6.1 RECLAMATION METHOD AND CURRENT RECLAMATION ACTIVITY

The reclamation plan and method remain unchanged from previously NYSDEC-approved Reclamation Plans for areas above 1170 feet amsl. The elevation of the water table was determined to be 1170 feet amsl by averaging the monthly water level measurements from MW-1 and MW-2 (Table 2). Areas below 1170 will be below the water table, and be reclaimed as a lake. During the coming Permit Term, reclamation may be initiated in those accessible areas that have reached their final extent and depth, except in those areas that will be continually affected by mining (processing area, haul roads, etc.) until final cessation of the operation.

6.2 CONCRRENT RECLAMATION

To date, approximately 7.3 acres of the Affected Area have been approved as reclaimed by the NYSDEC, 5.9 acres along the eastern LOM Boundary and 1.4 acres along the western LOM boundary. Three acres in the northwest corner of the LOM boundary will be reclaimed this permit term once the area has be excavated to reclamation grade. 0.65 acres have been removed for the eastern area previously approved as reclaimed by the NYSDEC due to a haul road being constructed through the area.

6.3 FINAL RECLAMATION

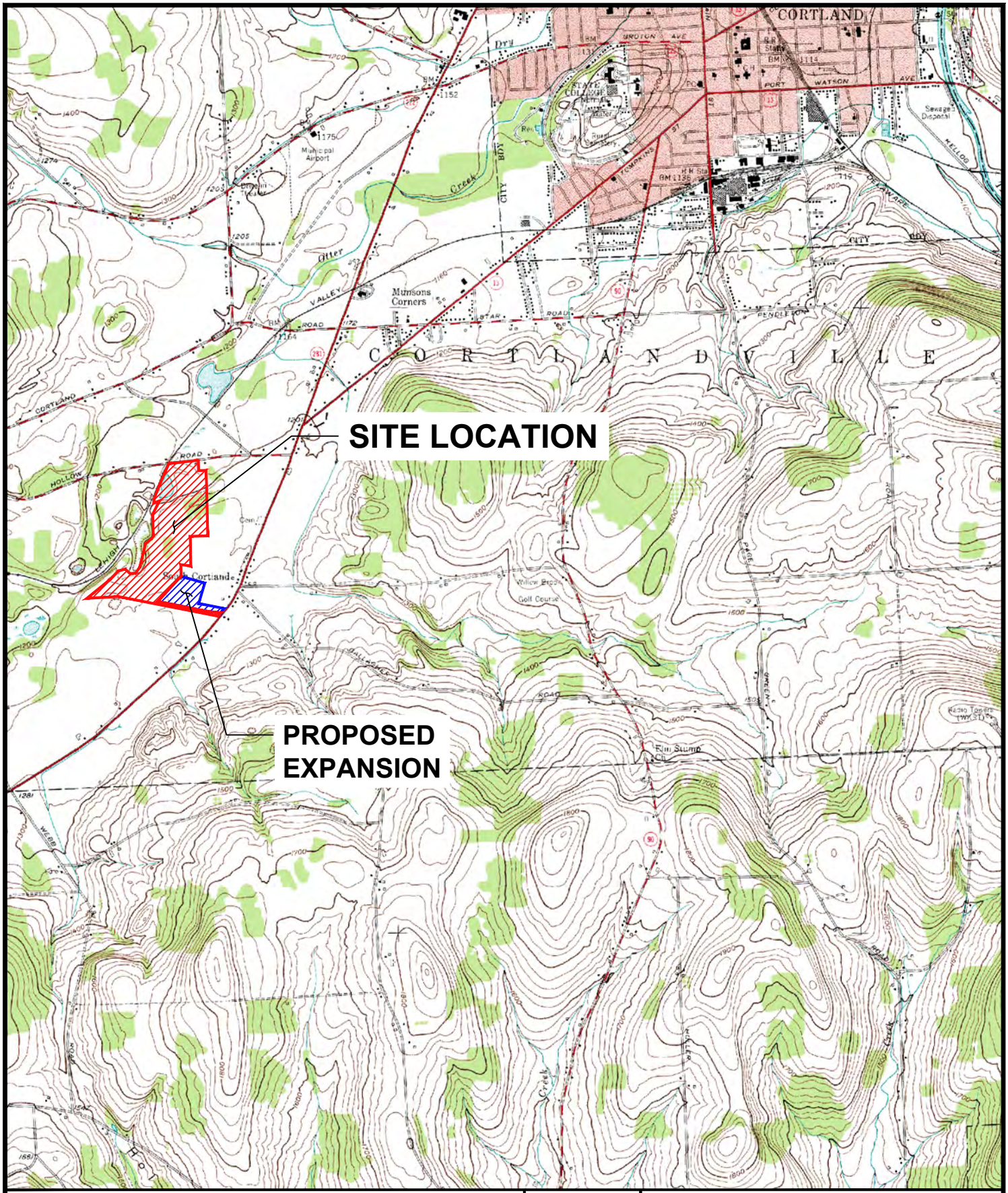
The completed mine area will be reclaimed as illustrated on the proposed Reclamation Plan and Cross Section drawings (Figure 4). The primary faceature of the completed mine will be the lake area, the lake will be approximately 54.2 acres and have a water elevation of ±1170 feet amsl. The final floor elevation will be 1070 as shown on the Reclamation Cross sections. (Figure 4) The sloped area above elevation 1170 feet amsl will be covered with a minimum of 10 inches of topsoil, graded to 1 vertical to 2 horizontal, and seeded with approved seed mixture.

A permanent access road will be retained from NYS Route 13 into the southern portion of the pit, and provide access to the lake (Figure 4). At the completion of the active mine life and final reclamation, all mining equipment and facilities will be removed offsite. A general site cleanup will be provided as necessary. The Applicant has no current plan for subsequent development of the site beyond that which is set forth herein. All reclamation will be completed within two years of the cessation of mining.

7.0 COMPLAINTS, ENFORCEMENTS, AND OTHER IMPACTS

During the present permit term there have been no complaints issued by the Town or neighbors regarding the operation.

FIGURES



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SITE LOCATION MAP

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H Associates

FIGURE 1

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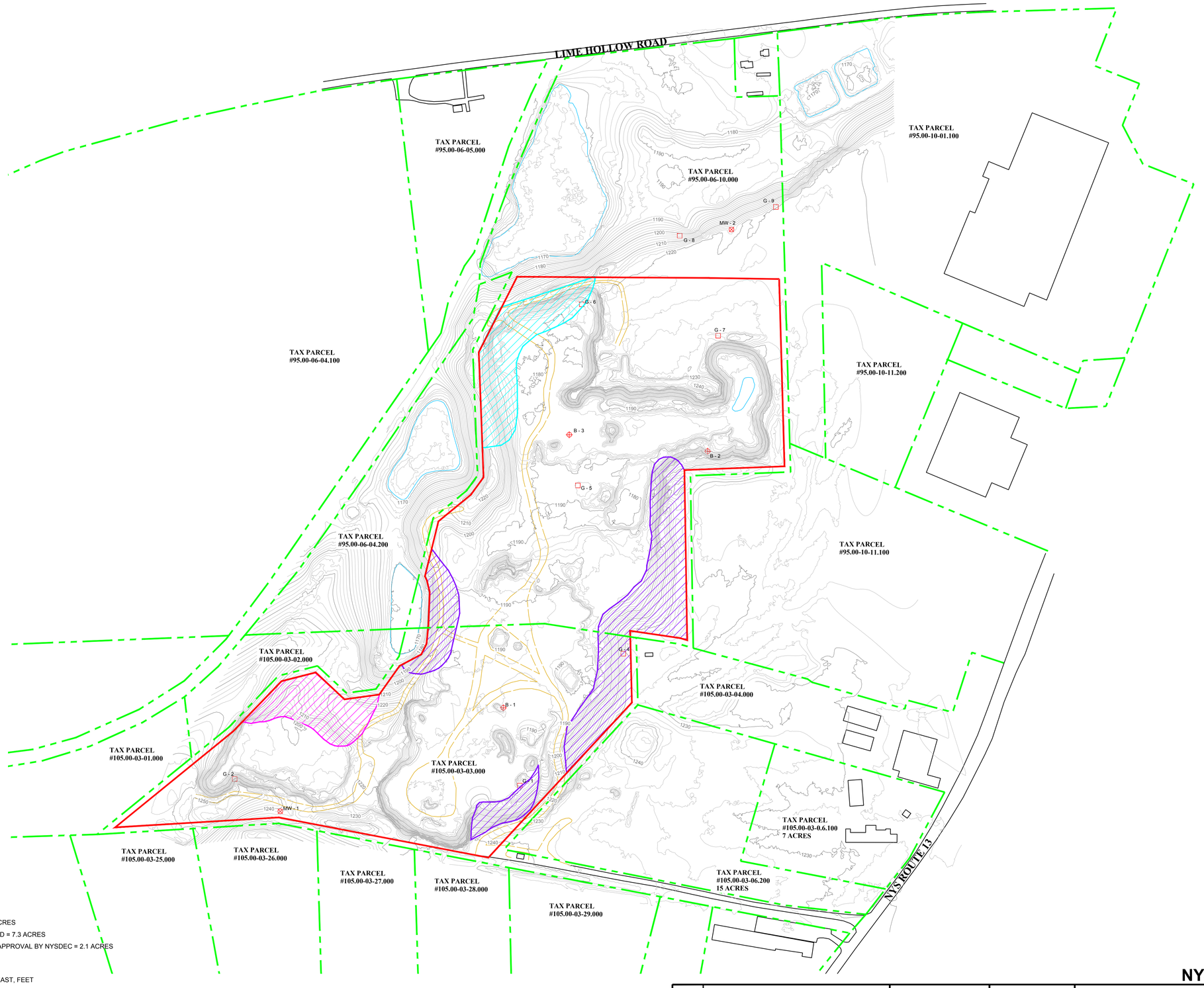

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- TEST PIT
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 7.3 ACRES
- AREA RECLAIMED; AWAITING REVIEW AND APPROVAL BY NYSDEC = 2.1 ACRES

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

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SCALE IN FEET
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NYSDEC MLF# 70436

EXISTING MINING PLAN

TOWN OF CORTLANDVILLE

CORTLANDVILLE SAND & GRAVEL

CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 2

SHEET 1 OF 1

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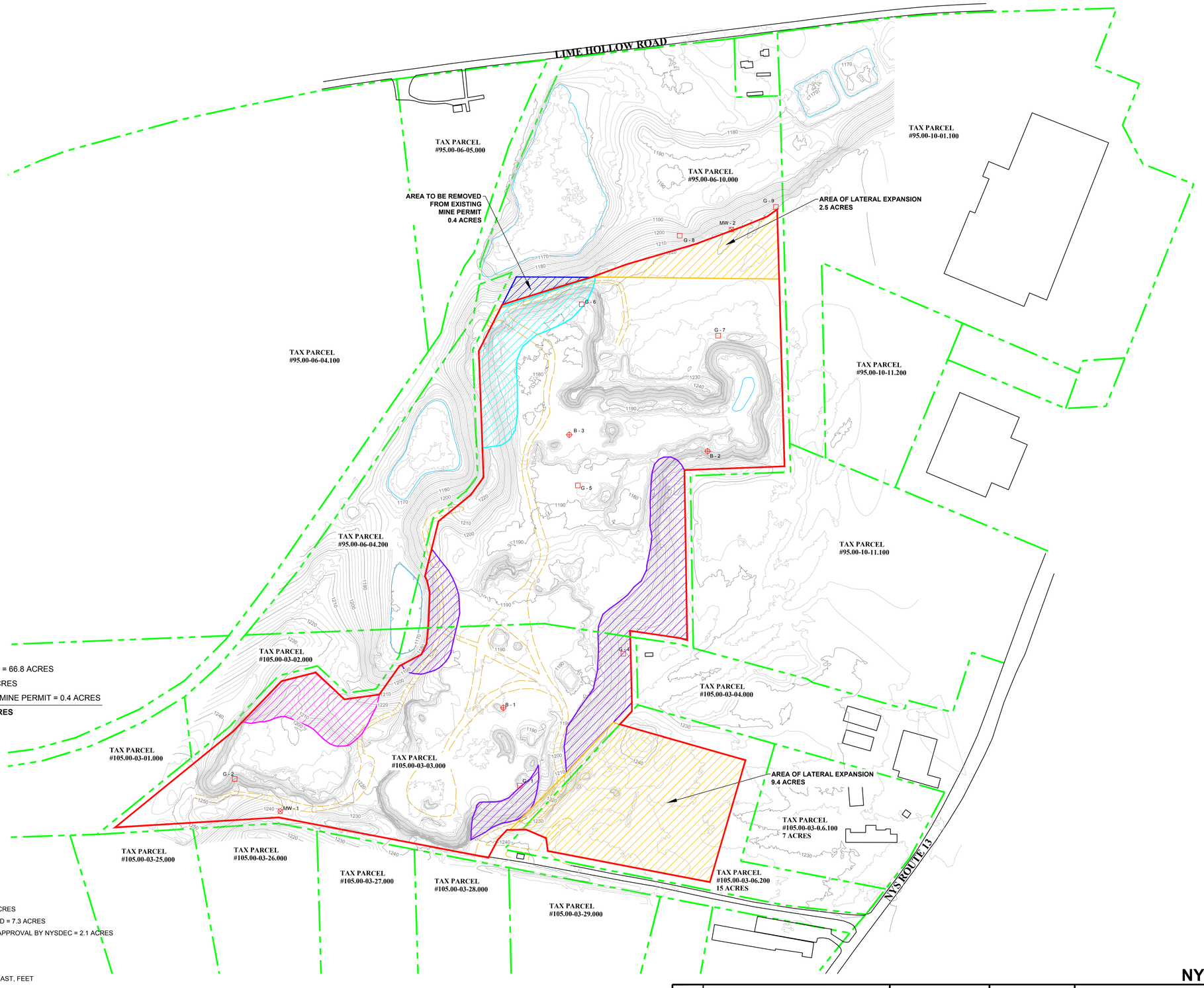

AFFECTED AREA SUMMARY:

CURRENTLY PERITTED AFFECTED AREA = 66.8 ACRES
AREA OF LATERAL EXPANSION = 11.9 ACRES
AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
TOTAL NEW AFFECTED AREA = 78.3 ACRES

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- TEST PIT
- AREA TO BE RECLAIMED THIS TERM = 3.0 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 7.3 ACRES
- AREA RECLAIMED; AWAITING REVIEW AND APPROVAL BY NYSDEC = 2.1 ACRES

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
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5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.

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NYSDEC MLF# 70436

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PROPOSED MINING PLAN

TOWN OF CORTLANDVILLE

CORTLANDVILLE SAND & GRAVEL

CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 3

SHEET 1 OF 1

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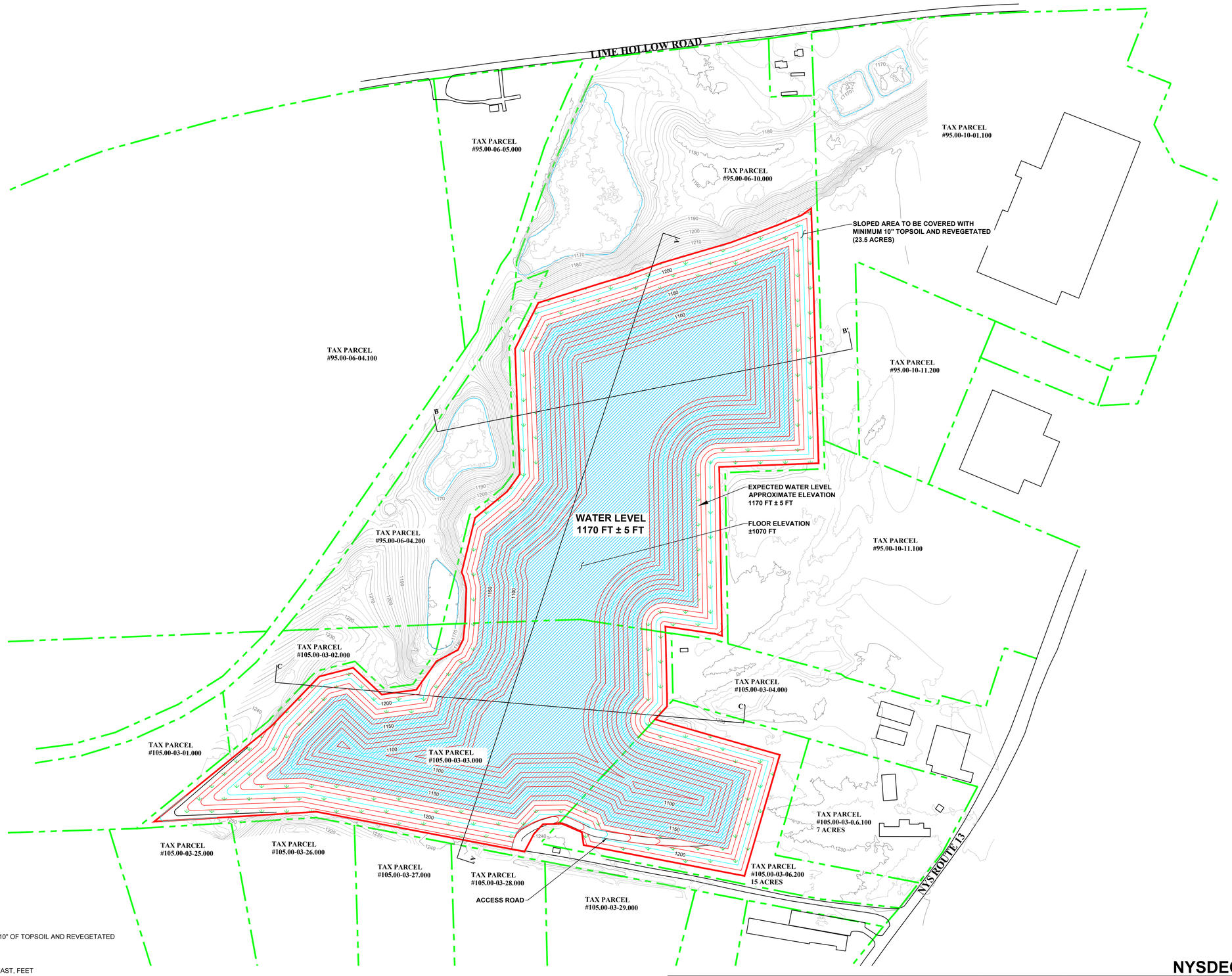

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- ROAD
- BUILDING/LARGE MISC. OBJECT
- AREAS TO BE COVERED WITH MINIMUM OF 10" OF TOPSOIL AND REVEGETATED

MAP NOTES:

1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
   VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
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NYSDEC MLF# 70436

PROPOSED RECLAMATION PLAN

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 4

SHEET 1 OF 2

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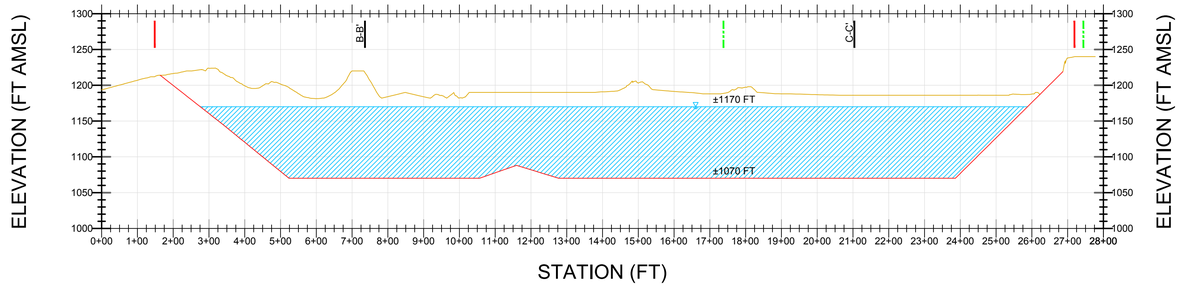
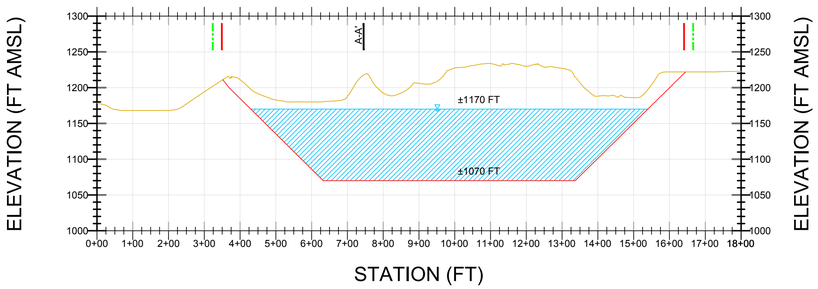
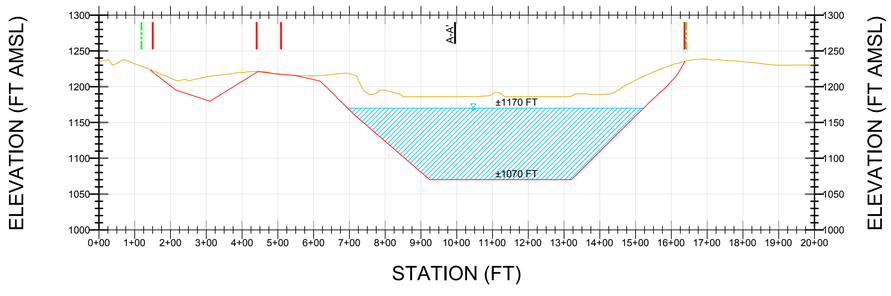
SECTION - A-A'



SECTION - B-B'



SECTION - C-C'



LEGEND

- EXISTING GRADE
- RECLAMATION GRADE
- PROPERTY LINE
- LIFE OF MINE BOUNDARY
- WATER LEVEL ±1170'

HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 100'
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NYSDEC MLF# 70436

RECLAMATION SECTIONS

CORTLANDVILLE SAND & GRAVEL

TOWN OF CORTLANDVILLE — CORTLAND COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 4

SHEET 2 OF 2

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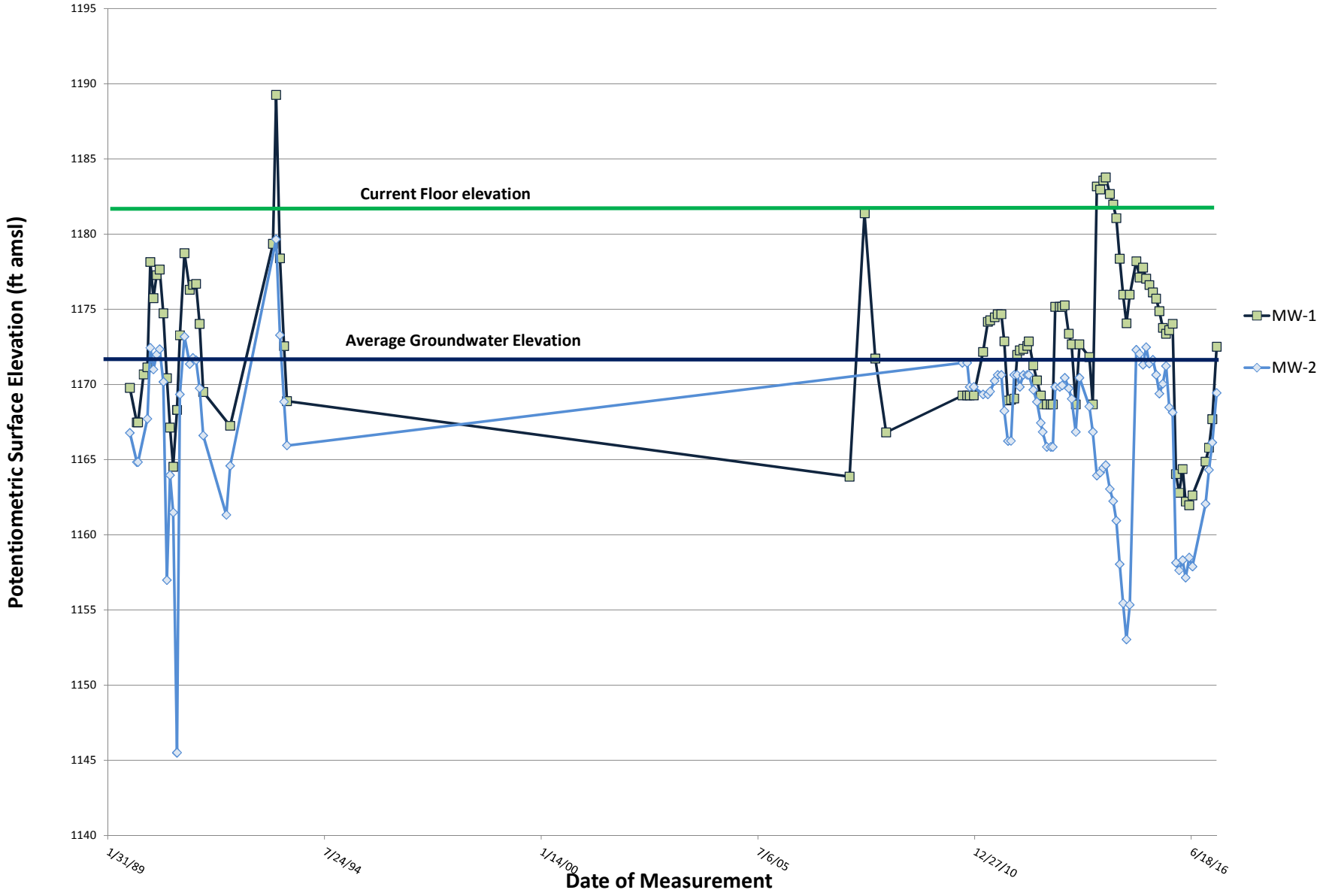
NYSDEC Permit ID # 7-1122-00043/00008

Figure 5
1989-2016 Monthly Groundwater Elevations
Cortlandville Sand & Gravel
Cortlandville, NY



TABLES

TABLE 1

WATER LEVEL ELEVATIONS (1982-2017)

Table 1
Water Level Elevations (1982-2017)

Date	MW-1 (Total depth:75.4')		MW-2 (Total depth:67.5')	
	TOC Elevation =	1237.37	TOC Elevation =	1225.64
	DTW	GW Elevation	DTW	GW Elevation
8/22/1989	67.6	1169.77	58.86	1166.78
10/25/1989	69.9	1167.47	60.8	1164.84
11/6/1989	69.9	1167.47	60.8	1164.84
12/28/1989	66.7	1170.67		
1/31/1990	66.23	1171.14	57.92	1167.72
2/27/1990	59.22	1178.15	53.2	1172.44
3/28/1990	61.63	1175.74	54.64	1171
4/26/1990	60.1	1177.27	53.66	1171.98
5/25/1990	59.73	1177.64	53.29	1172.35
6/28/1990	62.64	1174.73	55.47	1170.17
7/31/1990	66.95	1170.42	68.66	1156.98
8/28/1990	70.24	1167.13	61.67	1163.97
9/27/1990	72.85	1164.52	64.16	1161.48
10/31/1990	69.06	1168.31	80.13	1145.51
11/1/1990	69.06	1168.31	80.13	1145.51
11/28/1990	64.1	1173.27	56.3	1169.34
1/8/1991	58.64	1178.73	52.46	1173.18
2/26/1991	61.07	1176.3	54.28	1171.36
3/28/1991	60.74	1176.63	53.88	1171.76
4/26/1991	60.67	1176.7	54.03	1171.61
5/28/1991	63.34	1174.03	55.89	1169.75
7/1/1991	67.87	1169.5	59.03	1166.61
1/30/1992			64.32	1161.32
3/5/1992	70.12	1167.25	61.06	1164.58
4/5/1993	58.02	1179.35	no data	
5/3/1993	48.11	1189.26	45.98	1179.66
6/8/1993	58.98	1178.39	52.36	1173.28
7/16/1993	64.82	1172.55	56.79	1168.85
8/12/1993	68.48	1168.89		1165.94
10/30/2007	73.5	1163.87		
3/17/2008	55.99	1181.38		
6/23/2008	65.65	1171.72		
10/2/2008	70.56	1166.81		
9/6/2010	68.1	1169.27	54.2	1171.44
10/20/2010	68.1	1169.27	54.2	1171.44
11/12/2010	68.1	1169.27	55.8	1169.84
12/20/2010	68.1	1169.27	55.8	1169.84
3/15/2011	65.2	1172.17	56.3	1169.34
4/29/2011	63.2	1174.17	56.3	1169.34
5/20/2011	63.1	1174.27	56.1	1169.54
6/30/2011	62.9	1174.47	55.4	1170.24
7/29/2011	62.7	1174.67	55	1170.64
8/31/2011	62.7	1174.67	55	1170.64
9/28/2011	64.5	1172.87	57.4	1168.24
10/31/2011	68.44	1168.93	59.4	1166.24
11/28/2011	68.39	1168.98	59.39	1166.25
12/28/2011	68.3	1169.07	55	1170.64
1/24/2012	65.4	1171.97	55	1170.64
2/17/2012	65.1	1172.27	55.8	1169.84
3/21/2012	65	1172.37	55.00	1170.64
4/26/2012	64.8	1172.57	55	1170.64
5/10/2012	64.5	1172.87	55	1170.64
6/21/2012	66.1	1171.27	56	1169.64
7/25/2012	67.1	1170.27	56.8	1168.84
8/29/2012	68.1	1169.27	58.2	1167.44
9/15/2012	68.7	1168.67	58.8	1166.84
10/23/2012	68.7	1168.67	59.8	1165.84
11/30/2012	68.7	1168.67	59.8	1165.84
12/18/2012	68.7	1168.67	59.8	1165.84
1/9/2013	62.2	1175.17	55.8	1169.84
2/20/2013	62.2	1175.17	55.8	1169.84
3/15/2013	62.2	1175.17	55.7	1169.94
4/8/2013	62.1	1175.27	55.2	1170.44
5/15/2013	64	1173.37	55.9	1169.74
6/10/2013	64.7	1172.67	56.6	1169.04
7/18/2013	68.7	1168.67	58.8	1166.84
8/21/2013	64.7	1172.67	55.2	1170.44
11/20/2013	65.55	1171.82	57.11	1168.53
12/23/2013	68.7	1168.67	58.8	1166.84
1/28/2014	54.2	1183.17	61.7	1163.94
2/28/2014	54.4	1182.97	61.5	1164.14
3/28/2014	53.8	1183.57	61.2	1164.44
4/21/2014	53.6	1183.77	61	1164.64
5/28/2014	54.7	1182.67	62.6	1163.04
6/28/2014	55.4	1181.97	63.4	1162.24
7/28/2014	56.3	1181.07	64.7	1160.94
8/28/2014	59	1178.37	67.6	1158.04
9/28/2014	61.4	1175.97	70.2	1155.44
10/29/2014	63.3	1174.07	72.6	1153.04
11/28/2014	61.4	1175.97	70.3	1155.34
1/28/2015	59.17	1178.2	53.33	1172.31

Table 1
Water Level Elevations (1982-2017)

2/27/2015	60.25	1177.12	53.6	1172.04
3/30/2015	59.6	1177.77	54.33	1171.31
4/29/2015	60.33	1177.04	53.16	1172.48
5/28/2015	60.75	1176.62	54.25	1171.39
6/29/2015	61.25	1176.12	54	1171.64
7/30/2015	61.66	1175.71	55	1170.64
8/28/2015	62.5	1174.87	56.25	1169.39
9/30/2015	63.6	1173.77	55.6	1170.04
10/29/2015	64	1173.37	54.41	1171.23
11/27/2015	63.75	1173.62	57.16	1168.48
12/30/2015	63.33	1174.04	57.5	1168.14
1/29/2016	73.33	1164.04	67.5	1158.14
2/27/2016	74.58	1162.79	68	1157.64
3/31/2016	73	1164.37	67.33	1158.31
4/28/2016	75.16	1162.21	68.5	1157.14
5/30/2016	75.4	1161.97	67.16	1158.48
6/29/2016	74.75	1162.62	67.75	1157.89
7/27/2016	No reading/dry		No reading/dry	
8/31/2016	No reading/dry		No reading/dry	
9/29/2016	No reading/dry		No reading/dry	
10/28/2016	72.5	1164.87	63.58	1162.06
11/29/2016	71.58	1165.79	61.33	1164.31
12/30/2016	69.67	1167.7	59.5	1166.14
2/8/2017	64.86	1172.51	56.2	1169.44

TABLE 2

MONTHLY AVERAGE WATER LEVEL ELEVATIONS (1982-2017)

Table 2
Monthly Mean Water Levels

Monthly MEAN		
	MW-1	MW-2
JAN	1174.25	1167.24
FEB	1174.66	1168.34
MARCH	1174.84	1167.92
APRIL	1175.38	1168.56
MAY	1175.88	1169.48
JUNE	1173.8	1168.07
JULY	1173.34	1166.29
AUG	1172.86	1166.33
SEPT	1171.73	1165.25
OCT	1168.76	1162.33
NOV	1170.33	1164.27
DEC	1170.56	1167.82
Average	1169.93	

APPENDICIES

APPENDIX A

NYSDEC MINE PERMIT APPLICATION

PRINT

Division of Mineral Resources

MINING PERMIT APPLICATION

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

1. a. MINE FILE NUMBER: 70436	1. b. DEC ID NUMBER: 7-1122-00043/00008
2. NAME OF APPLICANT: RT 13 ROCKS, LLC.	
3. TELEPHONE NUMBER: 607.756.2115	
4. PERMANENT ADDRESS: NUMBER & STREET NAME: 765 State Route 13	
CITY: Cortland / STATE: NY / ZIP CODE: 13045	
5. CONTACT PERSON: Carol Simon	6. a. TELEPHONE NUMBER: 607.756.2115
6. b. EMAIL ADDRESS: csimon.adhan@yahoo.com	

7. MINED LAND PROJECT

	Yes	No
a. Will the total acreage affected by mining for the entire mining site be equal to or greater than 5 acres?	☑	☐
b. Will the vertical depth from the top of the mine face to the floor exceed 20 feet?	☑	☐
c. Will there be on-site processing of mining products (eg. crushing, screening, washing) that requires an air permit?	☐	☑
d. Will mining occur within 100 feet of a surface water body (eg. stream, lake) or wetland area?	☐	☑
e. Will any consolidated materials be mined (eg. limestone, trap rock, sandstone)?	☐	☑
f. Will mining occur within 500 feet of any dwelling?	☐	☑
g. Will mining ever occur below the water table?	☑	☐

8. TAXPAYER ID (If other than individual, provide Federal Taxpayer ID Number)

9. APPLICATION TYPE: ☐ New ☐ Renewal ☑ Modification ☐ Transfer

10. a. PRESENT PERMIT TERM: Expiration Date 06 / 30 / 2020

10. b. COMING PERMIT TERM: ☑ 5 years ☐ Other _____ years

11. NAME OF MINERAL/MATERIAL TO BE MINED: Sand & Gravel

12. LOCAL ORDINANCES

a. Is mining prohibited at this location? ☐ Yes ☑ No

12. b. Does the local government require any type of permit for mining at this location? ☑ Yes ☐ No

13. a. ARE ANY OTHER STATE MINING PERMITS CURRENTLY HELD BY THE APPLICANT? ☐ Yes ☑ No

13. b. If YES, give Mine File Number(s)

14. Has any owner, partner, corporate officer or corporate director of your organization ever held any of these positions in another organization that has had a New York State mining permit **SUSPENDED OR REVOKED** or has had a New York State mined land reclamation bond **FORFEITED?**
☐ Yes ☑ No If YES, identify the person(s)

15. ACREAGE SUMMARY (To be filled in by applicant)

		FOR OFFICIAL DEC USE ONLY
a. Total acreage controlled by owner at this location	135 acres	acres
b. Total acreage permitted by DEC prior to this application	66.8 acres	acres
c. Total acreage affected since April 1, 1975	66.8 acres	acres
d. Total acreage approved by DEC as reclaimed since April 1, 1975	7.3 acres	acres
e. Current affected acreage (c minus d)	59.5 acres	acres
f. Acreage included in this application, but not previously approved	11.5 acres	acres
g. New acreage to be affected during the coming permit term	11.5 acres	acres
h. Number of acres to be reclaimed during coming permit term	3.0 acres	acres

16. NAME OF MINING OPERATION: Cortlandville Sand & Gravel

17. MINE LOCATION

Road: State Route 13
Nearest Road Intersection: Finger lakes East Drive
Town: Cortlandville
County: Cortland

18. MAP LOCATION

a. Quadrangle Name: Cortland

b. ☑ 15 minute ☐ 7 ½ minute

FOR OFFICIAL DEC USE ONLY

LATITUDE: _____ LONGITUDE: _____ NAD 83

19. NAME AND ADDRESS OF SURFACE LANDOWNER(S)

Christopher Henry Holdings, LLC.
1865 State Route 13
Cortland, NY, 13045

20. NAME AND ADDRESS OF MINERAL OWNER(S)

Christopher Henry Holdings, LLC.
1865 State Route 13
Cortland, NY, 13045

21. The surface landowner(s) and the mineral owner(s) of the property that is to be mined by the above applicant have read the Mined Land Use Plan, which sets forth the applicant's mining and reclamation plan for the property to be mined, and hereby irrevocably consent and agree to the performance of the Mined Land Use Plan by the applicant, his surety or insurer, or the NYS Department of Environmental Conservation. The surface landowner(s) and mineral owner(s) further agree to allow access to the property to Department personnel for the purpose of conducting inspections or investigations in the regular course of their duties.

SIGNATURE(S) OF SURFACE LANDOWNER(S)	DATE	SIGNATURE(S) OF MINERAL OWNER(S)	DATE

22. I hereby affirm under penalty of perjury that information provided on this form is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

NAME, TITLE AND SIGNATURE OF APPLICANT OR AUTHORIZED REPRESENTATIVE	DATE

APPENDIX B

NYSDEC ORGANIZATIONAL REPORT

PRINT

DIVISION OF MINERAL RESOURCES
625 BROADWAY - 3RD FLOOR, ALBANY, NEW YORK 12233-6500

OFFICE FILE NUMBER

ORGANIZATIONAL REPORT

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

INCOMPLETE FORMS ARE NOT ACCEPTABLE AND WILL BE RETURNED FOR COMPLETION

1. FULL NAME AND COMPLETE MAILING ADDRESS OF THE ENTITY; INCLUDE NAME AND TITLE TO WHOM ALL CORRESPONDENCE SHOULD BE SENT.

RT 13 ROCKS, LLC.
DBA CORTLANDVILLE SAND & GRAVEL
765 ROUTE 13
CORTLAND, NY 13045

EMAIL ADDRESS: ✔
TELEPHONE (✔) ✔
FAX NUMBER (✔)

2. FULL NAME AND COMPLETE MAILING ADDRESS OF **AGENT IN NEW YORK** WHO CAN BE SERVED ORDERS, NOTICES AND PROCESSES OF THE DEPARTMENT OR ANY COURT OF LAW. POST OFFICE BOX ADDRESSES ARE NOT ACCEPTABLE.

✔

EMAIL ADDRESS:
TELEPHONE ( ) 753.8623

3. TYPE OF ACTIVITY (Check those that apply)

- ☑ PRODUCTION–Oil, Gas, Injection or Geothermal Well(s)
- ☐ STORAGE–Underground Gas or LPG Facility
- ☐ PURCHASING–Of Oil or Gas from Others
- ☐ TRANSPORTATION–By Truck or Pipeline for Others
- ☐ PLUGGING–Plug and Abandon Wells for Others
- ☑ DRILLING–Drill Wells for Others
- ☐ SOLUTION MINING–Own/Operate Facility
- ☐ BRINE DISPOSAL–Own/Operate Facility
- ☐ STRATIGRAPHIC–Own Well or Hole
- ☑ SURFACE MINING–Own/Operate Facility
- ☐ UNDERGROUND MINING–Own/Operate Facility

4. STATE WHETHER THE ENTITY IS A CORPORATION, LIMITED LIABILITY COMPANY, ASSOCIATION, PARTNERSHIP, INDIVIDUAL, PUBLIC AUTHORITY OR GOVERNMENTAL AGENCY, OR TRUST. IF FOREIGN (OUT-OF-STATE) CORPORATION, GIVE STATE AND DATE OF INCORPORATION AND DATE OF AUTHORIZATION TO DO BUSINESS IN NEW YORK STATE. IF PARTNERSHIP, STATE WHETHER GENERAL OR LIMITED AND COUNTY OF FILING. IF DBA, GENERAL PARTNERSHIP OR ASSUMED NAME OF A LIMITED LIABILITY PARTNERSHIP, GIVE COUNTY OF FILING.

LLC

5. IF THE NAME ENTERED IN BOX 4 IS NEW, INCLUDE THE COMPLETE NAME AND ADDRESS OF THE PREVIOUS ENTITY.

6. IF ENTITY IS A CORPORATION OR ASSOCIATION, LIST **ALL** DIRECTORS **AND ALL** OFFICERS. IF A PARTNERSHIP, LIST **ALL** GENERAL **AND ALL** LIMITED PARTNERS. IF A LLC, LIST **ALL** MEMBERS. CHECK BOX IF ADDITIONAL SHEETS ARE ATTACHED. ☐

NAME	TITLE
Christopher Henry	Owner / Member
Carol Simon	Owner / Member
Adam C Henry	Owner / Member
Matthew J VanWagenen	Owner / Member

7. LIST ALL PERSONS AUTHORIZED BY THE ENTITY TO SIGN ALL SUBMITTALS TO THE DEPARTMENT.

NAME	TITLE
Christopher Henry	Owner / Member

I hereby affirm under penalty of perjury that the information provided in this report is true to the best of my knowledge and belief. I am aware that false statements made in this report are punishable pursuant to Section 210.45 of the Penal Law.

TYPE OR PRINT NAME OF AUTHORIZED PERSON
Christopher Henry

SIGNATURE

DATE

SWORN TO AND SUBSCRIBED
BEFORE ME, THIS _____
DAY OF _____ 20 _____
NOTARY PUBLIC

APPENDIX C

NYSDEC FULL ENVIRONMENTAL ASSESSMENT FORM

Full Environmental Assessment Form
Part 1 - Project and Setting

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the project sponsor to verify that the information contained in Part 1is accurate and complete.

A. Project and Sponsor Information.

Name of Action or Project: Cortlandville Sand & Gravel NYSDEC Mine Permit Modification		
Project Location (describe, and attach a general location map): The mine site is located on State Route 13 seven hundred feet south of the intersection of State Route 123 and State Route 13.		
Brief Description of Proposed Action (include purpose or need): The purpose of this application is to modify the approved Mined Land Use Plan ("MLUP") to extend the Life of Mine Boundary both laterally and vertically. Cortlandville Sand & Gravel (Cortlandville S&G) is proposing to expand northerly by approximately 2.5 acres and to the southeast by approximately 9.4 acres. 0.4 acres of the southeastern expansion area are located within the 120 acre parcel mining is currently taking place on, the reaming 9.0 acres of land are located within the adjacent tax parcel #105.00-03-06.200 (also owned by Christopher Henry Holdings, LLC. owner of Cortlandville S & G). The new tax parcel to be included in the mine permit area is located in the southeast corner of the mine site, and is currently an open field (Figure 2 & 3). Cortlandville S&G is also proposing to expand the vertical limit of the current and proposed excavation area by mining ~100 feet into the water table. The 9.0 acre southeastern expansion area tax parcel #105.00-03-06.200 is, currently zoned Industrial 2 (I-2) by the town of Cortlandville. Under section 178-40.4. of Cortlandvilles Zoning Regulations Sand and gravel mining is a permitted use subject to site plan approval and conditional permit.		
Name of Applicant/Sponsor: RT 13 ROCKS, LLC.	Telephone: 607.756.2115 E-Mail:	
Address: 765 State Route 13		
City/PO: Cortland	State: New York	Zip Code: 13045
Project Contact (if not same as sponsor; give name and title/role): Richard Hisert	Telephone: 518.270.1620 E-Mail: rhisert@h2hassociates.com	
Address: 179 River St. - H2H Associates, LLC		
City/PO: Troy	State: New York	Zip Code: 12180
Property Owner (if not same as sponsor):	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:

B. Government Approvals

B. Government Approvals, Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)		
Government Entity	**If Yes: Identify Agency and Approval(s) Required**	**Application Date (Actual or projected)**
a. City Council, Town Board, or Village Board of Trustees ☐Yes☑No		
b. City, Town or Village Planning Board or Commission ☑Yes☐No	Planning Board- Site Plan Approval and Conditional Permit	Projected: 3/23/2017
c. City Council, Town or Village Zoning Board of Appeals ☑Yes☐No	Zoning Board- Site Plan Approval and Conditional Permit	Projected: 3/23/2017
d. Other local agencies ☐Yes☑No		
e. County agencies ☐Yes☑No		
f. Regional agencies ☐Yes☑No		
g. State agencies ☑Yes☐No	NYSDEC - Mining Permit	Projected: 3/23/2017
h. Federal agencies ☐Yes☑No		

i. Coastal Resources.
i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? ☐Yes☑No

ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? ☐Yes☑No

iii. Is the project site within a Coastal Erosion Hazard Area? ☐Yes☑No

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? ☐Yes☑No

- **If Yes,** complete sections C, F and G.
- **If No,** proceed to question C.2 and complete all remaining sections and questions in Part 1

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? ☑Yes☐No

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? ☑Yes☐No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) ☑Yes☐No

If Yes, identify the plan(s):

Yes, the site is located within the Cortland Aquifer.

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? ☐Yes☑No

If Yes, identify the plan(s):

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. ☑ Yes ☐ No
If Yes, what is the zoning classification(s) including any applicable overlay district?
Agriculture,Industrial, and Cortland Aquifer Overlay District

b. Is the use permitted or allowed by a special or conditional use permit? ☑ Yes ☐ No

c. Is a zoning change requested as part of the proposed action? ☐ Yes ☑ No
If Yes,
i. What is the proposed new zoning for the site? _____

C.4. Existing community services.

a. In what school district is the project site located? Cortland City School District

b. What police or other public protection forces serve the project site?
Cortland City Police Department

c. Which fire protection and emergency medical services serve the project site?
Munsons Corners Fire Departments

d. What parks serve the project site?
Suggett Park, Dexter Park, and Citizens Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? To expand an existing Sand & Gravel operation to adjacent parcels and to deepen the operation to a maximum of 100 feet into the water table

b. a. Total acreage of the site of the proposed action? 78.3 acres
b. Total acreage to be physically disturbed? 9.4(new) acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 135 acres

c. Is the proposed action an expansion of an existing project or use? ☑ Yes ☐ No
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % 16.6 Units: acres

d. Is the proposed action a subdivision, or does it include a subdivision? ☐ Yes ☑ No
If Yes,
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)
ii. Is a cluster/conservation layout proposed? ☐ Yes ☑ No
iii. Number of lots proposed? _____
iv. Minimum and maximum proposed lot sizes? Minimum _____ Maximum _____

e. Will proposed action be constructed in multiple phases? ☐ Yes ☑ No
i. If No, anticipated period of construction: _____ months
ii. If Yes:
- Total number of phases anticipated _____
- Anticipated commencement date of phase 1 (including demolition) _____ month _____ year
- Anticipated completion date of final phase _____ month _____ year
- Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: _____

The entire site would become part of the mine permit area. Mining of the sand & gravel would occur from west to east, from top to bottom over a 10-15 yr. period at the current consumption rate of the deposit.

f. Does the project include new residential uses? ☐Yes ☑No

If Yes, show numbers of units proposed.

	One Family	Two Family	Three Family	Multiple Family (four or more)
Initial Phase				
At completion of all phases				

g. Does the proposed action include new non-residential construction (including expansions)? ☐Yes ☑No

If Yes,

i. Total number of structures _____

ii. Dimensions (in feet) of largest proposed structure: _____height; _____width; and _____ length

iii. Approximate extent of building space to be heated or cooled: _____ square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☑Yes ☐No

If Yes,

i. Purpose of the impoundment: Mining will be taking place below the water table creating an impoundment.

ii. If a water impoundment, the principal source of the water: ☑ Ground water ☐ Surface water streams ☐Other specify:

iii. If other than water, identify the type of impounded/contained liquids and their source.

iv. Approximate size of the proposed impoundment. Volume: 160 million gallons; surface area: 8 acres

v. Dimensions of the proposed dam or impounding structure: N/A height; N/A length

vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete):

The impoundment will be a pond created below the surrounding grade. The impoundment will be 8 acres of a 54.2 acre impoundment across the site.

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? ☑Yes ☐No
(Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite)

If Yes:

i. What is the purpose of the excavation or dredging? Production of course and fine aggregate from sand & gravel deposit on site.

ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?

- Volume (specify tons or cubic yards): 10529520.4 Cubic Yards
- Over what duration of time? _____

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them.

Sand and gravel will be excavated and dredged across the site. The excavated material will be processed, and solid as coarse and fine aggregate for construction prepossess.

iv. Will there be onsite dewatering or processing of excavated materials? ☑Yes ☐No

If yes, describe. There will not be NO onsite dewatering, but the material excavated will be mechanically separated into fine and coarse aggregate using a mobile crusher.

v. What is the total area to be dredged or excavated? 78.3 acres

vi. What is the maximum area to be worked at any one time? 9.0 acres

vii. What would be the maximum depth of excavation or dredging? 160 from surrounding grade feet

viii. Will the excavation require blasting? ☐Yes ☑No

ix. Summarize site reclamation goals and plan: _____

Area above 1170 feet amsl will be graded to 1 vertical to 2 horizontal, and seeded with approved seed mixture. Area of site below 1170 feet amsl will be reclaimed as a lake (Figure 4).

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? ☐Yes ☑No

If Yes:

i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): _____

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:

_____

_____

_____

_____

iii. Will proposed action cause or result in disturbance to bottom sediments? ☐Yes☐No

If Yes, describe: _____

iv. Will proposed action cause or result in the destruction or removal of aquatic vegetation? ☐Yes☐No

If Yes:

- acres of aquatic vegetation proposed to be removed: _____
- expected acreage of aquatic vegetation remaining after project completion: _____
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): _____

_____

- proposed method of plant removal: _____
- if chemical/herbicide treatment will be used, specify product(s): _____

v. Describe any proposed reclamation/mitigation following disturbance: _____

_____

c. Will the proposed action use, or create a new demand for water? ☐Yes☑No

If Yes:

i. Total anticipated water usage/demand per day: _____ gallons/day

ii. Will the proposed action obtain water from an existing public water supply? ☐Yes☑No

If Yes:

- Name of district or service area: _____
- Does the existing public water supply have capacity to serve the proposal? ☐Yes☐No
- Is the project site in the existing district? ☐Yes☐No
- Is expansion of the district needed? ☐Yes☐No
- Do existing lines serve the project site? ☐Yes☐No

iii. Will line extension within an existing district be necessary to supply the project? ☐Yes☑No

If Yes:

- Describe extensions or capacity expansions proposed to serve this project: _____

_____

- Source(s) of supply for the district: _____

iv. Is a new water supply district or service area proposed to be formed to serve the project site? ☐Yes☑No

If, Yes:

- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- Proposed source(s) of supply for new district: _____

v. If a public water supply will not be used, describe plans to provide water supply for the project: _____

_____

vi. If water supply will be from wells (public or private), maximum pumping capacity: _____ gallons/minute.

d. Will the proposed action generate liquid wastes? ☐Yes☑No

If Yes:

i. Total anticipated liquid waste generation per day: _____ gallons/day

ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each): _____

_____

_____

iii. Will the proposed action use any existing public wastewater treatment facilities? ☐Yes☑No

If Yes:

- Name of wastewater treatment plant to be used: _____
- Name of district: _____
- Does the existing wastewater treatment plant have capacity to serve the project? ☐Yes☐No
- Is the project site in the existing district? ☐Yes☐No
- Is expansion of the district needed? ☐Yes☐No

- Do existing sewer lines serve the project site? ☐Yes ☑No
- Will line extension within an existing district be necessary to serve the project? ☐Yes ☑No

If Yes:

- Describe extensions or capacity expansions proposed to serve this project: _____

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? ☐Yes ☑No

If Yes:

- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- What is the receiving water for the wastewater discharge? _____

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge, or describe subsurface disposal plans):

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: _____

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? ☐Yes ☑No

If Yes:

i. How much impervious surface will the project create in relation to total size of project parcel?

_____ Square feet or _____ acres (impervious surface)

_____ Square feet or _____ acres (parcel size)

ii. Describe types of new point sources. There will be no offsite discharge of stormwater.

iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?

Stormwater runoff from the site will be directed into the existing pit to infiltrate into the groundwater.

- If to surface waters, identify receiving water bodies or wetlands: _____
- Will stormwater runoff flow to adjacent properties? ☐Yes ☑No

iv. Does proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? ☑Yes ☐No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? ☑Yes ☐No

If Yes, identify:

i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)

Heavy equipment will be used onsite, front end loaders, haul trucks, mobile screening plant.

ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)

iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? ☐Yes ☑No

If Yes:

i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) ☐Yes ☑No

ii. In addition to emissions as calculated in the application, the project will generate:

- _____Tons/year (short tons) of Carbon Dioxide (CO_2)
- _____Tons/year (short tons) of Nitrous Oxide (N_2O)
- _____Tons/year (short tons) of Perfluorocarbons (PFCs)
- _____Tons/year (short tons) of Sulfur Hexafluoride (SF_6)
- _____Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflourocarbons (HFCs)
- _____Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? ☐Yes ☑No

If Yes:

i. Estimate methane generation in tons/year (metric): _____

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): _____

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? ☑Yes ☐No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust):

Diesel exhaust will be produced onsite by heavy equipment, and the mobile crusher. Dust will be produced from onsite truck traffic and crushing activities Dust will be controlled by using a water truck to keep haul roads wet, and the entrance way to Route 13 will be kept clean. Mining actives will be taking place below grade which will contain dust onsite. Material excavated below water will not generate dust.

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? ☐Yes ☑No

If Yes:

i. When is the peak traffic expected (Check all that apply): ☐ Morning ☐ Evening ☐Weekend
☐ Randomly between hours of _____ to _____.

ii. For commercial activities only, projected number of semi-trailer truck trips/day: _____

iii. Parking spaces: Existing _____ Proposed _____ Net increase/decrease 0

iv. Does the proposed action include any shared use parking? ☐Yes ☑No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe:

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? ☑Yes ☐No

vii Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? ☐Yes ☑No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? ☐Yes ☑No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? ☐Yes ☑No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: _____

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):

iii. Will the proposed action require a new, or an upgrade to, an existing substation? ☐Yes ☑No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: 6 AM - 6 PM
- Saturday: 6 AM - 2 PM
- Sunday: No Operations
- Holidays: No Operations

ii. During Operations:

- Monday - Friday: 6 AM - 6 PM
- Saturday: 6 AM - 2 PM
- Sunday: No Operations
- Holidays: No Operations

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? ☐ Yes ☑ No

If yes:

i. Provide details including sources, time of day and duration:

ii. Will proposed action remove existing natural barriers that could act as a noise barrier or screen? ☐ Yes ☑ No

Describe:

n.. Will the proposed action have outdoor lighting? ☐ Yes ☑ No

If yes:

i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? ☐ Yes ☑ No

Describe:

o. Does the proposed action have the potential to produce odors for more than one hour per day? ☐ Yes ☑ No

If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures:

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage? ☐ Yes ☑ No

If Yes:

i. Product(s) to be stored

ii. Volume(s) _____ per unit time _____ (e.g., month, year)

iii. Generally describe proposed storage facilities:

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? ☐ Yes ☑ No

If Yes:

i. Describe proposed treatment(s):

ii. Will the proposed action use Integrated Pest Management Practices? ☐ Yes ☑ No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? ☐ Yes ☑ No

If Yes:

i. Describe any solid waste(s) to be generated during construction or operation of the facility:

- Construction: _____ tons per _____ (unit of time)
- Operation : _____ tons per _____ (unit of time)

ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:

- Construction:
- Operation:

iii. Proposed disposal methods/facilities for solid waste generated on-site:

- Construction:
- Operation:

s. Does the proposed action include construction or modification of a solid waste management facility? ☐ Yes ☑ No

If Yes:

i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): _____

ii. Anticipated rate of disposal/processing:

- _____ Tons/month, if transfer or other non-combustion/thermal treatment, or
- _____ Tons/hour, if combustion or thermal treatment

iii. If landfill, anticipated site life: _____ years

t. Will proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? ☐ Yes ☑ No

If Yes:

i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: _____

ii. Generally describe processes or activities involving hazardous wastes or constituents: _____

iii. Specify amount to be handled or generated _____ tons/month

iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: _____

v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? ☐ Yes ☑ No

If Yes: provide name and location of facility: _____

If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility:

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.

i. Check all uses that occur on, adjoining and near the project site.

☐ Urban ☑ Industrial ☑ Commercial ☐ Residential (suburban) ☐ Rural (non-farm)
☐ Forest ☑ Agriculture ☐ Aquatic ☐ Other (specify): _____

ii. If mix of uses, generally describe:

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	0	0	0
• Forested	0	0	0
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	15	10	5
• Agricultural (includes active orchards, field, greenhouse etc.)	0	0	0
• Surface water features (lakes, ponds, streams, rivers, etc.)	0	54	54
• Wetlands (freshwater or tidal)	0	0	0
• Non-vegetated (bare rock, earth or fill)	55	0	-55
• Other Describe: _____			

c. Is the project site presently used by members of the community for public recreation? ☐Yes ☑No
i. If Yes: explain: _____

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? ☐Yes ☑No
If Yes,
i. Identify Facilities:
_____
_____

e. Does the project site contain an existing dam? ☐Yes ☑No
If Yes:
i. Dimensions of the dam and impoundment:
- Dam height: _____ feet
- Dam length: _____ feet
- Surface area: _____ acres
- Volume impounded: _____ gallons OR acre-feet

ii. Dam's existing hazard classification: _____
iii. Provide date and summarize results of last inspection:
_____
_____

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? ☐Yes ☑No
If Yes:
i. Has the facility been formally closed? ☐Yes ☑ No
- If yes, cite sources/documentation: _____

ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:
_____
_____
iii. Describe any development constraints due to the prior solid waste activities: _____
_____

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? ☐Yes ☑No
If Yes:
i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:
_____
_____

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? ☐Yes ☑ No
If Yes:
i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: ☐Yes ☐No
☐ Yes – Spills Incidents database Provide DEC ID number(s): _____
☐ Yes – Environmental Site Remediation database Provide DEC ID number(s): _____
☐ Neither database

ii. If site has been subject of RCRA corrective activities, describe control measures: _____
_____
_____

iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? ☐Yes ☑No
If yes, provide DEC ID number(s): _____

iv. If yes to (i), (ii) or (iii) above, describe current status of site(s):
_____
_____

v. Is the project site subject to an institutional control limiting property uses? ☐Yes ☑No

- If yes, DEC site ID number: _____
- Describe the type of institutional control (e.g., deed restriction or easement): _____
- Describe any use limitations: _____
- Describe any engineering controls: _____
- Will the project affect the institutional or engineering controls in place? ☐Yes ☐No
- Explain: _____

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? Grater than 200 feet

b. Are there bedrock outcroppings on the project site? ☐Yes ☑No
If Yes, what proportion of the site is comprised of bedrock outcroppings? _____%

c. Predominant soil type(s) present on project site:

Howard Gravelly Loam	97 %
Palymyra Gravelly Silt Loam	3 %
	%

d. What is the average depth to the water table on the project site? Average: 13 feet

e. Drainage status of project site soils:
☑ Well Drained: 100 % of site
☐ Moderately Well Drained: _____% of site
☐ Poorly Drained _____% of site

f. Approximate proportion of proposed action site with slopes:
☑ 0-10%: 100 % of site
☐ 10-15%: _____% of site
☐ 15% or greater: _____% of site

g. Are there any unique geologic features on the project site? ☐Yes ☑No
If Yes, describe: _____

h. Surface water features.
i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? ☐Yes ☑No
ii. Do any wetlands or other waterbodies adjoin the project site? ☐Yes ☑No
If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.
iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? ☑Yes ☐No
iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name _____ Classification _____
- Lakes or Ponds: Name _____ Classification _____
- Wetlands: Name _____ Approximate Size _____
- Wetland No. (if regulated by DEC) _____

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? ☐Yes ☑No
If yes, name of impaired water body/bodies and basis for listing as impaired: _____

i. Is the project site in a designated Floodway? ☐Yes ☑No

j. Is the project site in the 100 year Floodplain? ☐Yes ☑No

k. Is the project site in the 500 year Floodplain? ☐Yes ☑No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? ☑Yes ☐No
If Yes:
i. Name of aquifer: Cortland Aquifer

m. Identify the predominant wildlife species that occupy or use the project site: _____

_____ _____ _____

_____ _____ _____

n. Does the project site contain a designated significant natural community? ☐Yes ☑No

If Yes:

i. Describe the habitat/community (composition, function, and basis for designation): _____

ii. Source(s) of description or evaluation: _____

iii. Extent of community/habitat:

- Currently: _____ acres
- Following completion of project as proposed: _____ acres
- Gain or loss (indicate + or -): _____ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? ☐ Yes ☑No

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? ☐Yes ☑No

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? ☐Yes ☑No

If yes, give a brief description of how the proposed action may affect that use: _____

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐Yes ☑No

If Yes, provide county plus district name/number: _____

b. Are agricultural lands consisting of highly productive soils present? ☐Yes ☑No

i. If Yes: acreage(s) on project site? _____

ii. Source(s) of soil rating(s): _____

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐Yes ☑No

If Yes:

i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature

ii. Provide brief description of landmark, including values behind designation and approximate size/extent: _____

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☐Yes ☑No

If Yes:

i. CEA name: _____

ii. Basis for designation: _____

iii. Designating agency and date: _____

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on, or has been nominated by the NYS Board of Historic Preservation for inclusion on, the State or National Register of Historic Places? ☐ Yes ☑ No

If Yes:

i. Nature of historic/archaeological resource: ☐ Archaeological Site ☐ Historic Building or District

ii. Name: _____

iii. Brief description of attributes on which listing is based:

_____

f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory? ☐ Yes ☑ No

g. Have additional archaeological or historic site(s) or resources been identified on the project site? ☐ Yes ☑ No

If Yes:

i. Describe possible resource(s): _____

ii. Basis for identification: _____

h. Is the project site within fives miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? ☑ Yes ☐ No

If Yes:

i. Identify resource: Scenic Route 90

ii. Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): 50 miles of scenic highway through central New York, established by NYS scenic byways. Site will not have any impact on the scenic byway.

iii. Distance between project and resource: 4.5 miles.

i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? ☐ Yes ☑ No

If Yes:

i. Identify the name of the river and its designation: _____

ii. Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☑ Yes ☐ No

F. Additional Information

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

Applicant/Sponsor Name Richard Hiser Date April 26, 2017

Signature _____ Title Principal - Hydrogeologist

PRINT FORM

Appendix 1.1.B: Spill Prevention and Response Plan (H2H, A Bowman Company)

Spill Prevention and Response Plan – Cortlandville Sand & Gravel

Town of Cortlandville, Cortland County, New York

NYSDEC Mine Permit #7-1122-00043/00008

MLR #70436

Prepared for:
Route 13 Rocks, LLC
765 State Route 13
Cortland, NY 13045

Prepared by:
H2H, A Bowman Company
179 River St
Troy, NY 12180
518.270.1620

October 2023

Contents

1.0 Introduction 3
2.0 Site Operations 4
2.1 Current Operations 4
2.2 Proposed Operations 4
3.0 Stormwater Management 5
4.0 Potential Contaminant Sources 6
5.0 Spill Prevention/ Best Management Practices (BMPs) 8
5.1 General 8
5.2 Vehicle/Equipment Maintenance Area 9
5.3 Fueling 10
5.4 Vehicle Parking and Roadways 10
5.5 Fluid Storage 11
5.6 Waste Management 11
5.7 Over-Water Operations 11
5.8 Restricted Access 11
6.0 Spill Response 12
6.1 Minor Release 12
6.2 Reportable Spill 12
6.3 Major Spill Incidents 14
6.4 Spill Kits 14
7.0 Emergency/Contingency Plan 16
8.0 Employee Training 18
9.0 Groundwater and Surface Water Monitoring 19
10.0 Inspections and Recordkeeping 20
11.0 Potential Spill Impacts to Town's Water Supply 21
12.0 Spill Prevention Plan Revisions 22

Tables:

Table 1 – Properties of Potential Contaminants
Table 2 – Contact List

Figures:

Figure 1 – Site Plan Map
Figure 2 – Oil/Water Separator Detail

Appendices:

Appendix A – Forms
Appendix B – Typical Safety Data Sheets

1.0 Introduction

This Spill Prevention and Response Plan (Plan) has been developed to support the permitted sand and gravel mine pond located within the aquifer protection district established by the Town of Cortlandville. The Plan's purpose is to mitigate risk of degrading the integrity of the water quality in the mine pond, South Pond, Mid-Pond, North-Pond, and the aquifer.

The Plan includes a description of existing and future operations, stormwater management, potential contamination sources and their physical properties, and area-specific and general best management practices to prevent and respond to spills. The Plan describes site-specific conditions that support a conclusion that potential impacts from spills to the quality of the Town of Cortlandville's Lime Hollow wells would be unlikely. Nevertheless, a spill emergency/contingency plan is included. The Plan will be revised as necessary and as additional data become available.

Plan appendices include various forms to document performance of the Best Management Practices (BMPs) and training. Safety Data Sheets (SDS) are included for petroleum compounds typically used at the site. The SDS address safety precautions for handling the compounds, responding to spills, physical properties, toxicity data, and so on.

2.0 Site Operations

Figure 1 is a site plan map that shows the locations of the key site components and infrastructure. Other than the excavation pit, most of the infrastructure is located in the southeast corner of the site 3,000 feet from the Town well field which are located 880 feet northwest of the northwest corner of the proposed mine pond that will occupy the excavation.

2.1 Current Operations

The principal current operations and operational areas at the site are:

- Stripping topsoil (~10-inches) and stockpiling it for reclamation;
- Excavating sand and gravel in a dry pit with front-end loader above the water table;
- Hauling to the portable processing area;
- Screening and crushing the mined material;
- Conveyors and material stockpiling;
- Weighing the mined product at the truck scale;
- Hauling the material offsite by truck.

Supporting infrastructure includes:

- Access road – there is one access road into and out of the southeast corner of the site;
- Haul road;
- Scale house with truck scale (the only permanent structure onsite);
- Parking area;
- Equipment storage;
- Perimeter hedgerow.

2.2 Proposed Operations

The principal changes proposed by the permit modification are:

- Excavating sand and gravel below the water table using a land-based long-stick excavator, wireline dredge or hydraulic dredge;
- Paving the Vehicle/Equipment Maintenance Area.

3.0 Stormwater Management

Runoff is minimal in the mine area owing to the highly permeable nature of the ground surface, as evidenced by the lack of streams in the mine and well field vicinity, and the highly permeable nature of the underlying glacial outwash sand and gravel deposits. Any runoff which does occur is directed toward the excavation area (not directly to the surface water), and as a result, a site-specific stormwater pollution prevention plan is unnecessary. The site is not located within a 100- or 500-year floodplain.

4.0 Potential Contaminant Sources

The proposed mine pond will be secluded and not associated with land uses and surface water contaminant sources that may otherwise be expected in the region. These sources include wastewater discharges, manure spreading, livestock, compost, urban stormwater runoff, road salt, agricultural chemicals, pesticides, septic field leachates, sewers, cooling tower blowdown, river flood infiltration, and land disposal of industrial wastes. Based on groundwater sampling in the mine pond area, nutrient (nitrate, phosphorus) levels should be exceptionally low which should minimize the potential future risk of harmful algal blooms in the mine pond.

Applicant knows of no surface sand and gravel mine ponds or lakes in New York State that have adversely affected water quality at nearby water wells.

Potential contaminant sources currently used at the permitted mine site are typically petroleum and related compounds:

- Gasoline - Gasoline use would be limited to service vehicles that would typically be parked overnight in the paved area at the south end of the Property.
- Diesel fuel – The primary fuel for the excavation equipment would be diesel, dispensed using a fuel truck operating under spill prevention protocols. The excavator would typically be situated on land adjacent to the excavation thereby maintaining the eight-foot separation distance from the seasonal high-water table.
- Hydraulic fluids – Whether an excavator or a dredge is used, hydraulic lines would extend over and into the mine pond water during excavation operations. The lines represent a potential source of release if the lines leak or break. However, petroleum-based drips, leaks or spills in water should be easy to detect visually during inspections, contain (with booms), and remove (with absorbents).
- Other petroleum-based fluids such as motor oil, gear oil, transmission fluid, brake and steering fluids and antifreeze/coolant would be associated with either land-based equipment or floating dredge, would be present in relatively small quantities, and would be visibly apparent in the event of leaks or spills for clean-up.

Environmentally- friendly fluids would be used insofar as practicable; for example, propylene glycol is considerably less toxic than ethylene glycol and may be labeled as “non-toxic antifreeze”. It is often used as antifreeze where ethylene glycol would be inappropriate such as in food processing systems or in water pipes in homes where incidental ingestion may be possible. It also may be suitable for use in automotive and heavy-duty engine coolants and aqueous heat transfer fluids. The suitability and practicability of its use in excavation equipment would be evaluated prior to mine pond excavation.

Measures would be taken to prevent, minimize, and mitigate releases of pollutants. Spill response equipment (boom, absorbents, shovels, empty drum, etc.) would be stored near the active excavation area. Vehicles and equipment would be properly operated and maintained to reduce the risk of releases. Vehicle and equipment washing, and light maintenance activity would be located on a paved surface at the south end of the Property 3.000 feet from the Town wells. Vehicle wash water would be contained and treated by an oil-water separator.

Onsite storage of fuels would be limited to a mobile fuel truck. Onsite storage of lubricants, hydraulic fluids, etc. would be minimal and would be at the far south end of the property. Storage and use of solvents such as volatile organic compounds would be de minimis and any that may be incidentally present would be at the office area at the south end of the mine. Releases should be negligible.

Onsite processing of sand and gravel is minimal. Material washing is not planned; thus, process wash water will not be generated. Flocculants are not needed and would not be used onsite. Dust suppression is achieved only through application of water.

Potential risks to the wells' water supply from potential contaminants in the proposed mine pond would be immaterial when the precautions, small amount of reasonably likely sources, distances, exposure pathways, attenuation processes, and relative recharge amounts are taken into account.

A summary of relevant physical and chemical properties for the potential pollutants is presented in **Table 1**. Generic Safety Data Sheets (SDS) for the principal compounds, diesel fuel, gasoline and hydraulic oil, are included in **Appendix B**. This compilation is representative of current and proposed site conditions. Review of the SDS's and especially the spill response measures described therein will be part of the employee training program. No additional compounds are expected to be used onsite as a result of the proposed mine expansion and deepening.

The mine pond will be ultimately reclaimed as a permanent pond. Peripheral areas will be vegetated; some of which has already been completed. Application of lime and fertilizer to disturbed land areas around the former mine pond may be included as necessary in the initial reclamation process to ensure healthy vegetation growth.

5.0 Spill Prevention/ Best Management Practices (BMPs)

Summarized below are general and area-specific best management practices (BMPs) that will be followed at the site.

5.1 General

The intent of BMPs is to minimize or prevent adverse environmental impacts as a result of the mining operations. These BMPs are summarized below.

Mine operations will not include the following systems and activities which are commonly found at mining operations and could lead to adverse environmental impacts. The existing and proposed mine operations do not include:

- Stationary petroleum bulk storage tanks (other than a 1,000-gallon, double-wall tank on a skid at the scale house);
- Dry wells;
- Storm drains;
- Oil-filled electrical equipment;
- Mine de-watering;
- Sand and gravel washing equipment;
- Process water;
- Boiler blowdown;
- Blasting;
- Need for individual SPDES discharge permit;
- Use of chlorinated solvents;
- Flocculent use.

BMPs that will be followed at the site to prevent spills and their potential adverse effects include:

- Good housekeeping;
- Preventive maintenance;
- Use of environmentally friendly and non-toxic fluids insofar as practicable;
- Availability of fire extinguishers;
- Availability of spill kits;
- Site access security;
- Site-specific procedures associated with operational activities and areas to prevent and respond to spills;
- Emergency/contingency plan;
- Updated contact list **(Table 2)**;
- Employee training;
- Inspections;
- Oil/water separator **(Figure 2)**;
- Groundwater and surface water monitoring;
- Recordkeeping including Spill Prevention and Response Plan documentation forms **(Appendix A).**

5.2 Vehicle/Equipment Maintenance Area

The Vehicle/Equipment Maintenance Area at the south end of the mine **(Figure 1)** will be located on a paved slab to be constructed to contain reduce, minimize, or eliminate the discharge of pollutants. A detail for the 40-foot by 40-foot slab is included on Figure 1. The paved slab will facilitate cleanup and reduce or eliminate the potential for spills to migrate to soil or groundwater. Runoff will cycle through an oil/water separator. The following BMPs apply specifically to the maintenance:

1. Inspect all vehicles and equipment for fluid leaks on a regular basis including hydraulic and coolant hoses, fittings, connections, and on-board storage containers. Check and record fluid levels prior to the start of the working day. Inspect the ground surface under vehicles and equipment following any extended period of parking, over-night or longer. Cleanup any area where vehicle or equipment fluids have leaked onto the ground surface. Report any incident of fluid leakage to the maintenance and repair supervisor.
2. Make sure equipment is checked for lubrication, fuel, or other fluid leaks upon arrival at the site.
3. Perform major vehicle maintenance offsite and minor maintenance in the designated maintenance area. Do not perform maintenance activities which could result in the discharge of pollutants outdoors during rain events.
4. Designate a special area of the paved pad to drain and replace fluids such as motor oil, other lubricants, and coolants, and take precautions to prevent fluids from contacting stormwater or the ground surface, e.g., oil/water separator.
5. Keep a drip pan under vehicles while unclipping hoses, unscrewing filters, or removing other parts which could result in fluid spills. Use several drip pans, where necessary, to separate specific fluids for reuse, recycling or storage and disposal.
6. Collect used or leftover motor oil, gear oil, hydraulic oil, transmission fluids, brake and steering fluids, antifreeze, for recycling, but make sure they are safely and securely stored. Drain used oil filters over an oil-recycling container prior to recycling or disposal. Do not mix motor oil or antifreeze with other maintenance fluids.
7. Cleanup any spilled oil residues promptly using shop rags or absorbents. Place used shop rags in a storage container for recycling and reuse. Place absorbents in a separate labeled storage container for recycling or disposal.
8. Minimize use of solvents and where possible use environmentally friendly products (non-toxic, biodegradable). Do not mix with other maintenance fluids. Reuse or recycle solvents whenever possible. Place spent solvents in a specific labeled storage container for storage and proper disposal.
9. Recycle used automotive or equipment parts if possible or dispose of properly. Store metal parts waiting for recycling or disposal in an enclosed container. Cover with temporary tarps any part too large to be transported by on-site container.
10. For vehicle lubrication transfer procedures: Use a funnel to transfer liquids when appropriate. Use absorbent spill apron or drip pans when transferring lubricating fluids. Use absorbent materials or mats to address spills.
11. Use dry cleanup methods such as sweeping for removal of litter and debris or use recyclable rags or absorbents for small leaks and spills.

5.3 Fueling

The fueling of readily mobile equipment will be done within the general confines of the paved vehicle/equipment maintenance area to reduce, minimize or eliminate the discharge of pollutants caused by vehicle/equipment fueling. The excavator may be fueled using a fuel truck following spill prevention and mitigation protocols. Following are fueling area specific BMPs:

1. Conduct regular inspection of vehicles and equipment to make sure they are properly maintained. Inspect tanks and mountings for evidence of corrosion or structural failure because a faulty or dropped fuel tank could lead to a spill. Check gaskets, hose condition and fittings. Make repairs promptly.
2. Train employees in the proper fueling and cleanup procedures. Use fueling safeguards. Discourage "topping-off" of vehicle tanks because topping off tanks increases the risk of spilling fuel onto the ground. Avoid overfill. Use overflow protection devices on fuel tank systems and transfer equipment to warn operator to automatically shutoff transfer pumps when the tank reaches full capacity.
3. Inspect the fueling areas daily for evidence of vehicle leaks. Report evidence of leaks to the Site Manager. Small leaks could grow into large leaks. Do not wash down area with water that could spread off the fueling area pad. Clean up spills quickly to preclude the possibility they could mix with stormwater.
4. Use dry cleanup methods (rags, absorbent pads, granular material, sweeping) where possible.
5. Store and maintain appropriate spill clean-up materials (e.g., spill kit) in a location known to all employees near the fueling operation. Ensure through the training program that employees are familiar with the Spill Prevention and Response Plan including proper spill cleanup procedures and disposal of materials.
6. Provide covered storage container for contaminated rags and absorbents at all locations of potential spills or cleanups.
7. For large equipment that is not readily mobile (e.g. conveyors, large backhoe, dragline dredge) and must be fueled outside the paved maintenance area, follow the BMPs listed above and take additional precautions to prevent spills such as: use of funnels, use of drip pans or absorbents, and provide constant vigilance to prevent overfill.

5.4 Vehicle Parking and Roadways

The parking area is located in the paved vehicle/equipment maintenance area (Figure 1). In addition to the relevant BMPs listed above which will comprise part of the site culture, additional BMPs associated with the parking area are as follows:

1. Park vehicles in the designated parking spots on the paved slab.
2. Inspect designated parking areas and roadways on a daily basis for signs of leaks or spills. Cleanup any leak or spill upon discovery.
3. Employees will be discouraged from performing any onsite maintenance on their vehicles.
4. Only clean water will be used for roadway dust suppression.

5.5 Fluid Storage

There are no major fluid storage facilities onsite. Small, localized storage will be inherent in the mobile equipment and on the backs of maintenance trucks. Minor storage is available in the scale house.

5.6 Waste Management

Wastes will be properly stored and disposed of. In addition to the area specific BMPs listed above, the following BMPs are specifically related to management of any wastes generated onsite that could lead to uncontrolled releases:

1. Good housekeeping will be practiced. Litter and debris will be picked up from the site daily.
2. Trash and bulk wastes will be stored in designated receptacles for routine pick up and disposal.
3. Waste containers will be properly sized, constructed, labeled, and maintained for the intended purpose.
4. Mechanical components that could leak oil, e.g., used oil filters, will be placed in designated covered leak-proof containers pending pick up by a commercial service.
5. Used oils or other waste fluids will be placed in labeled designated covered leak-proof containers pending pick up by a commercial service.
6. Used absorbents will be placed in designated covered leak-proof containers pending pick up by a commercial service.
7. Proper management of wastes is part of the employee training program.

5.7 Over-Water Operations

Unless an on-water dredge is used, except for the mechanical booms and buckets that would enter the water, the mine excavation equipment including engine, fuel tanks and oil reservoirs would be located onshore where spills would be detected and cleaned up. Oil spills on water would be unlikely but cleaned up promptly with absorbents. As stated above environmentally friendly lubricants would be used insofar as practicable.

5.8 Restricted Access

Access to the property will be restricted by security fencing. A locking gate will be established on the mine access road. The topography and hedgerow vegetation around the property perimeter provide a barrier to discourage unauthorized access by vehicles and trespassers. Additional barriers will be added as needed. Signs will be posted for the water hazard.

6.0 Spill Response

This section describes the appropriate response procedures to be implemented in the event of a release or spill. Upon discovery, releases will be classified as minor, a reportable spill, or a major spill incident depending on the volume and the characteristics of the material released.

6.1 Minor Release

Minor release - A minor release is easily controlled and cleaned up with no chance of an adverse impact to the environment. This includes releases that are so small or so located such that there is no reasonable potential that the released fluid would contact soil or water or penetrate pavement. Minor releases shall be contained and cleaned up promptly. The cause of the release shall be identified and eliminated to prevent recurrence.

A minor release is one that poses no significant harm (or threat) to human health and safety or the environment. Minor discharges are generally those where:

- The quantity of product discharged is small (generally less than 5 gallons of oil/petroleum product);
- Discharged material is easily stopped and controlled at the time of the discharge;
- The discharge is located near the source;
- Discharged material is NOT likely to reach soil ground surface or water;
- There is little risk to human health/safety or the environment; and
- There is little risk of fire or explosion.

Minor discharges can be cleaned-up by mine personnel. The following guidelines apply in the event of a minor release:

- Contain the discharge with discharge response materials and equipment, and place discharge debris in properly labeled waste containers;
- Other than *de minimis* releases, notify the Site Manager or applicable alternate;
- The Site Manager or applicable alternate will complete the Release and Spill Log Form included in Appendix A. This form maintains a running tally of all releases and spills at the site. The form will be reviewed periodically to evaluate the effectiveness of the BMPs at preventing releases and identify improvements.
- If it is determined that the discharge involved more than 5 gallons of product and is potentially reportable, see below.

6.2 Reportable Spill

Spill - A spill is large enough or of such nature that it must be reported to NYSDEC. All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) **within 2 hours of discovery**, except spills which meet all of the four following criteria:

- The quantity is known to be less than 5 gallons; and
- The spill is contained and under the control of the spiller; and
- The spill has not and will not reach the State's water or any land; and
- The spill is cleaned up within 2 hours of discovery.

Note the following:

- The Spill Response Center is staffed 24- hours a day.
- A spill in a dirt or gravel parking lot or on an unpaved surface is considered to have impacted land and is reportable if all the criteria listed above are met.
- A spill is considered to have **not** impacted land if it occurs and is retained on a paved surface such as asphalt or concrete.
- The person reporting the discharge must provide the following information:
    - Name, location, organization, and phone number of the person calling;
    - Name and address of the party responsible for the incident;
    - Date and time of the incident;
    - Location of the incident;
    - Source and cause of the release or discharge;
    - Type of material(s) released or discharged;
    - Estimated quantity of materials released or discharged;
    - Initial actions taken to control the spill; and
    - Any other information that may help emergency personnel respond to the incident.

If a potentially reportable spill can be safely and effectively managed by site personnel, take the following response measures:

1. Stop the spill if possible and if safe (e.g., identify the source, right a tipped container, turn valve or shut off hose, etc.);
2. Isolate the Area - keep all sources of ignition away from the spill; keep personnel not involved with spill containment or cleanup out of the area;
3. Contain the spill (e.g., sorbents, absorbent booms, pads, or loose material used as a berm); cut off the spill route and limit the spread of the spill; response materials can be found in the spill kit;
4. Remove or recover any spilled/discharged oil/petroleum product, e.g., use non-sparking (as appropriate) shovels and brooms and squeegee to apply absorbent and collect saturated materials; ensuring that the residues and cleanup materials will not enter the environment; and
5. Clean equipment and dispose of the waste materials in labeled drums or containers stored in a secure place on the paved pad.

Report the Incident - Get help from fellow workers; contact the Site Manager or applicable alternate and tell supervisor about the spill immediately. Contact the NYSDEC Spill Hotline (1-800-457-7362).

Waste materials will be containerized in impervious bags, drums, or buckets. The Site Manager will characterize the waste for proper disposal and ensure that it is removed from the facility by a licensed waste hauler within two weeks.

If the spill may potentially affect groundwater or surface water, the Town will be notified of the situation upon discovery of this potential situation and in accord with protocols to be developed with the Town.

6.3 Major Spill Incidents

Major Spill Incidents pose a potential threat to human health or the environment. It is conceivable, although unlikely, that a spill incident could be this serious and not safely controlled and cleaned up by facility personnel. This would involve situations where:

- The discharge is large enough to spread beyond the immediate discharge area;
- The discharge requires special equipment, training or personnel to clean-up;
- The discharged material poses a hazard to human health/safety and/or the environment; and
- There is danger of fire or explosion.

In these more serious instances, the following guidelines would apply:

- Workers at risk must evacuate the discharge area and move to another area at a safe distance from the discharge;
- If the Site Manager is not present at the facility, the senior on-site person notifies the Site Manager of the discharge and has the authority to initiate notification and response;
- The Site Manager (or senior on-site person) must call for medical assistance if workers are injured;
- The Site Manager (or senior on-site person) must immediately contact the NYSDEC Spill Hotline (1-800-457-7362);
- The Site Manager (or senior on-site person) must document the discharge on the Release or Spill Log Form;
- The Site Manager (or senior on-site person) coordinates clean-up and obtains assistance from another response organizations as necessary; and
- Other responsible authorities including the Town Supervisor will be notified if the spill could potentially adversely impact the groundwater supply. A contact list is provided in **Table 2.**

6.4 Spill Kits

A dedicated spill kit for spill response will be available onsite in the scale house. This spill kit is in close proximity to and readily accessible from the vehicle/equipment maintenance and fueling areas. An additional spill kits will be kept in close proximity to the excavation area and would include boom, absorbent, shovels and empty drum. Review of spill kit contents and use will be part of the employee training program. Kits will be periodically inspected, and any used components replaced.

Recommended spill kit contents:

- Drip pans
- Shop rags
- Absorbents (loose)

- Absorbent pads and/or boom (“pigs”)
- Waste containers – 5-gallon buckets, 55-gallon drums
- Shovels
- Push broom
- Funnels
- Garbage bags
- Brushes

7.0 Emergency/Contingency Plan

For planning purposes, the following low-probability, worst-case scenario describes a hypothetical situation whereby the potential for migration of pollutants from the mine pond toward the well field may be greatest if the mine pond is located within the well field's capture zone:

- Low groundwater level (September-November);
- Relatively warm fall weather to lower surface water viscosity;
- Relatively large spill occurs at northwest corner of the fully built-out mine lake;
- Detection of spill is delayed if it occurs before a weekend or holiday down-period;
- Prevailing wind from the southeast directs waves and lake water toward the northwest corner;
- Town wells are pumping continually to restore the water level in the storage tanks after a heavy water-demand period, e.g., a major holiday or spectator event on television.

Section 6.0 outlines three levels of response that may result directly from spills. It is unlikely that a spill related emergency would occur onsite that could adversely impact the Town's water supply. Nevertheless, emergency/contingency planning is important because, even with careful planning and preventive measures, unforeseen incidents could occur, and it is important to be prepared. A key question is how such an emergency/contingency plan would be triggered. The three following scenarios are proposed:

1. Mine Owner/Operator detects a significant adverse change in monitoring well water chemistry that could reasonably be attributable to the mine;
2. Mine Owner/Operator detects a significant change in the mine pond water chemistry that could reasonably adversely impact the Town's raw water chemistry after taking into account the effects of natural filtration in the 900-foot intervening distance between the mine pond and Town wells; or
3. Town detects a significant adverse change in raw water chemistry that could reasonably be attributable to the mine.

Should such an event occur, the emergency/contingency response action is generalized as follows:

1. Perform confirmatory water quality analyses at an appropriate frequency;
2. Assess if the changes affect potability or aesthetic concerns (color, odor, taste);
3. Bring the changed water quality to the attention of the Town Supervisor/Mine Owner/Operator (**Table 2**); the Supervisor may involve NYSDEC/SWCD/Health Department for technical support; thereafter meet at an appropriate frequency to ensure that all parties understand the situation and what is being done about it;
4. Expand the water analyses in question as necessary to assess the changes in water quality between the mine and well field;
5. Perform a water quality assessment to determine the potential causes, characteristics, and location of the problem;
6. Perform a suitably scoped feasibility study to evaluate and recommend source isolation or elimination and adverse impact elimination by water treatment or other corrective action alternatives;

7. If appropriate, temporarily stop mining activity;
8. Perform the necessary additional investigatory, planning and design activities;
9. Undertake interim and long-term remedial action; and
10. Establish enhanced monitoring and inspection procedures to verify the effectiveness of the remedy.

8.0 Employee Training

All personnel at the site will be alerted to the nearly presence of the well field and the potential adverse impacts that could result from pollutant releases. All personnel will therefore potentially be directly or indirectly responsible for spill prevention and response. In this vein, personnel will be trained in the operation and maintenance of equipment and procedures to prevent the discharges of oil and spill response. Training will be provided by the Site Manager or designate.

The training program will include:

- Orientation of all new personnel involved with site operations to ensure understanding of the environmental setting of the mine and why special precautions must be taken to prevent adverse impacts to water quality;
- Visual inspections of the facility including a walk-through of any new or significantly modified equipment with potential for generating spills;
- Proper operation and maintenance of the onsite equipment;
- Detailed review of the Spill Prevention and Response Plan and its appendices;
- Review of spill prevention procedures;
- Identification of the person(s) responsible and accountable for spill prevention and response,
- Review of the different classes of release and spills, thresholds, and response;
- A list of personnel responsibilities, communication channels;
- Review of spill cleanup procedures and the location, contents and use of spill kits;
- Use of personal protective equipment as appropriate;
- Use of log forms – release and spill list, inspection logs;
- Refresher training sessions at least annually;
- Additional debriefing, training, or "tailgate" sessions following reportable spills, or when there are significant changes to the Plan, applicable laws or regulations, or operation and maintenance procedures and equipment; and
- Lessons learned and suggestions for improvements related to release and spill incidents and means of preventing future occurrences.

Training records are kept on file and should be readily available for inspection. A copy of the Training log is included in **Appendix A.**

9.0 Groundwater and Surface Water Monitoring

Based on the findings of the baseline hydrogeologic assessment, the long-term monitoring (LTM) program will consist of the following:

- Maintain the existing monitoring well network (MW-1, MW-2, MW-3S, MW-3D, MW-4S).
- Develop a hydrograph for all water level data for all wells.
- Continue the ongoing monthly groundwater level measurement program and assess changes in groundwater flow gradients and directions as the mine pond develops.
- Sample and analyze groundwater from MW-1, MW-3S and MW-3D quarterly beginning one quarter before the mine is deepened below the water table. Analysis shall consist of the field parameters (dissolved oxygen, specific conductivity, pH, turbidity, temperature, and oxidation reduction potential) and analytes measured in the laboratory as recommended by the Health Department.
- Report the quarterly water level and water quality monitoring data to the Town within 60 days of receipt of validated results in accord with a protocol to be developed.
- Sample and analyze mine pond water for the same parameters as groundwater.
- Request Town to track static water levels and drawdown at the Line Hollow Road well field to identify trends as the proposed mine pond develops.
- Develop and submit annual reports or provide sooner notification if a potentially significant anomaly is detected. The Town will be included in the distribution list for the reports. Reports would summarize reportable spills, if any.
- Install stilling wells, and automated water level and temperature measurement instruments (transducers) in the South Pond, Mid Pond, and North Pond to monitor pond elevations.

Locations of monitoring wells are shown in **Figure 1.**

10.0 Inspections and Recordkeeping

Inspections are an integral part of spill prevention and are embedded in many of the BMPs listed above. The Spill Prevention and Response Plan including its summary of BMPs will be maintained in good working order at all times. An updated copy of the Plan, contact list, and cumulative log forms will be kept onsite in the scale house for inspection by the NYSDEC and Town in addition to any other documentation required under the mine permit. Log forms (**Appendix A**) that will be maintained include:

- Release and Spill Reporting Log;
- Training Log;
- Spill Prevention and Response Plan revisions list.

11.0 Potential Spill Impacts to Town's Water Supply

This section is an expansion of the Section 2.3.3. 1– Groundwater Quality - Contaminants from Stormwater Runoff and Petroleum Spills – that was included in H2H's mine permit modification narrative dated March 2018. NYSDEC requested additional clarification in its comments provided in September 2018.

H2H concurs that the potential for surface water and groundwater contamination from petroleum spills must be eliminated or reduced to acceptable levels. Mine operations to date have not experienced any spills. However, the proposed mine deepening poses additional risks during mining. The risks are exacerbated by the mine's apparent location within Zone 1A of the Town's wellhead protection area. Most of the minimum 8-foot-thick sand and gravel buffer would eventually be eliminated. The proposed mine ultimately would be deepened to below the water table resulting in creation of a mine pond. This deepened area would be located greater than 880 feet side gradient (southwest) of Town wells except during brief periods during Town well operation under low water conditions when the mine pond may be hydraulically upgradient of the nearest Town well. Owing to equilibration of the fully-built-out mine pond's surface water level with local groundwater levels, the volume of water stored at the north end of the mine pond nearest the Town's well field would increase.

The mine pond will consist high-quality, low-nutrient oligotrophic flow-thru groundwater. Risk of potentially polluted mine pond water affecting Town well water recharge would be mitigated or eliminated through a program of pollution prevention as described herein.

12.0 Spill Prevention Plan Revisions

This Spill Prevention and Response Plan will be reviewed and updated as appropriate after the mine permit is issued and at least every five years thereafter in conjunction with mine permit renewals. In the interim, the Plan will be reviewed and revised in response to the following:

- The Plan fails to function well in an emergency;
- The facility changes in design, construction, excavating equipment, operations, maintenance, or other circumstances in a way that increase the potential for releases of oil/petroleum product or if there are changes in the response necessary in an emergency;
- Oil/petroleum products generated, used, stored or processed at the site a r e changed; or
- The list of Emergency Contacts or responsible personnel changes.

Appendix A includes a log form that will be used to keep track of document changes made to the Spill Prevention and Response Plan.

Tables

TABLE 1
PHYSICAL PROPERTIES OF PETROLEUM COMPOUNDS

Petroleum or Other Compound	Typical Specific Gravity	Relative Solubility in Water	
Unleaded Gasoline, ethanol	0.68 - 0.78	insoluble	x
Unleaded Gasoline	0.72	insoluble	x
Diesel Fuel	0.82	insoluble	x
Motor Oil	0.86-0.88	insoluble	x
Gear Oil	0.88 - 0.89	insoluble	x
Hydraulic Oil	0.87	insoluble	x
Hydraulic Transmission Fluid	0.87	insoluble	x
Antifreeze	1.06 - 1.09	complete	x
Automatic Transmission Fluid	0.85 - 0.88	insoluble	x
Power Transmission Fluid	0.89 - 0.91	insoluble	x
Power Steering Fluid	0.87	insoluble	x
Clutch and Brake Fluid DOT 3, DOT 4	1.00 - 1.07	soluble	x
Vacuum Pump Oil	0.89 - 0.91	insoluble	x

Reference - Safety Data Sheets included in Appendix
Intended use is identification of and response to Spills not Human Health Risk Assessment refer to section 11.0 of this report

TABLE 2
CONTACT LIST

ROUTE 13 ROCKS LLC
765 State Route 13,
Cortland. NY 13045
Owners:
Christopher Henry
Carol Simon
(607)753-8623

NYSDEC - Region 7
(607)753-3095

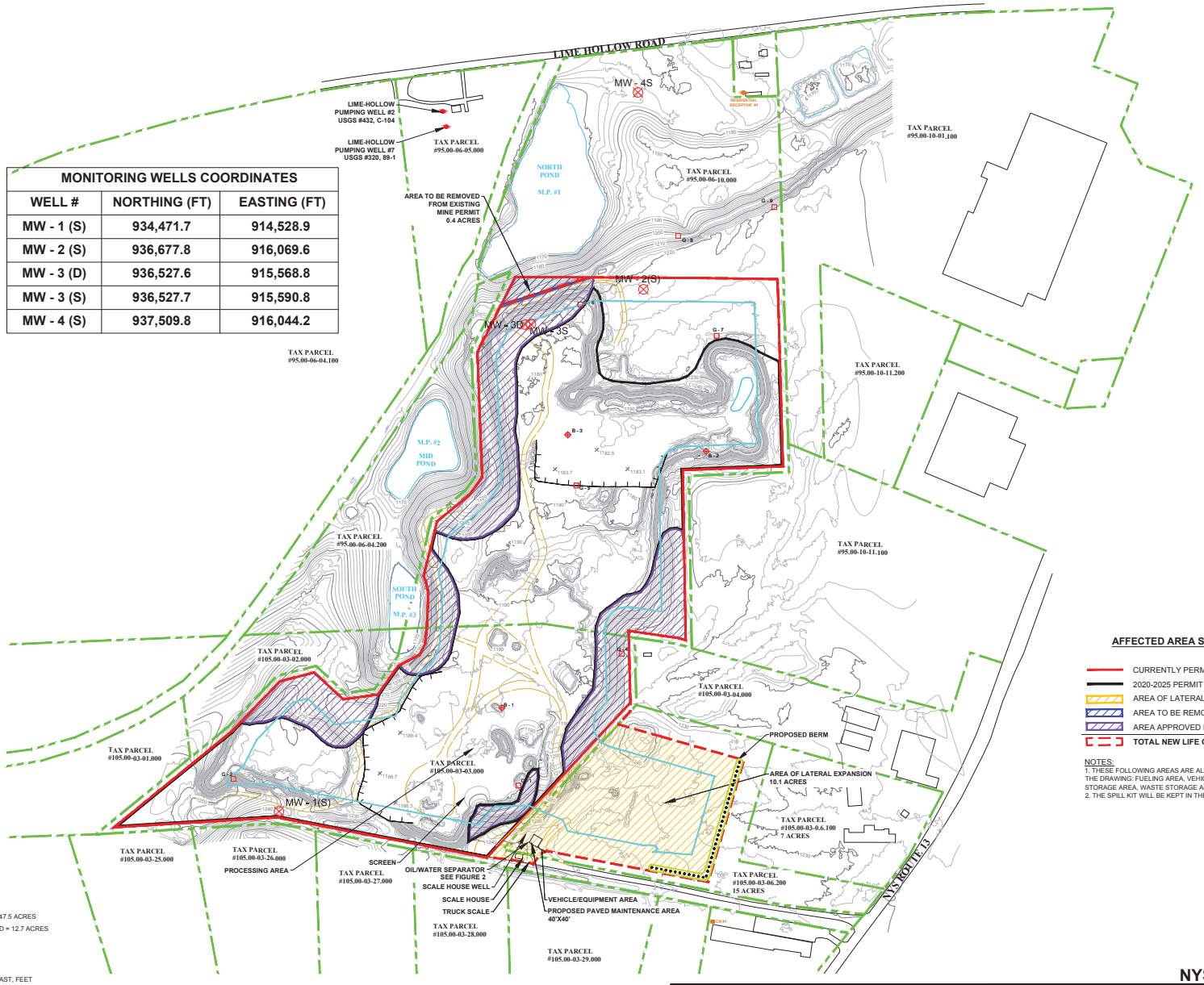
Spill Reporting -
NYSDEC Spills Hotline (24 hrs)
1-800-457-7362

Soil and Water Conservation District – Cortland County
(607)756-5991

Town of Cortlandville – Supervisor
Dick Tupper
(607) 756-6091

Ambulance / Fire department / Police
911

Figures



MONITORING WELLS COORDINATES		
WELL #	NORTHING (FT)	EASTING (FT)
MW - 1 (S)	934,471.7	914,528.9
MW - 2 (S)	936,677.8	916,069.6
MW - 3 (D)	936,527.6	915,568.8
MW - 3 (S)	936,527.7	915,590.8
MW - 4 (S)	937,509.8	916,044.2

AFFECTED AREA SUMMARY:

- CURRENTLY PERMITTED LIFE OF MINE = 66.8 ACRES
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA OF LATERAL EXPANSION = 10.1 ACRES
- AREA TO BE REMOVED FROM EXISTING MINE PERMIT = 0.4 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- **TOTAL NEW LIFE OF MINE = 76.5 ACRES**

NOTES:
1. THESE FOLLOWING AREAS ARE ALL INCLUDED IN THE VECHILE/EQUIPMENT AREA LABELED ON THE DRAWING: FUELING AREA, VEHICLE PARKING AREA, EQUIPMENT STORAGE AREA, FLUID STORAGE AREA, WASTE STORAGE AREA, AND PORTA-JOHN LOCATION.
2. THE SPILL KIT WILL BE KEPT IN THE SCALE HOUSE DURING THE COURSE OF OPERATIONS.

LEGEND
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- LIFE OF MINE BOUNDARY 66.8 Acres
- ACTIVE FACES UPDATED 6/17/2020
- BELOW WATER OPERATIONS BOUNDARY
- ROAD
- MINE/UNPAVED ROAD
- BUILDING/LARGE MISC. OBJECT
- SUBSURFACE BORING
- MONITORING WELL
- TEST PIT
- 2020-2025 PERMIT TERM AFFECTED AREA = 47.5 ACRES
- AREA APPROVED BY NYSDEC AS RECLAIMED = 12.7 ACRES
- ×1190 SPOT SHOT ELEVATIONS

MAP NOTES:
1. CONTOUR INTERVAL = 2'
2. HORIZONTAL DATUM: NAD83 NEW YORK STATE PLANE EAST, FEET
VERTICAL DATUM: NAVD88
3. ALL PROPERTY LINES SHOWN ARE APPROXIMATED AND BASED ON THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER, HISTORIC DRAWINGS (HARRINGTON ASSOCIATES, "REVISED MINING PLAN, CORTLANDVILLE MINING GRAVEL, INC.", 1995) AND THE CORTLAND COUNTY GIS WEBSITE.
4. MINE PLAN INFORMATION WAS TAKEN FROM HISTORIC DRAWINGS REAGAN LAND SURVEYING, "TOPOGRAPHY SURVEY, CORTLANDVILLE MINE HOLDINGS, LLC.", 2014.
5. ALL TAX PARCEL NUMBERS HAVE BEEN TAKEN FROM THE NYSDEC ENVIRONMENTAL RESOURCE MAPPER WEBSITE.
6. CONTOURS CREATED USING PHOTOGRAMMETRIC METHODS BASED ON 01-26-2017 FLIGHT BY H2H ASSOCIATES
7. PLANIMETRICS BASED ON AERIAL PHOTO FROM 01-26-2017 FLIGHT BY H2H ASSOCIATES,LLC.
8. ACTIVE FACE LOCATIONS UPDATED ON 6/17/2020.

SCALE IN FEET
0 100 200 400

N

DATE		REVISIONS RECORD/DESCRIPTION
3/06/18	1	COMMENTS FROM NYSDEC NOIA 11/10/2017
9/24/18	2	SPILL PLAN LABELS & DETAILS
6/27/19	3	HORIZONTAL DATUM CORRECTED IN NOTES & PONDS LABELS ADDED
10/22/20	4	REVISED ACERAGES ON 10/22/2020
04/14/21	5	REVISED LOM BOUNDARY 04/14/2021
	6	

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

NYSDEC MLF# 70436

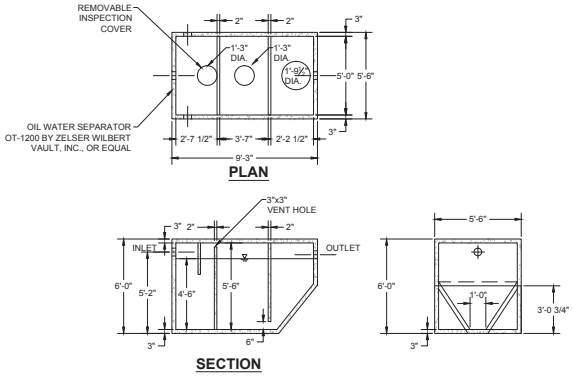
MINE PLAN MAP

TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

H2H GEOSCIENCE ENGINEERING
179 RIVER ST,
TROY, NY 12180
(518) 270-1620
WWW.H2HG-E.COM

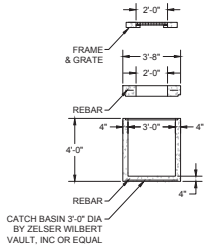
FIGURE 1

SHEET 1 OF 1



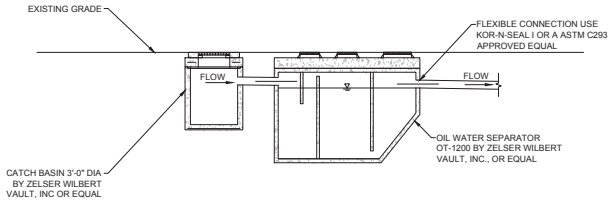
OIL WATER SEPARATOR

TYPICAL DESIGN - FINAL DESIGN TO BE ENGINEERED UPON PROJECT APPROVAL



CATCH BASIN DETAIL

TYPICAL DESIGN - FINAL DESIGN TO BE ENGINEERED UPON PROJECT APPROVAL



TYPICAL OIL WATER SEPARATOR SECTION DETAIL

TYPICAL DESIGN - FINAL DESIGN TO BE ENGINEERED UPON PROJECT APPROVAL

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
	5
	6

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY :	SAS
DESIGN BY :	SAS
CHECK BY :	MJP
PROJ. NO :	360.00
SCALE :	1"=200'
DATE :	03-21-2017

OIL WATER SEPARATOR DETAIL

TOWN OF CORTLANDVILLE — **CORTLANDVILLE SAND & GRAVEL** — CORTLAND COUNTY, NY

H2H GEOSCIENCE ENGINEERING
179 RIVER ST.
TROY, NY 12180
(518) 270-1620
WWW.H2HG-E.COM

FIGURE 2

SHEET 1 OF 1

Appendices

APPENDIX A
FORMS

TRAINING LOG
Spill Prevention and Response Plan

Facility Name: Route 13 Rocks, LLC
Facility Address: 765 State Route 13, Cortland, NY 13045
Instruction: Log is to be filled by the Route 13 Rocks LLC employees and kept on file for at least three years. Upon completion of the training this form must be complete and on file.

DATE	INSTRUCTOR	TOPICS	EMPLOYEE NAME

REVISION LOG
Spill Prevention and Response Plan

Facility Name: Route 13 Rocks, LLC
Facility Address: 765 State Route 13, Cortland, NY 13045
Instruction: Log is to be updated whenever changes are made to the Plan to provide a continuous record of the plan's maintenance and changes.

Date	Spill Plan Section No.	Description including rationale

RELEASE AND SPILL REPORTING FORM
Spill Prevention and Response Plan

Facility Name: Route 13 Rocks, LLC
Facility Address: 765 State Route 13, Cortland, NY 13045
Instruction: Log is to be updated whenever a non-reportable release or a spill occurs onsite. De minimis releases are not to be recorded. This log will provide a continuous record of releases and will be periodically reviewed to confirm the effectiveness of existing BMPs or to help identify improvements.

DATE	LOCATION	MATERIAL including amount	DESCRIPTION including cause and response	REPORTED

APPENDIX B
SAFETY DATA SHEETS

SAFETY DATA SHEET

Section 1. Identification

CHS Inc.
P.O. Box 64089
Mail station 525
St. Paul, MN 55164-0089

Transportation Emergency (CHEMTREC) : **1-800-424-9300**
Technical Information : **1-651-355-8443**
SDS Information : **1-651-355-8445**

Product name : Ä !Ã"Ã#$%&%'Ã()%'

Common name : Ä !Ã"Ã#*+,*--.,/Ã(0/-1ÃÄ !Ã"Ã2*34Ã&0-506Ã#Ã7#89:1ÃÄ !Ã"Ã';Ã &0-506Ã#*/+Ã7#89:1ÃÄ !Ã"Ã)-,6.Ã' ;Ã&0-506Ã#*¼//-Ã7#89<)=9 8/ 9:

Chemical name : A/,6 -/0?Ã#* +,*--.,/

Chemical family : >Ã?*@,06/Ã 5ÃA.6.55*=*ÃÃ*ÃB1ÃÄ4,4/=*B1Ã.=9Ã>6 ?.,*BÃ 2896 B.6E=!

SDS no. : G"HIJKL>G

Revision date : GM<GN"DG

Chemical formula : K*@,06/

Relevant identified uses of the substance or mixture and uses advised against

Ä ,Ã.F.*-.E-/ !

Section 2. Hazards identification

OSHA/HCS status : U4*+Ã?.,/6*.-Ã*+ÃB 9/6/9 Ã4.Y.69 0+ÃEÃ&,4/ÃC&2>Ã2.Y.69ÃR ??0= *B,* =Ã&,.=9. 69Ã7LNÃR(SÃ"N"GG:!

Classification of the substance or mixture : ('>KK>P'%Ã'$Q)$#&Ã JÃR../3 68Ã
R>SR$ÄCT%Ä$R$UVÃJÃR../3 6Ã8
>&A$S>U$CÄÃ2>W>S#ÃJÃR.,/3 6Ã"
>Q)>U$RÃ2>W>S#Ã7>R)U%:ÃJÃR.,/3 6Ã8L
>Q)>U$RÃ2>W>S#Ã7'CÄTJU%SK:ÃJÃ,/3 68ÃL

GHS label elements

Hazard pictograms :



Signal word : #.=3 /6

Hazard statements : (-.??.E-/ Ã-*X0Ã9=9ÃF.D 6!
&0+D/B,/9Ã5ÃB.0+*=3ÃB.=Ã/
K.8 Ã/Ã5.,.-Ã*5Ã+;.-- ;/9Ã.=9Ã/=/6+Ã.*6;.8+!
U @*BÃ, Ã.X0.,*BÃ-*5/Ã;*,4ÃÃ-=+,*=Ã/55/B,+!

Precautionary statements

General : S/.9 Ã-.E/-ÃE/5 6/Ã0+/!ÃÃZ//DÃ 0,Ã 5Ã6/.B4Ã 5ÃÃ4!ÃÃ5/9*B.-Ã.9F*B/Ã*+Ã=//9/9Ã4.F/ÃD6 90B,ÃB =,.*=/6Ã 6Ã -.E/ -Ã.,Ã4.=9!

Prevention : CE,.*=Ã+D/B*-Ã*=+,60B,* =+Ã5E/Ã0+/!ÃÃ# Ã= ,Ã4.=9Ã0=,*-Ã-Ã+.5/,8ÃD6/B.0,*=+Ã4.F/ÃE//=Ã6/.9Ã.=9Ã 0=9/ 6+, 9!ÃÃ)+/ÃD/6+ =.-ÃD6 ,/B,*F/Ã/X0*D?=/,Ã.+Ã6/X0*6/9ÃV .6ÃD6 ,/B,*F/Ã3- F/+!ÃÃ\6Ã/8 /Ã 6Ã5.B/Ã D6 ,/B,* =!ÃÃZDÃ.; .8 Ã56 ?Ã4/.,1Ã4 ,Ã+065.B/+D6]+1Ã D/=Ã5?/+Ã.=9Ã ,4/6Ã*3=*,* =Ã+ 06B/+!ÃÃÄ Ã+?]*=3!)+/Ã/@D-+* = JD6 5Ã/-B,6*B.-1ÃF/=,*-.,*=31Ã-*3Ã,=9Ã.-Ã?,/6*.-J4 .=9-*=3Ã/X0*D?/ =,!ÃÃ+/Ã =-8 Ã= =J+D6]*=3Ã , -+!ÃÃU.]/ÃD6/B.0,* =.68Ã?/.+06/+Ã.3 .*=+,Ã+,.,*BÃ9*+B4/6ÃÃZ//DÃB =,.*=/ 6Ã,*34,ÃB- +/9!ÃÃ>F*9Ã6/-/.+/Ã, Ã ,4/Ã/=F*6 =?/= ,!

Response : R --/ B,Ã+D*--.3ÃÃÃ/@D +/9Ã 6ÃB =B=/9^ÃÃT/,Ã?/9*B.-Ã.,,/=,* =!ÃÃ$&Ã >"C\ %#^ÃÃ3/9*. ,/-8ÃB.--Ã.Ã AC$&CÄÃR%ÀU%SÃ 6ÃB*B*.+ÃÃ# ÃÄCÃ=90B/Ã ?*,*=3!ÃÃ3(ÃÃ&Z$Ã7 6Ã4.*6:^ÃÃU.]/Ã*5Ã9*. ,/-8Ã.--Ã B =,.?*= .,/9ÃB- ,4*=3!ÃÃS*=+/Ã+]*=Ã;*,4Ã;.,/6Ã 6Ã+46!

Storage : &, 6/Ã- B]/9Ã0D!ÃÃ&6/Ã*=Ã.Ã;/-JF/=,*-.,/9ÃD-.B/!ÃÃZDÃB -!

Disposal : #*+D +/Ã 5ÃB =,/=,+Ã.=9ÃB =,=/6Ã*=Ã.BB9.=B/Ã;*,4Ã.--Ã- B1Ã6/3* =.-1Ã=.,* =.Ã.=9Ã*=,/6=,* =. -Ã6/30-,* =+!

Hazards not otherwise classified (HNOC) : Ä =/ Ã]= ;=!

Hazardous Material Information System (U.S.A.) **Health :** L [**Flammability :** L **Physical hazards :** G

National Fire Protection Association (U.S.A.) **Health :** L **Flammability :** L **Instability :** G

Section 3. Composition/information on ingredients

Substance/mixture : K*@,06/

Chemical name : A/,6 -/0?Ã#* +,*--,/

Other means of identification : À !Ã"Ã#*+,*--,/Ã(0/-1ÃÀ !Ã"Ã2*34Ã&0-506Ã#Ã7#89:1ÃÀ !Ã"Ã';Ã&0-506Ã#*+/-Ã7#89:1ÃÀ !Ã"Ã)-,6.Ã' ;Ã&0-506Ã#*/+/ -Ã7#89<)=9 8/ 9:

Ingredient name	%	CAS number
#*+,*--,/+Ã7D/,6 -/0?:1Ã4896 ,6/../9 Ã-*34, Z/6 +*=/ Ã7D/,6 -0?:1Ã4896 9/ +0-506*Y/9 Z/6 +/= / Ä.D4 ,4.-/= /	MGĀJÃ"GG MGĀJÃ"GG MGĀJÃ"GG "ĀJÃO	MH_HJH_J` MH_HJ`"JG `GG`JLGJM N'JLGJI

>=8ÃB =B/=,6.,* =Ã+4 ;=Ã.+Ã.Ã6.=3Ã*+Ã, ÃD6 ,/B,ÃB =5*9/=,8Ã 6Ã*+Ã90/Ã, ÃE.,B4ÃF.6*.,* =!

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : $5Ã?/6*.-ÃB ?/ +Ã*=ÃB =,.B,Ã;*,4Ã,4/Ã+8Ã*??/9*../- 8Ã;.+4Ã,4/Ã/8/+Ã;*,4Ã-.63/Ã.? 0=,+Ã 5Ã;.,/6Ã5 6Ã"OÃ ?*=0,/+1Ã BB.+*=.--8Ã*5,*=3Ã,4/Ã- ;/6Ã9=Ã0DD6Ã-*9+!ÃT/,Ã?/ *B.-Ã.,,/=,* =!

Inhalation : $5ÃD/6+ =ÃE6/..,4/+Ã*63/Ã.? 0 =,+Ã 5Ã?../6*.-1Ã? F/Ã,4/Ã/@D+/9ÃD/6+ =Ã, Ã56/+4Ã.*6Ã.,Ã =BÃ65,4*=3Ã4.+Ã +, DD/9 1ÃD/65 6?Ã.6,*5*B*.-Ã6/+D=6Ã7//DÃ,4/ÃD/6+ =Ã.6?Ã. =9Ã..,Ã6/+,!ÃTÃ?/9*B.-Ã.,,/=,* = Ã.+Ã+ =Ã.+Ã D ++*E/!

Skin contact : $5Ã,Ã?../6*.- ÃB ?/+Ã*=ÃB =,.B,Ã;*,4Ã,4/Ã+]*=1Ã;.+4Ã,4/ÃB =*=?,/9Ã+]*=Ã*,4Ã+ .DÃ.=9Ã,./6ÃD6 ?D,-8 !Ã$5,4/Ã ?../6*.-ÃD/ =/,6.,/+Ã,46 034ÃB- ,4*=3Ã6/? F/Ã,4/ÃB- ,4*=3Ã.=9Ã;. +4Ã,4/Ã+]*=Ã;*,4Ã+ .D.=9Ã;.,/6ÃD6 ?D,-8!Ã$5 *66*,..* =ÃD/+*+,+Ã.5,/6Ã;.+4*=31Ã3/,Ã?/9*Ã..,/=,* =Ã*??/9 *./-8 !

Ingestion : $5Ã?/6*.-Ã4. +ÃE//=Ã+;.. -- ;/ 91Ã9 Ã= ,Ã*=90ÃF?*,*=3!ÃT/,Ã?/9 *B.-Ã.,,/=,* =Ã??/9*../- 8!

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : À Ã]= ; =Ã+*3=*B.=,Ã/55/B,+Ã 6ÃB6*Ã4.Y.69+!

Inhalation : À Ã]= ; =Ã+*3=*B.=,Ã/55/B,+Ã 6ÃB6*Ã4.Y.69+!

Skin contact : À Ã]= ; =Ã+*3=*B.=,Ã/55/B,+Ã 6ÃB6*Ã4.Y.69+!

Ingestion : K.8 Ã=/Ã5.,-Ã*5Ã+;.-- ;/ 9Ã.=9Ã/=,/6+Ã.*6;.8+!

Over-exposure signs/symptoms

Eye contact : >9F/6+/Ã+8? D, ?+Ã?.8 Ã=B-09Ã,4/Ã5 -- ;*=3^ÃD.*=Ã 6Ã*66*,1Ã,=6*=31Ã6/9=/ ++!

Inhalation : >9F/6+/Ã+8? D, ?+Ã?.8 Ã=B-09Ã,4/Ã5 -- ;*=3^ÃÃ6/+D*6.,Ã8.B,Ã66*,..* =1ÃB 04=31

Skin contact : >9F/6+/Ã+8? D, ?+Ã?.8 Ã=B-09Ã,4/Ã5 -- ;*=3^Ã*66*,..* =1Ã6/9=/++!

Ingestion : À Ã]= ; =Ã+*3=*B.=,Ã/55/B,+Ã 6ÃB6*Ã4.Y.69+!

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : U6/.,Ã+8? D, ?.,*B.-- 8!ÃÃR =,.B,ÃD *+ =Ã,6/.,?/=,Ã+D/B*=*+,Ã*??9*. ,/-8Ã*5Ã-.63/ÃX0*=*/+Ã4.F/ÃE//=Ã*=3=,/9Ã 6Ã*=4=/9!

Specific treatments : À Ã+D/B5*BÃ,6/.,?/=,!

Protection of first-aiders : À Ã.B,* =Ã+4.--ÃE/Ã,.]/=Ã*F= -F*=3Ã.=8ÃD/6+ =.-Ã6*+]Ã 6Ã;*,4 Ã,+0*,.EÃ,6.*=*=3ÃÃ?.8ÃE/Ã9.=36 0+Ã, Ã,4/Ã D/6+ =ÃD6 F*9*=3Ã.Ã9, Ã3*F/Ã?0,4J, J? 0 ,4Ã6/+0+B*,.,* =!

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media :)+/Ã968ÃB4/?*B.- 1ÃRC1Ã;.,/6Ã+D6.8Ã75 3:Ã 6Ã5 .?!

Unsuitable extinguishing media : # Ã= ,Ã0+/Ã;.,/6Ãb/,Ã 6Ã;.,/6JE.+/9 Ã5*6/Ã/@,*=30*8+!

Specific hazards arising from the chemical : a.D 6+Ã.6/Ã4/.F*/6Ã,4.=Ã.*6Ã.=9Ã?.8Ã,6.F-Ã.- = 3Ã,4/Ã36 09Ã, ÃÃ+ 06B/Ã 5Ã*3=*,*Ã7D*- ,Ã-*34 4/../61Ã/-/B,6*BÃ? , 6:Ã+ ?/Ã9*+,.=B/Ã.;. 8!ÃÃR =,.*=/6+1Ã960?+/=Ã/?D,8 :ÃB.=Ã/@D9/Ã;4/ =Ã 4/..Ã7;/-9 *=31ÃB0,,*=31Ã/,B!:Ã*+Ã.1DD-*/9

Hazardous thermal decomposition products : #/B ?D +*,* =ÃD6 90B,+Ã?.8=B-09Ã,4/Ã5 -- ;*=3Ã?../6*. -+^
B.6E =Ã9* @*9/
B.6E =Ã? = @*9

Special protective actions for fire-fighters : \ . ,/6Ã?.8 Ã£/Ã*=/55/B,*F/Ã =Ã5-.?/+1ÃE0,Ã+4 0-9ÃE9Ã, Ã]//DÃ5*6/J/@Ã9/9ÃB = ,.*=/6+ÃB -!
\ . ,/6Ã 6Ã5 .?Ã+D6/9Ã*=, ÃB =.*=/6Ã 5Ã4 ,ÃE06=3ÃD6 9B,ÃB 09ÃB.0+Ã56 ,4*=3Ã.=9Ã9=3 /6Ã
5*6/Ã5*34,/6+!Ã'.63/Ã5*6/+1Ã+0B4Ã.+Ã,.=]Ã5*6/+ÃE=Ã6 09Ã;*,4ÃB.0,*=!Ã$DÃ+*E/1ÃD0?DÃ,4/Ã
B =,/=,+Ã56 ?Ã,4/Ã,.=]Ã.=9Ã]//DÃ.9b *=*3Ã+,60B,06/+ÃB -Ã;*;4Ã!Ã>F *9Ã+D6/.9*=3ÃE06=3Ã
-*X09Ã;*,4Ã;.,/6Ã0+/9Ã5 6ÃB -*=3Ã6D0+/+!Ã# Ã= ,Ã5-0+4Ã9ÃD0E*BÃ+/;/6+!Ã>F *9Ã*=4,* =Ã 5Ã
F.D 6+!Ã(*6/5*34,/6+Ã+4 0Ã9/.6Ã+/-5JB =,.*=/9ÃE6/.,4*=3ÃDD.6., 0+!

Special protective equipment for fire-fighters : (*6/J5*34,/6+Ã+4 09Ã;/. 6Ã.DD6 6*.,/ÃD6 ,/B,*F/Ã/X0*?D=,Ã.=9Ã+/-5JB =,.*=/9 ÃE6/.,4*=3Ã.DD6.,0+Ã
7&RP>:Ã;*,4Ã.Ã50--Ã5.B/JDÃ£B/6.,/9 Ã*=ÃD +*,*F/ÃD6/++06/Ã? 9

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Z//DÃ0==/B/++. 6Ã£.=9Ã0=6 .,/B,/9ÃD/6+ ==/-Ã56 ?Ã/=,/6*=3!ÃÃ>9ÃE6/,4*=3ÃD 6Ã 6Ã?*+,!ÃÃA6 9Ã.9/X0. ,/Ã
F/=,*-.,* =!ÃÃ\/.6Ã.DD6 D6*,/Ã6/+D*6., 6Ã;4/=ÃF/=,*-.,* =Ã*+Ã*9/X0 .,/!ÃÃA0,Ã=Ã.DD6D6*.,/ÃD/6+ =. -ÃD6 ,/B,*F/Ã
/X0*D?/=,!

Methods and materials for containment and cleaning up

Spill : R =,.* =Ã;*,4Ã9*]/+Ã 6Ã.E6E/=,Ã,ÃD6/F/=,Ã?*36.,* =Ã, Ã+/;/ 6+=,6/.?+!ÃÃU.]/Ã0DÃ+?.--Ã+D*Ã;*,4Ã9ÃB4/?*B.- Ã
.E+ 6E/=,cÃ-.63/Ã+D*+Ã?.8Ã6/X0*ÃD0?DÃ 6ÃF.B00?ÃD6* 6Ã, ÃE/=,!ÃÃK.8Ã6/X0*6/Ã/@B.,* =Ã 5Ã+/F6/-8Ã
B =,.?*= .,/9Ã+ *-!

Section 7. Handling and storage

Precautions for safe handling

Protective measures : A0,Ã =Ã.DD6 6*.,/ÃD/6+ =. -ÃD6 ,/B,*F/Ã/X0?D=,Ã7+//Ã&/B,* =Ã`:!ÃÃ# Ã= ,Ã3/,Ã*=Ã+Ã 6Ã =Ã+]*=Ã 6ÃB=,3!*
Ã= ,ÃE6/.,4/ ÃF 6Ã 6Ã?*+,!ÃÃ# Ã= ,Ã*=3/+,!ÃÃ)+/ÃÃ=,!8Ã.9/X0 . ,/ÃF/=,*-.,* =!ÃÃ\/.6Ã.DD6 D6*,/Ã6/+D*6., 6Ã
;4/= ÃF=,*-.,* =Ã*+Ã*=.9X0..,/!

Advice on general occupational hygiene : %.,*=31Ã96*=3Ã.=9Ã+?]*=3Ã+4 0-9ÃEÃD6 4*E/9Ã*=Ã.6/+Ã;4/6/Ã,4*+Ã?.,/6*.-Ã*+Ã4.=91Ã+, 6/9Ã.=9Ã
D6 B/++/9!ÃÃ\ 6]/6+Ã+4 0-9Ã;.+4 Ã4.=9+Ã.=9Ã5.B/ÃE/5 6/Ã/.,*=31Ã6*=]*=3Ã.=9Ã+?]*=3!

Conditions for safe storage, including any incompatibilities : # Ã= ,Ã+, 6/Ã.E F/Ã,4/Ã5 -- ; *=3Ã,/?D/6,06/^Ã""IdRÃ7LIOHd(:!ÃÃ9 6 0+Ã.= 9Ã, @*BÃ50?/+Ã?Ã5 6?Ã5Ã,4/Ã
9/B ?D +*,* =Ã 5Ã,4*+ÃD6B9Ã*5Ã6/9Ã.,/Ã/@B/++*F/Ã,/?D/6.,06+Ã5 6Ã/@,/=9/9ÃD/6+Ã 5Ã,*?/!ÃÃ,6/Ã*=Ã
.BB 69. =B/Ã;*,4Ã- B.-Ã6/30-,* =+!ÃÃ&, 6/Ã*=Ã.Ã9Ã6B -Ã.=9Ã;/-JF/=,*-.,/9Ã.6/. 1Ã.;.8 Ã56 ?Ã*=B ?D.,*EÃ
?.,/6*.-+Ã7+// Ã&/B,* =Ã"G:!ÃÃ)+/Ã.DD6D,/ÃB =,.*= ?/=,Ã, Ã.F *9Ã/=F*6 =?/=,.-ÃB =,.?*=.,* = !

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
#*+,*--,/+Ã7D/,6 -/0?:1Ã4896 ,6/.,/9 Ã-*34,	**OSHA PEL (United States).** ÃÃU>^ÃL"IÃDD? ÃÃU>^Ã"LGGÃ3?<?e **ACGIH TLV (United States, 4/2014). Absorbed through skin.** ÃÃU>^ÃLGGÃ?3<?e+Ã, ,.-Ã4896 B.6E=ÃF.D 6:Ã`Ã4 06+!
Z/6 +*=/ Ã7D/,6 -0?:1Ã4896 9/ +0-506*Y/9	**ACGIH TLV (United States, 4/2014). Absorbed through skin.** ÃÃU>^ÃLGGÃ?3<?e+Ã, ,.-Ã4896 B.6E=ÃF.D 6:Ã`Ã4 06+!
Z/6 +/= /	**NIOSH REL (United States, 10/2013).** ÃÃU>^Ã"GGÃ?3<?eÃ"GÃ4 06+! **ACGIH TLV (United States, 4/2014). Absorbed through skin.** ÃÃU>^ÃLGGÃ?3<?e+Ã, ,.-Ã4896 B.6E=ÃF.D 6:Ã`Ã4 06+!
Ã.D4 ,4.-/= /	**ACGIH TLV (United States, 4/2014). Absorbed through skin.** ÃÃU>^ÃOLÃ?3<?eÃ06+! ÃÃU>^Ã"GÃDD?Ã`Ã4 06+! **NIOSH REL (United States, 10/2013).** ÃÃ&U^Ã_OÃ?3<?eÃ"OÃ?*=0,/+! ÃÃ&U^Ã"OÃDD?Ã"OÃ?*=0 ÃÃU>^ÃOGÃ?3<?eÃ"GÃ4 06+! ÃÃU>^Ã"GÃDD?Ã"GÃ4 06+! **OSHA PEL (United States, 2/2013).** ÃÃU>^ÃOGÃ?3<?eÃ06+! ÃÃU>^Ã"GÃDD?Ã`Ã4 06+!

Appropriate engineering controls :)+/Ã =- 8Ã*,4Ã.9/X0 ../ÃF/=,*-.,* =!

Environmental exposure controls : %?*++* =+Ã56 ?ÃF/=,*-.,* =Ã 6Ã]ÃD6 B/++Ã/X0?/= ,Ã+4 0-9ÃEÃ4/B]/9Ã, Ã/=+06Ã,4/8ÃB ?D-8Ã*,4Ã,4/Ã
6/X06/?/=,+Ã 5Ã/=F*6 =?/=,.- ÃD6 ,/B,* =Ã-/3+-.,* =!

Individual protection measures

Hygiene measures : \ . +4Ã4.=9+1Ã5 6/.6?+Ã.=9Ã5.B/Ã,4 634-8Ã.5,/6Ã4.=9-3ÃB4/?*B.-ÃD6 9B,+1ÃE/5 6/Ã/.,*=31Ã+?]*=Ã3=9Ã0+3Ã
,4/Ã-.F., 68 Ã=9Ã.,Ã,4/Ã/=9Ã 5Ã,4/Ã; 6]*=ÃD/6* 9ÃÃ=06/Ã,4.Ã/8/ ;.+4 Ã+,.,* =+Ã.=9Ã+.5/,Ã+4 ;/6+Ã.6/ Ã3- +/Ã
, Ã,4/Ã; 6]+,.,* =Ã- B. ,* =!

Eye/face protection : S/B ??/ =9/9 ^Ã&D-.+4Ã3 33+Ã.=9Ã.Ã5.B/Ã+4*/-91Ã;6/Ã+D-.+4Ã.Y .69Ã/@*+!

Skin protection

Hand protection : HĀJĀ`Ā4 06+Ā7E6/.],Ā84Ā,*?/:^ĀÄ*,6*-/Ā3/+!

Body protection : S/B ??/ =9/9 ^Ā' =3Ā+-//F/9ĀB F/6.--+!

Other skin protection : S/B ??/ =9/9 ^Ā$?D/6F0+ĀE ,+!

Respiratory protection : $5ĀF,*-.,* =Ā*+Ā*=.9Ā0.,/1Ā0+/Ā.ĀÄ$C&2JB/6,*5*/9Ā6G;DĀ;*,4Ā.=Ā 63.=*BĀF.D 6ĀB.6,6*93/ĀĀANOĀD.6,*B/Ā 5*-,/6!

Section 9. Physical and chemical properties

Appearance

Physical state : '*X0*9!ĀfK.8ĀB =,.*=Ā6/9Ā98g

Color : R-/. 6Ā, Ā-*34/Ā8;!

Odor : 2896 B.6E=!

Odor threshold : Ä ,Ā.F.*-.E-/ !

pH : Ä ,Ā.F.*-.E-/ !

Melting point : Ä ,Ā.F.*-.E-/ !

Boiling point : "_"!"" Ā, ĀLN`!``dRĀ7IHGĀ, ĀG(;G

Flash point : R- +/ 9ĀB0D^ĀI`Ā, ĀMMdRĀ7"GG!HĀdĀ"OG fA/=+]8 JK.6,/=+!g

Flammability : Ä ,Ā.F.*-.E-/ !

Lower and upper explosive (flammable) limits : ' ;/ 6^ĀG!_k)DD/ 6^ĀOk

Relative density : G!`L

Evaporation rate : h"Ā7P0,8Ā.B/,.,/ĀiĀ":

Solubility : $=+ -0E/Ā*=Ā,4/Ā5 ;*=3 Ā?.,/6*.-+^ĀB -9Ā;.,/6Ā .=9Ā4 ,Ā;.,/6!

Solubility in water : $=+ -0E/

Partition coefficient: n-octanol/water : Ä ,Ā.F.*-.E-/ !

Auto-ignition temperature : L"GdRĀ7H6d(:

Decomposition temperature : Ä ,Ā.F.*-.E-/ !

SADT : Ä ,Ā.F.*-.E-/ !

Viscosity : Ä ,Ā.F.*-.E-/ !

Vapor pressure : jM!_Ā]A.Ā7jOGĀ??Ā23:Ā7M(t`

Vapor density : h"Āf>*6ĀiĀ"g

Section 10. Stability and reactivity

Reactivity : Ä Ā+D/B5*BĀ,/+9Ā,.Ā6/-. ,/9Ā, Ā6/.B,*F*,8Ā.F.*-.E-/Ā5 6Ā*,+Ā6 90B,Ā 6Ā*,+Ā*=36#9*!

Chemical stability : U4/ĀD6 90B,Ā*+ĀE-,/ !

Possibility of hazardous reactions :)=9/ 6Ā= 6?.-ĀB =9,* =+Ā 5Ā+, 6.3/Ā.9Ā0+/1Ā4.Y.69+Ā6/.B,* =+Ā;*--Ā=,Ā BB06!

Conditions to avoid : >F *9Ā.--ĀD ++*/Ā+ 06B/+Ā 5Ā*3=*,* =Ā7H1Ā.6Ā5-.?/:!ĀĀĀ= , ĀD6/++0Ā*/1ĀB0„1Ā 1ĀE6.Y/1Ā+ -9/61Ā96*--9ĀĀ8Ā*= /@D +/Ā8 =,.*=/ 6+Ā, Ā4/.,Ā 6Ā+ 06B/+Ā 5Ā*3=*ĀĀĀ= ,Ā.-- ; ĀF.D 6Ā, Ā.BB0?0-.,/Ā*=ĀĀ 6ĀB =5*=/9Ā.6/.+!

Incompatible materials : S/.B,*F/Ā 6Ā*=B ?D.,*E-/Ā;*,4Ā,4/Ā5 -;*=3 Ā?.,/6*.-+^Ā&,6 =3Ā@*9*=3Ā.3=,+!

Hazardous decomposition products :)=9/ 6Ā= 6?.-ĀB =9,* =+Ā 5Ā+, 6.3/Ā.9Ā0+/1Ā4.Y.69+Ā9/B ? D +*,* =ĀD6 90B,+Ā+4-9Ā= ,ĀE/ĀD60B/9!

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Z/6 +*=/ Ā7D/,6 -0?:1 4896 9/ +0-506*9/	'#OGĀC6.-	S.,	hOGGĀ?3<]3	J
Z/6 +/= / Ä.D4 ,4.-/= /	'#OGĀC6.- '#OGĀ#/6?.- '#OGĀC6.-	S., S.EE*, S.,	"OĀ3<]3 hLGĀ3<]3 HNGĀ?3<]3	J J J

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Z/6 +*=/ Ā7D/,6 -0?:1 4896 9/ +0-506*9/	&]*=ĀJĀK 9/6.,/Ā*66*,,=	S.EE*,	J	LHĀ4 06+ĀOGGĀ?3	J
Z/6 +*=/ Ā7D/,6 -0?:	&]*=ĀJĀ&/F/6/Ā*66*,.=,	S.EE*,	J	OGGĀ?3	J
	&]*=ĀJĀK 9/6.,/Ā*66*,,=	S.EE*,	J	LHĀ4 06+Ā"GGk	J
	&]*=ĀJĀK 9/6.,/Ā*66*,.=	S.EE*,	J	G!OĀ?'	J
Ä.D4 ,4.-/= /	&]*=ĀJĀK*-9Ā*66*,.=,	S.EE*,	J	HNOĀ?3	J
	&]*=ĀJĀ&/F/6/Ā*66*,.=,	S.EE*,	J	LHĀ4 06+ĀG!GOĀ?'	J

Sensitization

Skin : U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Respiratory : U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Mutagenicity

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
Z/6 +/= / Ä.D4 ,4.-/= /	J J	I LP	J S/.+ =.E-8Ā=,*B*D.,/9Ā, ĀE/Ā.Ā40?.=ĀB.6B=*3/ =!

Reproductive toxicity

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Teratogenicity

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Specific target organ toxicity (single exposure)

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Specific target organ toxicity (repeated exposure)

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Aspiration hazard

Name	Result
#*+,*--,/+Ā7D/,6 -/0?:1Ā48 96 ,6/.,/9 Ā-*34, Z/6 +*=/ Ā7D/,6 -/0?:1Ā48 96 9/ +0-506*Y/9 Z/6 +/= /	>&A$S>U$CÄÄ2>W>S#ĀJĀR.,/3 68Ā" >&A$S>U$CÄÄ2>W>S#ĀJĀR.,/3 68Ā" >&A$S>U$CÄÄ2>W>S#ĀJĀR.,/3 68Ā"

Information on the likely routes of exposure : #/6?.-ĀB = ,.B,!Ā%8ĀB =,.B,!Ā$=4.-.,* =!Ā$3/+,* =!

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
#*+,*--,/+Ā7D/,6 -/0?:1Ā48 96 ,6/.,/9 Ā -*34, Ä.D4 ,4.-/= /	>B0,/Ā'ROGĀLGGĀI3<'Ā(6/+4Ā;.,/6 >B0,/Ā%ROGĀ"MĀI3<'Ā(6/+4Ā;.,/6 >B0,/Ā'ROGĀLOGĀI3<'ĀK.6*=Ā;.,/6 >B0,/Ā'ROGĀLI'ĀI3<'Ā(6/+4Ā;.,/6 R46 =*BĀÄC%RĀG!M_ĀDD?Ā(6/+4Ā;.,/6	(*+4ĀJĀ'/D ?*+Ā?.B6 B4*60+ #.D4 =*.ĀJĀ#.D4*.Ā?.3 =.ĀJĀÄ/ =., / R60+,.B/. =+ĀJĀA.-./? = /,/+ĀD03* (*+4ĀJĀK/-.= ,./ =*.Ā5-0F*.,*-*ĀÄ6F./ (*+4ĀJĀC=B 6=B40+Ā]*+,B4	HĀ9.8+ H`Ā4 06+ H`Ā4 06+ NMĀ4 0+ HG9Ā8 +

Persistence and degradability

U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Ä.D4 ,4.-/= /	I !H	IM!OĀ, Ā"M`	- ;

Mobility in soil

Soil/water partition coefficient (K_{OC}) : U4/6/Ā*+Ā= Ā9.,.Ā.F.*-E-/!

Other adverse effects : Ä Ā]= ; =Ā+*3=*B.=,Ā/55/B,+Ā 6ĀB6*Ā,4.Y.69+!

Section 13. Disposal considerations

Disposal methods : #*+D +.-Ā 5Ā,4*+ĀD6 90B,1Ā+ -0Ā.=9Ā.=8ĀE8JD6 90B,+Ā+4 0-9BĀ?D-8Ā;*,4Ā,4/Ā6/X0*6?//=,+Ā 5Ā/=F*6 =?/=,.-Ā D6 ,/B,* =Ā.=9Ā;.+,/Ā9*+D +.-Ā-/3*+-.,* =Ā.=9Ā.=8Ā6/3* =-Ā- B.-Ā0,4 6*,8Ā6/X0*6/?/ =,+!

Section 14. Transport information

DOT IDENTIFICATION NUMBER	)Ä"L M`	**DOT proper shipping name**	A%USC'%)KĀ#$&U$'>U%&1ĀÀ!C!&!Ā7Z/6 +*=/Ā7D/6 -/0?:1 4896 9/ +0-506*Y/9 1ĀÀ.D4,4.-/=/ :!ĀK.6*=/ĀD 0-,.=,Ā 7Z/6 +/= /:ĀSQĀ7Ä.D4,4.-/=/:
DOT Hazard Class(es)	I	**PG**	$$$
DOT EMER. RESPONSE GUIDE NO.	"L`		

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) PAIR**^ĀÄ.D4,4.-/=/
TSCA 8(a) CDR Exempt/Partial exemption^ĀÄ ,Ā9/,/6?*=/9
United States inventory (TSCA 8b)^Ā>--ĀB ?D =/=,+Ā.6/Ā-*+,/9Ā 6Ā/@/?/9!
Clean Water Act (CWA) 307^ĀÄ.D4,4.-/=/
Clean Water Act (CWA) 311^ĀÄ.D4,4.-/=/

Clean Air Act Section 602 Class I Substances : Ä ,Ā-*+,/9
Clean Air Act Section 602 Class II Substances : Ä ,Ā-*+,/9
DEA List I Chemicals (Precursor Chemicals) : Ä ,Ā-*+,/9
DEA List II Chemicals (Essential Chemicals) : Ä ,Ā-*+,/9
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : '*+,/9

SARA 302/304

Composition/information on ingredients

Ä ĀD6 90B,+Ā;/6/Ā5 0=9!

SARA 304 RQ : Ä ,Ā.DD-B.E-/!

SARA 311/312

Hazard classifications : (*6/Ā4.Y.69
#/-. 8/9Ā7B46 =B:Ā4/.-,4Ā4.Y.69

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
#*+,*--,/+Ā7D/,6 -/0?:1Ā4896 ,6/.,/9 Ā-*34, Z/6 +*=/ Ā7D/,6 -/0?:1Ā4896 9/ +0-506*Y/9 Z/6 +/= / Ä.D4 ,4.-/= /	MGĀJĀ"GG MGĀJĀ"GG MGĀJĀ"GG " ĀJĀO	V/+! V/+! V/+! V/+!	Ä ! Ä ! Ä ! Ä !	Ä ! Ä ! Ä ! Ä !	Ä ! Ä ! Ä ! V/+!	Ä ! Ä ! Ä ! V/+!

SARA 313 : U4*+ĀD6 90B,Ā79+<= ,:ĀB =,.*=Ā, @*BĀB4/?*B.Ā+0Eb/B,Ā,4Ā6/D 6,*=3Ā6/X6?/=,+Ā 5Ā&>S>Ā&/B,* =ĀI"IĀ 5Ā ,4/Ā%?/63/=B8ĀA-.==*3Ā.=9ĀR??0=*,8 Ā S*34,JU JZ= ;Ā>B,Ā 5Ā"N`M=Ā9Ā 5ĀHGĀR(SĀI_L!

Product name	CAS number	%
Ä.D4 ,4.-/= /	N"JLGJI	GĀJĀI

&>S>ĀI"IĀ= ,*5*B.,* =+Ā?0+,Ā= ,ĀE/Ā9/,.B4/9Ā56 ?Ā4/Ā&#&Ā.=9Ā.=8Ā D8*=3Ā.=9Ā6/9*+,6*E0=Ā 5Ā,4/Ā&#&Ā+4.--Ā*=9ĀB D8*=3Ā=9Ā6/9*+,6*E0=Ā 5Ā ,4/Ā= ,*B/Ā.,,.B4/9 Ā, ĀB D*/+Ā 5Ā,4/Ā&#&Ā+0E+/X,08Ā6/9*+,60E/9 !

State regulations

Massachusetts : U4/Ā5 -- ;*=3ĀB ?D =/=,+Ā.6/Ā-*+,/9ĀZ/6 +/=/cĀÄ.D4,4.-/= /
New York : U4/Ā5 -- ;*=3ĀB ?D =/=,+Ā.6/Ā-*+,/9ĀÄ.D4,4.-/=/
New Jersey : U4/Ā5 -- ;*=3ĀB ?D =/=,+Ā.6/Ā-*+,/9ĀZ/6 +/=/cĀÄ.D4,4.-/= /
Pennsylvania : U4/Ā5 -- ;*=3ĀB ?D =/=,+Ā.6/Ā-*+,/9ĀZ/6 +/=/cĀÄ.D4,4.-/= /
California Prop. 65 : **WARNING:**ĀU4*+ĀD6 90B,ĀB =,.*=+Ā.ĀB4/?*B.Ā]= ;= Ā, Ā,4/Ā&,/Ā 5ĀR.-*5 6=*.Ā, ĀB.0+/ĀB.=B/6!

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Ä.D4 ,4.-/= /	V/+!	Ä !	V/+!	Ä !

Section 16. Other information

Revision date	:	GM<GN<"DG	**Supersedes**	:	""<"O<LGI
Revised Section(s)	:	""1ĀL1Ā"M!	**Prepared by**	:	ZKZĀS/30-. , 68Ā&/6F*B/+ĀB!

Ä ,*B/Ā, Ā6.9/6

U2%ĀÄ(CSK >U$CÄĀRCÄU>$Ä%#Ā$Ä2%&Ā&#&ĀS%'>U%&ĀÄ'V ĀUCĀU2%Ā&A%R$RĀK>U%S$>'Ā%ÄU$($%#ĀU#C%&ĀÄCUĀCa%SĀ)&%ĀC(ĀU2>ĀK>U%S$>'ĀÄĀRCKP$Ä>U$CÄĀ\ $U2Ā>ÄVĀCU2%SĀ
K>U%S$>'ĀCSĀ$ÄĀ>ÄVĀA>SU$ >SĀASCR%&&!ĀĀĀRCKA'$>ÄR%Ā\ $U2ĀLNĀR$S! ĀN"G!"LGG73:R2&Ā2>&ĀAS%A>S%#Ā2$&Ā&#&ĀĀĀ&%TK%ÄU&1ĀU2 ĀU2%ĀU%ÄUĀ2>UĀU2C&%Ā&%TK%ÄU&Ā%Ā
S%>#ĀUCT%U2 %SĀ>&Ā>Ā2 C'%Ā\ $U2 C)UĀU%mU)>'ĀCK$&&$CÄ&ĀCSĀ>'U%S>U$CÄ&!ĀĀR2&ĀP%%a%&Ā2%Ā$Ä(CSK>U$CÄĀRCÄU>$Ä%#Ā2%S%$ÄĀ$Ā2%Ā>RR)S>U%Ā)UĀK>Z%&ĀÄCĀ
S%AS%&%ÄU>U$CÄ1Ā)>S>Ä U%%ĀCSĀ\>SS>Ä UV1Ā%mS%&&ĀCSĀA'%#1ĀPC)UĀU2%Ā>RR)S>RV1Ā%'$>P$'$UV1ĀCSĀCK A'%U%Ä%&&Ā(ĀU2%ĀÄ(CSK >U$CÄĀCSĀ>PC)UĀU2%Ā($UÄ%&&ĀCĀ
RCÄU%ÄU&Ā2%S%$ÄĀ(CSĀ2%$UĀT%Ä%S>'ĀCSĀA>SU$R)'>SĀA)SAC&%&!ĀA%S&CÄ&ĀS%a$%$ÄTĀU2$&Ā&#&Ā2C)'# ĀK>Z%ĀU2%$SĀCÄĀ#%U%SK$Ä>U$CÄĀ>&ĀCĀU2%ĀK>U%S$>'n&Ā
&)$U>P$$UVĀ>Ä#ĀRCKA'%U%Ä%&&(ĀCSĀ)&%Ā$ÄĀ2%$SĀA>SU$R)'>S Ā>AA'$ R>U$CÄ&!

OUR ENERGY COMES THROUGH.®

A BRAND OF CHS

SAFETY DATA SHEET

Section 1. Identification

CHS Inc.
P.O. Box 64089
Mail station 525
St. Paul, MN 55164-0089

Transportation Emergency (CHEMTREC) : **1-800-424-9300**
Technical Information : **1-651-355-8443**
SDS Information : **1-651-355-8445**

Product name : Ä !"#"$ %Ã&'$( )()ÃÄ !"$*'(Ã+*,#Ã-,# '"$
Common name : Ä !"#"$ %Ã#, '" $Ã.$(')!
Chemical name : 9*:#,Ã1(,2"$(34Ã;*!,*$$,(
Chemical family : /*0()Ã1(,2"$(34Ã56) 2"7 28"'

SDS no. : ?@AB/DE?
Revision date : ?AF?DF@?H
Chemical formula : /*0,32(

Relevant identified uses of the substance or mixture and uses advised against

<",Ã = *$ 8$(>

Section 2. Hazards identification

OSHA/HCS status : Q#*!Ã4 ,(2* $Ã*!Ã7""!)(2() Ã# \ 2)" 3!Ã86Ã,#(ÃOL5EÃ5 \ 2)ÃM"443' *7 ,*"'ÃL, ') 2)ÃTGDÃMIPÃ@?@@??U>

Classification of the substance or mixture : I9E//E.9-Ã9JK&J;LÃ CÃM ,(:"26Ã@
LNJ<ÃMOPPOLJG<FJPPJQEJO<ÃOMÃ,(:" 26ÃG
L-PJO&LÃ-R-Ã;E/EÀ-F ÃR-ÃJPPJQEQJO<ÃOMÃ,(:" 26ÃG
À-P/ÃM-99Ã/&QEÀ-<JMJQ RÃCÃM ,(:"2Ã@.
MEPMJ<OÀ-<JMJQRÃCÃM ,(:"ÃE
QOSJMÃQÃP-1PO;&MQJO<ÃT&'8"2'Ã7#*$)JÃCÃM ,(:"Ã6
L1-MJIJMÃQEPÀ-Q ÃOPÀE<ÃQSJMJQRÃTP-1-EQ; Ã-S1 OL&P-UÃCÃM ,(:"26Ã@
EL1JPEQJO<Ã5EVEP;ÃCÃM ,(:"26Ã@
EK&EQJMÃEVEP;ÃT9O<ÀCQ-P/UÃOMÃ,(:" 26ÃW

GHS label elements

Hazard pictograms :



Signal word : ; ': (2

Hazard statements : -0,2(4($6 ĀX$ 44 8$(Ā$3*)Ā ')Ā= Z"2>
M 3!(! Ā!(2*"3!Ā(6(Ā*22*, ,*">
M 3!(! Ā![*'Ā*22*, ,*">
/ 6 Ā7 3!(Ā:(' (,*7Ā)(X(7,!>
/ 6 Ā7 3!(Ā7 '7(2>
L3!Z(7,() ĀXĀ) 4 :*': Ā,#(Ā3'8"2' Ā7#*$)>
/ 6 Ā8(ĀX , $Ā*XĀ!+ $$")Ā(')Ā(' ,(2!Ā *2+ 6!>
M 3!(! Ā) 4 :(Ā,"Ā"2: '!Ā,#2"3:# ĀZ2"$"' : ()Ā"2Ā2(Z ,()Ā(0Z " !32(>
5 24X3$Ā,"Ā Y3,*7Ā$*X(Ā+*,#Ā$"!:Ā$ĀXX(7,!>

Precautionary statements

General : P( ) Ā$ 8(Ā8(X"2(Ā3!(>ĀĀN((ZĀ"3,Ā"XĀ2(7#Ā"XZĀ(7#Ā$ĀX()* 7 $Ā)=*7(Ā*!Ā'(()()]Ā# =(ĀZ2")37,Ā7"', *'(2Ā"2Ā $ 8($Ā ,Ā# ')>

Prevention : O8, *'Ā!Z(7* $Ā*'!,237,*"'!Ā8(X2(Ā3!(>ĀĀ;"Ā"',Ā# ')$ (Ā3',*$Ā $Ā X(,6 ĀZ2(7 3,*"!Ā# =(Ā8((ĀÀ2( ) Ā ')Ā 3')(2!,"")>ĀĀ&!(ĀZ(2!"' $ĀZ2",(7,*=(Ā(Y3*Z4(,Ā !Ā2(Y3*2()>ĀĀ(^ 2ĀZ2",(7,*=(Ā:$"=(!>ĀĀ(^2Ā(6(Ā"2ĀX 7(Ā Z2",(7,*"' >ĀĀ(ĀZĀ + 6 ĀX2"4Ā#(,]Ā#",Ā!32X 7(!]Ā 2[!]Ā"Z(' ĀXĀ$!Ā ')Ā",#(2Ā*: ' *,*"' Ā!"327(!>ĀĀ<"Ā!4"[*':> &!(Ā(0Z$"!*"' CZ2"'"XĀ($(2*7 $]Ā=(',*$,*':]Ā$*:#,*Ā ')Ā $ $Ā4,(2* $C#)$ *':Ā(Y 3*Z4(' ,>ĀĀ(Ā"'$6 Ā""C!Z 2[*':Ā ,""$!>ĀĀQ [(ĀZ2(7 3,*" 26Ā4(!32(!Ā : *'!,Ā!, ,*7Ā)*!7# 2: (>ĀĀ(ZĀ7"', *'(2Ā,*:#,$Ā$"!()>ĀĀE"=)Ā2($(!(Ā,"Ā ,#(Ā('=*2"'4(' ,>Ā;"Ā"',Ā82(,#(Ā=Z"2>ĀĀ;"Ā"',Ā(,]Ā)2*'[Ā"2Ā4"[(Ā+#('Ā3!*': Ā,#*!ĀZ2")37,>ĀĀ#Ā# ') !Ā ,#"2"3: #$6Ā X,(2Ā# ')$*'>

Response : À(,Ā4()*7 $Ā ,,(',*"' Ā*X"3Ā6X(($Ā3+($$>ĀĀ(0Z'!( )Ā"2Ā7"'7(2 ()_ĀĀÀ(,Ā()*7 $Ā ,,(',*"'>ĀĀJIĀ^ E99O^ - ;_ J44()* ,($6 Ā7 $$Ā Ā1OJ<ZĀM-<Q-PĀ"2ĀZ#67* ' >Ā;"Ā<OQĀ*')37(Ā="4*,*':>ĀĀJIĀO<ĀLN<ĀT"2Ā# *2U_ĀĀQ [(Ā"XXĀ *44()* ,($6Ā $$Ā7"', 4*' ,()Ā7$",#*' :>ĀĀP*'!(Ā![*'Ā+*,#Ā+ ,(2Ā2Ā!#"+(2>ĀIĀO<ĀLNJ<_Ā !#Ā+*,#ĀZ$(6Ā"XĀ !" ZĀ ')Ā+ ,(2>ĀĀQ [(Ā"XX"', 4*' ,() Ā7$",#*':>ĀĀJXĀ![*'Ā*22Ā"7732!_ĀĀÀ(Ā4()*7 $Ā ,,(',*" '>ĀĀJIĀ<Ā-R-L_ P*'!(Ā7 3,*"3!$6Ā+*,#Ā+ ,(2ĀX"2Ā!(=(2 $Ā4*'3,(!>ĀĀP(4"=(Ā7"', Ā$('!(!]Ā*XĀZ2(!('(,Ā ')Ā(!6 Ā,"Ā)">ĀM"',*'3(Ā 2*'!*' :>ĀĀXĀ(6Ā*22*, ,*"'ĀZ2(*!,!_ĀĀ(,Ā4()*7 $Ā ,,(',*"'>

Storage : L,"2(Ā$"7[()Ā3Z>ĀĀ;2(Ā*'Ā Ā+($$=(',*$,()ĀZ$ 7(>ĀĀ(ZĀ7"' $>

Disposal : ;*!Z" !(Ā"XĀ7"',(',!Ā ')Ā7"', * '(2Ā*'Ā 77"2) '7(Ā+*,#Ā $$Ā$]Ā2:*"" $]Ā' ,*"" $ Ā ')Ā*',(2' ,*"" $Ā2(:3$*""!>

Hazards not otherwise classified (HNOC) : <"'(Ā['"+'>

Hazardous Material Information System (U.S.A.) **Health :** G ` **Flammability :** B **Physical hazards :** ?

National Fire Protection Association (U.S.A.) **Health :** G **Flammability :** B **Instability :** ?

Section 3. Composition/information on ingredients

Substance/mixture : /*0,32(

Chemical name : 9*:#,Ā1(,2"$(34Ā;*!,*$$,(

Other means of identification : À !"#"$ %Ā#,'" $Ā.$(')!

Ingredient name	%	CAS number
À !"$*' (]Ā' ,32 $ Q"$3(' (-,#6 $ĀE$7"#"$.('\(' (@]G]BCQ2*4(,$#6(' \('(-,#6 $8(' \('(	A?ĀCĀ@?? @?ĀCĀW? HĀCĀ@? HĀCĀ@? @ĀCĀH @ĀCĀH	a??ACA@CD @?aCaCW ABC@D b@CBD@/ DHCA@A @??CB@CB

E'6 Ā7"'7(',2 ,*"" Ā!#"+'Ā !Ā Ā2 ': (Ā*!Ā,"ĀZ2",(7,Ā7"'X*)(',* *$6Ā"2Ā*!Ā)3(Ā,"Ā8 ,7#Ā= 2* ,*"">

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : JXĀ4(2* $Ā7"4(!Ā*'Ā7"', 7,Ā+*,#Ā,#(Ā(6!]Ā*44()* ,($ 6Ā+ !#Ā,#(Ā(6(!Ā+*,#Ā$ 2:(Ā 4"3',!Ā"XĀ+ ,(2ĀX"2Ā@HĀ 4*'3,(!]Ā"77 !*" ' $$6Ā$*X,*':Ā,#(Ā$"+(2Ā)Ā3ZZ(2Ā$*)!>ĀÄ(,Ā)4*7 $Ā ,,(',*"">

Inhalation : JXĀZ(2!"'Ā82(,#(!Ā*'Ā$ 2:(Ā 4"3 ',!Ā"XĀ4 ,(2* $]Ā4"=(Ā#(Ā(0Z"! ()ĀZ(2!" 'Ā,"ĀX2(!#Ā *2Ā ,Ā"'7(>ĀĀ8X(,#*': Ā# !Ā !,"ZZ()]ĀZ(2X"24Ā 2,*X*7* $Ā2(!Z*2Ā)Ā'((ZĀ,#(ĀZ(2!"' Ā+ 24Ā ')Ā ,Ā2(!,>ĀÄ(,Ā4()*7 $Ā ,,(',*"" Ā !Ā!"'"Ā !Ā Z"!!*8 $(>

Skin contact : JXĀ(Ā4 ,(2* $ Ā7"4(!Ā*'Ā7"', 7,Ā+*,#Ā,#(Ā![*']Ā+ !#Ā,#(Ā7"', 4 * ,()Ā![*' Ā+*,#Ā!" ZĀ ') Ā+ ,(2ĀZ2"4Z,$6>ĀĀX(Ā 4 ,(2* $ĀZ('(,2 ,(!Ā,#2"3: #Ā7$",#*':]Ā2(4"=(Ā,#(Ā7$",#*'Ā ')Ā+ !#Ā,#(Ā![*'Ā+*,#Ā!" ZĀ ')Ā+ ,(2ĀZ2"4Z ,$6>ĀĀX *22*, ,*"'ĀZ2!*!,!Ā X,(2Ā+ !#*':]Ā:(,Ā4()*7 $Ā ,,(',*"'Ā*44() *,($6>

Ingestion : JXĀ4(2* $Ā# !Ā8(('Ā!+ $$"+()]Ā)"Ā'",Ā*')37(Ā=4*,*':>ĀÄ(,Ā4() *7 $Ā ,,(',*"" Ā44()* ,($ 6>

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : M 3!(! Ā!(2*"3!Ā(6(Ā*22*, ,*">

Inhalation : <"Ā["'+ 'Ā!*:'* X7 ',Ā(XX(7,!Ā"2Ā7Z*$Ā# \ 2)!>

Skin contact : M 3!(! Ā![*'Ā*22*, ,*">

Ingestion : / 6 Ā8(ĀX , $Ā*XĀ!+ $$"+Ā(')Ā(' ,(2!Ā *2+ 6!>ĀĀ2*, ,*':Ā,"Ā4"3,#]Ā,#2" ,Ā ')Ā!,"4 7#>

Over-exposure signs/symptoms

Eye contact : E)=(2!(Ā!6 4 Z,"4!Ā4 6 Ā'7$3)(Ā,#(ĀX"$$"+*_'ĀZ *'Ā"2Ā*22*, ,]Ā+ ,(2*':]Ā2()'(!!>

Inhalation : E)=(2!(Ā!6 4 Z,"4!Ā4 6 Ā'7$3)(Ā,#(ĀX"$$"+*_'ĀĀ2(!Z*2 ,"2Ā6,2 7,Ā22*, ,*"']Ā7"3:#*': >

Skin contact : E)=(2!(Ā!6 4 Z,"4!Ā4 6 Ā'7$3)(Ā,#(ĀX"$$"+*_'Ā*22*, ,*"']Ā2()'(!!>

Ingestion : <"Ā["'+ 'Ā!*:'* X7 ',Ā(XX(7,!Ā"2Ā7Z*$Ā# \ 2)!>

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Q2(,Ā!64 Z,"4 ,*7 $$6>ĀĀM"', 7,ĀZ"*!"'Ā,2(,4(',Ā!Z(7* $*!,Ā*44()* ,($6Ā*XĀ$ 2:(ĀY3',*(!Ā# =(Ā8(('Ā*': (!,()Ā "2Ā*'# $()>

Specific treatments : <"Ā!Z(7*X7Ā,2(,4(',>

Protection of first-aiders : <"Ā 7,*"'Ā!# $$Ā8(Ā, [('Ā*="$=*':Ā '6 ĀZ(2!"' $Ā2*![Ā"2Ā+*,#Ā3*, 8$Ā,2 *'*': >ĀĀ*!Ā!3!Z(7,()Ā,# ,ĀX34(!Ā 2(Ā!,*$$ĀZ2(!(,)Ā#(Ā2(!73(2Ā!#"3$)Ā+(2Ā 'Ā ZZ2'Z2* ,(Ā4 ![Ā "2Ā!($XC7"', *'()Ā82(,#*' :Ā ZZ 2,3!>ĀĀ4 6Ā 8(Ā) ' :(2"3 ! Ā,"Ā#(ĀZ(2!"'ĀZ2"=*)*': Ā *)Ā,"Ā:*=(Ā4"3,#C,"C4"3,#Ā2(!3!7*, ,*"' >ĀĀ'#Ā7"', 4*' ,()Ā7$",#*' :Ā ,#"2"3: #$6Ā+*,#Ā+ ,(2Ā8(X"2(Ā2(4"=*'Ā,]Ā2Ā+(2Ā:$'=(!>

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : &!(Ā)26Ā7#(4*7 $]ĀMQ]Ā+ ,(2Ā!Z2 6ĀTX":UĀ"2ĀX" 4>

Unsuitable extinguishing media : ;"Ā'",Ā3!(Ā+ ,(2Āc(,Ā"2Ā+ ,(2C8 !() ĀX*2(Ā(0,*':3*!#2!>

Specific hazards arising from the chemical : 5*:# $6Ā="$,*$(Ā4 ,(2* $>ĀI$"+*':Ā: !"$*'(Ā7 'Ā8(Ā:'*,() Ā86Ā($XC:('(2 ,()Ā!, ,*7Ā($(7,2*7*,%b 7"', *' (2!Ā!#"3$)Ā8(Ā8"')()Ā ')Ā:2"3')()>Ād Z" 2!Ā4 6Ā,2 +$Ā $" : Ā,#(Ā:2"3') Ā,"Ā Ā!"327(Ā"XĀ *-'* ,*"ĀTZ*$Ā$*:#,]Ā#(,(2]Ā($(7,2*7Ā4","2UĀ!"4(Ā)*!, '7Ā+ 6 >ĀM"', *'(2!]Ā)234!ĀT(='(Ā(4Z,6 UĀ7 'Ā (0Z$")(Ā+#(' Ā#(,ĀT+($)':]Ā73,,*':]Ā(,7>UĀ*!Ā ZZ$*()

Hazardous thermal decomposition products : ;(7"4Z " !*,*"' ĀZ2")37,!Ā4 6Ā'7$3)(Ā,#(ĀX"$$"+Ā4 ,(2* $!_ 7 28"' Ā)*"0*)(7 28"' Ā4"'"0*) (

Special protective actions for fire-fighters : ^ ,(2Ā4 6Ā8(Ā*'(XX(7,*=(Ā"'ĀX$ 4(!]Ā83,Ā!#"3$)Ā8(!()Ā,"Ā[((ZĀ X*2(C(0Z)Ā7"' , *'(2!Ā7"' $> 9 2:(ĀX*2(!]Ā!37#Ā !Ā, '[Ā2(!]Ā!#"3$)Ā8(ĀX"3:#,Ā+*,#Ā7 3',*'ĀJZ"Ā!*8 $]ĀZ34ZĀ,#(Ā7"',(' ,!Ā2"4Ā ,#(Ā, '[Ā ')Ā[((ZĀ)c"*'*':Ā!,237,32(!Ā7""$Ā ')ĀZ2",(7,ĀZ(2!"' ($>ĀE="*')Ā!Z2( )*':Ā832"' :Ā$*Y3)Ā +*,#Ā+ ,(2Ā3!() ĀX"2Ā7""$*':ĀZ3'!(!>Ā;"Ā'",ĀX$3!#Ā)"+'ĀZ38$*7Ā+(2!>ĀQ#(Ā3!(Ā"XĀ Ā!($XC 7"', *' ()Ā82(,#*':Ā Z Z 2 ,3!Ā ') ĀZ2",(7,*=(Ā7$",#*':Ā*!Ā2(4"4 (')( )ĀX"2ĀX*2(ĀX*:#,(2!>ĀE= *'# $,*"' ĀXĀ=Z"2!>

Special protective equipment for fire-fighters : I*2(CX*:#,(2!Ā!#"3$)Ā+(2Ā ZZ2"Z2* ,(ĀZ2",(7,*=(Ā(Y3*Z(,Ā ')Ā !($XC7"', *'() Ā82(,#*': Ā ZZ 2,3!Ā TLM.EUĀ+*,#Ā ĀX3$$ĀX 7(ĀZ(7(() Ā*'ĀZ"!*,*=(ĀZ2(!!32(Ā4")(>

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : N((ZĀ3' '(7(!! 26Ā ')Ā3'Z 2",(7,()ĀZ(2!" "($ ĀX2"4Ā(',(2*':>ĀĀE"=)Ā82(,#*': Ā=Z"2Ā"2Ā4*!,>ĀĀ12')(Ā) (Y3 ,(Ā =(',*$,*"'>ĀĀ^(2Ā ZZ2"Z2*,(Ā2(!Z*2 ,"2Ā+#(Ā=(',*$,*"'Ā*!Ā*)(Y3 ,(>ĀĀ13,"ĀĀ ZZ2"Z2* ,(ĀZ(2!"' $ĀZ2",(7,*=(Ā (Y3*Z4(',>

Methods and materials for containment and cleaning up

Spill : M"', * 'Ā+*,#Ā)*[(!Ā"2Ā 8"28(' ,Ā",ĀZ2(=(',Ā4*:2 ,*"'Ā,"Ā!(+(2!#,2(4!>ĀĀQ [(Ā3ZĀ!4 $$Ā!Z3$$Ā+*,#ĀĀ2(4*7 $ Ā 8!"28 (',%Ā$ 2:(Ā!Z$$Ā4 6Ā2(Y3*2(34ZĀ"2Ā= 7334ĀZ2*"2Ā,"Ā"28(',>ĀĀ/ 6 Ā2(Y3*2(Ā(07= ,*"'Ā"XĀ!(=(2($6Ā 7"', 4*' ,()Ā!"*$>

Section 7. Handling and storage

Precautions for safe handling

Protective measures : 13,Ā"'Ā ZZ2"Z2* ,(ĀZ(2!"' $ĀZ2",(7,*=(Ā(Y3*Z,ĀT!((ĀL(7,*"'Āa U>ĀĀ;"Ā'",Ā:(,Ā*'Ā(5Ā"2Ā"'Ā![*'Ā"2Ā7$",#*> ;"Ā'",Ā82(,#(Ā=Z"2Ā"2Ā4*!,>ĀĀ;"Ā'",Ā*':(!,>ĀĀ&!(Ā"'$6+*,#Ā)(Y3 ,(Ā=(',*$,*"'>ĀĀ^(2Ā ZZ2"Z2* ,(Ā2(!Z*2 ,"2Ā +#(' Ā+',*$,*" 'Ā*!Ā*')(Y3 ,(>

Advice on general occupational hygiene : - ,*':]Ā)2*'[* ':Ā ') Ā!4"[*':Ā!#" 3$)Ā8ĀZ2"#*8()Ā*'Ā 2(!Ā+#(2(Ā,#*!Ā4 ,(2* $Ā*!Ā# '$()]Ā!,"2()Ā ') Ā Z2"7(!!( )>ĀĀ*2[(2!Ā!#"3 $)Ā+ !#Ā# ')Ā ')ĀX 7(Ā8(X"2(Ā(,*':]Ā)2*'[*' :Ā ')Ā!4"[* ':>

Conditions for safe storage, including any incompatibilities : ;"Ā'",Ā!,"2(Ā 8"=(Ā,#(ĀX"$$"+*':Ā,(4Z(2,32(_Ā@@WeMĀ>ĒeWĀ)"2"3!Ā ')Ā,"0*7ĀX34(!Ā4 6ĀX"24ZĀX,#(Ā)(7"4Z " !*,*"'Ā"XĀ,#*!ĀZ23'7,Ā*XĀ2()Ā ,Ā(07(!!*=(Ā,(4Z(2 ,32 (! ĀX"2Ā(0,(')()ĀZ(2*)!Ā"XĀ,*4(>ĀĀ,12(Ā*'Ā 77"2) ' 7(Ā+*,#Ā$"'Ā2(:3$,*"'!>ĀĀL,"2(Ā*'Ā Ā)2Ā7"'"$Ā ')Ā+($C=(',*$,()Ā 2( ]Ā + 6 ĀX2"4Ā*'7"4Z ,*8Ā 4 ,(2* $!ĀT!((Ā(7,*"'Ā@?U>ĀĀ&!(Ā ZZ2"Z(Ā7"', *' 4(',Ā,"Ā =" *)Ā('=*2"'4(', $Ā7"' , 4*' ,*"' >

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Ā !"$*' (]Ā' ,32 $	**OSHA PEL 1989 (United States, 3/1989).** ĀĀLQ9_Ā@H??Ā4:F4fĀ@HĀ4*'3,(!> ĀĀLQ9_ĀH??ĀZZ4Ā@HĀ4*' ĀĀ^QE_ĀD??Ā4:F4fĀaĀ#"32!> ĀĀ^QE_ĀW??ĀZZ4ĀaĀ#"32!>
Q"$3(' (	**NIOSH REL (United States, 10/2013).** ĀĀLQ9_ĀHA?Ā4:F4fĀ@HĀ4*'3,(!> ĀĀLQ9_Ā@H?ĀZZ4Ā@HĀ4*' ĀĀ^QE_ĀWbHĀ4:F4fĀ@?Ā#"32!> ĀĀ^QE_Ā@??ĀZZ4Ā@?Ā#"3 **OSHA PEL Z2 (United States, 2/2013).** ĀĀE/1ĀH??ĀZZ4Ā@?Ā3,(!> ĀĀM-J9W?ĀZZ4 ĀĀ^QE_ĀG??ĀZZ4ĀaĀ#"32!> **ACGIH TLV (United States, 4/2014).** ĀĀ^QE_ĀG?ĀZZ4ĀaĀ#"32!>
-,#6 $ĀE$7"#"$	**ACGIH TLV (United States, 6/2013).** ĀĀLQ9_Ā@???ĀZZ4ĀĀ@H3,(!> **NIOSH REL (United States, 4/2013).**

	ĀĀQE_Ā@D??Ā4:F4fĀ@?Ā#"32!> ĀĀQE_Ā@???ĀZZ4Ā@32Ā#" **OSHA PEL (United States, 2/2013).** ĀĀQE_Ā@D??Ā4:F4fĀaĀ#"32!> ĀĀQE_Ā@???ĀZZ4ĀaĀ#"3
.('\(' (	**ACGIH TLV (United States, 4/2014). Absorbed through skin.** ĀĀLQ9_ĀaĀ4:F4fĀHĀ4*'3,(!> ĀĀLQ9_ĀG>HĀZZ4Ā@HĀ4*'3,(!> ĀĀQE_Ā@>AĀ4:FaĀĀ#"32!> ĀĀQE_Ā?>HĀZZ4ĀaĀ#"32!> **NIOSH REL (United States, 10/2013).** ĀĀLQ9_Ā@ĀZZ4Ā@HĀ4*'3,(!> ĀĀQE_Ā?>@ĀZZ4Ā@?Ā#"32!> **OSHA PEL (United States, 2/2013).** ĀĀLQ9_ĀHĀZZ4Ā@HĀ4*'3,(!> ĀĀQE_Ā@ĀZZ4ĀaĀ#"32!> **OSHA PEL Z2 (United States, 2/2013).** ĀĀE/1_ĀH?ĀZZ4Ā@?Ā4;'(!> ĀĀM-J9GĀĀZZ4 ĀĀQE_Ā@?ĀZZ4ĀaĀ#"32!>
@]G]BCQ2*4(,$#6(' \('(	**ACGIH TLV (United States, 4/2014).** ĀĀQE_Ā@GWĀ4:F4fĀaĀ#"32!> ĀĀQE_ĀGHĀZZ4ĀaĀ#"32!> **NIOSH REL (United States, 10/2013).** ĀĀQE_Ā@GHĀ4:F4fĀ@?Ā#"32!> ĀĀQE_ĀGHĀZZ4Ā@?Ā#"32!> **OSHA PEL 1989 (United States, 3/1989).** ĀĀQE_ĀGHĀZZ4ĀaĀ#"32!> ĀĀQE_Ā@GHĀ4:F4fĀaĀ#"32!>
-,# 6$8(' \('(	**ACGIH TLV (United States, 4/2014).** ĀĀQE_ĀG?ĀZZ4ĀaĀ#"32!> **NIOSH REL (United States, 10/2013).** ĀĀLQ9_ĀHBHĀ4:F4fĀ@HĀ4*'3,(!> ĀĀLQ9_Ā@GHĀZZ4Ā@3HĀ4*' ĀĀQE_ĀBWHĀ4:F4fĀ@?Ā#"32!> ĀĀQE_Ā@??ĀZZ4Ā@2Ā#"3 **OSHA PEL (United States, 2/2013).** ĀĀQE_ĀBWHĀ4:F4fĀaĀ#"32!> ĀĀQE_Ā@??ĀZZ4ĀaĀ#"32!>

Appropriate engineering controls : &!(Ā'"$ 6Ā+*,#Ā)(Y3 ,(Ā=(',*$,*"'>

Environmental exposure controls : -4*!!*"'!ĀX2"4Ā=(',*$,*"'Ā"2Ā+" 2[ĀZ2"7(!!Ā(Y3*Z4(' ,Ā!#"3$)Ā8(Ā7#(7[()Ā,"Ā('!3 2(Ā,#(6Ā7"4Z$6Ā+*,#Ā,#(Ā 2(Y32(4(',!Ā"XĀ('=*2"'4(', $ ĀZ2",(7,*"'Ā$(:!$,*"' >

Individual protection measures

Hygiene measures : ^ !#Ā# ')!]ĀX"2(24!Ā ')ĀX 7(Ā,#"2"3 :#$6Ā X,(2Ā# ')$*'Ā7#(4*7 $ĀZ2")3,!]Ā8(X"2(Ā(,*':]Ā!4"[*': Ā ')Ā3!*' :Ā ,#(Ā$ = ,"26Ā')Ā ,Ā,#(Ā(')Ā"XĀ,#(Ā+"2[*': ĀZ(2*"')>ĀĀ32(Ā,# , Ā(6(+ !# Ā!, ,*"'!Ā ')Ā! X(,6 Ā!#"+(2!Ā 2(Ā7$"!(Ā ,"Ā,#(Ā+"2[!, ,*"'Ā$"7 ,*"'>

Eye/face protection : P(7"44(')() _ĀLZ$!#Ā:":: $(!Ā ') Ā ĀX 7(Ā!#*($)]Ā+#2((Ā!Z$!#Ā# \ 2)Ā(0*1 ,!>

Skin protection

Hand protection : BĀCĀaĀ#"32!ĀT82([,#2Ā,*4(U_Ā<*,2*$('Ā($>

Body protection : P(7"44(')() _Ā9"':Ā!$((=()Ā7"=(2 $$!>

Other skin protection : P(7"44(')() _ĀJ4Z(2"3!Ā8"" ,!>

Respiratory protection : JXĀ;*$,*" 'Ā*!Ā*')(Y3 ,(]Ā3!(Ā Ā<JOL5C7(2,*X*()Ā2(!Z,"2Ā+*,#Ā 'Ā"2: ' *7Ā= Z"2Ā7 2,2*):(Ā) Ā1DHĀZ 2,*73(Ā X*$,(2>

Section 9. Physical and chemical properties

Appearance

Physical state	:	9*Y3')>	**Relative density**	: ?>AaĀ,"Ā?>ba
Color	:	P()) *!#Ā:"$)('Ā82" +'>	**Evaporation rate**	: L$"+(2>
Odor	:	Ā !"$*' (	**Solubility**	: J'!"$38 $(Ā*'Ā,#(ĀX"$$" Ā ,(2* $!_Ā7"$)Ā+ ,(2Ā ')Ā#" ,Ā+ ,(2>
Odor threshold	:	@?ĀZZ4	**Solubility in water**	: <(:$ *:*8$(>
pH	:	<",Ā = *$ 8$(>	**Partition coefficient: n-octanol/water**	: <",Ā = *$ 8$(>
Melting point	:	<",Ā = *$ 8$(>	**Auto-ignition temperature**	: GHb>GĀG'ĀBHB>BBeMĀTBDHĀ,)'ĀaH?
Boiling point	:	GA>AAeMĀTBDH?	**Decomposition temperature**	: <",Ā = *$ 8$(>
Flash point	:	M$"!( ) Ā73Z_ĀCBHeMĀTCBDeIUĀg'2(;'([[>h	**SADT**	: <",Ā = *$ 8$(>
			Viscosity	: <",Ā = *$ 8$(>

Flammability	:	<",Ā = *$ 8$(>		
Lower and upper explosive (flammable) limits	:	9"+(2_Ā@>Bj &ZZ(2_Āb>Aj	**Vapor pressure**	: HW>WĀ[1 ĀTB??Ā44Ā5:UĀJTAa
			Vapor density	: WĀ,"ĀBĀgE@ĀiĀ

Section 10. Stability and reactivity

Reactivity : <"Ā!Z(7*X7Ā,(!,Ā , Ā2($,()Ā,"Ā2(7,*=*,ĀĀ = *$ 8$(ĀX"2Ā!ĀZ2") 37,Ā"2Ā*,!Ā*':2()*(!>

Chemical stability : Q#(ĀZ2")37,Ā*!Ā!8$(>

Possibility of hazardous reactions : &')(2Ā'"24 $Ā7"') *,*""!Ā"XĀ!,"2 :(Ā ')Ā3!(]Ā# \ 2) "3!Ā2(7,*" '! Ā+*$$Ā"7732>

Conditions to avoid : E="*)Ā $$ĀZ"!!*8(Ā!"327(!Ā"XĀ*:'*,*""ĀT!Z2[Ā"2ĀX$ 4(U*>ĀW"Ā, ĀZ2(!!32\(]Ā73,]Ā+($)]Ā82 \(]Ā!"$)(2]Ā)2*$$]Ā;2Ā"2Ā (0Z"!(Ā7"', *'(2!Ā,"Ā#(,Ā"2Ā!"327(!Ā"XĀ*:'*,*>Ā;W"',Ā $$" + Ā= Z"2Ā,"Ā 77343$,(Ā*'Ā$Ā"2Ā7"'X*'()Ā 2(!>

Incompatible materials : P(7,*=(Ā"2Ā*"7"4Z ,*8$(Ā+*,#Ā,#(ĀX*$$"Ā4 ,(2* $!_Ā"0*)**' :Ā4 ,(2* $!]Ā 7*)!Ā ')Ā $[$*!>

Hazardous decomposition products : &')(2Ā'"24 $Ā7"') *,*""!Ā"XĀ!,"2 :(Ā ')Ā3!(]Ā# \ 2) "3!Ā)(7" 4 Z"!* ,*"' ĀZ2")37,!Ā!#"3$)Ā'",Ā8(ĀZ2"}37()>

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Q"$3(' (	9MH?ĀJ'# $,*"' Ād Z"2	P ,	BDĀ:F4f	BĀ#"32!
	9;H? ĀO2 $	P ,	AWAĀ4:F[:	C
-,#6 $ĀE$7"#"$	9MH?ĀJ'# $,*"' Ād Z"2	P ,	@GB1?Ā4:F4f	BĀ#"32!
	9;H? ĀO2 $	P ,	bĀ:F[:	C
.('\(' (	9;H? ĀO2 $	P ,	DW?Ā4:F[:	C
@]G]BCQ2*4(;#6(' \('(	9MH?ĀJ'# $,*"' Ād Z"2	P ,	@a??Ā4:F4f	BĀ#"321
	9;H? ĀO2 $	P ,	HĀ:F[:	C
-,#6 $8(' \('(	9;H? Ā;(24 $	P 88 *,	kH???Ā4:F[:	C
	9;H? ĀO2 $	P ,	WH?Ā4:F[:	C

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Ä !"$*' (]Ā' ,32 $	-6 (!ĀCĀ/*$)Ā*22*, ',	534 '	C	aĀ#"321Ā@?ĀZZ4	C
	-6 (!ĀCĀ/")(2 ,(Ā*22*, ' ,	/ '	C	@Ā#"321ĀHĀZZ4	C
Q"$3(' (	- 6(!ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	?>HĀ4*'3,(!Ā@?Ā 4:	C
	L[*'ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	GBĀ#"21ĀG?Ā4:	C
	-6 (!ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	ab?Āl:	C
	-6 (!ĀCĀL(=(2(Ā*22*, ',	P 88 *,	C	GBĀ#"21ĀGĀ4:	C
	L[*'ĀCĀ/*$)Ā*22*, ',	1*:	C	GBĀ#"21ĀGH?Āl9	C
	L[*'ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	BWHĀ4:	C
	L[*'ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	H??Ā4:	C
-,#6 $ĀE$7"#"$	-6 (!ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	@??Āl9	C
	L[*'ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	GBĀ#"21ĀG?Ā4:	C
	-6 (!ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	GBĀ#"21ĀH??Ā4:	C
	-6 (!ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	?>?AAAAAbĀ 4*'3,(!Ā@??Ā4:	C
	-6 (!ĀCĀL(=(2(Ā*22*, ',	P 88 *,	C	H??Ā4:	C
	L[*'ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	B??Ā4:	C
.('\(' (	- 6(!ĀCĀ/")(2 ,(Ā*22*, ',	P 88 *,	C	aaĀ4:	C
	L[*'ĀCĀ/")(2 ,(Ā*22*, ' ,	P 88 *,	C	GBĀ#"21ĀG?Ā4:	C
	-6 (!ĀCĀL(=(2(Ā*22*, ',	P 88 *,	C	GBĀ#"21ĀGĀ4:	C
	L[*'ĀCĀ/*$)Ā*22*, ',	P ,	C	aĀ#"321ĀAĀl9	C
	L[*'ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	GBĀ#"21Ā@HĀ4:	C
-,#6 $8(' \('(	-6 (!ĀCĀL(=(2(Ā*22*, ',	P 88 *,	C	H??Ā4:	C
	L[*'ĀCĀ/*$)Ā*22*, ',	P 88 *,	C	GBĀ#"21Ā@HĀ4:	C

Sensitization

Skin : Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Respiratory : Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Mutagenicity

Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
Ä !"$*' (]Ā' ,32 $ Q"$3(' (.('\(' (-,#6 $8(' \('(	C C m C	G W @ G	C C N'"+' Ā,"Ā8(Ā Ā#34 'Ā7 27*":(' > C

Reproductive toxicity

Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Teratogenicity

Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Q"$3(' (@]G]BCQ2*4(,#6(' \('(	M ,(:" 26ĀW M ,(:" 26ĀW	<",Ā ZZ$7 8$(> <",Ā ZZ$7 8$(>	< 27",*7Ā(XX(7,! P(!Z* 2 ,"26Ā,2 7Ā22*, ,*""

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Q"$3(' (.('\(' (	M ,(:" 26ĀG M ,(:" 26Ā@	<",Ā)(,(24*'( ) <",Ā)(,(24*'( )	<",Ā)(,(24*'( ) <",Ā)(,(24*'( )

Aspiration hazard

Name	Result
Ä !"$*' (]Ā' ,32 $ Q"$3(' (.('\(' (	EL1JPEQJD<Ā5EVEP;ĀCĀM ,(:"26Ā@ EL1JPEQJD<Ā5EVEP;ĀCĀM ,(:"26Ā@ EL1JPEQJD<Ā5EVEP;ĀCĀM ,(:"26Ā@

Information on the likely routes of exposure : ;(24 $Ā7'" , 7,>Ā6 (Ā7'", 7,>ĀJ'# $,*" >Ā(!,*" '>

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Ä !"$*' (]Ā' ,32 $	E73,(Ā-MH?Ā@b>HĀ4:F9Ā/ 2Ā'+ ,(2	M23!, 7('!ĀCĀE2,(4* Ā!Z>ĀC3ĀZ$**	BaĀ#"32
	E73,(Ā-MH?Ā@>HĀ4:F9Ā/ 2Ā'+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : ' ĀCĀ<('" , (	BaĀ#"32
Q"$3(' (	E73,(Ā-MH?ĀBWĀZZ4Ā/ 2*'(Ā+ ,(2	E$: (ĀCĀL[($(,"'(4 Ā7"!, ,34	DAĀ#"32
	E73,(Ā-MH?Ā@3?ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	bGĀ#"32
	E73,(Ā-MH?Ā@@?ĀI:F9ĀI2(!#Ā+ ,(2	M23!, 7(' !ĀCĀĀ 44 23!Ā Z!(3) "$*4' (3!ĀCĀE)3$,	BaĀ#"32
	E73,(Ā-MH?ĀA??ĀI:F9ĀI2(!#Ā+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : ' ĀCĀn3=('*$(Ā TI$():$*':]Ā5 ,7#$*' :]Ā^ ('$ *':U	BaĀ#"32
	E73,(Ā9MH?ĀH?HĀI:F9ĀI2(!#Ā+ ,(2	I*!#ĀCĀO'7"2#67#3!Ā[*!3,7#ĀCĀ3	DAĀ#"32
	M#2"' *7Ā<O-MĀH???ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	DAĀ#"32
	M#2"' *7Ā<O-MĀ@???ĀI:F9ĀI2(!#Ā+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : '	G@Ā) 6
-,#6 $ĀE$7"#"$	E73,(Ā-MH?Ā@b>@Ā4:F9Ā/ 2*'(Ā+ ,(2	E$: (ĀCĀ&ĀĀZ(2,3!	DAĀ#"32
	E73,(Ā-MH?ĀG??ĀI:F9ĀI2(!#Ā+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : '	BaĀ#"32
	E73,(Ā9MH?ĀGH?ĀI:F9Ā/ 2*'(Ā+ ,(2	M23!, 7('!ĀCĀE2,(4* ĀX2 '7*!7 ĀC 9 2= (	BaĀ#"32
	E73,(Ā9MH?ĀB?C?ĀI:F9ĀI2(!#Ā+ ,(2	I *!#ĀCĀO'7"2#67#3!Ā46[*!!	BĀ) 6!
	M#2"' *7Ā<O-MĀB>DDHĀ4:F9Ā/ 2Ā'+ ,(2	E$: (ĀCĀ&ĀĀZ(2,3!	DAĀ#"32
	M#2"' *7Ā<O-MĀ?>WbHĀ3$F9ĀI2(!#Ā+ ,(2	I*!#ĀCĀĀ 483!* Ā#"$2""[* ĀC9Ā2= (	@GĀ+((
.('\(' (	E73,(Ā-MH?ĀGD??ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	bGĀ#"32
	E73,(Ā-MH?Ā@W??ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀL7('()(!43!Ā 8 3') ' !	DAĀ#"32
	E73,(Ā-MH?ĀDG?ĀI:F9ĀI2(!#Ā+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : ' ĀCĀ<('" , (	BaĀ#"32
	E73,(Ā9MH?ĀG@?ĀI:F9Ā/ 2*' (Ā+ ,(2	M23!, 7('!ĀCĀE2,(4* Ā! $*' ĀĀ< 3Z$**	BaĀ#"32
	E73,(Ā9MH?ĀH>ĀĀ3$F9ĀI2(!#Ā+ ,(2	I *!#ĀCĀO'7"2#67#3!Ā:" 233!7# ĀCĀ26	DAĀ#"32
	M#2"' *7Ā<O-MĀ@>HĀ,"ĀH>BĀ3$F9Ā/ 2*'(Ā+ ,(2	I*!#ĀCĀ/"2'"(Ā! 0 ,*$* !ĀCĀn3*=$(Ā TI$():$*':]Ā5 ,7#$*' :]Ā^ ('$ *':U	BĀ+(([!
@]G]BCQ2*4(,#6(' \('(	E73,(Ā9MH?ĀB@?ĀI:F9Ā/ 2*'(Ā+ ,(2	M23!, 7(' !ĀCĀ-$!4"Z3!ĀZ(7,('* 723!ĀC E)3$,	BaĀ#"32
	E73,(Ā9MH?ĀG>BĀ4:F9ĀI2(!#Ā+ ,(2	I*!#ĀCĀQ*$ Z* Ā'"$$	DAĀ#"32
-,#6 $8(' \('(	E73,(Ā-MH?ĀBA??ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	bGĀ#"32
	E73,(Ā-MH?ĀWA?ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	DAĀ#"32
	E73,(Ā-MH?ĀGD?ĀI:F9ĀI2(!#Ā+ ,(2	; Z# '* ĀCĀ; Z#' * Ā4 : ' ĀCĀ<('" , (	BaĀ#"32
	E73,(Ā9MH?ĀH?C?ĀI:F9Ā/ 2*'(Ā+ ,(2	M23!, 7(' !ĀCĀE4(2*7 46*!Ā8 #*	BaĀ#"32
	E73,(Ā9MH?ĀB?C?ĀI:F9ĀI2(!#Ā+ ,(2	I*!#ĀCĀO'7"2#67#3!Ā46[*!!	DAĀ#"32
	M#2"' *7Ā<O-MĀ@???ĀI:F9ĀI2(!#Ā+ ,(2	E$: (ĀCĀ1!(3)"[*27#'(2*($$Ā!387 Z*, ,	DAĀ#"32

Persistence and degradability

Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Ä !"$*' (]Ā' ,32 $	C	@?Ā,"ĀGH??	#*:#
Q"$3(' (	G>bW	D?	$"+
-,#6 $ĀE$7"#"$	C?>WG	C	$"+
.('\(' (	G>@W	@@	$"+
@]G]BCQ2*4(,#6 \('(	W>AW	GBW	$"+
-,#6 $8(' \('(	W>A	C	$"+

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Q#(2(Ā*!Ā'"Ā) , Ā = *$ 8$(>

Other adverse effects : <"Ā['"+ 'Ā!*:'* X7 ',Ā(XX(7,!Ā"2Ā7*2*$Ā# \ 2)!>

Section 13. Disposal considerations

Disposal methods : ;*!Z" ! $Ā"XĀ,#*!ĀZ2")37,]Ā!"$3,!Ā ')Ā '6 Ā86CZ2")37,!Ā!#"3$)Ā7"4Z$6Ā+*,#Ā,#(Ā2(Y3*2(,!Ā"XĀ('=*2'"4(', $Ā Z2",(7,*'" Ā ')Ā+ !,(Ā)*!Z " ! $Ā$(*!$,*'"Ā ') Ā '6 Ā2(:*'" $Ā$"7$Ā3,#"2*,6Ā2(Y3*2(4(' ,!>

Section 14. Transport information

DOT IDENTIFICATION NUMBER &<@G?W

DOT proper shipping name ÀELO9J<-ĀTÄ !"$*'( ]Ā' ,32 $]ĀQ"$3('(U>Ā/ 2*'(ĀZ"$3, ',Ā TÄ !"$*'( ]Ā' ,32 $UĀPKĀT.('\('(]ĀQ"$3('(U

DOT Hazard Class(es) W

PG J

DOT EMER. RESPONSE GUIDE NO. @Ga

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**_Ā<",Ā)(,(24*'()
United States inventory (TSCA 8b)_ĀE$$Ā7"4Z'"(,!Ā 2(Ā$*!,()Ā"2Ā(0(4Z,()>
Clean Water Act (CWA) 307_ĀQ"$3('(%Ā.('\('(%Ā-,#6 $3(' \('(
Clean Water Act (CWA) 311_ĀQ"$3('(%Ā.('\('(%Ā-,#6 $3(' \('(

Clean Air Act Section 602 Class I Substances : <",Ā$*!,()

Clean Air Act Section 602 Class II Substances : <",Ā$*!,()

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : 9*!,()

DEA List I Chemicals (Precursor Chemicals) : <",Ā$*!,()

DEA List II Chemicals (Essential Chemicals) : 9*!,()

SARA 302/304

Composition/information on ingredients

<"ĀZ2")37,!Ā+(2(ĀX"3')>

SARA 304 RQ : <",Ā ZZ$7 8$(>

SARA 311/312

Hazard classifications : I*2(Ā# \ 2)
J44()* ,(ĀT 73,(UĀ#($,#Ā# \ 2)
;($ 6()ĀT7#2"'*7UĀ#(,$Ā# \ 2)

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Ä !"$*' (]Ā' ,32 $	A?ĀCĀ@??	<">	<">	<">	<">	R(!>
Q"$3(' (	@?ĀCĀW?	R(!>	<">	<">	R(!>	R(!>
-,#6 $ĀE$7"#"$	HĀCĀ@?	R(!>	<">	<">	R(!>	<">
.('\(' (	HĀCĀ@?	R(!>	<">	<">	R(!>	R(!>
@]G]BCQ2*4(,#6 \('(	@ĀCĀH	R(!>	<">	<">	R(!>	<">
-,#6 $8(' \('(	@ĀCĀH	R(!>	<">	<">	R(!>	R(!>

SARA 313 : Q#*!ĀZ2")37,ĀT)"(F'",UĀ7'", *'Ā,"0*7Ā7#(4*7 $Ā!38c(7,Ā,"#(Ā2(Z"2,*':Ā2(Y32(4(',!Ā"XĀLEPEĀL(7,*'"ĀW@WĀ"XĀ ,#(Ā-4(2:('76 Ā1$ "*' :Ā ')ĀM" 443'*,6 Ā*:#,CQ"CN'"+ĀE7,Ā"XĀ@Da)ĀXĀB?ĀMIPĀWbG>

Product name	CAS number	%
Q"$3(' (S6$('(.('\(' (@]G]BCQ2*4(,#6 $8(' \('(-,#6 $8(' \('(	@?aCaCW @WWZG?Cb b@CBDG DHCAOA @??C@BCB	&ZĀ,"Ā@H &ZĀ,"ĀG? &ZĀ,"ĀH &ZĀ,"ĀH &ZĀ,"ĀH

LEPEĀW@WĀ'",*X*7ĀĀ43!,Ā'",Ā8(Ā)(, 7#() ĀX2"4ĀĀ(ĀL;LĀ ')Ā ' 6Ā"Z6*':Ā ')Ā2()*!,2*83*'"Ā"XĀ,#(ĀL;LĀ!# $$Ā*'7ĀĀ7"Z6*':Ā ') Ā2()*!,2*83*'"Ā"XĀ ,#(Ā'",*7(Ā ,, 7#() Ā,"Ā7"Z*(!Ā"XĀ,#(ĀL;LĀ!38!(Y3(,$6Ā2()*!,2*8,() >

State regulations

Massachusetts : Q#(ĀX"$$'"+Ā7"4Z" ' (',!Ā 2(Ā$*!,() _ĀĀ"$* '(]Ā' ,32 $%ĀQ"$3(%Ā-,#6ĀE$7"#'"%Ā.('\('(%Ā@]G] BCQ2*4(,#6 $8(' \('(%Ā-,#6 $8(' \('(

New York : Q#(ĀX"$$'"+Ā7"4Z" ' (',!Ā 2(Ā$*!,() _Ā"$3('(%Ā.('\(' (%Ā-,#6 $8(' \('(

New Jersey : Q#(ĀX"$$'"+Ā7"4Z" ' (',!Ā 2(Ā$*!,() _ĀĀ"$* '(]Ā' ,32 $%ĀQ"$3(%Ā-,#6ĀE$7"#'"%Ā.('\('(%Ā@]G] BCQ2*4(,#6 $8(' \('(%Ā-,#6 $8(' \('(

Pennsylvania : Q#(ĀX"$$'"+Ā7"4Z" ' (',!Ā 2(Ā$*!,() _Ā"$3('(%Ā-,#6ĀE$7"#'"%Ā.('\('(%Ā@]G]BCQ2*4(,#6 $8(' \('(%Ā-,#6 $8(' \('(

California Prop. 65 : **WARNING:** ĀQ#*!ĀZ2"]ĀĀ7"' *'!Ā Ā7#(4*7 $Ā["'+' Ā,"Ā,#(ĀL,(Ā"XĀM $*X*2Ā,"Ā7 3!(Ā7 '7(2Ā ') Ā8*2,#Ā)(X(7,!Ā"2Ā",#(2Ā2(Z2"]Ā7,*=(Ā# 24>

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Q"$3(' (.('\(' (-,#6 $8(' \('(	<"> R(!> R(!>	R(!> R(!> <">	<"> A>BĀI:F) 6ĀT*':(!,*'" U @WĀI:F) 6ĀT*'# $,*'"U B@ĀI:F) 6ĀT*':(!,*'" U HBĀI:F) 6ĀT*'# $,*'"U	b???ĀI:F) 6 ĀT*':(!,*'" U @W??ĀI:F) 6 ĀT*'# $,*'"U GBĀI:F) 6 ĀT*':(!,*'" U BDĀI:F) 6 ĀT*'# $,*'"U <">

Section 16. Other information

Revision date : ?AF?DF@@H

Revised Section(s) : @]ĀG]Ā@A>

Supersedes : @@F@H@VV?

Prepared by : N/NĀP(:3$,"26ĀL(2=*7(!ĀJ7>

<",*7(Ā,"Ā2( )(2
Q5-ĀJ<IOP/ EQJO<ĀMO<QEJ<-;ĀJ<Ā5JLĀL;LĀP-9EQ-LĀ O<9RĀOĀG-ĀL1-MJ IJMĀ/EQ-PJE9ĀJ -<QJIJ-;>Ā ĀQĀ O-LĀ<OQĀMOd-PĀ&L-ĀOIĀQ5EQĀ/EQ-PJE 9ĀdĀMO/.J<EQJO<Ā^ JG5ĀE<RĀOG-PĀ / EQ-PJE9ĀOPĀJ<ĀE<RĀ1EPQ&9EPĀ1POM-LL>ĀĀ<ĀMO/19JE<M-Ā^ JG5ĀGDĀM>PĀD@@G??T:WĀLĀ5ELĀ1P-1EP-; ĀGJLĀL;LĀJ<ĀL-Ā/-<QL]Ā^ JG5ĀQ5-ĀdQ-<QĀG5EQĀGOL-ĀL-Ā/-< QLĀ-Ā P-E;ĀQOĀ-Q 5-PĀELĀEĀ 5O9-Ā^ JG5O&QĀQSQ&E9ĀO/JLLJO<LĀOPĀE9Q-PEQJO<L>ĀM5LĀ.-9J-d-LĀQ 5-ĀJ<IOP/ EQJO<ĀMO<QEJ<-;Ā5-P-J<ĀQOĀ-ĀEMM&P EQ-]Ā&QĀ/ EN-LĀ<OĀ P-1P-L-< QEQJO<]Ā&EPE< Q--] ĀOPĀ'EPPE< QR]Ā-S1P-LLĀOPĀJ 19J-;]Ā E.O &QĀG-ĀEMM&PEMR]ĀP-9JE.J9JQR]ĀOPĀO/ 19-Q-<-LLĀ OIĀQ5-ĀJ<IOP/ EQJO<ĀOPĀE.O&QĀ5-ĀIJ Q<-LLĀO I Ā MO<Q-<QLĀ5-P-J<ĀIOPĀ-JQ 5-PĀĀ-<-PE9ĀOPĀ1EPQJM&9EPĀ1&P1 OL-L>ĀĀ-P LO<LĀP-dJ-^ J<ĀĀG5JLĀL;LĀL5O&9; Ā/EN-ĀQ5-JPĀO^ <Ā;-Q-P/ J<EQJO<ĀELĀQOĀG-Ā/ EQ-PJE9oLĀ L&JQE.J9JQRĀE<; ĀMO/19-Q-<-LLĀ IOPĀ&L-ĀJ<ĀG-JPĀ1EPQJM&9EPĀE119JMEQJO<L>

CENEX
OUR ENERGY COMES THROUGH.®

A BRAND OF CHS

SAFETY DATA SHEET

Section 1. Identification

CHS Inc.
P.O. Box 64089
Mail station 525
St. Paul, MN 55164-0089

Transportation Emergency (CHEMTREC) : 1-800-424-9300
Technical Information : 1-651-355-8443
SDS Information : 1-651-355-8445

Product name : Ä !ÃÄ"#$Ã%#&#$'&()Ã#'+ ,-$)Ã."/'$-/ #Ã0Ã1$#2"+2Ã3(,#/#/Ã 4-5 ,"(#

SDS no. : @ABCDÃ.EF@

Common name : 3(,# -/#/ Ã4-5 ,"(#)Ã1$#2"+2Ã3(,#-/#/Ã4-5 , "(#

Revision date : @GHGBAHG@

Chemical name : ;'"< &Ã1#&$,#+2Ã%"5&#,,-

Chemical formula : ."6&+$#

Chemical family : ."6#/Ã1#&$,#+2Ã78/ $ 9-$: (

Relevant identified uses of the substance or mixture and uses advised against

= &Ã->-",-:,# ?

Section 2. Hazards identification

OSHA/HCS status : Ã<"5Ã2-&#$"-,Ã"5Ã9/(#$#/Ã<-\-$/ +5Ã:8Ã&<#ÃQN7FÃ7-\-$/ÃO 22+("9-&" (ÃN&-(/- $/ÃTG]ÃOI*ÃAJA@@G@@U?

Classification of the substance or mixture : I;F..FJ;KÃ;LM3L%NÃ DÃO-&#' $ÃA
NPL=ÃL**LÀÃLQ=ÃDÃO-&#' $ÃG
KRKÃL**LÀFÀQ=ÃDÃO-&#' $ÃGF
4K*.ÃOK;;Ã.3ÀF4K=LOLÀ RÃDÃO-&#' $Ã8
OF*OL=Q4K=LOLÀRÃDÃO-&#' $ÃAF
ÀQSLOÃÀÃ*K1*Q%3OÀLQ=ÃT#$&","&ÃDÃO-&#' $Ã8
ÀQSLOÃÀÃ*K1*Q%3OÀLQ=ÃT3(: $(Ã9<",/UÃDÃO-&#'Ã8
N1KOLILOÃF*4KÀ ÃQ*4F=ÃÀQSLOLÀRÃTNL=ÃKS1QN3*KUÃT=-$9 &"9Ã#$&3UÃD&#' $ÃW
N1KOLILOÃF*4KÀ ÃQ*4F=ÃÀQSLOLÀRÃT*K1KFÀÃKS1QN3*KUÃT<#-$"(Ã $'-(5UÃDÃO-&#$ÃA
FN1L*FÀLQ=Ã7FXF*%ÃDÃO-&#' $Ã8
FM3FÀLOÃFXF*%ÃTFO3ÀKUÃDÃO-&#ÃG8
FM3FÀLOÃFXF*%ÃT;Q=4DÀK*.UÃDÃO-&#' $ÃG

GHS label elements

Hazard pictograms :



Signal word : %-(' #$

Hazard statements : K6&$#2#,ÃV,-22-:,#Ã,"Y+"/Ã-(/Ã>-! $?
O-+5#5Ã5#$" +5Ã#Ã"$$"&-&" (?
O-+5#5Ã5Z"(Ã"$$"&-&" (?
.-8 Ã-+5#Ã'#(#&"9Ã/#V#9&5?
.-8 Ã-+5#Ã9-(9#$?
N+5!#9&#/ÃVÃ/-2-'"(' ÃV#$&Ã$Ã&<#Ã+(: $(Ã9;?
.-8 Ã#ÃV-&-,Ã"VÃ5[-,, [#Ã-(/Ã#(&#$5Ã-"$[-8?
.-8 Ã-+5#Ã/$ [5"(#55Ã $Ã/"\\'#55?
O-+5#5Ã/-2-'# Ã& Ã $'-(5Ã&<$ +'Ã!$, ('#/Ã $Ã$#!#-&#/Ã#6! 5+$#ÃT<#$"('Ã $'- (5U
Ã 6"9Ã& Ã-Y+-&"9Ã,"V#Ã["&Ã,Ã&("(' Ã#VV#9&5?

Precautionary statements

General : *#-/ Ã,-:#,Ã:#V $#Ã+5#?ÃÃP##!Ã +&Ã VÃ$#-9<Ã$#(ÃÃ#Ã2#/"9-,Ã-/ >"9#Ã"5Ã(##/#)Ã<->#Ã!$ /+9&Ã9 (&-"(#$Ã $Ã ,-:# ,Ã-&Ã<-(/?

Prevention : Q:&-"(Ã5!#9"-,Ã"(5&$+9&" (5Ã:$#Ã+5#?ÃÃ% Ã(&Ã#Ã(+(&",ÃÃ5-V#&Ã!$#9-+&"(5Ã<->#Ã:##(Ã$#/ Ã-(/Ã +(/# $5& /?ÃÃ#-$Ã!$ &#9&">#Ã', >#5?Ã#Ã$Ã#Ã $ÃV-9#Ã!$ &#(Ã#Ã^#-$Ã!$ &#9&">#Ã9, &<?Ã'Ã#!Ã-[-8ÃV$ 2Ã <#-&)Ã< &Ã5+$V-9#5)Ã5!-$Z5)Ã !#(ÃV,-2#5Ã&<#$Ã"Ã(Ã5 +$9#5?ÃÃ= Ã52 Z"('?ÃÃ35#Ã#6!, 5'D!$ \Ã #,#9&$"9)Ã#(&",-&"(')Ã,"'<&"Ã-(/Ã-, ,Ã2-&#$"-,D(, "('Ã#Y+"!2# (&?Ã5#Ã (,8Ã((D5!- $Z"('Ã& ,5?ÃÃÀ-Z#Ã !$#9-+ &" (-$8Ã2#-5+$#5Ã-' -"(5&Ã5&-&"9Ã/"59<#$ÃÃP##!Ã9 (&-"(#Ã&"'<&Ã,8, 5#/?ÃÃ35#Ã (Ã8+&/ $5Ã $Ã"(Ã-Ã[#D >#(&",-&#/Ã-$#?ÃÃ> "/Ã$#,#-5#Ã& Ã&Ã#(>"$ (2#(&?ÃÃ% Ã(&Ã&$##Ã>-! $?ÃÃ% Ã(&Ã#$&()ÃÃ $Ã52 Z#Ã[<#(Ã +5"(' Ã&<"5Ã!$ /+9&?ÃÃ<-(/5Ã&< $ +'<,8Ã-V&#$Ã<-(/,"?(

Response : O ,,#9&Ã5!",,-'#?ÃÃ#&Ã2#/"9-,Ã-&&#(&Ã"VÃ#&ÃV##,Ã!#,,?ÃÃÃ#6! 5# /Ã $Ã9 (9#$(#/`ÃÃ4#&Ã"9- ,Ã-&&#(&" (?ÃÃLI L=7F;K%`ÃÃ*#2 >#Ã!#$5 (Ã& ÃV$#5<Ã-"$Ã-(/ÃÃ#2V $&-:,#ÃV $&-&"('?ÃÃO-,,Ã-Ã1QLNQ=ÃOK=ÀK*Ã $Ã !<8 5"9"-(Ã"VÃÃV##,Ã!#,,?ÃÃLMÃ F;;Q^ K%`ÃÃ2#/"-&#, 8Ã9-,,Ã1QLNQ=ÃOK=ÀK*Ã $Ã!<8"9"-(?ÃÃ% Ã=ÃÃ "(/+ 9#Ã> 2"&"('?ÃÃÃQ=ÃNPL=ÃT $Ã<-"$ÃZÃÃ VVÃ"22#/"-&#,,Ã9 (&-2"(-&#/Ã9, &<"(?ÃÃ*"(5#Ã5Z"(Ã["&<Ã[-&#$Ã $Ã5< [# $?ÃÃÃQ=ÃNPL=ÃÃ^5<Ã["&<Ã!,#&ÃVÃ5 -!Ã-(/Ã[- &#$?ÃÃ#Ã VVÃ9 (&-2"(-&#/Ã9, &<"(/ Ã-5<Ã"&Ã :#V $#Ã$#5#?ÃÃÃ5Z"(Ã"$$"&-&" (Ã 99+$5ÃÃ"&#Ã-&&#(&?ÃÃÃL=ÃKRKN"ÃÃ5#Ã9-+ &' +5,8Ã["&<Ã[-&#$ÃV $Ã 5#>#$-,Ã2"(+&#5?ÃÃ*#2 >#Ã9 (&-9&Ã,#(5#5)Ã"VÃ!$#5#(&&Ã8ÃÃ/ ?ÃO (&"(+#ÃÃ5"((?ÃÃL#&ÃÃ"$$"&-&" (ÃÃ5#5&5` 4#&Ã2#/"9-,Ã-&&#(&"?(

Storage : N& $#Ã, 9Z#/Ã+?ÃÃÃ&N$#Ã"(Ã-Ã[#Ð,>#(&",-&#/Ã!,-9#ÃÃ#!Ã9 ,?

Disposal : %"5! 5#Ã VÃ9 (&#(&5Ã-(/Ã9 (&#$Ã"(Ã-99$/-(9# Ã["&<Ã-,,Ã, 9Ã$#'" (- ,)Ã(-&" (-,Ã-(/Ã"(&#$(&" (- ,Ã$#'+,-&" (5?

Hazards not otherwise classified (HNOC) : = (# ÃZ([(?

Hazardous Material Information System (U.S.A.) **Health :** G **Flammability :** B **Physical hazards :** @

National Fire Protection Association (U.S.A.) **Health :** G **Flammability :** B **Instability :** @

Section 3. Composition/information on ingredients

Substance/mixture : ."6&+$#

Chemical name : ;'"< &Ã1#&$,#+2Ã%"5&#,,-

Other means of identification : 3(,# -/#/ Ã4-5 ,"(#)Ã1$#2"+2Ã3(,#-/#/Ã4-5 , "(#

Ingredient name	%	CAS number
4-5 ,"(#)Ã(-&+$-, S8,#(# Ä ,+#(# K&<-(, A)G)BDÄ$"2#&#8 \#(# J#(\#(# K&<8#(\#(# (D7#6-(# =-!< &<-,#(#	89ÃÐ10@ aA@ÃDÃcGb aA@ÃDÃcGb <A1 aWÃDÃcb aWÃDÃcb aWÃDÃcb aWÃDÃeb a@?WÃDÃeA	@@EDEAD] AWW@@DC A@dDdDW EBDA@]bDEW@E CADE@W A@@A@B AA@D@DW] ADG@@W

F(8Ã9 (9#(&$-&" (Ã5< [(Ã-5Ã-Ã$-(' #Ã"5Ã& Ã!$ &#9&Ã9 (V"/#(&Ã-$Ã"5Ã/+#Ã& Ã:-&9<Ã>-$"-&" (?

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : LVÃ2&#$"-,Ã9 2#5Ã"(Ã9 (&-9&Ã["&<Ã&<#Ã5Z"(Ã"22#/"-&#,8Ã-5<Ã&<#Ã#5Ã["&<Ã,-$'Ã#-2 +(&5Ã VÃ[-&#$ÃV $ÃAbÃ 2"(+&#5)Ã 99-5" (-,, 8Ã"V&"('Ã&<#Ã, [#$ÃÃ(+!!# $Ã,"/5?Ã4#&Ã29-,Ã-&&#(&" (?

Inhalation : LVÃ!#$5 (Ã:$#-&<#5Ã'$'#Ã-2 + (&5Ã VÃ2-&#$"-,)Ã2 >#Ã#6! 5#/Ã!#$5 (Ã& ÃV$#5<Ã-"$Ã-&Ã (&#2&<'('Ã<-5Ã 5& !!#/)Ã!#$V $2Ã-$&"V"9"-,Ã$#5('$Ã"##Ã&<#Ã!#$5Ã($2Ã- (/Ã-&Ã$#5&?#&Ã2#/"9-,Ã-&&#(&Ã(5Ã5 (Ã-5Ã ! 55": ,#?

Skin contact : LVÃ#&Ã2-&#$"-Ã9 2#5Ã"(Ã9 (&-9&Ã["&<Ã&<#Ã5Z"()Ã[-5<Ã&<#Ã9-&#/Ã5Z"Ã"&<Ã5 -!Ã-(/ Ã[-&#$Ã!$ 2!&,8ÃÃ&<#Ã 2-&#$"-,Ã!#(#&$-&#5Ã&<$<Ã9, &<"()Ã$#2 >#Ã&Ã9, &<"Ã-(/Ã[-5<Ã&<#Ã5Z"(Ã["&<Ã-Ã-(/Ã[-&#$Ã!$ 2! &,8ÃÃV "$"&-&" (Ã$#5Ã5Ã-V&#$Ã[-5<"(')Ã'#&Ã2#,Ã9&&#(&" (Ã"22#/"&#,8?

Ingestion : LVÃ2&#$"-,Ã<5Ã:##(Ã5[- ,, [# /)Ã/ Ã(&Ã"(/+9#Ã>2"&"('?Ã4#&Ã2#/"9-,Ã-&&#(&"Ã"22#/"-&#, 8?

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : O-+5#5Ã5#$" +5Ã#Ã"$$"&-&" (?

Inhalation : O-(Ã9-+ 5#Ã9#(&$-,Ã(#$> +5ÃÃ#2ÃTO=NUÃ/#!$#5'ÃÃ.-8 Ã9-+5#Ã$ [5"(#55Ã $Ã/"\\'(#55?

Skin contact : O-+5#5Ã5Z"(Ã"$$"&-&" (?

Ingestion : O-(Ã9-+ 5#Ã9#(&$-,Ã(#$> +5ÃÃ#2ÃTO=NUÃ/#!$#5'ÃÃ.-8 Ã:#ÃV-&Ã"VÃ5[-,, [#Ã-(/Ã#(&#$5Ã-"$[-8?

Over-exposure signs/symptoms

Eye contact : F/>#$5#Ã5Ã !& 25Ã2-8 Ã(9,+/# Ã&<#ÃV ,, ["(Ã!-"(Ã $Ã"$$"&-&)Ã(&#$"(')Ã$#/(# 55?

Inhalation : F/>#$5#Ã5Ã !& 25Ã2-8 Ã(9,+/# Ã&<#ÃV ,, ["(ÃÃ$#5!"$-& Ã&$-9Ã'&-&" ()Ã9 +"(' ?

Skin contact : F/>#$5#Ã5Ã !& 25Ã2-8 Ã(9,+/# Ã&<#ÃV ,, ["(Ã"$$"&-&" ()Ã$#/(#55?

Ingestion : = ÃZ([(Ã5"'("V"9-(&Ã#VV#9&5Ã'$,Ã$-& $/5?

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Ä$#-&Ã2& 2-&"9-,, 8?ÃÃO (&-9&Ã! "5 (Ã&$#-&2#(&Ã5!#9&Ã"2#/"- &#,Ã"VÃ,-$'#ÃY&'(&"#5Ã<->#Ã:##(Ã#'$&#/Ã $Ã"(<-,#/?

Specific treatments : = Ã5!#9"V'9Ã&$#-&2#(&?

Protection of first-aiders : = Ā-9&" (Ā5<-,,Ā:#Ā&-Z#(Ā>"(,>"('Ā-(8 Ā#$5 (- ,Ā$"5ZĀ $Ā["&-Ā5&"&-#Ā&$-"("(?ĀĀ"&Ā5+5!#9&#/Ā&<-&ĀV+2#5Ā -$#Ā5&",,Ā!$#Ā&Ā$#59+#Ā5< +,/Ā[#-$Ā-(Ā-!! $!$"- &#Ā2-5ZĀ5#,VD9 (&-"(Ā:$#-&<"(Ā-!!- $-&+5?Ā2-8Ā :#Ā/-('#$ + 5Ā& Ā&Ā!#$5 (Ā!$ >"/"(' Ā"/Ā& Ā'">#Ā2 +&<D& D2 +Ā$#5+59"&-(?ĀĀ<5<Ā9 (&-2"(-&#/Ā9, &<"(Ā &< $ +' <,8Ā["&<Ā[-&#$Ā:#V $#Ā$#2 >Ā"&$Ā[#-$Ā', >#5?

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : 35#Ā/$8Ā<#2"9-,)ĀOQ)Ā[-&#$Ā5!$-ĀTV 'UĀ $ĀV -2?

Unsuitable extinguishing media : % Ā(&Ā+5#Ā[-&#$Āf#&Ā $Ā[-&#$DĀV'#Ā#6&"('#$5?

Specific hazards arising from the chemical : 7"'< ,8Ā>,-&",#Ā2-&#$"-,?ĀI, ["(' Ā-5 ," (#Ā9-(Ā:#Ā"("&#Ā:8Ā5#,VD'#(#$&#/Ā5&-&"9Ā#,#9&$"9"&8 9 (&-"(#$5Ā5< +/,Ā:#Ā: (/ #/Ā-(/Ā'$ +(/#/?Āh-! $5Ā2-8Ā&$-#,Ā-, (' Ā&<#Ā'$ +/(Ā& Ā-Ā5 +$9#Ā VĀ '"(" &" (ĀT!',&Ā,"'<&)Ā<#-&#$)Ā#,#9&$"9Ā2 & $UĀ5 2#ĀĀ["5&-(ĀO (&-"(#$5)Ā/$+25ĀT#>#(Ā#2UĀ8-(Ā #6!, /#Ā[<# (Ā<#-&ĀT[#,/(')Ā9+&&"(')Ā#&9?UĀ"5Ā-?,"#/

Hazardous thermal decomposition products : %#9 2! 5"&" (Ā!$ /+9&5Ā2-8Ā"(9,+#Ā&<#ĀV ,,("Ā2-&#$"- ,5`
9-$: (Ā/" 6"/#
9-$: (Ā2 (6"/ #

Special protective actions for fire-fighters : ^ - &#$Ā2-8#Ā"(#VV#9&">#Ā (ĀV,-2#5)Ā:+&Ā5< +Ā,Ā5#/Ā& ĀZ##/Ā$#D#6#/Ā9 (&"(#$5Ā9 ,? ;-$'# ĀV"$#5)Ā5+9<Ā-5Ā&$#5ĀĀ5< +Ā:#ĀV +'<&Ā["&<Ā9-(&ĀLV5": ,#)Ā!+2!Ā&<#Ā9 (&#&5Ā\2Ā &<#Ā&-(ZĀ-(/ĀZ#/f "(" ('Ā5&$+9&+$#5Ā9 ,ĀĀ($ &#9&Ā!#$5 (#,?ĀF> "/Ā5!$#-/"(Ā:+$("('Ā,"Y+/Ā ["&<Ā[-&#$Ā+5#ĀV $Ā9 ,"('Ā!-6! 5#5?Ā% Ā(&Ā\,+5<[ĀĀ!+: ,"9Ā#[#$5?ĀÄ<#Ā+5#Ā VĀ-Ā5#,VD 9 (&-"(#/Ā:$#- &"('Ā-! !-$-&+5Ā-(/Ā!$ &#9&">#Ā9, &<"('Ā"5Ā2#2#(/# /ĀV $ĀV"$#ĀV"'<&#$5?ĀF> "(<- ,-&" (Ā VĀ>$5?

Special protective equipment for fire-fighters : I"$#DV"'<&#$5Ā5,<Ā(#- $Ā-!!$! $'-&#Ā!$ &#9&">#Ā#Z#('&Ā-(/Ā5#,VD9 &"(#/ Ā:$#-&<"(Ā-!!- $&+5Ā TNOJFUĀ["&<Ā-ĀV+,,ĀV-9#Ā!!#$9&#/Ā(Ā! 5"&">#Ā!$#55+$#Ā2#?

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : P##!Ā+((#9#55- $8Ā-(/Ā+(! $ &#9&#/Ā!#$5(#, ĀV$ 2Ā#(&#$"('?ĀĀ'Ā:$#- &<"('Ā- ! $Ā $Ā2"5&?ĀĀ1'$#Ā-/ #Y+-&#Ā >#(&",-&" (?Ā#$Ā-!! $!$"- &#Ā$#5!"$-& $Ā[<#Ā>#(&",-&" (Ā"5Ā/"Y+-&#?ĀĀ1+&Ā!! $!$"- &#Ā!#$5 (-,Ā!$ &#9&">#Ā #Y+'2#(&?

Methods and materials for containment and cleaning up

Spill : O (&-"(Ā["&<Ā/"Z#5Ā $Ā5:$:#(&Ā&!$#>#(&Ā2'"$-&" (Ā& Ā5#[$5!&$#-25?ĀĀZ#Ā+!Ā52-,,Ā5!",Ā["&<Ā/$8<#2"9-, Ā -:5 $: #(&gĀ,-$'#Ā5!"5Ā2-8Ā$#Y+"$#2!Ā $Ā>-9++2Ā!$" $Ā& Ā-:5$: #(&?ĀĀ.-$#Y+"$#Ā#69&" (Ā VĀ5#$#,8Ā 9 (&-2"(-&#/Ā5 ",?

Section 7. Handling and storage

Precautions for safe handling

Protective measures : 1+&Ā (Ā-!!$! $"-&#Ā!#$5 (,Ā!$ &#9&">#Ā#Y2#!(&ĀT5##ĀN#9&" (Ā?ĀĀ% Ā(&Ā'#&Ā#5ĀĀ$Ā (Ā5Z"(Ā $Ā9,(&<" % Ā(&Ā:$#-&<#>! $Ā $Ā2"5&?ĀĀ% Ā(&Ā"('#5&?ĀĀ3$#Ā&(,$#Y+-&#Ā>#(&",-&" (?Ā#$Ā-!! $!$"- &#Ā$#5!"$-& $Ā [<#(Ā#(&",-&"(Ā"5Ā"(-/#Y+-&#?

Advice on general occupational hygiene : K-&"(')Ā/$"(Z'("Ā-(/ Ā52 Z"('Ā5< +,/Ā:#Ā!$ <":"&#/Ā"(Ā-$#Ā[<#$#Ā&<"5Ā2-&#$"5Ā<-(/#/)Ā5& $#/Ā-(/Ā !$ 9#55#/?ĀĀ^$Z#$5Ā5< +/Ā[-5< Ā<-(/5Ā-(/ ĀV-9#Ā:#V $#Ā#'8)Ā($"(Z"(Ā-(/Ā52 Z" ('?

Conditions for safe storage, including any incompatibilities : N& $#Ā"(Ā-99 $/(-9#Ā["&<Ā,9Ā$#'+,-&" (5?ĀĀN& $#Ā"(Ā-Ā5#'&#/Ā(/Ā-!! $ >#/Ā-$#-?ĀĀN& $#Ā"(Ā $"Ā(- 9 (&-"(#$Ā!$ &#9&#/ĀV$ 2Ā/"$#9&Ā<&#Ā,"(Ā-Ā/$Ā9 ,Ā-(/Ā[#, ,D>#(&",-&#/Ā-$#Ā-[-8 ĀV$ 2Ā"(9 2!-&":,#Ā 2-&#$"-,5ĀT5#Ā#9&" (ĀA@UĀĀ(/ /Ā-(/Ā/$"(Z?ĀĀN$#Ā, 9Z#/Ā+?ĀĀ!2"(- &#Ā-,,Ā"'(&" (Ā5 +$9#5?ĀĀN#!&$Ā$ĀV$ 2Ā 6"/" \"('Ā2-&#$"- ,5?ĀĀP##!Ā9 (&-"(#&"'<&Ā9, 5#/Ā-(/Ā5#-,#/ Ā+(&",Ā$#&ĀV $Ā+5#Ā?ĀĀ"(#$5Ā&<-&Ā<->#Ā:##(Ā !#(#/Ā2+5&Ā:#Ā9-$#\Ā&$,#5#-,#/Ā-(/ĀZ#! &Ā+!$"'<&Ā& Ā!$#>#(Z&Ā# ?ĀĀ% Ā(&Ā&$&Ā"(Ā+(,#, #/Ā9 (&-"(#$5? 35#Ā-!! $!$"- &#Ā9 (&-"(2#(&Ā& Ā"#Ā#(>"$ (2#(&-,Ā9 (&-2"(-&" (?

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
S8,#(#	**ACGIH TLV (United States, 3/2015).** ĀÑĀK;`ĀEbAĀ2'H2iĀAbĀ2"(+&#5? ĀĀNĀ\`ĀAb@Ā!!2ĀAbĀ2+&#5? ĀĀ^Ā F`ĀBWBĀ2'H2iĀdĀ< +$5? ĀĀ^Ā F`ĀA@@Ā!!2ĀdĀ< +$5? **OSHA PEL (United States, 2/2013).** ĀĀ^ F`ĀA@@Ā!!2ĀdĀ$5? ĀĀ^Ā F`ĀBWbĀ2'H2iĀdĀ< +$5?
Ā ,+#(#	**NIOSH REL (United States, 10/2013).** ĀÑĀK;`ĀbE@Ā2'H2iĀAbĀ2"(+&#5? ĀĀNĀ\`ĀAb@Ā!!2ĀAbĀ2+&#5?

	ĀĀ^ F`ĀWCbĀ2'H2iĀA@Ā< +$5? ĀĀ^ F`ĀA@@Ā!!2ĀA@Ā< + **OSHA PEL Z2 (United States, 2/2013).** Ā 1`Āb@@Ā!!2ĀA@Ā2"(+&#5? ĀĀOKLJ@@Ā2! ĀĀ^ F`ĀG@@Ā!!2ĀdĀ< +$5? **ACGIH TLV (United States, 3/2015).** ĀĀ^ F`ĀG@Ā!!2ĀdĀ< +$5?
K&<-(,	**ACGIH TLV (United States, 3/2015).** ĀĀK;`ĀA@@@2ĀAbĀ2"(+&#5? **NIOSH REL (United States, 10/2013).** ĀĀ^ F`ĀA@@@2ĀA@Ā< +$5? ĀĀ^ F`ĀA]@@Ā2'H2iĀA@Ā< +$5? **OSHA PEL (United States, 2/2013).** ĀĀ^ F`ĀA@@@2ĀdĀ< +$5? ĀĀ^ F`ĀA]@@Ā2'H2iĀdĀ< +$5?
A)G)BDÄ$"2#&#8 \#(#	**ACGIH TLV (United States, 3/2015).** ĀĀ^ F`ĀAGWĀ2'H2iĀdĀ< +$5? ĀĀ^ F`ĀGbĀ!!2ĀdĀ< +$5? **NIOSH REL (United States, 10/2013).** ĀĀ^ F`ĀAGbĀ2'H2iĀA@Ā< +$5? ĀĀ^ F`ĀGbĀ!!2ĀA@Ā< +$5?
J#(\#(#	**ACGIH TLV (United States, 3/2015). Absorbed through skin.** ĀĀK;`ĀdĀ2'H2iĀAbĀ2"(+&#5? ĀĀK;`ĀG?bĀ!!2ĀAbĀ2"(+&#5? ĀĀ^ F`ĀA?EĀ2'H2iĀ< +$5? ĀĀ^ F`Ā@?bĀ!!2ĀdĀ< +$5? **NIOSH REL (United States, 10/2013).** ĀĀK;`ĀAĀ!!2ĀAbĀ2"(+&#5? ĀĀ^ F`Ā@?AĀ!!2ĀA@Ā< +$5? **OSHA PEL (United States, 2/2013).** ĀĀK;`ĀbĀ!!2ĀAbĀ2"(+&#5? ĀĀ^ F`ĀAĀ!!2ĀdĀ< +$5? **OSHA PEL Z2 (United States, 2/2013).** Ā 1`Āb@Ā!!2ĀA@Ā2"(&#5? ĀĀOKLJĀ!!2 ĀĀ^ F`ĀA@Ā!!2ĀdĀ< +$5?
K&<8#(\#(#	**ACGIH TLV (United States, 3/2015).** ĀĀ^ F`ĀG@Ā!!2ĀdĀ< +$5? **NIOSH REL (United States, 10/2013).** ĀĀK;`ĀbBbĀ2'H2iĀAbĀ2"(+&#5? ĀĀK;`ĀAGbĀ!!2ĀAbĀ2"(+&#5? ĀĀ^ F`ĀBWbĀ2'H2iĀA@Ā< +$5? ĀĀ^ F`ĀA@@Ā!!2ĀA@Ā< + **OSHA PEL (United States, 2/2013).** ĀĀ^ F`ĀBWbĀ2'H2iĀdĀ< +$5? ĀĀ^ F`ĀA@@Ā!!2ĀdĀ< +$5?
(D7#6-(#	**ACGIH TLV (United States, 3/2015). Absorbed through skin.** ĀĀ^ F`Āb@Ā!!2ĀdĀ< +$5? **NIOSH REL (United States, 10/2013).** ĀĀ^ F`ĀAd@Ā2'H2iĀA@Ā< +$5? ĀĀ^ F`Āb@Ā!!2ĀA@Ā< +$5? **OSHA PEL (United States, 2/2013).** ĀĀ^ F`ĀAd@@Ā2'H2iĀdĀ< +$5? ĀĀ^ F`Āb@@Ā!!2ĀdĀ< +$5?
=-!< &<-,#(#	**ACGIH TLV (United States, 3/2015). Absorbed through skin.** ĀĀ^ F`ĀbGĀ2'H2iĀdĀ< +$5? ĀĀ^ F`ĀA@Ā!!2ĀdĀ< +$5? **NIOSH REL (United States, 10/2013).** ĀĀK;`ĀCbĀ2'H2iĀAbĀ2"(+&#5? ĀĀK;`ĀAbĀ!!2ĀAbĀ2"(+&#5? ĀĀ^ F`Āb@Ā2'H2iĀA@Ā< +$5? ĀĀ^ F`ĀA@Ā!!2ĀA@Ā< +$5? **OSHA PEL (United States, 2/2013).** ĀĀ^ F`Āb@Ā2'H2iĀdĀ< +$5? ĀĀ^ F`ĀA@Ā!!2ĀdĀ< +$5?

Appropriate engineering controls : 35#Ā (, 8Ā"&<Ā-/#Y+-&#Ā>#(&",-&" (?

Environmental exposure controls : K2"55" (5ĀV$ 2Ā>#(&",-&" (Ā $Ā$ZĀ!$ 9#55Ā#"!2#(&Ā5< +,/Ā:Ā<#9Z#/Ā& Ā#(5Ā#Ā&<#Ā 2!,8 Ā["&<Ā&<#Ā $#Y+$#2#(&5Ā VĀ#(>"$ (2#(&Ā!$ &#9&" (Ā,#5,-&" (?

Individual protection measures

Hygiene measures : ^ - 5<Ā<-(/5)ĀV $#-$25Ā-(/ĀV-9#Ā&< $<8 Ā-V&#$Ā<-(/";Ā9<#2"9- ,Ā!$ /+ 9&5)Ā:#V $#Ā#-&"(')Ā52 Z"Ā-(/Ā+5"(' Ā &<#Ā,->-& $Ā/Ā-&Ā&<#Ā#(/Ā VĀ&<#Ā[$Ā!#$" /?ĀĀ+$#Ā&<Ā[-5< &-&" (5Ā-(/Ā5-V#Ā5 [#$5Ā-$Ā, 5#Ā & Ā&<#Ā[$Z5&-&" (Ā,9(?

Eye/face protection : *#9 22# (/#/ `ĀN!,-5<Ā' " ,#5Ā-(/ Ā-ĀV-9#Ā5<"#,/)Ā[$#Ā5!,-5<Ā-\ -$/Ā#65&5?

Skin protection

Hand protection : BĀDĀdĀ< +$5ĀT:$#-Ā&<Ā&"2#U`Ā="&$",#Ā5?

Body protection : *#9 22# (/#/ `Ā; ('Ā5,## >#/Ā9 >#$-,,5?

Other skin protection : *#9 22# (/#/ `ĀL2!#$ +5Ā: &5?

Respiratory protection : LVĀ&",-&"(Ā"5Ā"(-/#Y+-&#)Ā+5#Ā-Ā=LQN7D9#$&"V"#Ā$&!&<Ā-(Ā $'- ("9Ā>-! $Ā9-$&$"/'#Ā-(Ā1]bĀ!-$&"9+&#Ā V",&#$?

Section 9. Physical and chemical properties

Appearance

Physical state : ;"Y+"/?

Color : *#// "5<Ā' ,/#(Ā:$ [(?

Odor : 4-5 ,"(#

Odor threshold : A@Ā!!2

pH : = &Ā->-",-:,# ?

Melting point : = &Ā->-",-:,# ?

Boiling point : GE?EEmOĀTBd@

Flash point : O, 5#/ Ā9+!`ĀDB@mOĀTDB@mlUĀj$#Ā(Ā3l

Flammability : = &Ā->-",-:,# ?

Lower and upper explosive (flammable) limits : ; [# $`ĀA?Bn
3!!# $`ĀC?En

Relative density : @?CG

Evaporation rate : N, [#$?

Solubility : L(5 ,+: ,#Ā"(Ā&<#Ā\"(', Ā2-&#$"-,5`Ā9 ,/Ā[-&#$Ā -(/Ā< &Ā[-&#$?

Solubility in water : =#', """: ,#?

Partition coefficient: n-octanol/water : = &Ā->-",-:,# ?

Auto-ignition temperature : GbC?GĀ& ĀBbB?BBmOĀTB]bĀ&lĀdb@

Decomposition temperature : = &Ā->-",-:,# ?

SADT : = &Ā->-",-:,# ?

Viscosity : = &Ā->-",-:,# ?

Vapor pressure : bW?WĀZ1-ĀTB@@Ā22Ā7lUĀTEd

Vapor density : BĀjF"$ĀkĀAl

Section 10. Stability and reactivity

Reactivity : = Ā5!#9"V9Ā&#5&ĀĀ$#,-&#/Ā& Ā$#-9&"Ā<&"-:,# ĀV $Ā'$Ā$ / +9&Ā $Ā"&5Ā"('$(&'5?

Chemical stability : Ā<#Ā!$ /+9&Ā"5Ā,5&?

Possibility of hazardous reactions : 3(/# $Ā($2-,Ā9 (/ "&" (5Ā VĀ5& $-'#Ā/Ā+5#)Ā<-\-$/ +5Ā$#-9&'(5Ā[",,Ā(&Ā 99+$?

Conditions to avoid : F> "/Ā-,,Ā! 55": ,#Ā5 +$9#Ā VĀ"'("&" (ĀT$ZĀ $ĀV,-2#!'?ĀĀ&Ā!$#55+$#)Ā9+&[#/)Ā:$-\#)Ā5 ,/#$)Ā/$",,)Ā'$"Ā $Ā #6! 5# Ā9 (&-"(# $5Ā& Ā<#-&Ā $Ā5 +$9#5Ā VĀ?Ā&Ā"(&Ā-,,[Ā>-! $Ā& Ā-99+2+,-&#Ā"([Ā, $Ā9 (V"(#/Ā$#-5?

Incompatible materials : *#-9&">#Ā $Ā"(9 2!- &":,#Ā["&<Ā&<#Ā[V',, Ā2-&#$"-,5`Ā 6"/"(" Ā2-&#$"-,5)Ā-9"/5Ā-(/Ā-,Z-,"5?

Hazardous decomposition products : 3(/# $Ā($2-,Ā9 (/ "&" (5Ā VĀ5& $-'#Ā/Ā+5#)Ā<-\-$/ +5Ā/#9 2 ! 5" &" (Ā!$ /+9&5Ā5< ,/Ā(&Ā:#Ā!$ /+9#/?

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
S8,#(#	;Ob@ĀL(<-,-&" (Ā4-5?	*-&	b@@Ā2	BĀ< +$5
	;%b@ĀQ$-,	*-&	BW@Ā2'HZ'	D
Ā ,+#(#	;Ob@ĀL(<-,-&" (Āh-! $	*-&	B]Ā'H2i	BĀ< +$5
	;%b@ĀQ$-,	*-&	EWEĀ2HZ	D
K&<-(,	;Ob@ĀL(<-,-&" (Āh-! $	*-&	AGB@@Ā2'H2i	BĀ< +$5
	;%b@ĀQ$-,	*-&	CĀ'HZ'	D
A)G)BDĀ$"2#&#8 \#(#	;Ob@ĀL(<-,-&" (Āh-! $	*-&	Ad@@Ā2'H2i	BĀ< +$5
	;%b@ĀQ$-,	*-&	bĀ'HZ'	D
J#(\#(#	;%b@ĀQ$-,	*-&	] W@Ā2'HZ'	D
K&<8#(\#(#	;%b@Ā%#$2-,	* -:: "&	ob@@Ā2'HZ'	D
	;%b@ĀQ$-,	*-&	Wb@@'HZ'	D
(D7#6-(#	;Ob@ĀL(<-,-&" (Ā4-5?	*-&	Bd@@Ā!!2	BĀ< +$5
	;%b@ĀQ$-,	*-&	AbdB@Ā2'HZ'	D
=-!< &<-,#(#	;%b@Ā%#$2-,	* -:: "&	oG@Ā'HZ'	D
	;%b@ĀQ$-,	*-&	B]@Ā2'HZ'	D

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
4-5 ,"(#)Ã(-&+$-,	K8#5ÃDÃ.",/Ã"$$"&-(&	7+2-(	D	dÃ< +$5ÃA@Ã!!2	D
	K8#5ÃDÃ. /#$-&#Ã"$$'&-(	.-(	D	AÃ< +$5Ãb@Ã!!2	D
S8,#(#	K8#5ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	dCÃ2'	D
	K8#5ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5ÃbÃ2	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-&	D	dÃ< +$5ÃÆ@	D
	NZ"(ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	GBÃ< +$5Ãb@@Ã2'	D
	NZ"(ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	A@@n	D
Ä ,+#(#	K8#5ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	@?bÃ2"(+&#5ÃA@@ 2 '	D
	NZ"(ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	GBÃ< +$5ÃG@Ã2'	D
	K8#5ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	dC@Ãp'	D
	K8#5ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5ÃGÃ2'	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	1"'	D	GBÃ< +$5ÃGb@Ãp;	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	BWbÃ2'	D
	NZ"(ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	b@@Ã2'	D
K&<-(,	K8#5ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5Ãb@@Ã2'	D
	K8#5ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	@?@EHHEEHCÃ 2"(+&#5ÃA@Ã2'	D
	K8#5ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	A@@Ãp;	D
	K8#5ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	b@@Ã2'	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	B@@Ã2'	D
J#(\#(#	K8#5ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	ddÃ2'	D
	NZ"(ÃDÃ. /#$-&#Ã"$$'&-(	*-:: "&	D	GBÃ< +$5ÃG@Ã2'	D
	K8#5ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5ÃGÃ2'	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-&	D	dÃ< +$5ÃÆ@	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5ÃAbÃ2'	D
K&<8#(\#(#	K8#5ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	b@@Ã2'	D
	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5ÃAbÃ2'	D
(D7#6-(#	K8#5ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	A@Ã2'	D
=-!< &<-,#(#	NZ"(ÃDÃ.",/Ã"$$"&-(&	*-:: "&	D	BJbÃ2'	D
	NZ"(ÃDÃN#>#$#Ã"$$"&-(&	*-:: "&	D	GBÃ< +$5Ã@?@bÃ2	D

Sensitization

Skin : Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Respiratory : Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Mutagenicity

Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
4-5 ,"(#)Ã(-&+$-,	D	GJ	D
S8,#(#	D	W	D
Ä ,+#(#	D	W	D
J#(\#(#	q	A	P([(Ã& Ã:#Ã-Ã<+2-(Ã9-$9"#(?
K&<8#(\#(#	D	GJ	D
=-!< &<-,#(#	D	GJ	*#-5 (-:, 8Ã-(&"9"!-&#/Ã& Ã:#Ã-Ã<+2-(Ã9-$9"# (?

Reproductive toxicity

Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Teratogenicity

Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Ä ,+#(#	O-&#' $8ÃW	= &Ã-!!," 9-:,# ?	=-$9 &"9Ã#VV#9&5
A)G)BDÄ$"2#&#8 \#(#	O-&#' $8ÃW	= &Ã-!!," 9-:,# ?	*#5!" $-& $8&$8$"&-" (
(D7#6-(#	O-&#' $8ÃW	= &Ã-!!," 9-:,# ?	=-$9 &"9Ã#VV#9&5

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Ä ,+#(#	O-&#' $8ÃG	= &Ã/#&#$2"(#	= &Ã/#&#$2"(#
J#(\#(#	O-&#' $8ÃA	= &Ã/#&#$2"(#	= &Ã/#&#$2"(#
K&<8#(\#(#	O-&#' $8ÃG	= &Ã/#&#$2"(#	<#-$"('Ã $'- (5
(D7#6-(#	O-&#' $8ÃG	= &Ã/#&#$2"(#	= &Ã/#&#$2"(#

Aspiration hazard

Name	Result
;"'< &Ã1#&$,#+2Ã%"5&#,,- 4-5 ,"(#)Ã(-&+$-, Ä ,+#(# J#(\#(# K&<8#(\#(# (D7#6-(#	FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A FN1L*FÄLQ=Ã7FXF*%ÃDÃO-&#' $%8A

Information on the likely routes of exposure : %#$2-,Ã9 (&9&?Ã8#Ã9 (&-9&?ÃL(<-,-&?Ã\#5&" (?

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
4-5 ,"(#)Ã(-&+$-,	F9+&#ÃKOb@ÃAC?bÃ2'H;Ã#Ã$[-(&#$	O$+5&-9#(5ÃDÃF$&#2"-Ã5#?ÃDÃ'"	BdÃ< +$5
	F9+&#ÃKOb@ÃA?bÃ2'H;Ã.-Ã$[-(&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃ=# (-8#	BdÃ< +$5
S8,#(#	F9+&#ÃLOb@ÃA@Ã2'H;	F,'-#	OGÃ< +$5
	F9+&#Ã;Ob@ÃdO@Ãp'H;Ã.-$"(#Ã[-&#$	O$+5&-9#(5ÃDÃ1-,-#2 (#&#5Ã!+'"	BdÃ< +$5
	F9+&#Ã;Ob@ÃWV@Ãp'H;ÃI$#5<Ã[-&#$	I"5<ÃDÃ1"2#!<#5Ã!$ 2#,- 5	] EÃ<+$5
Ä ,+#(#	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	F,'-# ÃDÃ15#+/ Z"$9<#$"#,Ã5+:9-! "&-&-	OGÃ< +$5
	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	O$+5&-9#(5ÃDÃ4-22-$+5Ã !5#+/ ,"2(-#+5ÃDÃF/+,&	BdÃ< +$5
	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃr+>#(#Ã TI,#/"," (')Ã7-&9<,"(')Ã^ #-(, "('U	BdÃ< +$5
	F9+&#Ã;Ob@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	I "5<ÃDÃQ(9 $(<9<+5ÃZ"9<ÃDÃ8	] EÃ< +$5
	O<$ ("9Ã=QKOÃA@@@Ãp'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-	GAÃ/-85
K&<-(,	F9+&#ÃKOb@ÃBA@Ã2'H;ÃI$#5<Ã[-&#$	O$+5&-9#(5ÃDÃQ95Ã5+:', : 5-	BdÃ< +$5
	F9+&#Ã;Ob@ÃdE@Ã2'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃ=# (-8#	BdÃ< +$5
	F9+&#Ã;Ob@Ã@@@@Ãp'H;Ã.-$"(#Ã[-&#$	I"5<ÃDÃF,:+$(+5Ã+$(+5	]EÃ< + $5
	O<$ ("9Ã=QKOÃB?]]bÃ2'H;Ã.-$"(#Ã[-&#$	F,'-# ÃDÃ3,-Ã!#$&+5-	] EÃ< +$5
A)G)BDÄ$"2#&<#8 \#(#	F9+&#Ã;Ob@ÃE@Ãp'H;Ã.-$"(#Ã[-&#$	O$+5&-9#(5ÃDÃK,-52 !+5Ã!9&#(9$+5ÃD F/+,&	BdÃ< +$5
	F9+&#Ã;Ob@ÃBÃ2'H;ÃI$#5<Ã[-&#$	I"5<ÃDÃÄ",-!"-Ã\'",,	]EÃ< +$5
J#(\#(#	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	F,'-# ÃDÃ15#+/ Z"$9<#$"#,Ã5+:9-! "&-&-	OGÃ< +$5
	F9+&#ÃKOb@ÃdO@@H;ÃI$#5<Ã[-&#$	F,'-# ÃDÃN#,#(-5&$+2Ã5!?	]EÃ< +$5
	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃ=# (-8#	BdÃ< +$5
	F9+&#Ã;Ob@ÃdO@@Ãp'H;Ã.-$"(#Ã[-&#$	O$+5&-9#(5ÃDÃF$&#2"-Ã5-,"Ã-ÃD!,""	BdÃ< +$5
	F9+&#Ã;Ob@ÃbÃ2'H;ÃI$#5<Ã[-&#$	I"5<ÃDÃQ(9 $(<9<+5Ã' $+59<- ÃDÃ$8	] EÃ< +$5
	O<$ ("9Ã=QKOÃ]dÃ2'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-	GAÃ/-85
	O<$ ("9Ã=QKOÃA?bÃ& ÃbÃ?BÃ+,H;Ã.-$"(#Ã[-&#$	I"5<ÃDÃ. $ (#Ã5-6-&"5'ÃDÃr#(",#Ã TI,#/"," (')Ã7-&9<,"(')Ã^ #-(, "('U	BÃ[##Z5
K&<8#(\#(#	F9+&#ÃKOb@ÃdE@@H;ÃI$#5<Ã[-&#$	F,'-# ÃDÃ15#+/ Z"$9<#$"#,Ã5+:9-! "&-&-	OGÃ< +$5
	F9+&#ÃKOb@ÃdO@@H;ÃI$#5<Ã[-&#$	F,'-# ÃDÃ15#+/ Z"$9<#$"#,Ã5+:9-! "&-&-	] EÃ< +$5
	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	O$+5&-9#(5ÃDÃF$&#2"-Ã5!?ÃDÃ'"	BdÃ< +$5
	F9+&#ÃKOb@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃ=# (-8#	BdÃ< +$5
	F9+&#Ã;Ob@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	I "5<ÃDÃQ(9 $(<9<+5Ã28"55	] EÃ< +$5
(D7#6-(#	F9+&#Ã;Ob@ÃW@@@H;ÃI$#5<Ã[-&#$	I"5<ÃDÃQ$# 9<$ 2"5Ã2 55-2:'9+5	]EÃ< +$5
=-!< &<-,#(#	F9+&#ÃKOb@ÃdE@@H;ÃI$#5<Ã[-&#$	%-!< ("-ÃDÃ%-!("-Ã2-' (-ÃDÃ=# (-8#	BdÃ< +$5
	F9+&#Ã;Ob@ÃdO@Ãp'H;Ã.-$"(#Ã[-&#$	O$+5&-9#(5ÃDÃ1-,-#2 (#&#5Ã!+'"	BdÃ< +$5
	F9+&#Ã;Ob@ÃdO@Ãp'H;ÃI$#5<Ã[-&#$	I"5<ÃDÃ.#,-(&-#("-ÃV,+>"-&",ÃÃD>-#	] EÃ< +$5

Persistence and degradability

Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
4-5 ,"(#)Ã(-&+$-,	D	A@Ã& ÃGb@@	<"'<
S8,#(#	W?AG	d?AÃ& ÃGb?]	, [
Ä ,+#(#	G?CW	]@	, [
K&<-(,	D@?Wb	D	, [
A)G)BDÄ$"2#&<#8 \#(#	W?EW	GBW	, [
J#(\#(#	G?AW	AA	, [
K&<8#(\#(#	W?E	D	, [
(D7#6-(#	B	b@A?AGd	<"'<
=-!< &<-,#(#	W?B	WE?bÃ& ÃAEd	, [

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Ä<#$#Ã"5Ã(Ã/-&-Ã->-",#?

Other adverse effects : = ÃZ([(Ã5'"("V"9-(&Ã#VV#9&5Ã'$,Ã$-"& $'5?

Section 13. Disposal considerations

Disposal methods : %"5! 5-,Ã VÃ&<"5Ã!$ /+9&)Ã5 ,+5Ã"-(/Ã-(8 Ã8 D!$ /+ 9&5Ã5< +,9Ã2!, 8Ã["&<Ã&<#Ã$#Y2+#$#5Ã VÃ#(>"$ (2#(&-,Ã !$ &#9&" (Ã-(/Ã[-5&#Ã/"5! 5-,Ã,#5,- & (Ã-(/ Ã-(8Ã$#'" (-,Ã, 9- ,Ã+&< $"&Ã$#Y+"$#2#&5?

Section 14. Transport information

DOT IDENTIFICATION NUMBER 3=AG@W

DOT proper shipping name 4FNQ;L=KÃT4-5 ,"(#)Ã(-&+$-,)ÃG$#(# U?Ã.-$"(#Ã! ,,+&-(&Ã T4-5 ,"(#)Ã(-&+$-,)Ã(D7#6#UÃ*MÃTJ#(\#(#)ÃS$(# U

DOT Hazard Class(es) W

PG L

DOT EMER. RESPONSE GUIDE NO. AGd

Section 15. Regulatory information

U.S. Federal regulations :

TSCA 8(a) PAIR`Ã=-!<&<-,#(#

TSCA 8(a) CDR Exempt/Partial exemption`Ã= &Ã/#&#$2"(#/

United States inventory (TSCA 8b)`ÃF,,Ã9 2! (# (&5Ã-$#Ã,"5&#/Ã $Ã#6$#2!?

Clean Water Act (CWA) 307`ÃÀ ,+#(#gÃJ#(\#(#gÃK&<;$(\#(#gÃ=-! <&<-,#(#

Clean Water Act (CWA) 311`ÃÀ ,+#(#gÃ$,#(# gÃJ#(\#(#gÃK&<;$(\#(#gÃ=-! <&<-,#(#

Clean Air Act Section 602 Class I Substances : = &Ã,"5&#/

Clean Air Act Section 602 Class II Substances : = &Ã,"5&#/

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : ;"5&#/

DEA List I Chemicals (Precursor Chemicals) : = &Ã,"5&#/

DEA List II Chemicals (Essential Chemicals) : ;"5&#/

SARA 302/304

Composition/information on ingredients

= Ã!$ / +9&5Ã[#$#ÃV +(/?

SARA 304 RQ : = &Ã-!!," 9-:,# ?

SARA 311/312

Hazard classifications : I"$#Ã<-\-$/
L22#/"-&#ÃT-9+&#UÃ;$#<Ã<-\-$/
%#,-$#/ÃT9<$ (9UÃ<#&,<Ã<-\-$/

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
4-5 ,"(#)Ã(-&+$-,	89ÃD0	= ?	= ?	= ?	= ?	R#5?
S8,#(#	aA@ÃDÃcGb	R#5?	= ?	= ?	R#5?	= ?
Ä ,+#(#	aA@ÃDÃcGb	R#5?	= ?	= ?	R#5?	R#5?
K&<-(,	<A1	R#5?	= ?	= ?	R#5?	= ?
A)G)BDÄ$"2#&#$ \#(#	aWÃDÃcb	R#5?	= ?	= ?	R#5?	= ?
J#(\#(#	aWÃDÃcb	R#5?	= ?	= ?	R#5?	R#5?
K&<8#(\#(#	aWÃDÃcb	R#5?	= ?	= ?	R#5?	R#5?
(D7#6-(#	aWÃDÃeb	R#5?	= ?	= ?	R#5?	R#5?
=-!< &<-,#(#	a@?WÃDÃeA	R#5?	= ?	= ?	R#5?	R#5?

SARA 313 : Ä<"5Ã!$ /+9&ÃT/ $H(&UÃ9 (&-"(Ã& 6"9Ã9<#2$5+:f#9&Ã&<#&#! $&"(Ã$#Y$#2#(&5Ã VÃNF*FÃN#9&" (ÃWAWÃ VÃ &<#ÃK2#$'#(9$Ä,-(("(' Ã-(/ÃO 22+("&8Ä'"<&DÀ DP([ÃF9&Ã VÃA]d[ÃÃ VÃB@ÃOI*ÃWCG?

Product name	CAS number	%
S8,#(#	AWW@@DC	A@ÃDÃW@
Ä ,+#(#	A@dDdDW	A@ÃDÃW@
A)G)BDÄ$"2#&#$ \#(#	]bDEWDE	bÃDÃA@
J#(\#(#	CADEDG	WÃDÃb
K&<8#(\#(#	A@@ADB	WÃDÃb
(D7#6-(#	AA@BDW	WÃDÃb
=-!< &<-,#(#	]ADG@W	@?WÃDÃA

NF*FÃWAWÃ(&"V"9&Ä2+5&Ã(&Ã:#Ã/#&-9<ÃV$ 2Ã&ÃN%NÃ-(/Ã-(Ã9 !8 "('Ã-(/ Ã$#/"5&$"&#' (Ã VÃ&<#ÃN%NÃ5<-,,#Ã9,!8 "('Ã- (/ Ã$#/"5&$"&#' (Ã VÃ &<#Ã(&"9#Ã-&&-9Ã&/ Ã9 !"#5Ã VÃ&<#ÃN%NÃ5+:$#Ã$#/"5&$"&#/?

State regulations

Massachusetts : Ä<#ÃV ,, ["('Ã9 2! (#(&5Ã-$#Ã,"5&#/Ã5 ," (#)Ã(-&+$-,gÃÀ ,+(# gÃS$#(# gÃK&(,gÃJ#(\#(#gÃA)G) BDÄ$"2#&;$(\#(#gÃK&<$#(\#(#gÃ(D7#6-(#

New York : Ä<#ÃV ,, ["('Ã9 2! (#(&5Ã-$#Ã,"5&#/Ã+# (#gÃS$#(# gÃJ#(\#(#gÃK&<$#(\#(#gÃ(D7#6-(#gÃ=-! <&<-,#(#

New Jersey : Ä<#ĀV ,, ["('Ā9 2! (#(&5Ā-$#Ā,"5&#4-5 ," (#)Ā(-&+$-,gĀÄ ,+# gĀS,#(# gĀK&(,gĀJ#(\#(#gĀA)G) BDÄ$"2#&<#(\#(#gĀK&<,#(\#(#gĀ(D7#6-(#gĀ=-! <&<-,#(#

Pennsylvania : Ä<#ĀV ,, ["('Ā9 2! (#(&5Ā-$#Ā,"5&#4-5 ," (#)Ā(-&+$-,gĀÄ ,+# gĀS,#(# gĀK&(,gĀJ#(\#(# gĀA)G)BDÄ$"2#&<#(\#(#g K&<,#(\#(#gĀ(D7#6-(#gĀ=-! <&<-,#(#

California Prop. 65 : **WARNING:**ĀÄ<"5Ā!$ /+9&Ā9 (&-"(5Ā-Ā9<#2"9ĀZ([(Ā& Ā&<#ĀN#& VĀO-,"(" $Ā& Ā9-+5#Ā9-(9#$Ā-Ā(:"$&<Ā /#V#9&5Ā $Ā &<#$Ā$#!9&">#Ā<-$2?

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Ä ,+#(#	= ?	R#5?	= ?	C@@Āp'H/-8ĀT"('#5&" (U AW@@Āp'H/-8ĀT"(<-,-&" (U
J#(\#(#	R#5?	R#5?	E?BĀp'H/-8ĀT"('#5&" (U AWĀp'H/-8ĀT"(<-,-&" (U	GBĀp'H/-8ĀT"('#5&" (U B]Āp'H/-8ĀT"(<-,-&" (U
K&<8#(\#(#	R#5?	= ?	BAĀp'H/-8ĀT"('#5&" (U bBĀp'H/-8ĀT"(<-,-&" (U	= ?
=-!< &<-,#(#	R#5?	= ?	R#5?	= ?
O+2#(#	R#5?	= ?	= ?	= ?

Section 16. Other information

Revision date : @GHGBAHG@ **Supersedes** : @EHAbHAG@

Revised Section(s) : A)ĀG)ĀB)ĀC)ĀA)ĀAG)ĀAB)ĀAb)ĀAE? **Prepared by** : P.PĀ*#'+,- & $ĀN#$>"9#5ĀL

= &"9#& Ā#-/#$

Ā7KĀL=IQ*. FÄLQ=ĀOQ=ÄFL=K%ĀLÄ7LNĀN%NĀ*K;FÄKNĀQ=;R ĀÄQĀÄ7KĀN1KOLLOĀ.FÄK*LF;ĀL%K=ÄLILK%?ĀÄ%QKNĀ=QÄĀQhK*Ā3NKĀQIĀÄ7FÄĀ.FÄK*LF ;ĀL=ĀOQ.JL=FÄLQ=Ā^ LÄ7ĀF=RĀQÄ7K*Ā . FÄK*LF;ĀQ*ĀL=ĀF=RĀ1F*ÄLO3; F*Ā1*QOKNN?ĀL=ĀOQ.1;LF=OKĀ^ LÄ7ĀG]ĀO!?*?Ā]A@ĀG@@TO7ĀNĀ7FNĀ1*K1F*K% ĀÄ7LNĀN%LĀĀNK4.K=ÄN)Ā^ LÄ7 ĀÄ7KĀLÄK=ĀĀÄ7FĀĀÄ7QNKĀNK4.K= ÄNĀKĀ *KF%ĀÄQ4KÄ7 K*ĀFNĀFĀ 7 Q;KĀ^ LÄ7 Q3ĀĀÄKSÄ3F;ĀQ.LNNLQ=NĀQ ĀF;ĀK*FÄ LQ=N?ĀO7NĀJK;KhKNĀÄ7 KĀL=IQ*. FÄLQ=ĀOQ=ĀFL=K%Ā7K*KL=ĀÄQKĀFOO3* FÄK)Ā3ĀĀ. FPKNĀ=QĀ *K1*KNK= ĀFÄLQ=)Ā3F*F= ÄKK)ĀQ*Ā^F**F= ÄR)ĀKS1KNNĀQ*ĀL 1;LK%)ĀJQ 3ÄĀÄ7KĀFOO3*FOR)ĀK;LFJL;L ÄR)ĀQ*ĀQ. 1;KÄK=KNNĀQIĀÄ7KĀL=IQ*. FÄLQ=ĀQ*ĀFJQ3ÄĀÄ7KĀILÄ=KNNĀQ Ā OQ=ÄK=ÄNĀ7K*KL=ĀIQ*ĀKLÄ7K*Ā4K=K*F;ĀQ*Ā1F*ÄLO3;F*Ā13* 1QNKN?ĀK* NQ=NĀ*KhLK^ L=4ĀÄ7LNĀN%NĀ7Q3;% Ā.FPKĀÄ7KL*ĀQ^ =Ā%KÄK*. L=FÄLQ=ĀFNĀQĀÄ7KĀ. FÄK*LF;sNĀ N3LÄFJL;LÄRĀF=%ĀOQ.1;KÄK=KNNĀIQ*Ā3NKĀL=ĀÄ7KL*Ā1F*ÄLO3;F* Ā11;L OFÄLQ=N?

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SAFETY DATA SHEET

Section 1. Identification

CHS Inc.
P.O. Box 64089
Mail station 525
St. Paul, MN 55164-0089

Transportation Emergency (CHEMTREC) : **1-800-424-9300 CCN23163**
Technical Information : **1-651-355-8443**
SDS Information : **1-651-355-8445**

Product name : Ä !"#$%&%'(Ā)*+'!Ā,-.Ā/0Ā12

Common name : Ä !"&+*'(3%"&4$5'$$'#Ā6*+'!7

Chemical name : 9+8"'(&%'4:Ā#7*

Chemical family : Ä !"#(&"8 #47

SDS no. : >?@B>CD?AĀ

Revision date : >C3>?3D?@

Chemical formula : 1'E%+"=

Relevant identified uses of the substance or mixture and uses advised against

;#%Ā&<&'*&8*=

Section 2. Hazards identification

OSHA/HCS status : F G'*=Ā%G'$Ā5&%="'&*Ā'$Ā4#%Ā(#4$&"!#+$Ā8Ā%G=Ā.-ĀIĀ&H&"!Ā#55+4'(& %#4Ā-%&4!&"ĀKDAĀJ)LĀ?A?>7 ?D>>MNĀ$Ā-O-Ā(#4%&$Ā&*+&8*=Ā'6#"5&%'#4Ā("'%'(&*Ā%#&%Ā&&4:Ā&4!ĀP"#P="Ā+$=Ā#6Ā%G=Ā(%'6Ā G'$Ā -O-Ā$G#+*!Ā8=Ā"=%&'Ā&4!Ā&<&'*&8Ā6#"Ā=5P*#=$Ā&4Ā#%G="Ā"$Ā#6Ā%G'$ĀP"#!+(%7

Classification of the substance or mixture : ;#%Ā(*&$$'6'=7!

GHS label elements

Signal word : ;#Ā$':4 &*ĀT#"7

Hazard statements : ;#ĀS4#T4Ā$':4'6(&4%Ā=66=(%$Ā#'&*Ā'G&"!&7

Precautionary statements

General : L=&! Ā*&8=Ā*8=6#"=Ā+$=7ĀĀR==PĀ#+%Ā#6Ā"=&'(=Ā'$Ā4==!=NĀG&<=ĀP"#!+(%Ā(#4%&'4="Ā#"Ā *&8=Ā&%ĀG&4!7

Prevention : ;#%Ā&PP&'8*=7

Response : ;#%Ā&PP&'8*=7

Storage : ;#%Ā&PP&'8*=7

Disposal : ;#%Ā&PP&'8*=7

Hazards not otherwise classified : ;#4= ĀS4#T47

Hazardous Material Information System (U.S.A.) **Health :** ? 3 **Flammability :** ? **Physical hazards :** >

National Fire Protection Association (U.S.A.) **Health :** ? **Flammability :** ? **Instability :** >

Section 3. Composition/information on ingredients

Substance/mixture : 1'E%+"=

Chemical name : 9+8"'(&%'4:Ā#7*

Other means of identification : Ä !"&+*'(3%"&4$5'$$'#Ā6*+'!7

Ingredient name	%	CAS number
O'$%'*%&=$ĀKP=%"#*=+5MNĀG&%ĀG=&<Ā P&"&66'4'(DN0B!'B%="%BPG%#*	UDCĀBĀVC> Y>7DC	0/W/ DBC/BW ?D@BZ

I 4 Ā(#4(=4%"&%Ā&G#T4Ā&$Ā&Ā=&4$Ā%#ĀP"#%=(%Ā(#4%&'4="Ā#"Ā$Ā!+=Ā%#Ā8&%(GĀ<&"'&%'#47

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact :

Inhalation :

Skin contact :

Ingestion :

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact :

Inhalation :

Skin contact :

Ingestion :

Over-exposure signs/symptoms

Eye contact :

Inhalation :

Skin contact :

Ingestion :

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician :

Specific treatments :

Protection of first-aiders :

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media :

Unsuitable extinguishing media :

Specific hazards arising from the chemical :

Hazardous thermal decomposition products :

Special protective actions for fire-fighters :

Special protective equipment for fire-fighters :

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel :

Methods and materials for containment and cleaning up

Spill :

Section 7. Handling and storage

Precautions for safe handling

Protective measures :

Advice on general occupational hygiene :

Conditions for safe storage, including any incompatibilities : Ä&4! *'4: Ā%=5P="&%+"=$Ā$Ā##%Ā=E(=Ā?WCb)ĀK@>bJM7ĀO#Ā=4Ā&Ā$%Ā%G=Ā64:Ā#!=5P="%"=]Ā??ZbJĀ KDZC7/b)M7Ā#Ā$Ā&4 ! Ā%#E'(Ā6+5=$ĀĀ&#"5Ā6Ā%G=Ā!=(#5P#%'#4Ā#6Ā%G'$ĀP"Ā&#"=!Ā&%Ā=E(=$$'<=Ā %=5P="&%+6Ā6#"Ā=E%=4!=!Ā#$Ā#6Ā%'5=7Ā#=Ā4Ā&((#&4(= ĀT'%GĀ*#(&*Ā"&%#$7ĀĀ#%Ā'4Ā&ĀNĀ(##*Ā&4!Ā T=**B<=4%%&!Ā&"=&NĀĀ&#5Ā'4(#5P&%=5&="'&*$ĀĀ=(=%'#4Ā?>M7ĀĀ^$=Ā&*Ā#%=Ā(#45=4 %Ā&##!Ā =4<'"#45=4 %&*Ā(#4%&5'4#47

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
O'$%'*%&=$Ā=%"#*=+$ĀĀ=%"=&%Ā=&<Ā"&66'4'(	**OSHA PEL (United States, 6/2016).** Ā@F I]ĀCĀ5:35cĀ@ĀG#+"$7 **ACGIH TLV (United States, 3/2017).** Ā@F I]ĀCĀ5:35cĀ@ĀG#+"$7Ā,4G&*&Ā6"&(%'#4 **NIOSH REL (United States, 10/2016).** Ā@F I]ĀCĀ5:35cĀ?>ĀG#+"$7Ā)#"5]Ā% ĀĀ-@9]Ā?>Ā5:35cĀ?CĀ5'4+%=$7Ā)#"5]%

Appropriate engineering controls : ^$=Ā#4*Ā'%GĀ&!=\&%=Ā<=4%'*&%'#47

Environmental exposure controls : a5'$$'#4$Ā6"#5Ā<=4%'*&%'#4Ā#$ĀP##(=$$Ā=\P5=4 %Ā$G#+*!Ā&=(S=!Ā%#Ā=4'$=Ā%GĀ(#5P* Ā'%GĀ%G=Ā "=\+' "=5=4%$Ā#6Ā=4<'"#45=4Ā&#=(%'#4Ā*&%'#4

Individual protection measures

Hygiene measures : F &$GĀG&$NĀ6#"=&"5$Ā&4!Ā6&(=Ā%G#"Ā&6%="ĀG&4Ā'G=5'(& *ĀP"#!(%$NĀ8=6#"=Ā=&%'4:NĀ$Ā&$!Ā+$'Ā %G=Ā*&<&Ā#!Ā&%Ā%G=Ā=4!Ā#6Ā%GĀ+"=Ā%GĀ&%T&$GĀ$%&%'#4$Ā&4!Ā$&&=#'="$Ā&*#$=Ā %#Ā%G=ĀT#"S$%&%#4Ā*#(&

Eye/face protection : L=(#55= 4!=!]Ā-P*&$GĀ:#:*=$Ā&4Ā&Ā6&(=Ā$G'=*!NĀ=Ā$P*&$G&!Ā=E$%$7

Skin protection

Hand protection : /ĀBĀ@ĀG#+"$ĀK8"=&$Ā%"#=M]Ā;'%"'#=Ā=$7

Body protection : L=(#55= 4!=!]Ā9#4:Ā$*=<=!Ā(#<="&**$7

Other skin protection : L=(#55= 4!=!]Ā,5P="=+$Ā8#%$7

Respiratory protection : ,6Ā=4%'*&%#$Ā'4&!=&%=NĀ+$=Ā&Ā;,.-ĀB(='%'6'=!Ā"&$G#TĀ%GĀ&4Ā#!(&Ā<&P#"Ā(&"%'"!:=Ā&4ACĀP&"%&%=Ā 6'*%="7

Section 9. Physical and chemical properties

Appearance

Physical state : 9'\+ '!7

Color : I 58="7

Odor : 1'*!7

Odor threshold : ;#%Ā&<&'*&8*=

pH : ;#%Ā&<&'*&8*=

Melting point : ;#%Ā&<&'*&8*=

Boiling point : ;#%Ā&<&'*&8*=

Flash point : J*#$=! Ā(+P]ĀeD>@bJĀK7#0M

Flammability : ;#%Ā&<&'*&8*=

Lower and upper explosive (flammable) limits : ;#%Ā&<&'*&8*=

Relative density : >7@0AĀ%#Ā>7@W

Evaporation rate : Y?ĀKa%G="7ĀdĀ?M

Solubility : ,4$#*+8*=Ā'4Ā%G=Ā6#"*&%="'&*$]Ā(#*!ĀT&%="Ā &4!ĀG#%ĀT&%="7

Solubility in water : ,4$#*+8*=

Partition coefficient: n-octanol/water : ;#%Ā&<&'*&8*=

Auto-ignition temperature : ;#%Ā&<&'*&8*=

Decomposition temperature : ;#%Ā&<&'*&8*=

SADT : ;#%Ā&<&'*&8*=

Viscosity : ;#%Ā&<&'*&8*=

Vapor pressure : Y>7?ZĀS`&ĀKY?Ā55ĀÄ:M]ĀK0@

Vapor density : ;#%Ā&<&'*&8*=

Section 10. Stability and reactivity

Reactivity : ;#Ā$P=('6(Ā%=$%&%Ā"%&!Ā%#Ā"=&(%&<&'*&8Ā6#"Ā&$Ā"#! +(%Ā#"Ā'%$Ā'4:"4%$7

Chemical stability : QG=ĀP"#!(%Ā'$Ā&8%7

Possibility of hazardous reactions : ^4!= "Ā4#"5&*Ā(#4!%'#4$Ā#6Ā$%#"&!ĀĀ&4NĀG&H&"$Ā"=&(%4$ĀT'**Ā4#Ā#((+"7

Conditions to avoid : ;#Ā$P=('6(Ā!&%&7

Incompatible materials : L=&(%'<=Ā#"Ā'4(#5P&8*=ĀT'%GĀ%G=Ā6#&%="'&*$]Ā#E'4:Ā5&%="'$7

Hazardous decomposition products : ^4!= "Ā4#"5&*Ā(#4!%'#4$Ā#6Ā$%#"&!ĀĀ&4NĀG&H&"$Ā!=(#5 P#$%'#ĀP"#!+(%$Ā$G#4#%Ā8=ĀP"#!7

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
DN0B!'B%="%BPG4#*	9OC>ĀO="5&* 9OC>Ā."&*	L&88'% L&%	e?>Ā 3S eC>>>Ā5:3S:	B B

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
DN0B!'B%="%BPG4#*	-S'4ĀBĀ1#!="&%=Ā'""%&4	L&%	B	>7CĀ5*	B

Sensitization

Skin : ;#%ĀG&H&#+$ĀKP="Ā5&6&(%+"="M7

Respiratory : ;#%ĀG&H&#+$ĀKP="Ā5&6&(%+"="M7

Mutagenicity

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Carcinogenicity

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Reproductive toxicity

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Teratogenicity

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Specific target organ toxicity (single exposure)

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Specific target organ toxicity (repeated exposure)

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Aspiration hazard

Name	Result
O'$%'*%=$Ā=%"#*=+$NĀG"#%"=&%ĀG=&<ĀP&"&66'4'(	I -`,LIQ, .;ĀÀIfILOĀBĀJ&%= : #" Ā?

Information on the likely routes of exposure : O="5&*Ā(#4&(%7Ā=Ā(#4%&(%7Ā,4G&7&%=$%'#7

Section 12. Ecological information

Toxicity

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Persistence and degradability

QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
DN0B!'B%="%BPG4#*	/7C	B	G':G

Mobility in soil

Soil/water partition coefficient (K_{oc}) : QG="=Ā'$Ā4#Ā!&%&Ā&*=&7*&

Other adverse effects : ;#ĀS4#T4Ā$':4'6(&4%Ā=66=(%$Ā#"&Ā'%&H&7

Section 13. Disposal considerations

Disposal methods : O'$P#$&*Ã#6Ã%G'$ÃP"#!+(%NÃ$%&*4!Ã&4Ã BP"#!+(%$Ã$G#+(#ÃP* ÃT'%GÃ%G=Ã"5\=4%$Ã#6Ã=4<'"#45=4%&*Ã P"#%=(%#&4!ÃT&$%=Ã$%&*Ã:$*&%'#4Ã&Ã&4Ã"=:'#4&*Ã*#(&+%G#'"Ã\+'"=5= 4%$7

Section 14. Transport information

DOT IDENTIFICATION NUMBER ;#%Ã&PP'&8*=7 **DOT proper shipping name** ;#%Ã&PP'&8*=7

DOT Hazard Class(es) ;#%Ã&PP'&8*=7 **PG** ;#%Ã&PP'&8*=7 **DOT EMER. RESPONSE GUIDE NO.** ;#%Ã&PP'&8*=

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 4(a) final test rules**]ÃDBX+%=4#(Ã&('! ÃKaMBBNBÃ@B@B&*Ã=$%="$

TSCA 8(a) PAIR]ÃDBX+%=4#(Ã&('! ÃKaMBBNBÃ@B@B&*Ã=$%="$

TSCA 8(a) CDR Exempt/Partial exemption]Ã;#%Ã!=%="5'4=!

United States inventory (TSCA 8b)]ÃI**Ã(#5P#4=4%$Ã&"=Ã*'$%=!Ã#"Ã%=5P

Clean Water Act (CWA) 307]Ã`G#$PG'#!'%G'#Ã&('!NÃ5'E=!Ã.N.B8'$K$=(BX+Ã&Ã$##(%MÃ%&="$NÃH'4(Ã$&*%$_ Q#*+=4=_Ã`G=4#*_ÃX=4H=

Clean Water Act (CWA) 311]ÃQ#*+=4=Ã1&*='(ÃI4G'"!= _Ã`G=4#*_Ã2*4Ã&(=%&%=_ÃX=4H=4=

Clean Air Act Section 602 Class I Substances : ;#%Ã*'$%=! **DEA List I Chemicals (Precursor Chemicals)** : ;#%Ã*'$%=!

Clean Air Act Section 602 Class II Substances : ;#%Ã*'$%=! **DEA List II Chemicals (Essential Chemicals)** : ;#%Ã*'$%=!

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : 9'$%=!

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ (lbs)	SARA 302 TPQ (gallons)	SARA 304 RQ (lbs)	SARA 304 RQ (gallons)
2'4 *Ã&(=%&%= `G=4#*	V>7>>? V>7>>>?	i =$7 i =$7	?>>> C>>Ã3Ã?>>>	?DA B	C>>> ?>>>	0//7@ B

SARA 304 RQ : CCZÃW0WDÃ*8$Ã3ÃDC7?W7/ÃS:ÃgW0C?D@ZÃ:&*Ã3ÃD@ÃD>C7WÃ9h

SARA 311/312

Hazard classifications : ;#%Ã&PP'&8*=7

Composition/information on ingredients

Name	Classification
O'$%'*%&=$ÃKP=%"#*=+5MÃ&G=&<Ã&"&66'4'(	I -`,LIQ, .;ÃÀIfILOÃBÃJ&%=:#" Ã?

SARA 313 : QG'$ÃP"#!+(%ÃK$8#%MÃ(#4%&'4Ã%#E'(Ã($5+(=(%Ã%#Ã?#'%'4:Ã"=\+"=5=4%$Ã#6Ã-ILIÃ-=(%'#4ÃZ?ZÃ#6Ã %G=Ãa5=":=4(Ã`*&44'4Ã&4!ÃJ#55+4'% Ã':G%BQ#BR4#TÃI(%Ã#6Ã2Ã@6ÃA/>ÃJ)LÃZWD7

Product name	CAS number	%
f'4(Ã(#5P#+4 !$	1'E%+"=	>7>AÃ&$Ãf'4(

-ILIÃZ?ZÃ4#%'6'(&%8Ã5+$%Ã4#%Ã8=Ã!=%Ã6'5Ã-Ã-O-Ã&4!Ã&4Ã#P '4:Ã&4Ã"=!'$%"'8%'#4Ã#6Ã%G=Ã-O-Ã$G&*=Ã(#P'+4:Ã&4! Ã"=!'$%"'8%'#4Ã#6Ã %G=Ã4#%'(=Ã&%%Ã&(Ã(#P'=$Ã#6Ã%G=Ã-O-Ã$+8%Ã"=!'$%"'8%=7

State regulations

Massachusetts : QG=Ã6#**#1Ã(#5P# 4=4%$Ã&"=Ã*'$Ã%=$%'**&%=$ÃKP=5MÃ&G=&<Ã&"&66'4'(_ÃO'$%'**&%=$ÃKP=%"#*=+5MÃ&G=&<Ã&"&66'4'(

New York : ;#4= Ã#6Ã%Ã(#5P#4=4%$Ã&"=Ã*'$%=!

New Jersey : QG=Ã6#**#1Ã(#5P# 4=4%$Ã&"=Ã*'$Ã%=$%'**&%=$ÃKP=5MÃ&G=&<Ã&"&66'4'(_ÃO'$%'**&%=$ÃKP=%"#*=+5MÃ&G=&<Ã&"&66'4'(

Pennsylvania : ;#4= Ã#6Ã%Ã(#5P#4=4%$Ã&"=Ã*'$%=!

California Prop. 65

WARNING]ÃQG'$ÃP"#!+(%Ã(&4Ã$EÃ#Ã%#ÃX=4H=ÃTG'(GÃ'$ÃS4#T4Ã%#Ã%G=Ã-%&%=Ã#6Ã%#"4&Ã%#Ã(&+$=Ã(#&Ã&4!Ã8'%GÃ!=6=(%$Ã#"Ã#%G=" "=P"#!+(%'<=ÃG&"5TÃ$ÃP"#!+(%Ã(&4Ã=EP#$#=Ã%#Ã(G=5'$Ã'4(+!'4:Ãa%GÃ&("*&%=NÃTG'(GÃ'$ÃS4#Ã%G=Ã-%&%=Ã#6Ã%#"4&Ã%#Ã(&+$=Ã(#&Ã&4!ÃQ#*=4=N

Ingredient name	No significant risk level	Maximum acceptable dosage level
a%G*Ā&("*&%= Q#*+=4= X=4H=4=	B B i=$7	B i=$7 i=$7

Section 16. Other information

Revision date : >C3>?3D?>@ **Supersedes** : >C3>W3D?G

Revised Section(s) : ?NĀZNĀ?@NĀ?NĀ?DNĀ?CNĀ?07 **Prepared by** : R1RĀL=:+*&%#"Ā-="<'(=$Ā4(7

;#%'(=Ā%#Ā&!="

QÀaĀ;).L1 I Q,.;ĀJ.;QI,;aOĀ,;Ā QÀ,-Ā-O-ĀLa9IQa-Ā .;9i ĀQĀQÀaĀ-`aJ, ),JĀ1IQaL,I9Ā, Oa;Q,),aO7ĀĀQĀO.a-Ā;.QĀ J.2aLĀ^-aĀ.)ĀQÀIQ Ā1IQaL,I 9Ā; ĀJ.1 X,;IQ, .;ĀF ,QÀĀI;i Ā.QÀaLĀ 1 I QaL,I9Ā. LĀ,;ĀI;iĀ`ILQ, J^9 ILĀ`L.Ja--7ĀĀ ,;ĀJ.1 `9,I;JaĀF ,QÀĀDAĀ7)7LĀ?A?>?D>>K:MNĀĀĀI-Ā`La`ILaO ĀQÀ,-Ā-O-Ā ,;Ā-a[1a;Q-NĀF ,QÀĀQÀaĀQa;QĀQÀIQĀQÀ.-aĀ-a[1a; Q-ĀXaĀ LaIOĀQ.[aQ ÀaLĀI-ĀIĀ F Ā.9aĀF ,QÀ.^QĀQa kQ^I9Ā.1,--,.;-Ā. L ĀI9QaLIQ ,. ;-7Ā ĀJĀ-ĀXa9,a2a-ĀQ ÀaĀ,;).L1 I Q,.;ĀJ.;QI,;aOĀÀaLa,;ĀQ.Ā XaĀIJJ^L I QaMX^QĀ1 IRa-Ā;.Ā La`La-a; QIQ,.;NĀ[^ILI; QaaNĀ.LĀF ILLI; QiNĀak`La--Ā.LĀ, 1 ` 9,aONIX. ^QĀQÀaĀIJJ^ LIJi NĀa9,IX,9, QiNĀ.LĀJ .1 `9aQa;a--Ā .)ĀQÀaĀ,;).L1 I Q,. ;Ā.LĀIX.^QĀ QÀaĀ),Q;a--Ā.) Ā J.;Qa;Q-ĀÀaLa,;Ā).LĀa,Q ÀaLĀ[a;aLI9Ā.LĀ`ILQ,J^9ILĀ`^L ` .-a-7Ā ĀaL -.;-ĀLa2,aF ,;[ĀQ Ā,-Ā-O-Ā -Ā.^9O Ā1IRaĀQÀa,LĀ.F ;ĀOaQaL1 ,;IQ, . ;ĀI-Ā Q.ĀQÀaĀ1IQaL,I9I- Ā -^,QIX, 9,Qi ĀI;O ĀJ.1 `9aQa;a--Ā).LĀ^-aĀ,;ĀQ Ā,LĀ`ILQ, J^9IL Ā``9, J IQ,.;-7

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OUR ENERGY COMES THROUGH.

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Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Hydraulic Oil AW 32, 46, 68

Product Use: Hydraulic Oil
Product Number(s): 255673, 255674, 255675, 293130, 293131, 293132
Company Identification
Chevron Products Company
a division of Chevron U.S.A. Inc.
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: 1 (800) 582-3835, LUBETEK@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Not classified as hazardous according to 29 CFR 1910.1200 (2012).

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 99 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

DELAYED OR OTHER HEALTH EFFECTS: Not classified

Indication of any immediate medical attention and special treatment needed

Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
Unusual Fire Hazards: Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose

such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Silver Shield, Viton, Nitrile Rubber.

Respiratory Protection: No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m3	--	--	--
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: <0.01 mmHg @ 37.8 °C (100 °F)
Vapor Density (Air = 1): >1
Initial Boiling Point: 315°C (599°F)
Solubility: Soluble in hydrocarbon solvents; insoluble in water.
Freezing Point: Not Applicable
Melting Point: No data available
Density: 0.87 kg/l @ 15°C (59°F) (Typical)
Viscosity: 28.80 mm2/s @ 40°C (104°F) Minimum
Coefficient of Therm. Expansion / °F: No data available
Evaporation Rate: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 170 °C (338 °F) Minimum
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for product components.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for product components.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:
This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).
These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.
The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY

This material is not expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material.
The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE

Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: NOT REGULATED AS A HAZARDOUS MATERIAL UNDER 49 CFR

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:

1.	Immediate (Acute) Health Effects:	NO
2.	Delayed (Chronic) Health Effects:	NO
3.	Fire Hazard:	NO
4.	Sudden Release of Pressure Hazard:	NO
5.	Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), ENCS (Japan), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

NEW JERSEY RTK CLASSIFICATION:
Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Hydraulic oil)

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 0 Flammability: 1 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: This revision updates the following sections of this Safety Data Sheet: 1 - 16
Revision Date: FEBRUARY 05, 2016

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on	OSHA - Occupational Safety and Health Administration

Cancer	
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Energy Technology Company, 6001 Bollinger Canyon Road San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Appendix 1.4.A: 2017 Coordinated Review (NYSDEC)

New York State Department of Environmental Conservation

Notice of Incomplete Application - This is NOT a Permit

Application ID: 7-1122-00043/00008 *Batch Number*: 810445

Facility: CORTLANDVILLE SAND & GRAVEL MINE
765 ST RTE 13
SOUTH CORTLAND, NY

Applicant: RT 13 ROCKS LLC *Owner ID*: 1731390
765 ST RTE 13
CORTLAND, NY 13045

Permit(s) Applied for: 1 - Article 23 Title 27 Mined Land Reclamation

Project Location: in CORTLANDVILLE in CORTLAND COUNTY

Your application for Permit is incomplete. The following items are required:

1) The project is being reviewed pursuant to the State Environmental Quality Review Act (SEQR). A designation of lead agency and a determination of significance for the purposes of SEQR are necessary before your application can be considered complete.

Additional Information:

cc: Tom Rigley, DEC Minerals
File

~~***Please submit requested information by***~~ _____
No further action can be taken until all of these materials are received.

Contact Person:
JOSEPH M DLUGOLENSKI
NYSDEC
1285 Fisher Ave
Cortland, NY 13045

Telephone Number: (607) 753-3095

Signature: JDlugolenski

Date: April 18, 2017

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 7
1285 Fisher Avenue, Cortland, New York 13045-1090
Phone: (607) 753-3095, ext. 294 • **Fax:** (607) 753-8532

April 18, 2017

Supervisor Richard Tupper
Town of Cortlandville
3577 Terrace Road
Cortland, NY 13045

RE: LEAD AGENCY COORDINATION NOTICE
Proposed Mine Expansion, Cortlandville Sand & Gravel Mine, 765 St Rte 13
Rt 13 Rocks LLC, DEC #7-1122-00043, MLR #70436
Town of Cortlandville, Cortland County

Dear Supervisor Tupper:

The Region 7 Office of the New York State Department of Environmental Conservation (DEC) received an application for a mining permit which impacts your Town. The applicant, Rt 13 Rocks LLC, proposes to mine sand and gravel from an additional 11.9 acres and mine below the water table. This project is subject to the State Environmental Quality Review Act (SEQR) and is a Type I action requiring lead agency coordination. Application materials received to date by DEC are enclosed for your review and comment.

This letter is provided to inform you that the Department of Environmental Conservation Region 7 proposes to act as lead agency for the SEQR review of this mining permit application. Amendments to the Mined Land Reclamation Law (MLRL) have affirmed that only the State can regulate mining operations under the MLRL. Therefore, we believe that DEC has principal environmental review responsibility for this action.

Should your town have direct jurisdiction over activities proposed by the applicant, and you wish to be lead agency, a dispute may be brought before the Commissioner of Environmental Conservation in accordance with the SEQR rules and regulations (Title 6 of the Official Compilation of Codes Rules and Regulations, §617.6(b)(5). Concurrence with the designation of the NYS Department of Environmental Conservation as lead agency and any initial comments or concerns relating to potential environmental impacts associated with the proposed action should be returned to the above address within 30 days. If we do not receive a response by that date we will assume you do not object to the NYS DEC serving as the SEQR Lead Agency for this project.

Please feel free to contact this office for further information.

Sincerely,

Joe Dugolenski
Deputy Regional Permit Administrator

Enc. DEC Mining Application package
cc: Tom Rigley, DEC Minerals-Syracuse
Christopher Henry, Rt 13 Rocks LLC
File

(fold #2)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL PERMITS
NYSDEC Region 7 Cortland Sub-Office
1285 Fisher Ave
Cortland NY 13045

CHRISTOPHER HENRY
RT 13 ROCKS LLC
765 ST RTE 13
CORTLAND, NY 13045

(fold #1) -- staple here

NOTICE OF RECEIPT OF APPLICATION

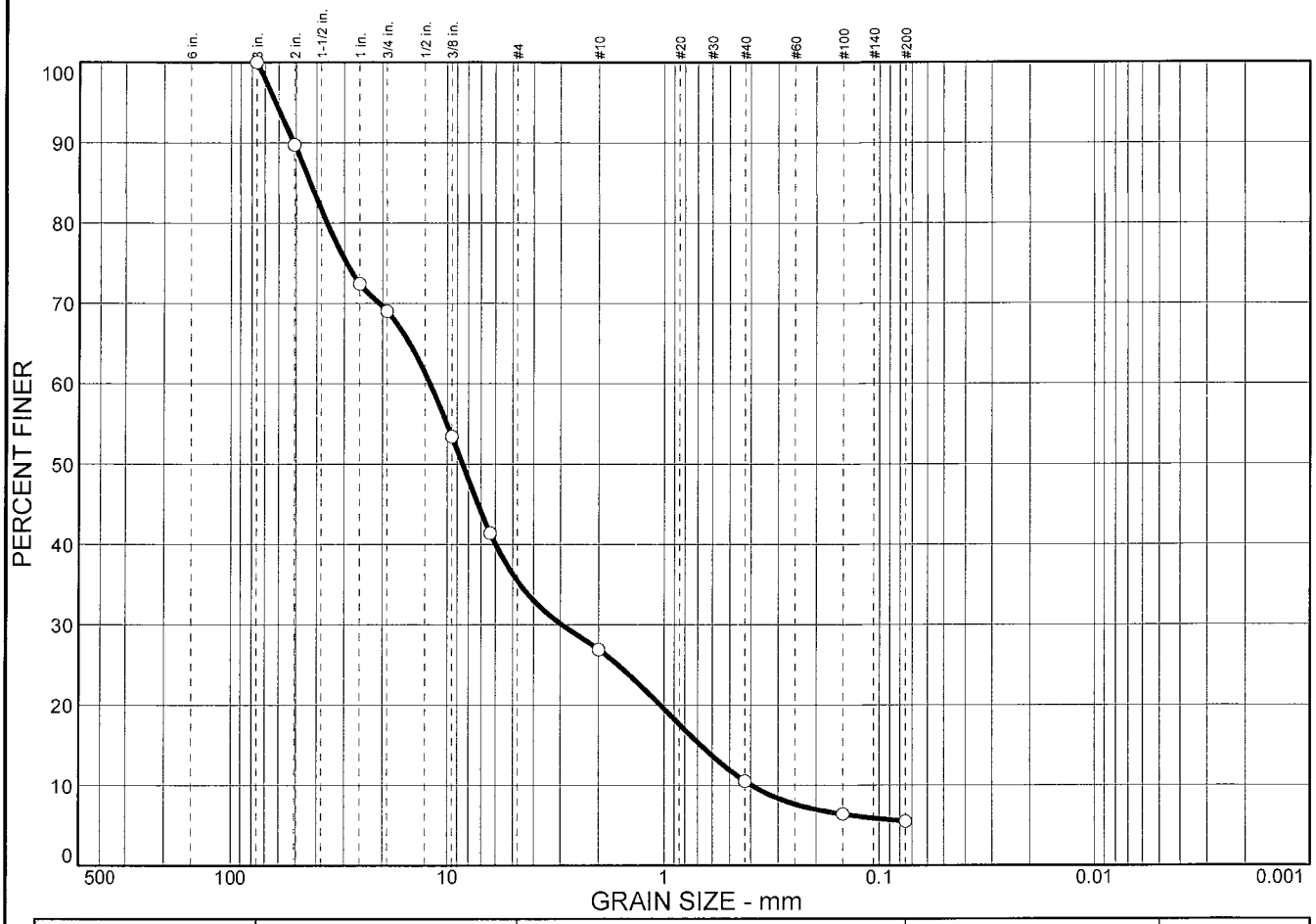
The Division of Environmental Permits has received the application referenced below. The material submitted is being reviewed by staff, and you will be advised in writing regarding the department's findings. In all future communications, please refer to the Application ID number.

Application ID:	7-1122-00043/00008
Date Received:	April 18, 2017
Applicant:	RT 13 ROCKS LLC
Facility:	CORTLANDVILLE SAND & GRAVEL MI
Description:	major mod, expand LOM 11.9 acres, & mine below water table
DEC Contact:	JOSEPH M DLUGOLENSKI

CC: TOM RIGLEY, DEC MINERALS
MICHAEL POLACCO, H2H ASSOCIATES
FILE

Appendix 2.1.A Grain Size Analysis

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	64.6	29.9	5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
2 in.	89.7		
1 in.	72.4		
0.75 in.	69.0		
0.375 in.	53.4		
0.25 in.	41.4		
#10	26.9		
#40	10.5		
#100	6.4		
#200	5.5		

* (no specification provided)

Soil Description

Well-graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 43.0 D_{60}= 12.1 D_{50}= 8.53
D_{30}= 2.96 D_{15}= 0.679 D_{10}= 0.397
C_u= 30.37 C_c= 1.83

Classification

USCS= GW-GM AASHTO=

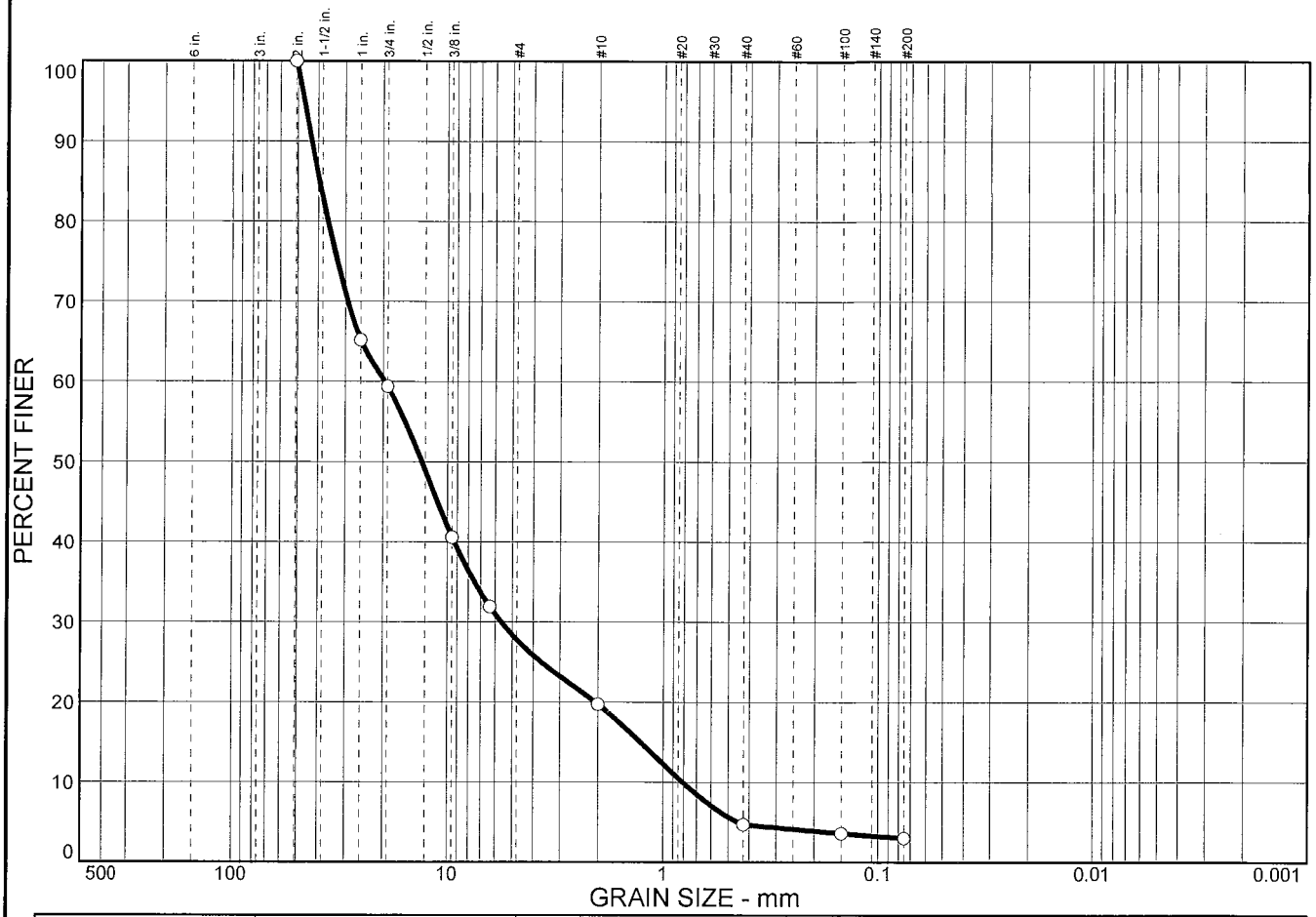
Remarks

Sample No.: 425 **Source of Sample:** **Date:** 12-10-18
Location: S-1 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 425

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	72.3	24.7	3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	65.2		
0.75 in.	59.4		
0.375 in.	40.6		
0.25 in.	31.9		
#10	19.7		
#40	4.7		
#100	3.6		
#200	3.0		

* (no specification provided)

Soil Description

Well-graded gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 39.6 D_{60}= 19.7 D_{50}= 13.2
D_{30}= 5.63 D_{15}= 1.28 D_{10}= 0.815
C_u= 24.13 C_c= 1.98

Classification

USCS= GW AASHTO=

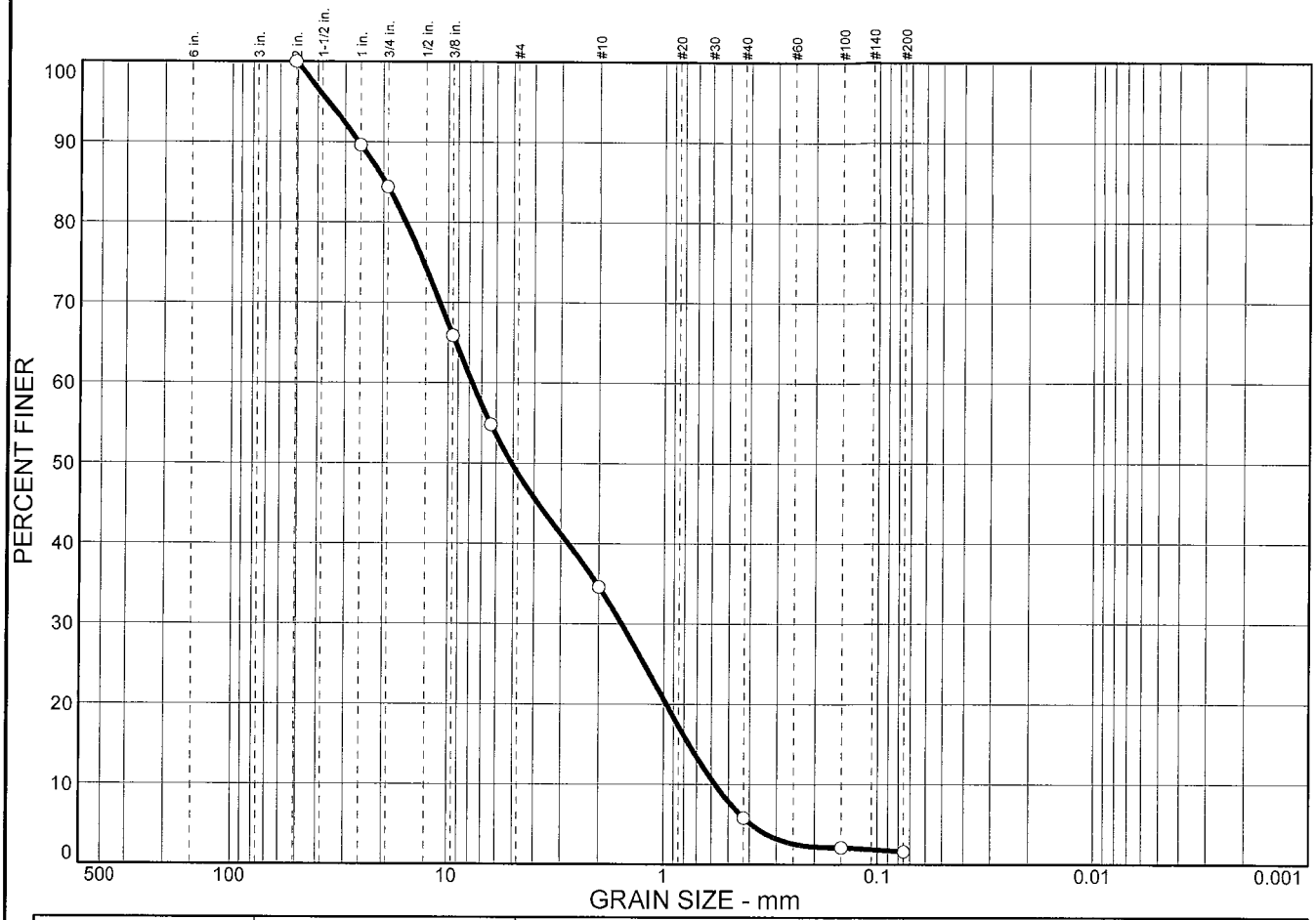
Remarks

Sample No.: 426 **Source of Sample:** **Date:** 12-10-18
Location: S-2 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 426

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	51.3	47.1	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	89.6		
0.75 in.	84.4		
0.375 in.	65.9		
0.25 in.	54.8		
#10	34.6		
#40	5.8		
#100	2.1		
#200	1.6		

* (no specification provided)

Soil Description

Poorly graded gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 19.6 D_{60}= 7.75 D_{50}= 5.09
D_{30}= 1.57 D_{15}= 0.762 D_{10}= 0.578
C_u= 13.42 C_c= 0.55

Classification

USCS= GP AASHTO=

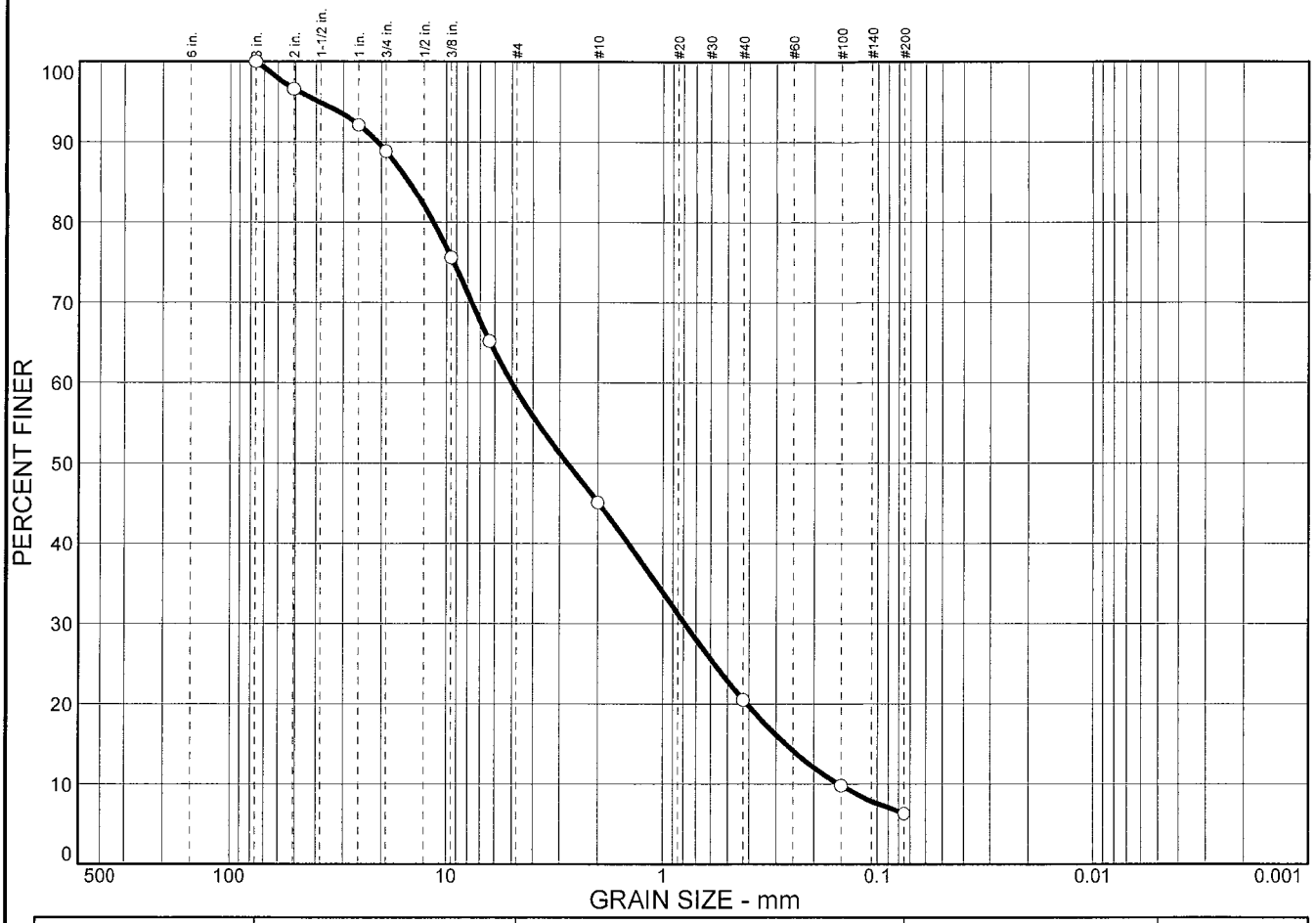
Remarks

Sample No.: 427 **Source of Sample:** **Date:** 12-10-18
Location: S-3 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 427

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	41.1	52.6	6.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
2 in.	96.6		
1 in.	92.1		
0.75 in.	88.8		
0.375 in.	75.6		
0.25 in.	65.2		
#10	45.1		
#40	20.5		
#100	9.8		
#200	6.3		

* (no specification provided)

Soil Description

Poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 14.9 D_{60}= 5.01 D_{50}= 2.78
D_{30}= 0.792 D_{15}= 0.271 D_{10}= 0.154
C_u= 32.46 C_c= 0.81

Classification

USCS= SP-SM AASHTO=

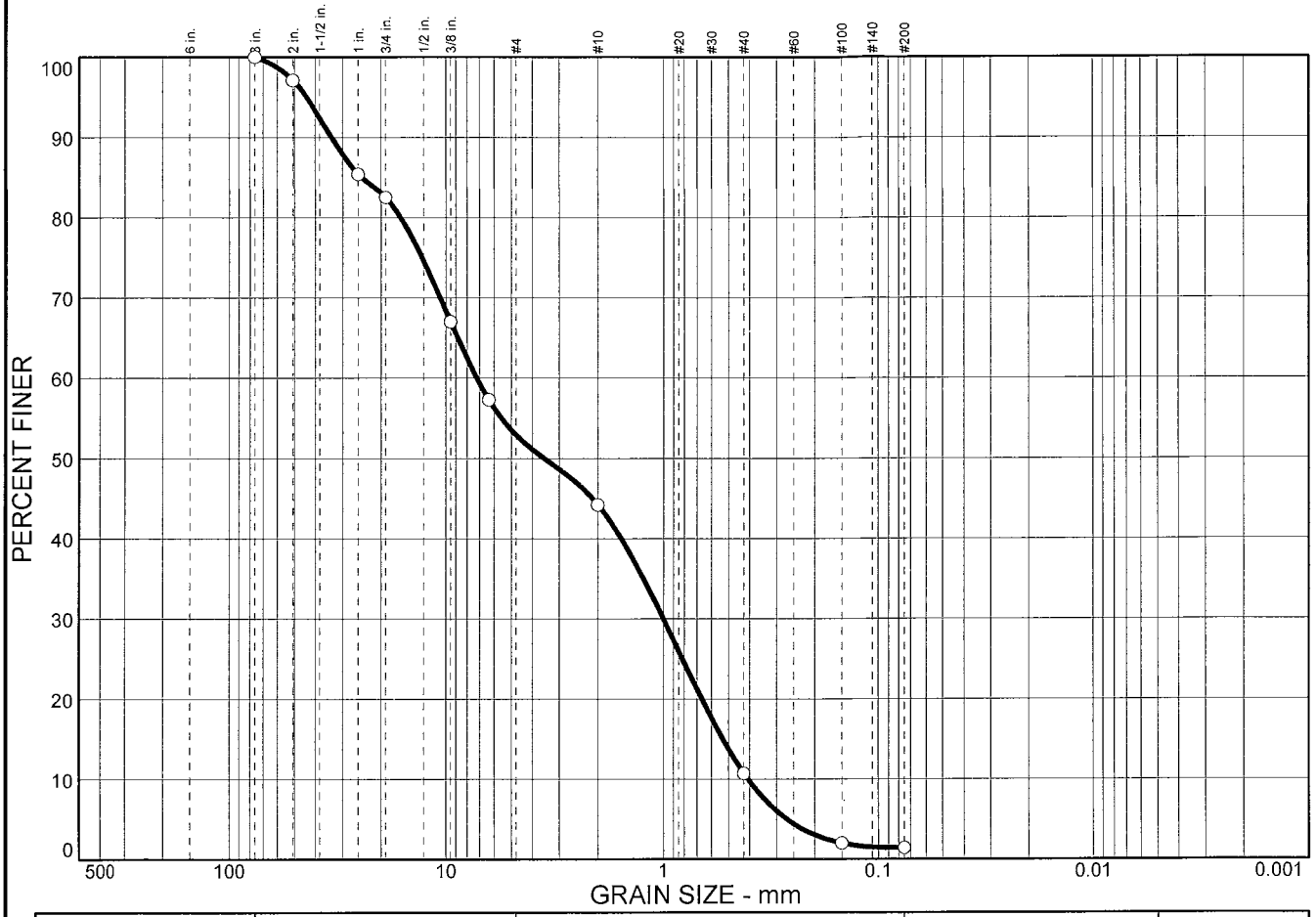
Remarks

Sample No.: 428 **Source of Sample:** **Date:** 12-10-18
Location: S-4 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 428

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	47.1	51.5	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
2 in.	97.1		
1 in.	85.4		
0.75 in.	82.5		
0.375 in.	67.0		
0.25 in.	57.3		
#10	44.2		
#40	10.7		
#100	2.0		
#200	1.4		

* (no specification provided)

Soil Description

Poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 24.5 D_{60}= 7.22 D_{50}= 3.54
D_{30}= 1.00 D_{15}= 0.532 D_{10}= 0.407
C_u= 17.71 C_c= 0.34

Classification

USCS= SP AASHTO=

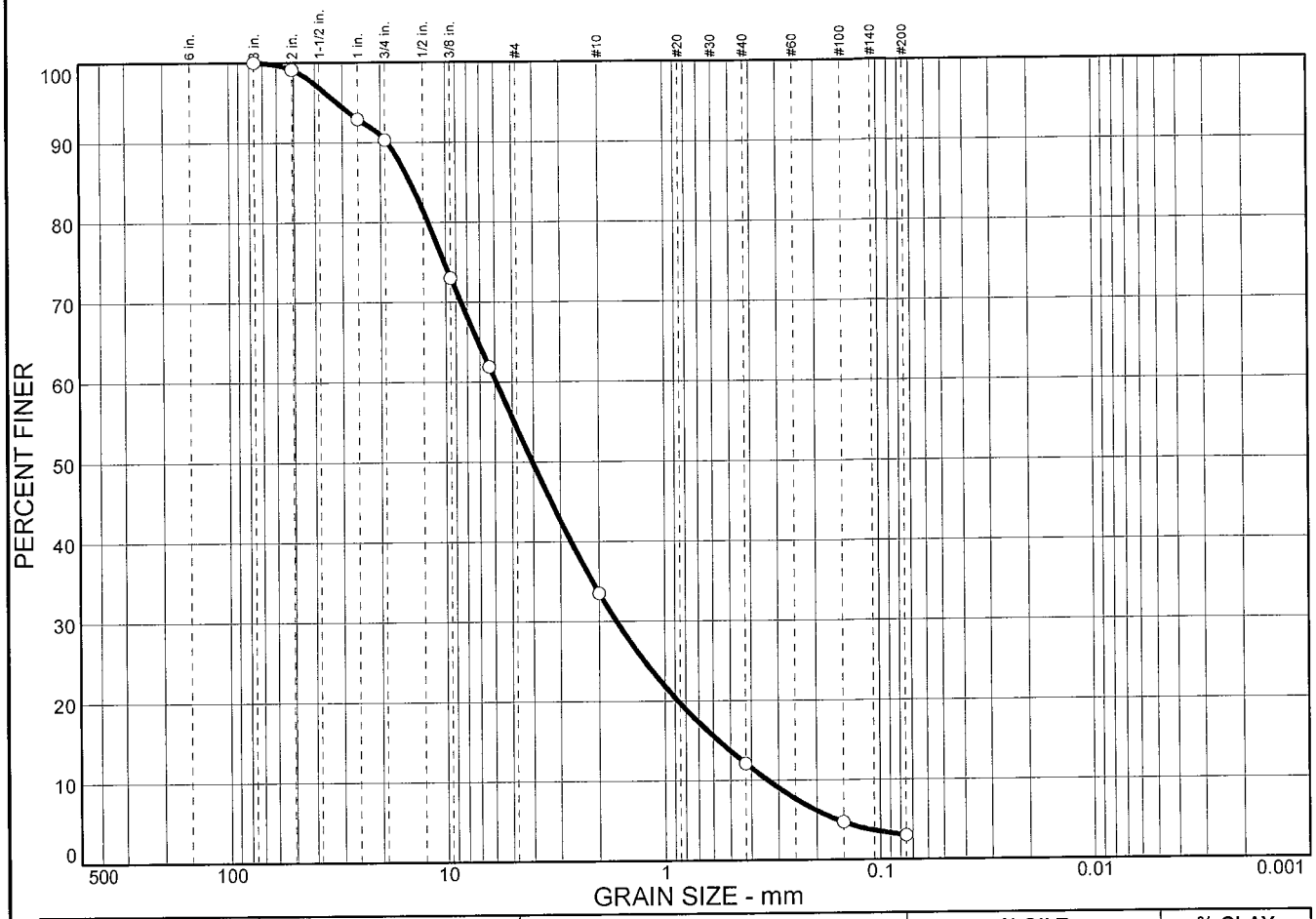
Remarks

Sample No.: 429 **Source of Sample:** **Date:** 12-11-18
Location: S-5 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 429

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	45.8	51.2	3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
2 in.	99.1		
1 in.	92.9		
0.75 in.	90.3		
0.375 in.	73.0		
0.25 in.	61.9		
#10	33.5		
#40	12.1		
#100	4.7		
#200	3.0		

* (no specification provided)

Soil Description

Well-graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 14.6 D_{60}= 5.91 D_{50}= 4.04
D_{30}= 1.67 D_{15}= 0.570 D_{10}= 0.337
C_u= 17.57 C_c= 1.40

Classification

USCS= SW AASHTO=

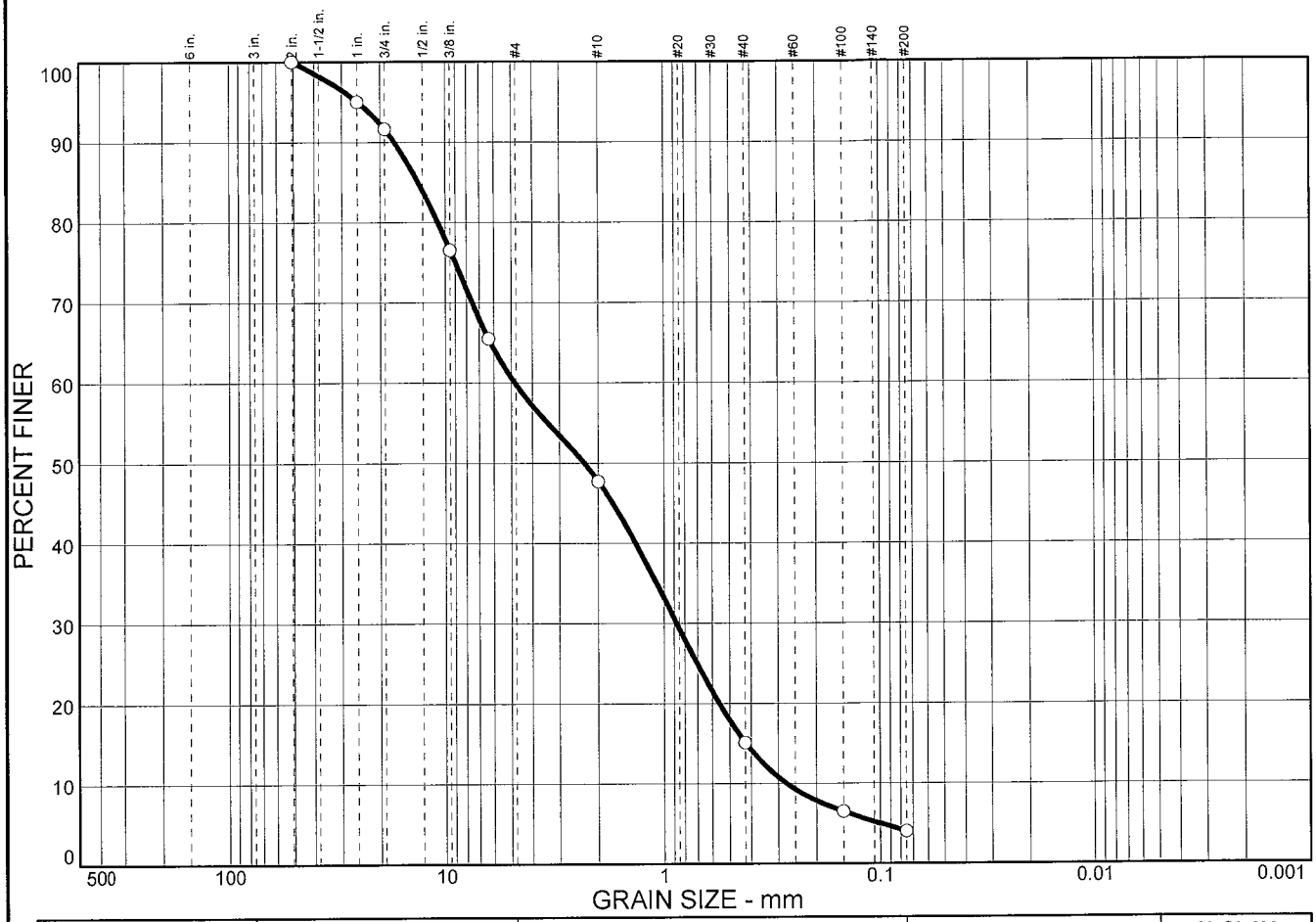
Remarks

Sample No.: 430 **Source of Sample:** **Date:** 12-11-18
Location: S-6 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 430

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	40.3	55.7	4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	95.0		
0.75 in.	91.6		
0.375 in.	76.5		
0.25 in.	65.5		
#10	47.7		
#40	15.1		
#100	6.5		
#200	4.0		

* (no specification provided)

Soil Description

Poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 13.4 D_{60}= 4.83 D_{50}= 2.32
D_{30}= 0.876 D_{15}= 0.422 D_{10}= 0.275
C_u= 17.53 C_c= 0.58

Classification

USCS= SP AASHTO=

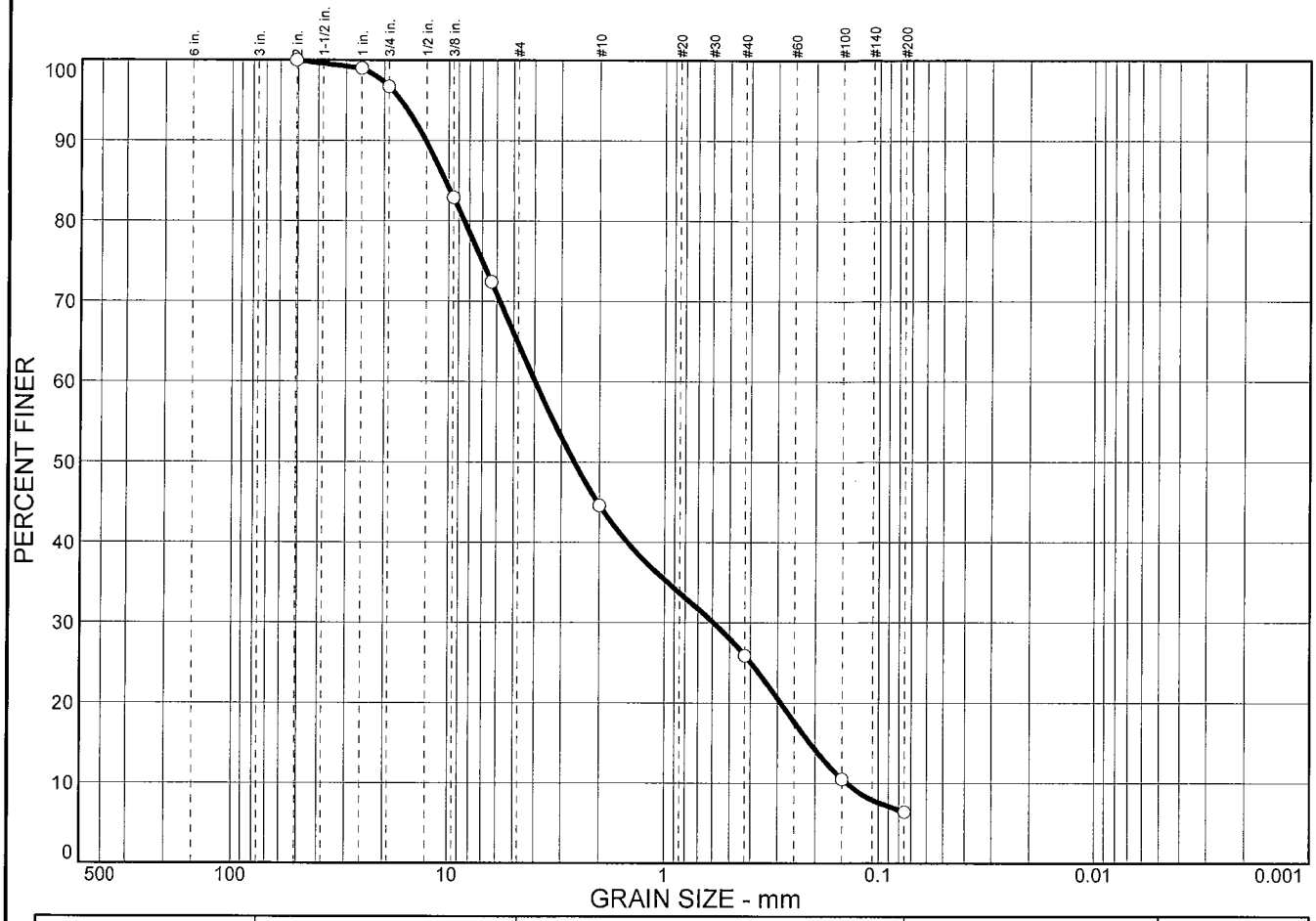
Remarks

Sample No.: 431 **Source of Sample:** **Date:** 21-11-18
Location: S-7 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 431

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	35.3	58.3	6.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	99.0		
0.75 in.	96.7		
0.375 in.	82.9		
0.25 in.	72.4		
#10	44.6		
#40	25.9		
#100	10.5		
#200	6.4		

* (no specification provided)

Soil Description

Poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.4 D_{60}= 3.97 D_{50}= 2.62
D_{30}= 0.595 D_{15}= 0.212 D_{10}= 0.143
C_u= 27.86 C_c= 0.62

Classification

USCS= SP-SM AASHTO=

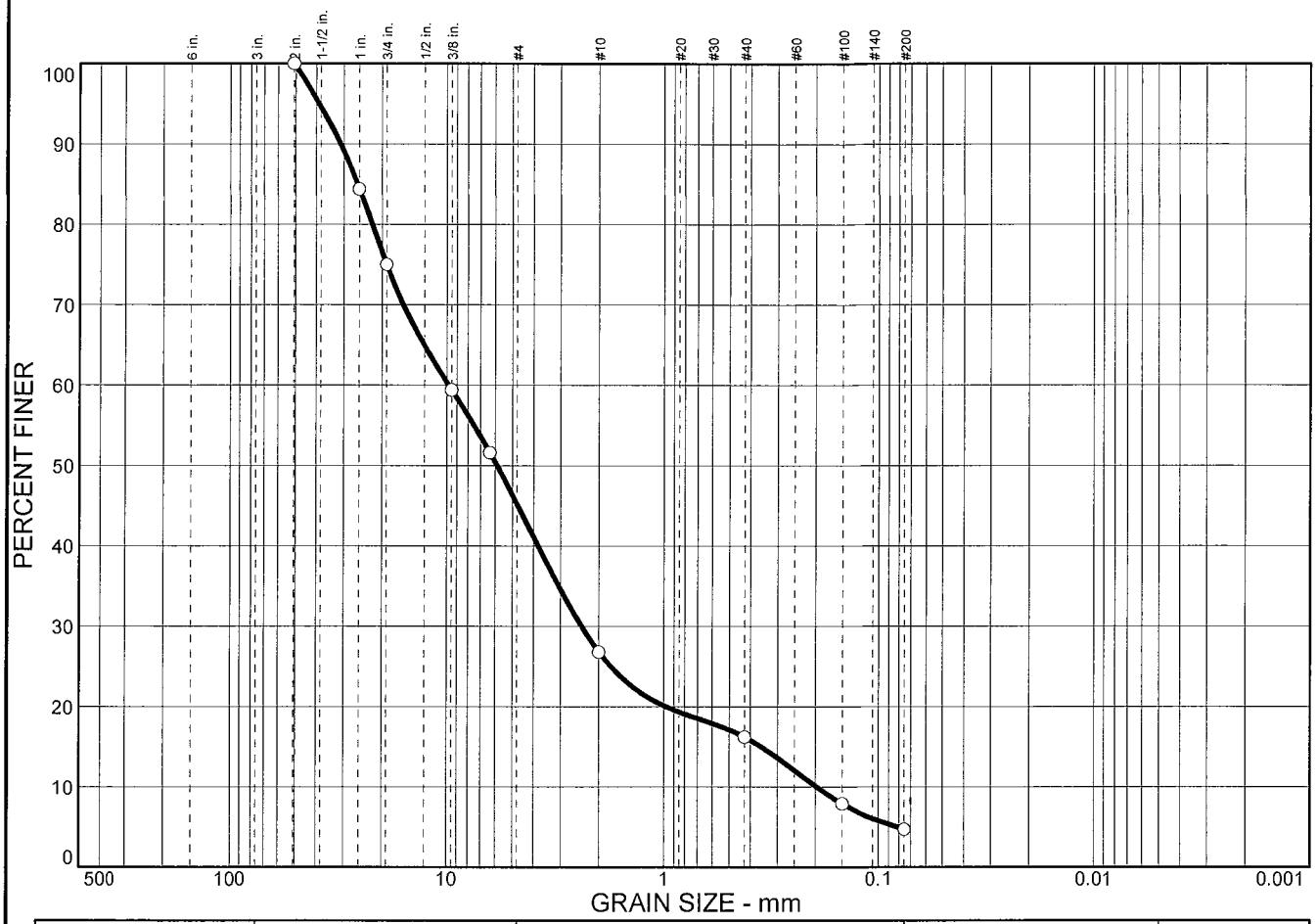
Remarks

Sample No.: 432 **Source of Sample:** **Date:** 12-12-18
Location: S-8 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 432

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	54.9	40.4	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	84.4		
0.75 in.	75.0		
0.375 in.	59.4		
0.25 in.	51.6		
#10	26.8		
#40	16.2		
#100	7.9		
#200	4.7		

* (no specification provided)

Soil Description

Well-graded gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 25.9 D_{60}= 9.84 D_{50}= 5.89
D_{30}= 2.41 D_{15}= 0.357 D_{10}= 0.198
C_u= 49.75 C_c= 2.97

Classification

USCS= GW AASHTO=

Remarks

Sample No.: 433 **Source of Sample:** **Date:** 12-12-18
Location: S-9 **Elev./Depth:**

SJB SERVICES, INC.

Client: H2H Associates,LLC
Project: Material Testing
Project No: CT-18-093 **Plate** 433

Appendix 2.1.B Test Boring Log

H2H Associates, LLC 179 River Street Troy, New York 12180 Tel: 518.270-1620 Fax: 518.270-1672	Appendix 2.1.B Test Boring Log	Boring No. MW-3D

PROJECT: Hydrogeologic Assessment					Sheet 1 of 5
CLIENT: Cortlandville Sand & Gravel					Job No. 360.00
DRILLING CONTRACTOR: North Star Drilling					Meas. Pt Elev: 1181.39
PURPOSE: Installation of Groundwater Monitoring Wells					Ground Elev: 1181.39
DRILLING METHOD: Symmetrix		SAMPLE		CASING	Datum: NAVD 83 New York State Plane Central, Feet/ Navd88
DRILL RIG TYPE: CME 55	TYPE	Cuttings / 2' Split Spoon		Symmetrix	Date Started: 12/03/18
GROUNDWATER DEPTH: 8.2' BGS	DIAM.	3"		5"	Date Finished: 12/6/18
MEASURING POINT: Ground Surface	WEIGHT	-			Driller: Steven Laeamee
LOCATION: Cortlandville S&G Mine	FALL	-			Geologist: Michael Polacco

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
5	No Sample					(0.0-7.0') Cuttings, same as 7.0'.	
		30	14	20	50	(7.0-9.0') Very Dark Gray (3/1), Fine to Coarse Sub Rounded Sandy Gravel, Dry, NP.	7.0 - 9.0' Split Spoon sample, cutting samples 0.0-7.0' same.
10						(9.0 - 17.0') Cuttings same 17.0'.	
15							
	S1 17.0-19.0	12	15	22	15	(17.0 - 19.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	17.0 - 19.0' Split Spoon, cutting samples 7.0-17.0' same.
20							

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
25						(19.0 - 27.0') Cuttings same as 27.0'.	
	S2 27.0 - 29.0	35	50	22	18	(27.0 - 29.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Fine to Coarse Sub Rounded Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	27.0 - 29.0' Split Spoon, Cutting samples 17.0-27.0' same.
30							
						(29.0-37.0') Cuttings same as 37.0'.	
35							
	S3 37.0 - 39.0'	40	31	20	22	(37.0 - 39.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Medium to Coarse Sub Rounded to Rounded Gravel and Sand, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	37.0-39.0' Split Spoon, Cutting Samples 27.0-37.0' same.
40							

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
45						(39.0 - 47.0') Cuttings same as 47.0'.	
	S4 47.0-49.0'					(47.0-49.0) Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Sandy Coarse Gravel, Trace Silt Large Angular Fragments of Rock From Cobbles, Wet, NP.	47.0 - 49.0 Split Spoon, Cutting Samples 37.0-47.0' same.
50						(49.0 - 57.0') Cuttings same as 57.0'.	
55							
	S5 57.0-59.0					(57.0-59.0) Very Dark Gray (3/1), Rounded to Sub Rounded Fine to Course Sandy Gravel, Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP.	57.0-59.0' Split Spoon, Cutting Samples 47.0-57.0' same.
60						(59.0 - 67.0') Cuttings same as 67.0'.	

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
	S6 67.0-69.0	14	23	55	50	(67.0 - 69.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Sandy Gravel, Trace Silt, Increase in Large Angular Fragments of Rock From Cobbles, Wet, NP.	67.0 - 69.0' Split Spoon, Cutting Samples 57.0 - 67.0'.
70							
75							
	S7 77.0 -79.0	58	40	23	26	(77.0 - 79.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Fine to Coarse Gravely Sand,Trace Silt, Large Angular Fragments of Rock From Cobbles, Wet, NP. Lenses of Light Tan, Clayey Silt W,P.	77.0 - 79.0' Split Spoon, Cutting Samples 67.0 - 77.0'.
80							
85							
	S8 87.0-89.0	40	58	26	53	(87.0 - 88.0') Very Dark Gray (3/1) to Dark Reddish Brown (3/4), Rounded to Sub Rounded Coarse Sandy Gravel, Trace Silt, Wet, NP. (88.0 - 89.0') Very Dark Gray (3/1), Rounded to Sub Rounded Gravely Sand, Trace Silt, Wet, NP.	87.0 - 89.0' Split Spoon. Cutting Samples 77.0 - 87.0'.

H2H Associates, LLC
179 River Street
Troy, New York 12180
Tel: 518.270-1620 Fax: 518.270-1672

Test Boring Log

Boring No. MW-3D

PROJECT: Hydrogeologic Assessment

CLIENT: Cortlandville Sand & Gravel

LOCATION: Cortlandville Sand & Gravel Mine

Sheet 5 of 5

Job No. 360.00

Depth (feet)	Sample Number	Blows on Sampler 0 -0.5	0.5-1.0	1.0-1.5	1.5-2.0	Geologic Description	Remarks
90	S9 89.0-91.0	40	37	35	28	(89.0 - 90.0') Very Dark Gray (3/1), Fine to Course Rounded to Sub rounded Gravely Sand, Trace Silt, Wet, NP. (90.0 - 91.0) Dark Gray (3/1), Fine to Coarse Gravely Sand Rounded to Sub rounded, Trace Silt.	89.0 - 91.0' Split Spoon,
91						**Total Depth - 91.0 Feet Below Ground Surface**	

Appendix 2.1.C Town of Cortlandville FOIL Request Documents

Annual Water Samples

Annual Water Samples 2019

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9I0714

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Sodium

Project / PO Number: N/A
Received: 09/11/2019
Reported: 09/18/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9I0714-01	**Collection Date:**	09/11/2019 8:36

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	58.5		1.02	mg/L		09/16/19 1404	09/16/19 1937	JDF

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 09/18/2019 17:32

MI AC* | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 16 ain Avenue, Sc n, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY R

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.9
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Sodium

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Sodium										Additional Notes
	Terrace Rd well	9-11-19	936 AM	1	DW	G	HNO3	1										Raw water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-11-19 8:59		9/11/19 8:59
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0711

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Disinfection Byproducts

Project / PO Number: N/A
Received: 07/11/2019
Reported: 07/29/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 1303 Fisher Ave.
Sample Matrix: Drinking Water
Lab Sample ID: J9G0711-01

Collected By: JM-Client
Collection Date: 07/11/2019 8:09

Analyses Subcontracted to: Envirotest Laboratories

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2								
Monochloroacetic acid	<2		2	ug/L		07/19/19 0900	07/19/18 1850	ETL
Monobromoacetic acid	<1		1	ug/L		07/19/19 0900	07/19/18 1850	ETL
Dichloroacetic acid	1.11		1	ug/L		07/19/19 0900	07/19/18 1850	ETL
Dibromoacetic acid	<1		1	ug/L		07/19/19 0900	07/19/18 1850	ETL
Trichloroacetic acid	<1		1	ug/L		07/19/19 0900	07/19/18 1850	ETL
Total Haloacetic acids (HAA5)	1.11		1	ug/L		07/19/19 0900	07/19/18 1850	ETL
Surrogate: 2-Bromopropionic acid	94	Limit: 70-130		% Rec		07/19/19 0900	07/19/18 1850	ETL

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds - GC/MS - THMs	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Total Trihalomethanes	15.0	80 MCL	0.500	ug/L			07/18/19 1348	JAN
Bromodichloromethane	4.31		0.500	ug/L			07/18/19 1348	JAN
Bromoform	1.34		0.500	ug/L			07/18/19 1348	JAN
Chloroform	5.31		0.500	ug/L			07/18/19 1348	JAN
Dibromochloromethane	3.99		0.500	ug/L			07/18/19 1348	JAN
Surrogate: 4-Bromofluorobenzene	110	Limit: 70-130		% Rec			07/18/19 1348	JAN
Surrogate: 1,2-Dichlorobenzene-d4	118	Limit: 70-130		% Rec			07/18/19 1348	JAN

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0711

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9G0711-02	**Collection Date:**	07/11/2019 7:30

Analyses Subcontracted to: Envirotest Laboratories

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2								
Monochloroacetic acid	<2		2	ug/L		07/19/19 0900	07/19/19 1919	ETL
Monobromoacetic acid	<1		1	ug/L		07/19/19 0900	07/19/19 1919	ETL
Dichloroacetic acid	<1		1	ug/L		07/19/19 0900	07/19/19 1919	ETL
Dibromoacetic acid	<1		1	ug/L		07/19/19 0900	07/19/19 1919	ETL
Trichloroacetic acid	<1		1	ug/L		07/19/19 0900	07/19/19 1919	ETL
Total Haloacetic acids (HAA5)	<1		1	ug/L		07/19/19 0900	07/19/19 1919	ETL
Surrogate: 2-Bromopropionic acid	94	Limit: 70-130		% Rec		07/19/19 0900	07/19/19 1919	ETL

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds - GC/MS - THMs	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Total Trihalomethanes	6.55	80 MCL	0.500	ug/L			07/18/19 1411	JAN
Bromodichloromethane	1.65		0.500	ug/L			07/18/19 1411	JAN
Bromoform	0.990		0.500	ug/L			07/18/19 1411	JAN
Chloroform	1.55		0.500	ug/L			07/18/19 1411	JAN
Dibromochloromethane	2.36		0.500	ug/L			07/18/19 1411	JAN
Surrogate: 4-Bromofluorobenzene	111	Limit: 70-130		% Rec			07/18/19 1411	JAN
Surrogate: 1,2-Dichlorobenzene-d4	117	Limit: 70-130		% Rec			07/18/19 1411	JAN

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health
EnviroTest Laboratories NY Lab ID No: 10142	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0711

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/29/2019 19:28

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY [illegible]

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 20.5
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Disinfection Byproducts/Stage 2
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	THM	HAA	Additional Notes
	1303 Fisher AVE.	7-11-19	809 to 814	5	DW	✓	Sodium Thiosulfate Ammonium Chloride	2	3	
	Walden Oaks BS	7-11-19	730 to 739	5	DW	✓		2	3	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-11-19 9:10 AM	[signature]	7/11 9:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0401

Town of Cortlandville Water

Hayne Smith
3577 Terrace Road
Cortland, NY 13045

Project Name: Quarterly Sample

Project / PO Number: N/A
Received: 06/05/2019
Reported: 06/18/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terracec Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9F0401-01	**Collection Date:**	06/05/2019 11:18

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	58.7		1.02	mg/L		06/11/19 1400	06/17/19 1454	JAM

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/18/2019 19:33

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.3
Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Quarterly Sample (Sodium)
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types **	Sodium							Additional Notes
	Terrace Rd well	6-5-19	11:18 AM	1	DW	1	None	1							Raw water

Cortlandville Water, Town of J9F0401

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-5-19 1700 PM	[signature]	6/5 12:[illegible]
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0224

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Radiological

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/26/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0224-02	**Collection Date:**	03/06/2019 9:54

Analyses Subcontracted to: Pace Analytical - Pittsburgh

Radiochemistry	Result	UNC	Limit(s)	MDA	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 900.0									
Gross alpha	0.797	+/-1.28		2.85	pCi/L			03/18/19 0812	PAP
Gross beta	0.341	+/-0.693		1.57	pCi/L			03/18/19 0812	PAP
lethod: EPA 903.1									
Radium-226	0.183	+/-0.267		0.449	pCi/L			03/20/19 2250	PAP
Tracer Recovery		96		Limit: 10-130	% Rec			03/20/19 2250	PAP
Method: EPA 904.0									
Radium-228	0.518	+/-0.378		0.764	pCi/L			03/21/19 1450	PAP
Carrier Recovery		70		Limit: 30-110	% Rec			03/21/19 1450	PAP
Tracer Recovery		89		Limit: 10-130	% Rec			03/21/19 1450	PAP

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health
Pace Analytical - Pittsburgh	
NY Lab ID No.: 10888	New York State Department of Health
PA DEP ID: 65-00282	Pennsylvania Department of Environmetnal Protection

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0224

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/26/2019 11:52

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0224

TAT 7 days

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Radiological

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point

Lab Sample ID: J9C0224-01

Matrix: Drinking Water

Sampled Date & Time:

Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
Gross Alpha Beta	EPA 900.0		183.00 days
Radium 226 903.1	EPA 903.1		183.00 days
Radium 228 904.0	EPA 904.0		183.00 days

Container(s)	Designator
P-1L Plastic Oblong WM, HNO3	A
P-1L Plastic Oblong WM, HNO3	B
P-1L Plastic Oblong WM, HNO3	C

Client Sample ID: Lime Hollow Treatment Plant - Entry Point

Lab Sample ID: J9C0224-02

Matrix: Drinking Water

Sampled Date & Time: 3/6/19 954 AM

Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
Gross Alpha Beta	EPA 900.0		183.00 days
Radium 226 903.1	EPA 903.1		183.00 days
Radium 228 904.0	EPA 904.0		183.00 days

Container(s)	Designator
P-1L Plastic Oblong WM, HNO3	A
P-1L Plastic Oblong WM, HNO3	B
P-1L Plastic Oblong WM, HNO3	C

Sampled/Relinquished by:	Date/Time: 11:10AM	Received by:
Printed Name: Jeffrey I MacLean	3/6/19 11:09 AM	Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 6

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0224

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Radiological

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Notes:

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Microbac Laboratories, Inc., New York Division

Chain of Custody

TAT 7 days

J9C0224

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Radiological

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0224-01
Matrix: Drinking Water
Sampled Date & Time:
Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
Gross Alpha Beta	EPA 900.0		183.00 days
Radium 226 903.1	EPA 903.1		183.00 days
Radium 228 904.0	EPA 904.0		183.00 days

Container(s)	Designator
P-1L Plastic Oblong WM, HNO3	A
P-1L Plastic Oblong WM, HNO3	B
P-1L Plastic Oblong WM, HNO3	C

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Lab Sample ID: J9C0224-02
Matrix: Drinking Water
Sampled Date & Time: 3/6/19 954 AM
Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
Gross Alpha Beta	EPA 900.0		183.00 days
Radium 226 903.1	EPA 903.1		183.00 days
Radium 228 904.0	EPA 904.0		183.00 days

Container(s)	Designator
P-1L Plastic Oblong WM, HNO3	A
P-1L Plastic Oblong WM, HNO3	B
P-1L Plastic Oblong WM, HNO3	C

Sampled/Relinquished by: Jeffrey A MacLean	Date/Time: 11:10AM	Received by:	
Printed Name: Jeffrey I MacLean	3/6/19 11:09 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	

Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 6

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0136

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Terrace Road

Project / PO Number: N/A
Received: 04/10/2019
Reported: 04/25/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Road Treatement Plant - Entry Point
Sample Matrix: Drinking Water
Lab Sample ID: J9D0136-01 **Collection Date:** 04/10/2019 13:56

Inorganics	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv 2.0								
Nitrate as N (Calc)	1.91		0.0500	mg/L		04/11/19 1200	04/11/19 1457	ASH
Nitrate-Nitrite as N	1.91	10.0 MCL	0.0500	mg/L		04/11/19 1200	04/11/19 1457	ASH
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		04/11/19 1200	04/11/19 1301	ASH

Analyses Subcontracted to: Microbac Laboratories Inc., Pittsburgh Division

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	<0.200		0.200	mg/L		04/15/19 1443	04/16/19 1742	CDC

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Herbicides - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv 1.0								
2,4-D	<0.100	70.0 MCL	0.100	ug/L		04/16/19 0930	04/17/19 2325	MRB
Dalapon	<1.00	200 MCL	1.00	ug/L		04/16/19 0930	04/17/19 2325	MRB
Dicamba	<0.100		0.100	ug/L		04/16/19 0930	04/17/19 2325	MRB
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	<0.200	7.00 MCL	0.200	ug/L		04/16/19 0930	04/17/19 2325	MRB
Pentachlorophenol	<0.0400	1.00 MCL	0.0400	ug/L		04/16/19 0930	04/17/19 2325	MRB
Picloram	<0.100	500 MCL	0.100	ug/L		04/16/19 0930	04/17/19 2325	MRB
2,4,5-TP (Silvex)	<0.200	50.0 MCL	0.200	ug/L		04/16/19 0930	04/17/19 2325	MRB
Surrogate: 2,4-Dichloropenylacetic acid	91.2	Limit: 70-130		% Rec		04/16/19 0930	04/17/19 2325	MRB

Inorganics	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-Cl E-2011								
Chloride	103		4.00	mg/L			04/11/19 1639	CLW

Pesticides and Polychlorinated Biphenyls (PCBs) - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst

CERTIFICATE OF ANALYSIS

J9D0136

Client Sample ID: Terrace Road Treatement Plant - Entry Point
Sample Matrix: Drinking Water
Lab Sample ID: J9D0136-01
Collection Date: 04/10/2019 13:56

Pesticides and Polychlorinated Biphenyls (PCBs) - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv 2.1								
Chlordane (tech.) [2C]	<0.200	2.00 MCL	0.200	ug/L		04/16/19 1100	04/16/19 2117	MRB
Dieldrin [2C]	<0.0200		0.0200	ug/L		04/16/19 1100	04/16/19 2117	MRB
Endrin [2C]	<0.0100	2.00 MCL	0.0100	ug/L		04/16/19 1100	04/16/19 2117	MRB
Toxaphene [2C]	<1.00	3.00 MCL	1.00	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1016 (PCB-1016) [2C]	<0.0800		0.0800	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1221 (PCB-1221) [2C]	<20.0		20.0	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1232 (PCB-1232) [2C]	<0.500		0.500	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1242 (PCB-1242) [2C]	<0.300		0.300	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1248 (PCB-1248) [2C]	<0.100		0.100	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1254 (PCB-1254) [2C]	<0.100		0.100	ug/L		04/16/19 1100	04/16/19 2117	MRB
Aroclor-1260 (PCB-1260) [2C]	<0.100		0.100	ug/L		04/16/19 1100	04/16/19 2117	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	96.0	Limit: 70-130		% Rec		04/16/19 1100	04/16/19 2117	MRB

Semi-Volatile Organic Compounds - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv 1.1								
1,2-Dibromo-3-chloropropane (DBCP) [2C]	<0.0100	0.200 MCL	0.0100	ug/L		04/15/19 1500	04/16/19 0934	MRB
1,2-Dibromoethane (Ethylene dibromide, EDB) [2C]	<0.0100	0.0500 MCL	0.0100	ug/L		04/15/19 1500	04/16/19 0934	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	106	Limit: 70-130		% Rec		04/15/19 1500	04/16/19 0934	MRB

Semi-Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv 2.0								
Alachlor	<0.190	2.00 MCL	0.190	ug/L		04/17/19 0900	04/24/19 0900	GMP
Aldrin	<0.095		0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Atrazine	<0.095	3.00 MCL	0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Benzo[a]pyrene	<0.019	0.200 MCL	0.019	ug/L		04/17/19 0900	04/24/19 0900	GMP
gamma-BHC (Lindane)	<0.019	0.200 MCL	0.019	ug/L		04/17/19 0900	04/24/19 0900	GMP
Butachlor	<0.095		0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
bis(2-Ethylhexyl)adipate	<0.571	400 MCL	0.571	ug/L		04/17/19 0900	04/24/19 0900	GMP
bis(2-Ethylhexyl)phthalate	<0.571	6.00 MCL	0.571	ug/L		04/17/19 0900	04/24/19 0900	GMP
Heptachlor	<0.038	0.400 MCL	0.038	ug/L		04/17/19 0900	04/24/19 0900	GMP
Heptachlor epoxide	<0.019	0.200 MCL	0.019	ug/L		04/17/19 0900	04/24/19 0900	GMP
Hexachlorobenzene	<0.095	1.00 MCL	0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Hexachlorocyclopentadiene	<0.095	50.0 MCL	0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Methoxychlor	<0.095	40.0 MCL	0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Metolachlor	<0.095		0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Metribuzin	<0.095		0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP

CERTIFICATE OF ANALYSIS

J9D0136

Client Sample ID: Terrace Road Treatement Plant - Entry Point
Sample Matrix: Drinking Water
Lab Sample ID: J9D0136-01 **Collection Date:** 04/10/2019 13:56

Semi-Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Propachlor (Ramrod)	<0.095		0.095	ug/L		04/17/19 0900	04/24/19 0900	GMP
Simazine	<0.067	4.00 MCL	0.067	ug/L		04/17/19 0900	04/24/19 0900	GMP
Surrogate: 1,3-Dimethyl-2-nitrobenzene	96.5	Limit: 70-130		% Rec		04/17/19 0900	04/24/19 0900	GMP
Surrogate: Pyrene-d10	103	Limit: 70-130		% Rec		04/17/19 0900	04/24/19 0900	GMP
Surrogate: Triphenyl phosphate	112	Limit: 70-130		% Rec		04/17/19 0900	04/24/19 0900	GMP

Semi-Volatile Organic Compounds - HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv 1.0								
Aldicarb sulfone	<0.800		0.800	ug/L		04/16/19 0933	04/16/19 1833	RSD
Aldicarb sulfoxide	<0.500		0.500	ug/L		04/16/19 0933	04/16/19 1833	RSD
Aldicarb (Temik)	<0.500		0.500	ug/L		04/16/19 0933	04/16/19 1833	RSD
Carbaryl (Sevin)	<0.500		0.500	ug/L		04/16/19 0933	04/16/19 1833	RSD
Carbofuran (Furaden)	<0.900	40.0 MCL	0.900	ug/L		04/16/19 0933	04/16/19 1833	RSD
3-Hydroxycarbofuran	<0.500		0.500	ug/L		04/16/19 0933	04/16/19 1833	RSD
Methomyl (Lannate)	<0.500		0.500	ug/L		04/16/19 0933	04/16/19 1833	RSD
Oxamyl	<2.00	200 MCL	2.00	ug/L		04/16/19 0933	04/16/19 1833	RSD
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	105	Limit: 70-130		% Rec		04/16/19 0933	04/16/19 1833	RSD

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Benzene	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Bromobenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Bromochloromethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
Bromodichloromethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
Bromoform	<0.50		0.50	ug/L			04/12/19 1655	JAN
Bromomethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
tert-Butylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
sec-Butylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
n-Butylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			04/12/19 1655	JAN
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			04/12/19 1655	JAN
Chloroform	<0.50		0.50	ug/L			04/12/19 1655	JAN
Chloromethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
2-Chlorotoluene	<0.50		0.50	ug/L			04/12/19 1655	JAN
4-Chlorotoluene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Dibromochloromethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			04/12/19 1655	JAN

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CERTIFICATE OF ANALYSIS

J9D0136

Client Sample ID: Terrace Road Treatement Plant - Entry Point
Sample Matrix: Drinking Water
Lab Sample ID: J9D0136-01 **Collection Date:** 04/10/2019 13:56

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			04/12/19 1655	JAN
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			04/12/19 1655	JAN
1,3-Dichlorobenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
1,1-Dichloroethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			04/12/19 1655	JAN
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			04/12/19 1655	JAN
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			04/12/19 1655	JAN
1,3-Dichloropropane	<0.50		0.50	ug/L			04/12/19 1655	JAN
2,2-Dichloropropane	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
1,1-Dichloropropene	<0.50		0.50	ug/L			04/12/19 1655	JAN
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			04/12/19 1655	JAN
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			04/12/19 1655	JAN
Hexachlorobutadiene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			04/12/19 1655	JAN
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			04/12/19 1655	JAN
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			04/12/19 1655	JAN
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Naphthalene	<0.50		0.50	ug/L			04/12/19 1655	JAN
n-Propylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Styrene	<0.50	100 MCL	0.50	ug/L			04/12/19 1655	JAN
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			04/12/19 1655	JAN
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Toluene	<0.50	1000 MCL	0.50	ug/L			04/12/19 1655	JAN
1,2,4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			04/12/19 1655	JAN
1,2,3-Trichlorobenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			04/12/19 1655	JAN
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			04/12/19 1655	JAN
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,2,3-Trichloropropane	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			04/12/19 1655	JAN
m,p-Xylene	<0.50		0.50	ug/L			04/12/19 1655	JAN
o-Xylene	<0.50		0.50	ug/L			04/12/19 1655	JAN
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			04/12/19 1655	JAN
Surrogate: 4-Bromofluorobenzene	94.8	Limit: 70-130		% Rec			04/12/19 1655	JAN
Surrogate: 1,2-Dichlorobenzene-d4	94.4	Limit: 70-130		% Rec			04/12/19 1655	JAN

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0136

Client Sample ID:	Terrace Road Treatement Plant - Entry Point		
Sample Matrix:	Drinking Water		
Lab Sample ID:	J9D0136-01	**Collection Date:**	04/10/2019 13:56

Analyses Subcontracted to: Pace Analytical - Pittsburgh

Radiochemistry	Result	UNC	Limit(s)	MDA	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 900.0									
Gross alpha	0.728	+/-1.3		2.74	pCi/L			04/22/19 1854	PAP
Gross beta	0.759	+/-1.22		2.54	pCi/L	A & C		04/22/19 1854	PAP
Method: EPA 903.1									
Radium-226	0.785	+/-0.458		0.444	pCi/L			04/24/19 1253	PAP
Tracer Recovery		96		Limit: 10-130	% Rec			04/24/19 1253	PAP
Method: EPA 904.0									
Radium-228	0.155	+/-0.435		0.975	pCi/L			04/22/19 1121	PAP
Carrier Recovery		74		Limit: 30-110	% Rec			04/22/19 1121	PAP
Tracer Recovery		69		Limit: 10-130	% Rec			04/22/19 1121	PAP

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division	
10121	New York State Department of Health
02-00257	PA Department of Environmental Protection
	PADEP Accreditation by Rule
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health
Pace Analytical - Pittsburgh	
NY Lab ID No.: 10888	New York State Department of Health
PA DEP ID: 65-00282	Pennsylvania Department of Environmetnal Protection

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/25/2019 12:41

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Microbac Laboratories, Inc., New York Division

Chain of Custody

TAT 7 days

J9D0136

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Terrace Road

Project / PO Number: N/A
Tenatively Scheduled: 4/1/2019
Field Route ID:

Client Sample ID: Terrace Road Treatement Plant - Entry Point
Lab Sample ID: J9D0136-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4-10-19 1:56pm

Analysis	Method	Field Results/Comments	Hold Time
505 PEST PCB Group	varies		14.00 days
NO3 EPA Group	varies		2.00 days
Chloride EPA300	EPA 300.0, Rv 2.1		28.00 days
515 Cl Acids	EPA 515.3, Rv 1.0		14.00 days
200.7 Na	EPA 200.7, Rv 4.4		180.00 days
505 PCB	EPA 505, Rv 2.1		14.00 days
505 PEST	EPA 505, Rv 2.1		14.00 days
Gross Alpha Beta	EPA 900.0		183.00 days
Radium 226 903.1	EPA 903.1		183.00 days
Radium 228 904.0	EPA 904.0		183.00 days
525 SVOC STD	EPA 525.2, Rv 2.0		14.00 days
531.2 Carbamates	EPA 531.2, Rv 1.0		28.00 days
504.1 EDB DBCP	EPA 504.1, Rv 1.1		14.00 days
524.2 VOC NY	EPA 524.2, Rv 4.1		14.00 days

Container(s)	Designator
P-1L Plastic Oblong WM, HNO3	A
V-40ml Clear Vial, Na Thio	B
V-40ml Clear Vial, Na Thio	C
V-40ml Clear Vial, Na Thio	D
V-40ml Clear Vial, Na Thio	E
A-250ml Amber NM, Na Thio	F
V-40ml Clear Vial, Ascorbic Acid, HCL	G
V-40ml Clear Vial, Ascorbic Acid, HCL	H
A-1L Amber NM, Na sulfite, 6N HCL	I
A-1L Amber NM, Na sulfite, 6N HCL	J
VA-60ml Amber NM, Na Thio, MAB	K
VA-60ml Amber NM, Na Thio, MAB	L
VA-60ml Amber NM, Na Thio, MAB	M
P-250ml Plastic Oblong WM	N
P-250ml Plastic Oblong WM	O
P-250ml Plastic Oblong WM, H2SO4	P
P-1L Plastic Oblong WM, HNO3	Q
P-1L Plastic Oblong WM, HNO3	R
P-1L Plastic Oblong WM, HNO3	S

Microbac Laboratories, Inc.
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Chain of Custody

J9D0136

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Terrace Road

Project / PO Number: N/A
Tenatively Scheduled: 4/1/2019
Field Route ID:

Client Sample ID: Trip Blank
Lab Sample ID: J9D0136-02
Matrix: Drinking Water
Type: Trip Blank

Sampled Date & Time: 4-10-19 1:56 PM

Analysis	Method	Field Results/Comments	Hold Time
504.1 EDB DBCP	EPA 504.1, Rv 1.1		14.00 days
524.2 VOC NY	EPA 524.2, Rv 4.1		14.00 days

Container(s)	Designator
V-40ml Clear Vial, Na Thio	A
V-40ml Clear Vial, Ascorbic Acid, HCL	C

Sampled/Relinquished by:	Date/Time: 4-10-19 14:57	Received by:
Printed Name: Jeffrey I MacLean		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:

As Received at Laboratory: On Ice: Yes / No Temp 11-2 °C Total Containers: 20

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

DONE 11/30/12

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0841

Town of Cortlandville Water

Hayne Smith
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Sample

Project / PO Number: N/A
Received: 03/13/2019
Reported: 03/22/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Road Well
Sample Matrix: Drinking Water
Lab Sample ID: J9C0841-01
Collected By: JM-Client
Collection Date: 03/13/2019 13:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		03/13/19 1532	03/14/19 1052	EDB
Escherichia coli	Absent			in 100mL		03/13/19 1532	03/14/19 1052	EDB

Client Sample ID: Sodium
Sample Matrix: Drinking Water
Lab Sample ID: J9C0841-02
Collected By: JM-Client
Collection Date: 03/13/2019 13:16

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	61.4		1.02	mg/L		03/18/19 0853	03/18/19 1625	BRC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0841

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/22/2019 10:48

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CERTIFICATE OF ANALYSIS

J9C0225

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: SOC

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/20/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0225-02	**Collection Date:**	03/06/2019 10:39

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Herbicides - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv 1.0								
2,4-D	<0.100	70 MCL	0.100	ug/L		03/12/19 0900	03/12/19 2258	MRB
Dalapon	<1.00	200 MCL	1.00	ug/L		03/12/19 0900	03/12/19 2258	MRB
Dicamba	<0.100		0.100	ug/L		03/12/19 0900	03/12/19 2258	MRB
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	<0.200	7 MCL	0.200	ug/L		03/12/19 0900	03/12/19 2258	MRB
Pentachlorophenol	<0.0400	1 MCL	0.0400	ug/L		03/12/19 0900	03/12/19 2258	MRB
Picloram	<0.100	500 MCL	0.100	ug/L		03/12/19 0900	03/12/19 2258	MRB
2,4,5-TP (Silvex)	<0.200	50 MCL	0.200	ug/L		03/12/19 0900	03/12/19 2258	MRB
Surrogate: 2,4-Dichloropenylacetic acid	94.1	Limit: 70-130		% Rec		03/12/19 0900	03/12/19 2258	MRB

Pesticides and Polychlorinated Biphenyls (PCBs) - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv 2.1								
Chlordane (tech.) [2C]	<0.200	2 MCL	0.200	ug/L		03/11/19 1300	03/11/19 2154	MRB
Dieldrin [2C]	<0.0200	0.2 MCL	0.0200	ug/L		03/11/19 1300	03/11/19 2154	MRB
Endrin [2C]	<0.0100	2 MCL	0.0100	ug/L		03/11/19 1300	03/11/19 2154	MRB
Toxaphene [2C]	<1.00	3 MCL	1.00	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1016 (PCB-1016) [2C]	<0.0800		0.0800	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1221 (PCB-1221) [2C]	<20.0		20.0	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1232 (PCB-1232) [2C]	<0.500		0.500	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1242 (PCB-1242) [2C]	<0.300		0.300	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1248 (PCB-1248) [2C]	<0.100		0.100	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1254 (PCB-1254) [2C]	<0.100		0.100	ug/L		03/11/19 1300	03/11/19 2154	MRB
Aroclor-1260 (PCB-1260) [2C]	<0.100		0.100	ug/L		03/11/19 1300	03/11/19 2154	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	100	Limit: 70-130		% Rec		03/11/19 1300	03/11/19 2154	MRB

emi-Volatile Organic Compounds - C/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv 1.1								

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CERTIFICATE OF ANALYSIS

J9C0225

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0225-02	**Collection Date:**	03/06/2019 10:39

Semi-Volatile Organic Compounds - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
1,2-Dibromo-3-chloropropane (DBCP)	<0.0100	0.2 MCL	0.0100	ug/L		03/08/19 1130	03/08/19 1811	MRB
1,2-Dibromoethane (Ethylene dibromide, EDB)	<0.0100	0.05 MCL	0.0100	ug/L		03/08/19 1130	03/08/19 1811	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	101	Limit: 70-130		% Rec		03/08/19 1130	03/08/19 1811	MRB

Semi-Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv 2.0								
Alachlor	<0.189	2 MCL	0.189	ug/L		03/14/19 0900	03/15/19 0041	GMP
Aldrin	<0.094		0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Atrazine	<0.094	3 MCL	0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Benzo[a]pyrene	<0.019	0.2 MCL	0.019	ug/L		03/14/19 0900	03/15/19 0041	GMP
gamma-BHC (Lindane)	<0.019	0.2 MCL	0.019	ug/L		03/14/19 0900	03/15/19 0041	GMP
Butachlor	<0.094		0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
)is(2-Ethylhexyl)adipate	<0.566	400 MCL	0.566	ug/L		03/14/19 0900	03/15/19 0041	GMP
)is(2-Ethylhexyl)phthalate	<0.566	6 MCL	0.566	ug/L		03/14/19 0900	03/15/19 0041	GMP
Heptachlor	<0.038	0.4 MCL	0.038	ug/L		03/14/19 0900	03/15/19 0041	GMP
Heptachlor epoxide	<0.019	0.2 MCL	0.019	ug/L		03/14/19 0900	03/15/19 0041	GMP
Hexachlorobenzene	<0.094	1 MCL	0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Hexachlorocyclopentadiene	<0.094	50 MCL	0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Methoxychlor	<0.094	40 MCL	0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Metolachlor	<0.094		0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Metribuzin	<0.094		0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Propachlor (Ramrod)	<0.094		0.094	ug/L		03/14/19 0900	03/15/19 0041	GMP
Simazine	<0.066	4 MCL	0.066	ug/L		03/14/19 0900	03/15/19 0041	GMP
Surrogate: 1,3-Dimethyl-2-nitrobenzene	101	Limit: 70-130		% Rec		03/14/19 0900	03/15/19 0041	GMP
Surrogate: Pyrene-d10	98.5	Limit: 70-130		% Rec		03/14/19 0900	03/15/19 0041	GMP
Surrogate: Triphenyl phosphate	110	Limit: 70-130		% Rec		03/14/19 0900	03/15/19 0041	GMP

Semi-Volatile Organic Compounds - HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv 1.0								
Aldicarb sulfone	<0.800		0.800	ug/L		03/11/19 1200	03/11/19 2122	RSD
Aldicarb sulfoxide	<0.500		0.500	ug/L		03/11/19 1200	03/11/19 2122	RSD
Aldicarb (Temik)	<0.500		0.500	ug/L		03/11/19 1200	03/11/19 2122	RSD
Carbaryl (Sevin)	<0.500		0.500	ug/L		03/11/19 1200	03/11/19 2122	RSD
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		03/11/19 1200	03/11/19 2122	RSD
3-Hydroxycarbofuran	<0.500		0.500	ug/L		03/11/19 1200	03/11/19 2122	RSD
Methomyl (Lannate)	<0.500		0.500	ug/L		03/11/19 1200	03/11/19 2122	RSD
Oxamyl	<2.00	200 MCL	2.00	ug/L		03/11/19 1200	03/11/19 2122	RSD

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CERTIFICATE OF ANALYSIS

J9C0225

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0225-02	**Collection Date:**	03/06/2019 10:39

Semi-Volatile Organic Compounds - HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	98.8	Limit: 70-130		% Rec		03/11/19 1200	03/11/19 2122	RSD

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/20/2019 09:50

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Microbac Laboratories, Inc., New York Division

Chain of Custody

TAT 7 days

J9C0225

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: SOC

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0225-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: _____

Analysis	Method	Field Results/Comments	Hold Time
505 PEST PCB Group	varies		14.00 days
515 Cl Acids	EPA 515.3, Rv 1.0		14.00 days
505 PCB	EPA 505, Rv 2.1		14.00 days
505 PEST	EPA 505, Rv 2.1		14.00 days
525 SVOC STD	EPA 525.2, Rv 2.0		14.00 days
531.2 Carbamates	EPA 531.2, Rv 1.0		28.00 days
.1 EDB DBCP	EPA 504.1, Rv 1.1		14.00 days

Container(s)	Designator
V-40ml Clear Vial, Na Thio	A
V-40ml Clear Vial, Na Thio	B
V-40ml Clear Vial, Na Thio	C
V-40ml Clear Vial, Na Thio	D
A-250ml Amber NM, Na Thio	E
A-1L Amber NM, Na sulfite, 6N HCL	F
A-1L Amber NM, Na sulfite, 6N HCL	G
VA-60ml Amber NM, Na Thio, MAB	H
VA-60ml Amber NM, Na Thio, MAB	I
VA-60ml Amber NM, Na Thio, MAB	J

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Lab Sample ID: J9C0225-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3/6/19 10:20 AM – 10:39 AM

Analysis	Method	Field Results/Comments	Hold Time
505 PEST PCB Group	varies		14.00 days
515 Cl Acids	EPA 515.3, Rv 1.0		14.00 days
505 PCB	EPA 505, Rv 2.1		14.00 days
505 PEST	EPA 505, Rv 2.1		14.00 days
SVOC STD	EPA 525.2, Rv 2.0		14.00 days
.2 Carbamates	EPA 531.2, Rv 1.0		28.00 days
504.1 EDB DBCP	EPA 504.1, Rv 1.1		14.00 days

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0225

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: SOC

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Container(s)	Designator
V-40ml Clear Vial, Na Thio	A
V-40ml Clear Vial, Na Thio	B
V-40ml Clear Vial, Na Thio	C
V-40ml Clear Vial, Na Thio	D
A-250ml Amber NM, Na Thio	E
A-1L Amber NM, Na sulfite, 6N HCL	F
A-1L Amber NM, Na sulfite, 6N HCL	G
VA-60ml Amber NM, Na Thio, MAB	H
VA-60ml Amber NM, Na Thio, MAB	I
VA-60ml Amber NM, Na Thio, MAB	J

Client Sample ID: Trip Blank
Lab Sample ID: J9C0225-03
trix: Drinking Water
Type: Grab

Sampled Date & Time: 3/6/19

Analysis	Method	Field Results/Comments	Hold Time
504.1 EDB DBCP	EPA 504.1, Rv 1.1	Container(s): V-40ml Clear Vial, Na Thio	14.00 days Designator: A

Sampled/Relinquished by: Jeffrey J. MacLean	Date/Time: 11:10am	Received by: DW	
Printed Name: Jeffrey J. MacLean	3/6/19 11:09am	Printed Name: DW	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 21

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0223

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: POC

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/18/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0223-02	**Collection Date:**	03/06/2019 10:43

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Benzene	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Bromobenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Bromochloromethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
Bromodichloromethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
Bromoform	<0.50		0.50	ug/L			03/08/19 1626	RSD
Bromomethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
tert-Butylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
sec-Butylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			03/08/19 1626	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/08/19 1626	RSD
Chloroform	<0.50		0.50	ug/L			03/08/19 1626	RSD
Chloromethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/08/19 1626	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Dibromochloromethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			03/08/19 1626	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/08/19 1626	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
1,1-Dichloroethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/08/19 1626	RSD
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			03/08/19 1626	RSD
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			03/08/19 1626	RSD
1,3-Dichloropropane	<0.50		0.50	ug/L			03/08/19 1626	RSD
',2-Dichloropropane	<0.50		0.50	ug/L			03/08/19 1626	RSD
.,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/08/19 1626	RSD

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0223

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0223-02	**Collection Date:**	03/06/2019 10:43

Volatile Organic Compounds - GC/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/08/19 1626	RSD
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/08/19 1626	RSD
Hexachlorobutadiene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/08/19 1626	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/08/19 1626	RSD
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			03/08/19 1626	RSD
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Naphthalene	<0.50		0.50	ug/L			03/08/19 1626	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Styrene	<0.50	100 MCL	0.50	ug/L			03/08/19 1626	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/08/19 1626	RSD
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Toluene	<0.50	1000 MCL	0.50	ug/L			03/08/19 1626	RSD
1,2,4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			03/08/19 1626	RSD
I,2,3-Trichlorobenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/08/19 1626	RSD
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			03/08/19 1626	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			03/08/19 1626	RSD
m,p-Xylene	<0.50		0.50	ug/L			03/08/19 1626	RSD
o-Xylene	<0.50		0.50	ug/L			03/08/19 1626	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/08/19 1626	RSD
Surrogate: 4-Bromofluorobenzene	98.0	Limit: 70-130		% Rec			03/08/19 1626	RSD
Surrogate: 1,2-Dichlorobenzene-d4	97.7	Limit: 70-130		% Rec			03/08/19 1626	RSD

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RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0223

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Christine Pechacek
Director
Reported: 03/18/2019 15:36

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0223

TAT 7 days

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: POC

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0223-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: _____

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv 4.1		14.00 days
		Container(s)	Designator
		V-40ml Clear Vial, Ascorbic Acid, HCL	A
		V-40ml Clear Vial, Ascorbic Acid, HCL	B

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Sample ID: J9C0223-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3/6/19 1043 AM

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv 4.1		14.00 days
		Container(s)	Designator
		V-40ml Clear Vial, Ascorbic Acid, HCL	A
		V-40ml Clear Vial, Ascorbic Acid, HCL	B

Client Sample ID: Trip Blank
Lab Sample ID: J9C0223-03
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3/6/19

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv 4.1		14.00 days
		Container(s)	Designator
		V-40ml Clear Vial, Ascorbic Acid, HCL	A

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0223

Town of Cortlandville Water

Project Name: POC

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Sampled/Relinquished by: Jeffrey J. MacLean	Date/Time: 11:10am 3/6/19 1109 hrs	Received by:
Printed Name: Jeffrey J. MacLean		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 5

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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CERTIFICATE OF ANALYSIS

J9C0228

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Chloride

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/13/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0228-02	**Collection Date:**	03/06/2019 10:03

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-Cl E-2011								
Chloride	41.2		2.00	mg/L			03/11/19 1036	CLW

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/13/2019 16:40

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0228

TAT 7 days

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Chloride

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0228-01
Matrix: Drinking Water
Type: Grab
Sampled Date & Time: _____

Analysis	Method	Field Results/Comments	Hold Time
Chloride EPA300	EPA 300.0, Rv 2.1	Container(s): P-250ml Plastic Oblong WM	28.00 days Designator: A

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Lab Sample ID: J9C0228-02
Matrix: Drinking Water
Sampled Date & Time: 3/6/19 10:03 Am
Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
Chloride EPA300	EPA 300.0, Rv 2.1	Container(s): P-250ml Plastic Oblong WM	28.00 days Designator: A

Sampled/Relinquished by: Jeffrey D MacLean	Date/Time: 11:10am	Received by:	
Printed Name: Jeffrey D MacLean	3/6/19 11:09	Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 2

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0222

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Nitrates

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/11/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Sample Matrix: Drinking Water
Lab Sample ID: J9C0222-02
Collected By: JM-Client
Collection Date: 03/06/2019 9:57

Inorganics	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv 2.0								
Nitrate as N (Calc)	2.53		0.100	mg/L		03/07/19 1230	03/07/19 1456	ASH
Nitrate-Nitrite as N	2.53	10.0 MCL	0.100	mg/L		03/07/19 1230	03/07/19 1456	ASH
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		03/07/19 1230	03/07/19 1332	ASH

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Sara Lechleitner
Customer Relationship Coordinator
Reported: 03/11/2019 17:06

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Microbac Laboratories, Inc., New York Division

Chain of Custody

TAT 7 days

J9C0222

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Nitrates

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0222-01
Matrix: Drinking Water
Sampled Date & Time: _____
Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
NO3 EPA Group	varies		2.00 days
		Container(s)	Designator
		P-250ml Plastic Oblong WM	A
		P-250ml Plastic Oblong WM, H2SO4	B

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Lab Sample ID: J9C0222-02
Matrix: Drinking Water
Sampled Date & Time: 3/6/19 9:57 AM
Type: Grab

Analysis	Method	Field Results/Comments	Hold Time
NO3 EPA Group	varies		2.00 days
		Container(s)	Designator
		P-250ml Plastic Oblong WM	A
		P-250ml Plastic Oblong WM, H2SO4	B

Sampled/Relinquished by: Jeffrey D. MacLean	Date/Time: 11:10AM 3/6/19 11:09 AM	Received by:
Printed Name: Jeffrey I MacLean		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:
Relinquished by:	Date/Time:	Received by:
Printed Name:		Printed Name:

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 4

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

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CERTIFICATE OF ANALYSIS

J9C0226

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Sodium

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/12/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Treatment Plant - Entry Point		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0226-02	**Collection Date:**	03/06/2019 10:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	12.8		1.02	mg/L		03/08/19 1236	03/08/19 1720	BRC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 03/12/2019 13:57

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Microbac Laboratories, Inc., New York Division

Chain of Custody

J9C0226

TAT 7 days

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045
Phone: (607) 756-9637

Project Name: Sodium

Project / PO Number: N/A
Tenatively Scheduled: 3/11/2019
Field Route ID:

Client Sample ID: Terrace Rd Treatment Plant - Entry Point
Lab Sample ID: J9C0226-01
Matrix: Drinking Water
Type: Grab
Sampled Date & Time: _____

Analysis	Method	Field Results/Comments	Hold Time
200.7 Na	EPA 200.7, Rv 4.4	Container(s): P-500ml Plastic Oblong WM, HNO3	180.00 days Designator: A

Client Sample ID: Lime Hollow Treatment Plant - Entry Point
Lab Sample ID: J9C0226-02
Matrix: Drinking Water
Type: Grab
Sampled Date & Time: 3/6/19 10:00 AM

Analysis	Method	Field Results/Comments	Hold Time
200.7 Na	EPA 200.7, Rv 4.4	Container(s): P-500ml Plastic Oblong WM, HNO3	180.00 days Designator: A

Sampled/Relinquished by: Jeffrey L MacLean	Date/Time: 11:00AM	Received by:	
Printed Name: Jeffrey L MacLean	3-6-19 11:09 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp 5.7 °C Total Containers: 2

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

Cortland County Health Department
Division of Environmental Health

60 Central Avenue, Cortland, New York 13045-2746
Telephone: 607-753-5035 Fax: 607-758-5578
www.cortland-co.org

January 11, 2019

Mr. Peter Alteri
Cortlandville Town Water
3575 Terrace Road
Cortland, NY 13045

Re: **Minimum Monitoring Requirements for 2019**
PWS NY1101755

Dear Mr. Alteri:

The attached sheets are a list of the samples that are required for your system. Only items that are checked ☑ are the samples required for 2018. Please note the locations that the samples need to be taken from and any comments that may be included for a specific sample.

Please make arrangements to have a lab collect the samples for analysis **OR** for you to pick up the correct sample bottles and instructions for sampling needed to collect the samples yourself.

We also remind you that any monitoring sample which exceeds a maximum contaminant level (MCL) or action level may require action on your part within a mandated time frame. Call us **immediately**, should any sample indicate a problem.

Monthly Operation Reports—Chlorine residuals and water use must be recorded daily on the monthly operation report. Operating reports must be received in our office by the 10th day of following month. Please note the Ground Water Rule (GWR) notation. The value is the minimum free chlorine residual that must be maintained to assure proper contact time.

Failure to perform the sampling and submit the results along with the operation reports by the applicable deadlines will be violations of Part 5 of the NYSSC and FSDWA and enforcement action will be taken.

The AWQR must be mailed or hand delivered to customers by May 31st. A copy of the AWQR along with the certification form must be sent to our office as well. Please contact me if you would like assistance in preparing your AWQR.

Also enclosed is a Reporting Emergency form which must be posted at your facility. Please contact this office with any questions concerning these required tests.

If you have any questions or find errors in this list after review, please call Phyllis Guest or myself at 753-5035, or e-mail at: mryan@cortland-co.org.

Sincerely,

Michael Ryan, P.E.
Public Health Engineer

Cc:

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2019	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Coliform, Total (TCR) Monthly		
☑	**Location: Distribution System** **Frequency: 5 Samples Monthly** A positive total coliform (TC+) sample requires notifying the health department and collecting repeat distribution system samples within 24 hours. Unless otherwise directed by the health department, source (or raw) water before any treatment, from all active wells, must also be sampled within 24 hours.		**5 Samples must be collected every month.**
	Chloride March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
	Nitrate March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
	Nitrite March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
	Part 5-1.42 and 5-1.47 - Lead and Copper June.		
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 20 Samples Every 3 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample at approved sites following correct sampling protocol and submit all certifications.	20 Samples Collected on or Before: 6/9/2016	**Next 20 samples must be collected between 6/1 and 9/30 within a single year by 9/30/2019**
	Part 5-1.52 Table 12 - Radiological March.		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 6 years**	Samples last collected: 3/4/2013	**Sample must be collected by 12/31/2019**

Due 2019	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements

Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.

☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** — Samples last collected: 3/20/2013 — **Sample must be collected by 12/31/2019**
Frequency: 1 Sample Every 6 years

Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.

Part 5-1.52 Table 9A - Disinfection Byproducts/Stage 2 — July

☑ **Location: DISTRIBUTION SYSTEM ID: DS001** — Samples last collected: 7/12/2018 — **Next 2 samples must be collected between 7/1 and 7/31 within a single year by 7/31/2019**
Frequency: 2 Samples Yearly

Sample Point: 1303 FISHER AVE
Sample Point No.: LRAA1
Sample Point Type: DS-Distribution System

Sample Point: WALDEN OAKS BOOSTER STATION
Sample Point No.: LRAA2
Sample Point Type: DS-Distribution System

One sample for TTHM's & one sample for HAA5's must be collected every year, at each sampling location, between 7/1 & 7/31. TTHM & HAA5 samples must be collected at the same time, at each sampling location.

Part 5-1.52 Table 9B - Principal Organic Chemicals — March

☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** — Samples last collected: 3/1/2018 — **Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
Frequency: 1 Sample Yearly

Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** — Samples last collected: 3/1/2018 — **Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
Frequency: 1 Sample Yearly

Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Part 5-1.52 Table 9C - Synthetic Organic Chemicals — March

☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** — Samples last collected: 3/1/2018 — **Sample must be collected by 12/31/2019**
Frequency: 1 Sample Every 18 Months

Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

Samples must be collected in an 18 month period. The next one is due by 9/1/19.

☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** — Samples last collected: 3/1/2018 — **Sample must be collected by 12/31/2019**
Frequency: 1 Sample Every 18 Months

Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Samples must be collected in an 18 month period. The next one is due by 9/1/19.

Sodium — March, June, Sept, Dec.

☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** — Samples last collected: 12/3/2018 — **1 Sample must be collected each calendar quarter.**
Frequency: 1 Sample Quarterly

Due 2019	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point		
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2018	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2019**
	Asbestos		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 1 Sample Every 9 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample in the area of distribution that has asbestos pipe.	Samples last collected: 3/4/2015	**Next sample must be collected by 12/31/2024**
	Part 5-1.52 Table 8B - Primary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2017	**Next sample must be collected between 1/1 and 12/31 within a single year by 12/31/2020**
	Part 5-1.52 Table 8D - Secondary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**

Cortlandville Town Water
THHM/HAA5 WATER MONITORING PLAN

Sampling is required for disinfection byproducts, including TTHMs and HAA5 in the distribution system, as well as chlorine residual. TTHMs and HAA5 shall be sampled, annually, on the second Thursday of July. The two sampling locations, representative of high TTHM and high HAA5, is 1303 Fisher Ave., the National Grid/NIMO building, the women's bathroom sink in the break room and Walden Oaks booster station, 962 Walden Pond Ln., spigot in station. The results of the TTHM and HAA5 samples will be compared to the respective MCLs of 80 and 60 ug/L. If either the TTHM or the HAA5 MCL is exceeded, the system shall begin quarterly sampling on second Thursday in October, January and April. The results of the most recent quarterly sampling shall be added to the previous three quarters, and the average of the four quarters (running annual average) will be compared to the MCL to determine compliance. Quarterly sampling shall continue, until the Cortland County Health Department approves reduced monitoring.

The residual chlorine level shall be measured when coliform samples are taken as specified by the coliform site monitoring plan. If any residual chlorine results exceed the Maximum Residual Disinfectant Level of 4 mg/L, the results for the month will be averaged and that average added to the average of the other months of the quarter to determine the quarterly average. The quarterly average will be added to the average of the previous three quarters to determine a running annual average which will be compared to the MRDL.

Revised December 9, 2013

Annual Water Samples 2020

Public Health
Prevent. Promote. Protect.
Cortland County Health Department

CORTLAND COUNTY HEALTH DEPARTMENT

COUNTY OFFICE BUILDING
60 CENTRAL AVENUE
CORTLAND, NEW YORK 13045-2746
(607) 753-5036
FAX: (607) 753-5209
http://www.cortland-co.org/432/Health-Department

Lisa Perfetti
Interim Public Health Director
Ngozi Mezu-Patel, MD
Medical Advisor

August 31, 2020

Re: Cortland County NTNC and Community Water Systems

Dear Water Operator/Owner:

The New York State Health Department announced on 8 25 2020 they would publish in the NYS Register on 8 26 2020 additional rules for 3 contaminants that are effective immediately (8 26 2020). You are receiving this because your system is either a Community water system (CWS) or a Non-Transient Non-Community water system (NTNC) as defined by Part 5 of the NYS State Sanitary Code.

All of these contaminants have required sampling dates as defined in the attached rule revision. You must sample for each of these contaminants within the designated time frames. The contaminants are:

Perfluorooctanoic acid (PFOA)	MCL of 10 parts per trillion (10ppt)
Perfluorooctane sulfonate (PFOS)	MCL of 10 parts per trillion (10ppt)
1,4-Dioxane	MCL 1 part per billion (1ug/L)

Attached also is an FAQ prepared by the state for the new MCL's. The following dates apply:

Monitoring must begin by October 25, 2020 for systems serving populations of 10,000 people or greater.

Monitoring must begin by November 25, 2020 for systems serving populations between 3,300 and 9,999 people.

Monitoring must begin by February 25, 2021 for systems serving less than 3,300 people.

Please read over the attached documentation and if you have any questions please call Phyllis Guest or myself at 753-5035, or email at mryan@cortland-co.org

This section for Part 5 NYS Sanitary Code can be found at https://www.cortland-co.org/517/Public-Water-Supplies---Facility-Operator

Sincerely,

Michael J. Ryan, P.E.

Director of Environmental Health, Cortland County

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0L0210

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/02/2020
Reported: 12/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0L0210-01
Collected By: JM-Client
Collection Date: 12/02/2020 10:04

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

lient Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0L0210-02
Collected By: JM-Client
Collection Date: 12/02/2020 10:06

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	75.2		1.02	mg/L		12/07/20 1235	12/07/20 1559	JDF

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J0L0210-03
Collected By: JM-Client
Collection Date: 12/02/2020 10:14

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
orine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/02/20 1014	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1369

Project Description

PFAS

For:

Peter Alteri

Town of Cortlandville Water

3577 Terrace Road

Cortland, NY 13045

Shannon Weeks

Customer Relationship Coordinator

Shannon Weeks

Tuesday, October 13, 2020

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac Laboratories, Inc., New York Division. If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed above.

I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1369

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: PFAS

Project / PO Number: N/A
Received: 09/17/2020
Reported: 10/13/2020

Sample Summary Report

Sample Name	Laboratory ID	Client Matrix	Sample Type	Sample Begin	Sample Taken	Lab Received
Lime Hollow Well	J0I1369-01	Drinking Water	Grab		09/17/20 15:20	09/17/20 16:01
Lime Hollow Well	J0I1369-02	Drinking Water	Grab		09/17/20 15:27	09/17/20 16:01
Field Blank	J0I1369-03	Drinking Water	Field Blank		09/17/20 15:20	09/17/20 16:01

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1369

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well
Sample Matrix: Drinking Water
Lab Sample ID: J0I1369-01
Collected By: JM-Client
Collection Date: 09/17/2020 15:20

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<0.962	0.962	1.92	ng/L	1		10/01/20 1142	10/09/20 0110	CAS
Perfluorooctane sulfonate (PFOS)	<0.962	0.962	1.92	ng/L	1		10/01/20 1142	10/09/20 0110	CAS
Surrogate: MPFHxA	112	Limit: 70-130		% Rec	1		10/01/20 1142	10/09/20 0110	CAS
Surrogate: M3HFPO-DA	90.4	Limit: 70-130		% Rec	1		10/01/20 1142	10/09/20 0110	CAS
Surrogate: MPFDA	109	Limit: 70-130		% Rec	1		10/01/20 1142	10/09/20 0110	CAS
Surrogate: d5-N-EtFOSAA	89.1	Limit: 70-130		% Rec	1		10/01/20 1142	10/09/20 0110	CAS

Client Sample ID: Lime Hollow Well
Sample Matrix: Drinking Water
Lab Sample ID: J0I1369-02
Collected By: JM-Client
Collection Date: 09/17/2020 15:27

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 522, Rv. 1 (2008)									
1,4-Dioxane	<0.100		0.100	ug/L	1		09/24/20 0900	09/25/20 1502	GMP
Surrogate: 1,4-Dioxane-d8	87.7	Limit: 70-130		% Rec	1		09/24/20 0900	09/25/20 1502	GMP

Client Sample ID: Field Blank
Sample Matrix: Drinking Water
Lab Sample ID: J0I1369-03
Collected By: JM-Client
Collection Date: 09/17/2020 15:20

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<0.893	0.893	1.79	ng/L	1		09/25/20 0848	09/30/20 0501	CAS
Perfluorooctane sulfonate (PFOS)	<0.893	0.893	1.79	ng/L	1		09/25/20 0848	09/30/20 0501	CAS
Surrogate: MPFHxA	92.6	Limit: 70-130		% Rec	1		09/25/20 0848	09/30/20 0501	CAS
Surrogate: M3HFPO-DA	80.4	Limit: 70-130		% Rec	1		09/25/20 0848	09/30/20 0501	CAS
Surrogate: MPFDA	90.6	Limit: 70-130		% Rec	1		09/25/20 0848	09/30/20 0501	CAS
Surrogate: d5-N-EtFOSAA	69.3	Limit: 70-130		% Rec	1	S2	09/25/20 0848	09/30/20 0501	CAS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1369

Definitions

MDL:	Minimum Detection Limit
ng/L:	Nanograms per Liter
RL:	Reporting Limit
S2:	Surrogate recovery is below acceptance limits.
ug/L:	Micrograms per Liter

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 17.8°C

Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		

roject Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH	
10861	New York State Department of Health
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/13/2020 17:20

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 17.8°

Therm ID 377

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

J0113 69

Cortlandville Water, Town of

PM: Shannon Weeks

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS & 1,4 Dioxane

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	PFOA	PFOS	1,4 Dioxane	Additional Notes
	Lime Hollow well	9-17-2020	3:20 PM	2	DW		T. Cizma	2			RAW Water
			3:22 PM	2	DW		N/A		2		
			3:27 PM	1	DW		Sodium thiosulfate			1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-17-2020 4:00 PM	Jennifer Walker	9/17/2020 1601
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ___ of ___

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1226

Project Description

PFAS

For:

Peter Alteri

Town of Cortlandville Water

3577 Terrace Road

Cortland, NY 13045

Shannon Weeks

Customer Relationship Coordinator

Shannon Weeks

Tuesday, October 6, 2020

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac Laboratories, Inc., New York Division. If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed above.

I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1226

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: PFAS

Project / PO Number: N/A
Received: 09/16/2020
Reported: 10/06/2020

Sample Summary Report

Sample Name	Laboratory ID	Client Matrix	Sample Type	Sample Begin	Sample Taken	Lab Received
Terrace Rd Well	J0I1226-01	Drinking Water	Grab		09/16/20 11:55	09/16/20 13:26
Field Blank	J0I1226-02	Drinking Water	Field Blank		09/16/20 11:57	09/16/20 13:26
Terrace Rd Well	J0I1226-03	Drinking Water	Grab		09/16/20 12:00	09/16/20 13:26

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1226

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0I1226-01
Collected By: JM-Client
Collection Date: 09/16/2020 11:55

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<1.00	1.00	2.00	ng/L	1		09/21/20 0855	09/24/20 0433	CAS
Perfluorooctane sulfonate (PFOS)	<1.00	1.00	2.00	ng/L	1		09/21/20 0855	09/24/20 0433	CAS
Surrogate: MPFHxA	96.9	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0433	CAS
Surrogate: M3HFPO-DA	68.3	Limit: 70-130		% Rec	1	S2	09/21/20 0855	09/24/20 0433	CAS
Surrogate: MPFDA	94.0	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0433	CAS
Surrogate: d5-N-EtFOSAA	71.8	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0433	CAS

Client Sample ID: Field Blank
Sample Matrix: Drinking Water
Lab Sample ID: J0I1226-02
Collected By: JM-Client
Collection Date: 09/16/2020 11:57

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<1.00	1.00	2.00	ng/L	1		09/21/20 0855	09/24/20 0454	CAS
Perfluorooctane sulfonate (PFOS)	<1.00	1.00	2.00	ng/L	1		09/21/20 0855	09/24/20 0454	CAS
Surrogate: MPFHxA	96.0	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0454	CAS
Surrogate: M3HFPO-DA	68.6	Limit: 70-130		% Rec	1	S2	09/21/20 0855	09/24/20 0454	CAS
Surrogate: MPFDA	84.4	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0454	CAS
Surrogate: d5-N-EtFOSAA	70.0	Limit: 70-130		% Rec	1		09/21/20 0855	09/24/20 0454	CAS

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0I1226-03
Collected By: JM-Client
Collection Date: 09/16/2020 12:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	MDL	RL	Units	Dilution	Note	Prepared	Analyzed	Analyst
Method: EPA 522, Rv. 1 (2008)									
1,4-Dioxane	<0.100		0.100	ug/L	1		09/24/20 0900	09/25/20 1435	GMP
Surrogate: 1,4-Dioxane-d8	89.9	Limit: 70-130		% Rec	1		09/24/20 0900	09/25/20 1435	GMP

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I1226

Definitions

MDL:	Minimum Detection Limit
ng/L:	Nanograms per Liter
RL:	Reporting Limit
S2:	Surrogate recovery is below acceptance limits.
ug/L:	Micrograms per Liter

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 10.2°C

Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		

oject Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH	
10861	New York State Department of Health
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/06/2020 12:04

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C): 10.2
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS & 1,4 Dioxane
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	PFOA	PFOS	1,4 Dioxane	Additional Notes
	Terrace Rd well	9-16-2020	11:55 AM	2	DW		TRIS	2	2		RAW WATER
			11:57 AM	2					2		
			12:00 PM	1						1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-16-2020		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			9/16/2020 1324
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ___ of ___

rev.12/26/2017

Page 5 of 5

J011226
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 [illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.2

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS & 1,4 Dioxane

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	PFOA	PFOS	1,4 Dioxane							Additional Notes
	Terrace Rd well	9-16-2020	11:55 AM	2	DW		TRIS	2	2								RAW WATER
			11:57 AM	2					2								
			12:00 PM	1						1							

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-16-2020	[signature]	9/16/2020 1324
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.9775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 15.3

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No (N/A)

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Disinfection By Products/Stage 2

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2 THM	552.2 HAA	524.2 THM	552.2 HAA	Additio
	Walden Oaks BS.	7-9-2020	700 AM 705 AM	2	DW	2	Sodium thiosulfate	2				
				3	DW	3	Ammonium Chloride		3			
	1303 Fisher AVE.	7-9-2020	845 AM 850 AM	2	DW	2	Sodium thiosulfate			2		
				3	DW	3	Ammonium Chloride				3	

PM: Shannon Weeks

Cortlandville Water, Town of

J0G07378

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-9-2020 923 AM	K Clark	7-9-2020 1003
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev 12/26/2017

Page ___ of ___

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0738

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Disinfection Byproducts

Project / PO Number: N/A
Received: 07/09/2020
Reported: 07/21/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Walden Oaks B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0G0738-01	**Collection Date:**	07/09/2020 7:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Total Trihalomethanes	6.99	80 MCL	0.500	ug/L			07/16/20 0239	RSD
Bromodichloromethane	2.00		0.500	ug/L			07/16/20 0239	RSD
Bromoform	0.900		0.500	ug/L			07/16/20 0239	RSD
Chloroform	2.05		0.500	ug/L			07/16/20 0239	RSD
Dibromochloromethane	2.04		0.500	ug/L			07/16/20 0239	RSD
Surrogate: 4-Bromofluorobenzene	109	Limit: 70-130		% Rec			07/16/20 0239	RSD
Surrogate: 1,2-Dichlorobenzene-d4	110	Limit: 70-130		% Rec			07/16/20 0239	RSD

Semivolatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2, Rv. 1 (1995)								
Total Haloacetic acids (HAA5)	3.33	60 MCL	1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Chloroacetic acid	<1.00		1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Bromoacetic acid	<1.00		1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Dichloroacetic acid	1.88		1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Trichloroacetic acid	<1.00		1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Dibromoacetic acid	1.45		1.00	ug/L		07/16/20 0800	07/17/20 0839	CKC
Surrogate: 2,3-Dibromopropionic acid	94.7	Limit: 70-130		% Rec		07/16/20 0800	07/17/20 0839	CKC

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0738

Client Sample ID:	1303 Fisher Ave.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0G0738-02	**Collection Date:**	07/09/2020 8:45

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Total Trihalomethanes	17.0	80 MCL	0.500	ug/L			07/16/20 0305	RSD
Bromodichloromethane	5.01		0.500	ug/L			07/16/20 0305	RSD
Bromoform	1.75		0.500	ug/L			07/16/20 0305	RSD
Chloroform	5.41		0.500	ug/L			07/16/20 0305	RSD
Dibromochloromethane	4.80		0.500	ug/L			07/16/20 0305	RSD
Surrogate: 4-Bromofluorobenzene	113	Limit: 70-130		% Rec			07/16/20 0305	RSD
Surrogate: 1,2-Dichlorobenzene-d4	115	Limit: 70-130		% Rec			07/16/20 0305	RSD

Semivolatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2, Rv. 1 (1995)								
Total Haloacetic acids (HAA5)	10.5	60 MCL	1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Chloroacetic acid	4.82		1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Bromoacetic acid	<1.00		1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Dichloroacetic acid	2.95		1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Trichloroacetic acid	1.13		1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Dibromoacetic acid	1.60		1.00	ug/L		07/16/20 0800	07/17/20 0900	CKC
Surrogate: 2,3-Dibromopropionic acid	91.4	Limit: 70-130		% Rec		07/16/20 0800	07/17/20 0900	CKC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0738

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/21/2020 09:31

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0272

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-03	**Collection Date:**	06/03/2020 7:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		06/03/20 0725	CUS

Client Sample ID:	Terrace Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-04	**Collection Date:**	06/03/2020 6:17

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

...etals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	64.1		1.02	mg/L		06/10/20 1415	06/10/20 1439	JDF

Client Sample ID:	Terrace Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-05	**Collection Date:**	06/03/2020 6:18

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

⓪ I ... AC*	3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 ... ain Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY RECC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID

Holding Time 10.6

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL WATER SAMPLES

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Table 8D										Add
	Lime Hollow well	5-19-2020	228 PM to 232 PM	5	DW			4										

J O E 1 1 1 5
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-19-2020 3:00 PM	[signature]	5/19/2020 1575
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E1115

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Annual Water Samples

Project / PO Number: N/A
Received: 05/19/2020
Reported: 06/12/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0E1115-01	**Collection Date:**	05/19/2020 14:28

Analyses Subcontracted to: Envirotest Laboratories

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM2150B								
Odor @ 60°C	1		1	T.O.N.			05/20/20 1838	ETL

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 4500-Cl E-2011								
Chloride	50.0		2.00	mg/L			05/22/20 1507	CLW
Method: SM 4500-$SO_4^{=}$ E-1997								
Sulfate as SO4	17.4		5.00	mg/L			05/21/20 1536	CLW

General Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 2120 B-2011								
Color - Apparent	<1		1	CU	H1		05/21/20 2000	MAD
pH for Color	7.7		0.10	S.U.			05/21/20 2000	MAD

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Manganese	<0.0020		0.0020	mg/L		05/22/20 1302	05/26/20 1245	JDF
Iron	<0.0102		0.0102	mg/L		05/22/20 1302	05/26/20 1245	JDF
Sodium	18.7		1.02	mg/L		05/22/20 1302	05/26/20 1245	JDF

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Silver	<0.0010		0.0010	mg/L		05/26/20 1142	05/26/20 1321	DLO
Zinc	0.0065		0.0051	mg/L		05/26/20 1142	05/26/20 1321	DLO

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E1115

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

CU:	Color Unit
H1:	Sample was received past holding time.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
S.U.:	Standard Units
T.O.N.:	Threshold Odor Number

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health
EnviroTest Laboratories	
NY Lab ID No: 10142	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/12/2020 14:49

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 [illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes (No) N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	8B										
	Lime Hollow well	3-5-2020	1:20-1:21 PM	3	DW	G		3										

Cortlandville Water, Town of
PM: Shannon Weeks
J0C0476

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-5-2020 143 PM	[signature]	3/5/2020 1344
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0476

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Lime Hollow

Project / PO Number: N/A
Received: 03/05/2020
Reported: 03/25/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0476-01	**Collection Date:**	03/05/2020 13:20

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-CN C/E-1999								
Cyanide - Total	<0.0100	0.200 MCL	0.0100	mg/L		03/09/20 1620	03/10/20 1235	CLW
Method: SM4500-F C-1997								
Fluoride	<0.200	4.00 MCL	0.200	mg/L			03/06/20 2052	CEO

Metals Total by CVAA	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 245.2								
Mercury	<0.00020	0.00200 MCL	0.00020	mg/L		03/23/20 1250	03/23/20 1324	JDF

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Antimony	<0.0004	0.0060 MCL	0.0004	mg/L		03/11/20 1207	03/11/20 1325	DLO
Arsenic	<0.0010	0.0100 MCL	0.0010	mg/L		03/11/20 1207	03/11/20 1325	DLO
Barium	0.0383	2.00 MCL	0.0051	mg/L		03/11/20 1207	03/11/20 1325	DLO
Beryllium	<0.0003	0.0040 MCL	0.0003	mg/L		03/11/20 1207	03/11/20 1325	DLO
Cadmium	<0.0010	0.0050 MCL	0.0010	mg/L		03/11/20 1207	03/11/20 1325	DLO
Chromium	<0.0010	0.100 MCL	0.0010	mg/L		03/11/20 1207	03/11/20 1325	DLO
Nickel	0.0009		0.0005	mg/L		03/11/20 1207	03/11/20 1325	DLO
Selenium	<0.0051	0.0500 MCL	0.0051	mg/L		03/11/20 1207	03/11/20 1325	DLO
Thallium	<0.0003	0.0020 MCL	0.0003	mg/L		03/11/20 1207	03/11/20 1325	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0476

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/25/2020 10:48

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C): 12.6
Therm ID:
Holding Time:
Samples Received on Ice: Yes No N
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Metal	EPA Analysis	Flouride	Chloride	NO3	NO3	Sodium	524.2 Voc	Sulfate	Odor	Additional Notes
	Terrace Rd well	3-4-2020	843 to 854	1	DW	1	HNO3	1										60 HP Running
				1	DW	1	Sodium Hyd		1									
				1	DW	1	NA			1								
				1	DW	1	NA				1							
				1	DW	1	NA					1						
				1	DW	1	H2S4						1					
				1	DW	1	Nitric Acid							1				
				2	DW	2	Ascorbic Acid HCL								2			
				1	DW	1	NA									1		
				1	DW	1	NA										1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments: NO CN. BH 2020

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-4-2020		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Received By: BH 3/4/2020 9:40

rev.12/26/2017

Page 1 of 2

J0C0327
Cortlandville Water, Town of
PM: Shannon Weeks

Page 5 of 6

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 ... ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C): 12.6
Therm ID:
Holding Time:
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Altieri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Altieri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSI

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types **	Color	200.7					Additional Notes
	Terrace Rd Well	3-4-2020	843 to 854	1	DW	1	NA	1						60 Hz Running
				1	DW	1	NA		1					

Cortlandville Water, Town of
PM: Shannon Weeks
J0C0327

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3/4/2020	[illegible]	3/5/2020 9:40
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page 2 of 2

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0327

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Terrace Rd Well

Project / PO Number: N/A
Received: 03/04/2020
Reported: 03/24/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Road Well
Sample Matrix: Drinking Water
Lab Sample ID: J0C0327-01
Collected By: JM-Client
Collection Date: 03/04/2020 8:43

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv 2.0								
Nitrate as N (Calc)	1.84		0.0500	mg/L		03/05/20 1113	03/05/20 1451	KED
Nitrate-Nitrite as N	1.84	10.0 MCL	0.0500	mg/L		03/05/20 1113	03/05/20 1451	KED
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		03/05/20 1113	03/05/20 1243	KED

Analyses Subcontracted to: Envirotest Laboratories

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 2150B								
Odor @ 60°C	1		1	T.O.N.			03/05/20 1540	ETL

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-Cl E-2011								
Chloride	138		4.00	mg/L			03/06/20 1519	CLW
Method: SM4500-SO4 E-1997								
Sulfate as SO4	10.1		5.00	mg/L			03/10/20 0953	CLW

General Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM2120 B-2001								
Color - Apparent	<1		1	CU			03/05/20 2100	MAD
pH for Color	7.7		0.10	S.U.			03/05/20 2100	MAD

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Manganese	<0.0020		0.0020	mg/L		03/06/20 1252	03/06/20 1332	DLO
Iron	<0.0102		0.0102	mg/L		03/06/20 1252	03/06/20 1332	DLO
Sodium	62.9		1.02	mg/L		03/06/20 1252	03/06/20 1332	DLO

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0327

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0327-01	**Collection Date:**	03/04/2020 8:43

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Silver	<0.0010		0.0010	mg/L		03/09/20 1155	03/09/20 1247	DLO
Zinc	0.0103		0.0102	mg/L	D	03/09/20 1155	03/11/20 1021	DLO

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Benzene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Bromobenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Bromochloromethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
Bromodichloromethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
Bromoform	<0.50		0.50	ug/L			03/05/20 2232	RSD
Bromomethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
ert-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
ec-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			03/05/20 2232	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/05/20 2232	RSD
Chloroform	<0.50		0.50	ug/L			03/05/20 2232	RSD
Chloromethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/05/20 2232	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Dibromochloromethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			03/05/20 2232	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/05/20 2232	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
1,1-Dichloroethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/05/20 2232	RSD
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			03/05/20 2232	RSD
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			03/05/20 2232	RSD
1,3-Dichloropropane	<0.50		0.50	ug/L			03/05/20 2232	RSD
2,2-Dichloropropane	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2232	RSD
rans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2232	RSD
is-1,3-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/05/20 2232	RSD

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0327

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0327-01	**Collection Date:**	03/04/2020 8:43

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Hexachlorobutadiene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/05/20 2232	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/05/20 2232	RSD
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			03/05/20 2232	RSD
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Naphthalene	<0.50		0.50	ug/L			03/05/20 2232	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Styrene	<0.50	100 MCL	0.50	ug/L			03/05/20 2232	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/05/20 2232	RSD
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Toluene	<0.50	1000 MCL	0.50	ug/L			03/05/20 2232	RSD
1,2,4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			03/05/20 2232	RSD
1,2,3-Trichlorobenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/05/20 2232	RSD
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2232	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			03/05/20 2232	RSD
m,p-Xylene	<0.50		0.50	ug/L			03/05/20 2232	RSD
o-Xylene	<0.50		0.50	ug/L			03/05/20 2232	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/05/20 2232	RSD
Surrogate: 4-Bromofluorobenzene	95.8	Limit: 70-130		% Rec			03/05/20 2232	RSD
Surrogate: 1,2-Dichlorobenzene-d4	91.4	Limit: 70-130		% Rec			03/05/20 2232	RSD

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

CU:	Color Unit
D:	The sample was diluted due to matrix interference.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
S.U.:	Standard Units
T.O.N.:	Threshold Odor Number
ug/L:	Micrograms per Liter

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0327

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health
EnviroTest Laboratories	
NY Lab ID No: 10142	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/24/2020 15:45

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 [illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID: 101
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff Maclean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Color										Additional Notes
	Lime Hollow well																	
	Lime Hollow well	3-3-2020	247-259 PM PM	1	DW	1	NA	1										100 HP Rinsing

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			3/3/2020 1559
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J0C0300

Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0300

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Lime Hollow

Project / PO Number: N/A
Received: 03/03/2020
Reported: 03/23/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well
Sample Matrix: Drinking Water
Lab Sample ID: J0C0300-01
Collected By: JM-Client
Collection Date: 03/03/2020 14:47

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv 2.0								
Nitrate as N (Calc)	2.23		0.0500	mg/L		03/04/20 1315	03/04/20 1716	KED
Nitrate-Nitrite as N	2.23	10.0 MCL	0.0500	mg/L		03/04/20 1315	03/04/20 1716	KED
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		03/04/20 1315	03/04/20 1408	KED

Analyses Subcontracted to: Envirotest Laboratories

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 2150B								
Odor @ 60°C	1		1	T.O.N.			03/04/20 1400	ETL

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-Cl E-2011								
Chloride	49.1		2.00	mg/L			03/05/20 0939	CLW
Method: SM4500-SO4 E-1997								
Sulfate as SO4	18.2		5.00	mg/L			03/05/20 1622	CLW

General Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM2120 B-2001								
Color - Apparent	<1		1	CU			03/04/20 2200	MAD
pH for Color	7.7		0.10	S.U.			03/04/20 2200	MAD

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	17.1		1.02	mg/L		03/05/20 1529	03/05/20 1727	DLO

CERTIFICATE OF ANALYSIS

J0C0300

Client Sample ID:	Lime Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0300-01	**Collection Date:**	03/03/2020 14:47

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Antimony	<0.0004	0.0060 MCL	0.0004	mg/L		03/06/20 1230	03/06/20 1524	JDF
Barium	0.0448	2.00 MCL	0.0051	mg/L		03/06/20 1230	03/06/20 1524	JDF
Beryllium	<0.0003	0.0040 MCL	0.0003	mg/L		03/06/20 1230	03/06/20 1524	JDF
Cadmium	<0.0010	0.0050 MCL	0.0010	mg/L		03/06/20 1230	03/06/20 1524	JDF
Chromium	<0.0010	0.100 MCL	0.0010	mg/L		03/06/20 1230	03/06/20 1524	JDF
Selenium	<0.0051	0.0500 MCL	0.0051	mg/L		03/06/20 1230	03/06/20 1524	JDF
Thallium	<0.0003	0.0020 MCL	0.0003	mg/L		03/06/20 1230	03/06/20 1524	JDF

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Benzene	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Bromobenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Bromochloromethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
Bromodichloromethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
Bromoform	<0.50		0.50	ug/L			03/04/20 2247	RSD
Bromomethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
tert-Butylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
sec-Butylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Chlorobenzene	1.63	100 MCL	0.50	ug/L			03/04/20 2247	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/04/20 2247	RSD
Chloroform	<0.50		0.50	ug/L			03/04/20 2247	RSD
Chloromethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/04/20 2247	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Dibromochloromethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			03/04/20 2247	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/04/20 2247	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
1,1-Dichloroethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/04/20 2247	RSD
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			03/04/20 2247	RSD
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			03/04/20 2247	RSD
1,3-Dichloropropane	<0.50		0.50	ug/L			03/04/20 2247	RSD
2,2-Dichloropropane	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/04/20 2247	RSD
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/04/20 2247	RSD

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0300

Client Sample ID:	Lime Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0300-01	**Collection Date:**	03/03/2020 14:47

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/04/20 2247	RSD
Hexachlorobutadiene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/04/20 2247	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/04/20 2247	RSD
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			03/04/20 2247	RSD
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Naphthalene	<0.50		0.50	ug/L			03/04/20 2247	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Styrene	<0.50	100 MCL	0.50	ug/L			03/04/20 2247	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/04/20 2247	RSD
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Toluene	<0.50	1000 MCL	0.50	ug/L			03/04/20 2247	RSD
1,2,4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			03/04/20 2247	RSD
1,2,3-Trichlorobenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/04/20 2247	RSD
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			03/04/20 2247	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			03/04/20 2247	RSD
m,p-Xylene	<0.50		0.50	ug/L			03/04/20 2247	RSD
o-Xylene	<0.50		0.50	ug/L			03/04/20 2247	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/04/20 2247	RSD
Surrogate: 4-Bromofluorobenzene	99.4	Limit: 70-130		% Rec			03/04/20 2247	RSD
Surrogate: 1,2-Dichlorobenzene-d4	93.0	Limit: 70-130		% Rec			03/04/20 2247	RSD

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0300

Client Sample ID:	Trip Blank		
Sample Matrix:	Drinking Water	**Collected By:**	Lab
Lab Sample ID:	J0C0300-02	**Collection Date:**	03/03/2020

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv 4.1								
Benzene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Bromobenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Bromochloromethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
Bromodichloromethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
Bromoform	<0.50		0.50	ug/L			03/05/20 2025	RSD
Bromomethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
tert-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
sec-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			03/05/20 2025	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/05/20 2025	RSD
Chloroform	<0.50		0.50	ug/L			03/05/20 2025	RSD
Chloromethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/05/20 2025	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Dibromochloromethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			03/05/20 2025	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/05/20 2025	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
1,1-Dichloroethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/05/20 2025	RSD
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			03/05/20 2025	RSD
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			03/05/20 2025	RSD
1,3-Dichloropropane	<0.50		0.50	ug/L			03/05/20 2025	RSD
2,2-Dichloropropane	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2025	RSD
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2025	RSD
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/05/20 2025	RSD
Hexachlorobutadiene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/05/20 2025	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/05/20 2025	RSD
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			03/05/20 2025	RSD
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Naphthalene	<0.50		0.50	ug/L			03/05/20 2025	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0300

Client Sample ID:	Trip Blank		
Sample Matrix:	Drinking Water	**Collected By:**	Lab
Lab Sample ID:	J0C0300-02	**Collection Date:**	03/03/2020

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Styrene	<0.50	100 MCL	0.50	ug/L			03/05/20 2025	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/05/20 2025	RSD
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Toluene	<0.50	1000 MCL	0.50	ug/L			03/05/20 2025	RSD
1,2,4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			03/05/20 2025	RSD
1,2,3-Trichlorobenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/05/20 2025	RSD
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			03/05/20 2025	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			03/05/20 2025	RSD
m,p-Xylene	<0.50		0.50	ug/L			03/05/20 2025	RSD
o-Xylene	<0.50		0.50	ug/L			03/05/20 2025	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/05/20 2025	RSD
Surrogate: 4-Bromofluorobenzene	94.4	Limit: 70-130		% Rec			03/05/20 2025	RSD
Surrogate: 1,2-Dichlorobenzene-d4	92.8	Limit: 70-130		% Rec			03/05/20 2025	RSD

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

CU:	Color Unit
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
S.U.:	Standard Units
T.O.N.:	Threshold Odor Number
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health
EnviroTest Laboratories	
NY Lab ID No: 10142	New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0300

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/23/2020 15:03

M... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 ... ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time 10.7
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: JM MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Metal	SW CN Amenable	Fluoride	Chloride	NO3	NO3	Sodium	524.2 Vac	Sulfate	Odor	Additional Notes
	Lime Hollow well	3-3-2020	247 PM PM to 259	1	DW	1	HNO3	1										100 HP Running
				1	DW	1	Sodium Hydr		1									
				1	DW	1	NA			1								
				1	DW	1	NA				1							
				1	DW	1	NA					1						
				1	DW	1	H2SO4						1					
				1	DW	1	NHric Acid							1				
				2	DW	2	Ascoric Acid HCL								2			
				1	DW	1	NA									1		
				1	DW	1	NA										1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments
NO CN bottle
3/4/2020 SW

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
JM MacLean	3-3-2020 329p	[signature]	3/3/2020 1529
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page 1 of 2

J0C0300
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0328

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Terrace Rd

Project / PO Number: N/A
Received: 03/04/2020
Reported: 03/18/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0328-01	**Collection Date:**	03/04/2020 10:20

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM4500-CN C/E-1999								
Cyanide - Total	<0.0100	0.200 MCL	0.0100	mg/L		03/09/20 1620	03/10/20 1239	CLW
Method: SM4500-F C-1997								
Fluoride	<0.200	4.00 MCL	0.200	mg/L			03/06/20 2052	CEO

Metals Total by CVAA	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 245.2								
Mercury	<0.00020	0.00200 MCL	0.00020	mg/L		03/10/20 1151	03/10/20 1222	JSQ

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Antimony	0.0007	0.0060 MCL	0.0004	mg/L		03/12/20 0843	03/12/20 1123	DLO
Arsenic	<0.0020	0.0100 MCL	0.0020	mg/L	D	03/12/20 0843	03/12/20 1219	DLO
Barium	0.0456	2.00 MCL	0.0051	mg/L		03/12/20 0843	03/12/20 1123	DLO
Beryllium	<0.0006	0.0040 MCL	0.0006	mg/L	D	03/12/20 0843	03/12/20 1219	DLO
Cadmium	<0.0010	0.0050 MCL	0.0010	mg/L		03/12/20 0843	03/12/20 1123	DLO
Chromium	<0.0020	0.100 MCL	0.0020	mg/L	D	03/12/20 0843	03/12/20 1219	DLO
Nickel	0.0010		0.0010	mg/L	D	03/12/20 0843	03/12/20 1219	DLO
Selenium	<0.0102	0.0500 MCL	0.0102	mg/L	D	03/12/20 0843	03/12/20 1219	DLO
Thallium	<0.0003	0.0020 MCL	0.0003	mg/L		03/12/20 0843	03/12/20 1123	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0328

Definitions

D:	The sample was diluted due to matrix interference.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/18/2020 15:46

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162(ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	8B										Addit
	Terrace Rd Well	3-4-2020	1020 - 1021	3	DW	G		3										

Cortlandville Water, Town of
PM: Shannon Weeks

J0C0328

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-4-2020		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			3/4/2020 1035
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MI AC* | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 1620 ain Avenue, Scra -A 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time 10.7
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Metal	CN Amenable	Fluoride	Chloride	NO2	NO3	Sodium	524.2 VOC	Sulfate	Odor	Additional Notes
	Lime Hollow well	3-3-2020	247 PM PM +0259	1	DW	1	HNO3	1										100 HP Running
				1	DW	1	Sodium Hydr		1									
				1	DW	1	NA			1								
				1	DW	1	NA				1							
				1	DW	1	NA					1						
				1	DW	1	H2SO4						1					
				1	DW	1	Nitric Acid							1				
				2	DW	2	Ascorbic Acid HCl								2			
				1	DW	1	NA									1		
				1	DW	1	NA										1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-3-2020 325p		3/3/2020 1529
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

CORTLAND COUNTY HEALTH DEPARTMENT

COUNTY OFFICE BUILDING
60 CENTRAL AVENUE Rm 120
CORTLAND, NEW YORK 13045-2746
(607) 753-5035
FAX: (607) 758-5578
http://www.cortland-co.org/478/Environmental-Health

Catherine Feuerherm
Public Health Director
Stuart W. Gillim, MD
Medical Advisor

Public Health
Prevent. Promote. Protect.
Cortland County Health Department

Division of Environmental Health Michael J. Ryan P.E., Environmental Health Director *envhealth@cortland-co.org*

January 10, 2020

Mr. Peter Alteri
Cortlandville Town Water
3575 Terrace Road
Cortland, NY 13045

Re: **Minimum Monitoring Requirements for 2020**
PWS NY1101755

Dear Mr. Alteri:

The attached sheets are a list of the samples that are required for your system. Only items that are checked ☑ are the samples required for 2020. Please note the locations that the samples need to be taken from and any comments that may be included for a specific sample.

Please make arrangements to have a lab collect the samples for analysis **OR** for you to pick up the correct sample bottles and instructions for sampling needed to collect the samples yourself.

We also remind you that any monitoring sample which exceeds a maximum contaminant level (MCL) or action level may require action on your part within a mandated time frame. Call us **immediately**, should any sample indicate a problem.

Monthly Operation Reports—Chlorine residuals and water use must be recorded daily on the monthly operation report. Operating reports must be received in our office by the 10th day of following month. Please note the Ground Water Rule (GWR) notation. The value is the minimum free chlorine residual that must be maintained to assure proper contact time.

Failure to perform the sampling and submit the results along with the operation reports by the applicable deadlines will be violations of Part 5 of the NYSSC and FSDWA and enforcement action will be taken.

The AWQR must be mailed or hand delivered to customers by May 31st. A copy of the AWQR along with the certification form must be sent to our office as well. Please contact me if you would like assistance in preparing your AWQR.

Also enclosed is a Reporting Emergency form which must be posted at your facility. Please contact this office with any questions concerning these required tests.

If you have any questions or find errors in this list after review, please call Phyllis Guest or myself at 753-5035, or e-mail at: mryan@cortland-co.org.

Sincerely,

Michael Ryan, P.E.
Public Health Engineer

Cc:

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2020	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Coliform, Total (TCR)		
☑	**Location: Distribution System** **Frequency: 5 Samples Monthly** A positive total coliform (TC+) sample requires notifying the health department and collecting repeat distribution system samples within 24 hours. Unless otherwise directed by the health department, source (or raw) water before any treatment, from all active wells, must also be sampled within 24 hours.		**5 Samples must be collected every month.**
	Chloride March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 4/10/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/6/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
	Nitrate March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 4/10/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/6/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
	Nitrite March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 4/10/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/6/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
	Part 5-1.52 Table 8B - Primary Inorganic Chemicals March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2020	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2017	**Next sample must be collected between 1/1 and 12/31 within a single year by 12/31/2020**
	Part 5-1.52 Table 8D - Secondary Inorganic Chemicals March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/1/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2017	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
	Part 5-1.52 Table 9A - Disinfection Byproducts/Stage 2 July 9th		
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 2 Samples Yearly** Sample Point: 1303 FISHER AVE Sample Point No.: LRAA1 Sample Point Type: DS-Distribution System Sample Point: WALDEN OAKS BOOSTER STATION Sample Point No.: LRAA2 Sample Point Type: DS-Distribution System One sample for TTHM's & one sample for HAA5's must be collected every year, at each sampling location, between 7/1 & 7/31. TTHM & HAA5 samples must be collected at the same time, at each sampling location.	Samples last collected: 7/11/2019	**Next 2 samples must be collected between 7/1 and 7/31 within a single year by 7/31/2020**
	Part 5-1.52 Table 9B - Principal Organic Chemicals March 2nd		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 4/10/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/6/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**
	Sodium March, June, Sept, Dec		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 12/4/2019	**1 Sample must be collected each calendar quarter.**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly**	Samples last collected: 3/6/2019	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2020**

Due 2020	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point		
	Asbestos		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 1 Sample Every 9 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample in the area of distribution that has asbestos pipe.	Samples last collected: 3/4/2015	**Next sample must be collected by 12/31/2024**
	Part 5-1.42 and 5-1.47 - Lead and Copper		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 20 Samples Every 3 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample at approved sites following correct sampling protocol and submit all certifications.	20 Samples Collected on or Before: 6/7/2019	**Next 20 samples must be collected between 6/1 and 9/30 within a single year by 9/30/2022**
	Part 5-1.52 Table 12 - Radiological		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 6 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 4/10/2019	**Next sample must be collected by 12/31/2025**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 6 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 3/6/2019	**Next sample must be collected by 12/31/2025**
	Part 5-1.52 Table 9C - Synthetic Organic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 9/1/19.	Samples last collected: 4/10/2019	**Next sample must be collected by 6/30/2021**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 9/1/19.	Samples last collected: 3/6/2019	**Next sample must be collected by 6/30/2021**

Cortlandville Town Water
THHM/HAA5 WATER MONITORING PLAN

Sampling is required for disinfection byproducts, including TTHMs and HAA5 in the distribution system, as well as chlorine residual. TTHMs and HAA5 shall be sampled, annually, on the second Thursday of July. The two sampling locations, representative of high TTHM and high HAA5, is 1303 Fisher Ave., the National Grid/NIMO building, the women's bathroom sink in the break room and Walden Oaks booster station, 962 Walden Pond Ln., spigot in station. The results of the TTHM and HAA5 samples will be compared to the respective MCLs of 80 and 60 ug/L. If either the TTHM or the HAA5 MCL is exceeded, the system shall begin quarterly sampling on second Thursday in October, January and April. The results of the most recent quarterly sampling shall be added to the previous three quarters, and the average of the four quarters (running annual average) will be compared to the MCL to determine compliance. Quarterly sampling shall continue, until the Cortland County Health Department approves reduced monitoring.

The residual chlorine level shall be measured when coliform samples are taken as specified by the coliform site monitoring plan. If any residual chlorine results exceed the Maximum Residual Disinfectant Level of 4 mg/L, the results for the month will be averaged and that average added to the average of the other months of the quarter to determine the quarterly average. The quarterly average will be added to the average of the previous three quarters to determine a running annual average which will be compared to the MRDL.

Revised December 9, 2013

MI(.AC^ | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 1620 ain Avenue, Scra .-A 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time 10.0
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BHET	Additional Notes
	Terrace Rd well	1-6-20	9:10 AM	1	DW	1	Na2S203	1	Raw Water
	Red Apple Rt13/McLean Rd	1-6-20	9:26 AM	1	DW	1	Na2S203	1	Cl0.6
	Cortlandville Highway Garage Rt-41 Polkville	1-6-20	10:50 AM	1	DW	1	Na2S203	1	Cl0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-6-2020 1103 AM		1/6/20 1103
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0A0325

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Sodium

Project / PO Number: N/A
Received: 01/06/2020
Reported: 01/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0A0325-01	**Collection Date:**	01/06/2020 12:12

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	73.8		1.02	mg/L		01/08/20 1142	01/08/20 1300	JDF

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 01/10/2020 11:29

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C): 12.3
Therm ID:
Holding Time:
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
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City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
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[ ] RUSH* (notify lab)
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Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Quarterly Sample
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	Sodium	Additional Notes
	Terrace Rd Well	1-6-2020	12:12 PM	1	DW	1	Nitric Acid	1	Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-6-20 1:17 PM	[signature]	1/6/20 1317
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Annual Water Samples 2021

CORTLAND COUNTY HEALTH DEPARTMENT

COUNTY OFFICE BUILDING
60 CENTRAL AVENUE Rm 120
CORTLAND, NEW YORK 13045-2746
(607) 753-5035
FAX: (607) 758-5578
http://www.cortland-co.org/478/Environmental-Health

Lisa Perfetti
Public Health Director
Ngozi Mezu-Patel, MD
Medical Advisor

Public Health
Prevent. Promote. Protect.
Cortland County Health Department

Division of Environmental Health Michael J. Ryan P.E., Environmental Health Director *envhealth@cortland-co.org*

January 15, 2021

Mr. Peter Alteri
Cortlandville Town Water
3575 Terrace Road
Cortland, NY 13045

Re: **Minimum Monitoring Requirements for 2021**
PWS NY1101755

Dear Mr. Alteri:

The attached sheets are a list of the samples that are required for your system. Only items that are checked ☑ are the samples required for 2021. Please note the locations that the samples need to be taken from and any comments that may be included for a specific sample.

Please make arrangements to have a lab collect the samples for analysis **OR** for you to pick up the correct sample bottles and instructions for sampling needed to collect the samples yourself.

We also remind you that any monitoring sample which exceeds a maximum contaminant level (MCL) or action level may require action on your part within a mandated time frame. Call us **immediately**, should any sample indicate a problem.

Monthly Operation Reports—Chlorine residuals and water use must be recorded daily on the monthly operation report. Operating reports must be received in our office by the 10th day of following month. Please note the Ground Water Rule (GWR) notation. The value is the minimum free chlorine residual that must be maintained to assure proper contact time.

Failure to perform the sampling and submit the results along with the operation reports by the applicable deadlines will be violations of Part 5 of the NYSSC and FSDWA and enforcement action will be taken.

The AWQR must be mailed or hand delivered to customers by May 31st. A copy of the AWQR along with the certification form must be sent to our office as well. Please contact me if you would like assistance in preparing your AWQR.

Also enclosed is a Reporting Emergency form which must be posted at your facility. Please contact this office with any questions concerning these required tests.

If you have any questions or find errors in this list after review, please call Phyllis Guest or myself at 753-5035, or e-mail at: mryan@cortland-co.org.

Sincerely,

Michael Ryan, P.E.
Public Health Engineer

Cc:

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Coliform, Total (TCR)		
☑	**Location: Distribution System** **Frequency: 5 Samples Monthly** A positive total coliform (TC+) sample requires notifying the health department and collecting repeat distribution system samples within 24 hours. Unless otherwise directed by the health department, source (or raw) water before any treatment, from all active wells, must also be sampled within 24 hours.		**5 Samples must be collected every month.**
	Chloride	March	
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 5/19/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
	Nitrate	March	
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
	Nitrite	March	
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
	Part 5-1.52 Table 9A - Disinfection Byproducts/Stage 2	July	2nd Thursday of July
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 2 Samples Yearly** Sample Point: 1303 FISHER AVE Sample Point No.: LRAA1 Sample Point Type: DS-Distribution System Sample Point: WALDEN OAKS BOOSTER STATION Sample Point No.: LRAA2 Sample Point Type: DS-Distribution System One sample for TTHM's & one sample for HAA5's must be collected every year, at each sampling location, between 7/1 & 7/31. TTHM & HAA5 samples must be collected at the same time, at each sampling location.	Samples last collected: 7/9/2020	**Next 2 samples must be collected between 7/1 and 7/31 within a single year by 7/31/2021**

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Part 5-1.52 Table 9B - Principal Organic Chemicals March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
	Part 5-1.52 Table 9C - PFOA, PFOS and 1,4-Dioxane March, June, Sept.		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: TERRACE RD TREATMENT PLANT #1 Sample Point No.: RW-001 Sample Point Type: RW-Raw Water Source		**1 Sample must be collected each calendar quarter.**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Quarterly** Sample Point: LIME HOLLOW TREATMENT PLANT Sample Point No.: RW-002 Sample Point Type: RW-Raw Water Source		**1 Sample must be collected each calendar quarter.**
	Part 5-1.52 Table 9C - Synthetic Organic Chemicals March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 3/1/21.	Samples last collected: 4/10/2019	**Sample must be collected by 6/30/2021**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 3/1/21.	Samples last collected: 3/6/2019	**Sample must be collected by 6/30/2021**
	Sodium March		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 6/3/2020	**1 Sample must be collected each calendar quarter.**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 5/19/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2021**
	Asbestos		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 1 Sample Every 9 years**	Samples last collected: 3/4/2015	**Next sample must be collected by 12/31/2024**

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample in the area of distribution that has asbestos pipe.		
	Part 5-1.42 and 5-1.47 - Lead and Copper		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 20 Samples Every 3 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample at approved sites following correct sampling protocol and submit all certifications.	20 Samples Collected on or Before: 6/7/2019	**Next 20 samples must be collected between 6/1 and 9/30 within a single year by 9/30/2022**
	Part 5-1.52 Table 12 - Radiological		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 6 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 4/10/2019	**Next sample must be collected by 12/31/2025**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 6 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 3/6/2019	**Next sample must be collected by 12/31/2025**
	Part 5-1.52 Table 8B - Primary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/5/2020	**Next sample must be collected between 1/1 and 12/31 within a single year by 12/31/2023**
	Part 5-1.52 Table 8D - Secondary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 5/19/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**

Cortlandville Town Water
THHM/HAA5 WATER MONITORING PLAN

Sampling is required for disinfection byproducts, including TTHMs and HAA5 in the distribution system, as well as chlorine residual. TTHMs and HAA5 shall be sampled, annually, on the second Thursday of July. The two sampling locations, representative of high TTHM and high HAA5, is 1303 Fisher Ave., the National Grid/NIMO building, the women's bathroom sink in the break room and Walden Oaks booster station, 962 Walden Pond Ln., spigot in station. The results of the TTHM and HAA5 samples will be compared to the respective MCLs of 80 and 60 ug/L. If either the TTHM or the HAA5 MCL is exceeded, the system shall begin quarterly sampling on second Thursday in October, January and April. The results of the most recent quarterly sampling shall be added to the previous three quarters, and the average of the four quarters (running annual average) will be compared to the MCL to determine compliance. Quarterly sampling shall continue, until the Cortland County Health Department approves reduced monitoring.

The residual chlorine level shall be measured when coliform samples are taken as specified by the coliform site monitoring plan. If any residual chlorine results exceed the Maximum Residual Disinfectant Level of 4 mg/L, the results for the month will be averaged and that average added to the average of the other months of the quarter to determine the quarterly average. The quarterly average will be added to the average of the previous three quarters to determine a running annual average which will be compared to the MRDL.

Revised December 9, 2013

CORTLAND COUNTY HEALTH DEPARTMENT

Public Health
Prevent. Promote. Protect.
Cortland County Health Department

COUNTY OFFICE BUILDING
60 CENTRAL AVENUE Rm 120
CORTLAND, NEW YORK 13045-2746
(607) 753-5035
FAX: (607) 758-5578
http://www.cortland-co.org/478/Environmental-Health

Lisa Perfetti
Public Health Director
Ngozi Mezu-Patel, MD
Medical Advisor

Division of Environmental Health Michael J. Ryan P.E., Environmental Health Director *envhealth@cortland-co.org*

June 7, 2021

Mr. Peter Alteri
Cortlandville Town Water
3575 Terrace Road
Cortland, NY 13045

Re: **Minimum Monitoring Requirements for 2021- REVISED**
PWS NY1101755

Dear Mr. Alteri:

The attached sheets are a list of the samples that are required for your system. Only items that are checked ☑ are the samples required for 2021. Please note the locations that the samples need to be taken from and any comments that may be included for a specific sample.

Please make arrangements to have a lab collect the samples for analysis **OR** for you to pick up the correct sample bottles and instructions for sampling needed to collect the samples yourself.

We also remind you that any monitoring sample which exceeds a maximum contaminant level (MCL) or action level may require action on your part within a mandated time frame. Call us **immediately**, should any sample indicate a problem.

Monthly Operation Reports—Chlorine residuals and water use must be recorded daily on the monthly operation report. Operating reports must be received in our office by the 10th day of following month. Please note the Ground Water Rule (GWR) notation. The value is the minimum free chlorine residual that must be maintained to assure proper contact time.

Failure to perform the sampling and submit the results along with the operation reports by the applicable deadlines will be violations of Part 5 of the NYSSC and FSDWA and enforcement action will be taken.

The AWQR must be mailed or hand delivered to customers by May 31st. A copy of the AWQR along with the certification form must be sent to our office as well. Please contact me if you would like assistance in preparing your AWQR.

Also enclosed is a Reporting Emergency form which must be posted at your facility. Please contact this office with any questions concerning these required tests.

If you have any questions or find errors in this list after review, please call Phyllis Guest or myself at 753-5035, or e-mail at: mryan@cortland-co.org.

Sincerely,

Michael Ryan, P.E.
Public Health Engineer

Cc:

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Coliform, Total (TCR)		
☑	**Location: Distribution System** **Frequency: 5 Samples Monthly** A positive total coliform (TC+) sample requires notifying the health department and collecting repeat distribution system samples within 24 hours. Unless otherwise directed by the health department, source (or raw) water before any treatment, from all active wells, must also be sampled within 24 hours.		**5 Samples must be collected every month.**
	Part 5-1.52 Table 9A - Disinfection Byproducts/Stage 2		
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 2 Samples Yearly** Sample Point: 1303 FISHER AVE Sample Point No.: LRAA1 Sample Point Type: DS-Distribution System Sample Point: WALDEN OAKS BOOSTER STATION Sample Point No.: LRAA2 Sample Point Type: DS-Distribution System One sample for TTHM's & one sample for HAA5's must be collected every year, at each sampling location, between 7/1 & 7/31. TTHM & HAA5 samples must be collected at the same time, at each sampling location.	Samples last collected: 7/9/2020	**Next 2 samples must be collected between 7/1 and 7/31 within a single year by 7/31/2021**
	Part 5-1.52 Table 9C - PFOA, PFOS and 1,4-Dioxane		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: TERRACE RD TREATMENT PLANT #1 Sample Point No.: RW-001 Sample Point Type: RW-Raw Water Source		**1 Sample must be collected each calendar quarter.**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Quarterly** Sample Point: LIME HOLLOW TREATMENT PLANT Sample Point No.: RW-002 Sample Point Type: RW-Raw Water Source		**1 Sample must be collected each calendar quarter.**
	Sodium		
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2021	**1 Sample must be collected each calendar quarter.**
	Asbestos		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 1 Sample Every 9 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample in the area of distribution that has asbestos pipe.	Samples last collected: 3/4/2015	**Next sample must be collected by 12/31/2024**
	Chloride		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/3/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/2/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**
	Nitrate		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/3/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/2/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**
	Nitrite		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/3/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/2/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**
	Part 5-1.42 and 5-1.47 - Lead and Copper		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 20 Samples Every 3 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample at approved sites following correct sampling protocol and submit all certifications.	20 Samples Collected on or Before: 6/7/2019	**Next 20 samples must be collected between 6/1 and 9/30 within a single year by 9/30/2022**
	Part 5-1.52 Table 12 - Radiological		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 6 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 4/10/2019	**Next sample must be collected by 12/31/2025**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 6 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/6/2019	**Next sample must be collected by 12/31/2025**

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements

Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.

Part 5-1.52 Table 8B - Primary Inorganic Chemicals

☐ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006**
Frequency: 1 Sample Every 3 years
Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

Samples last collected: 3/4/2020

Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023

☐ **Location: LIME HOLLOW TREATMENT PLANT ID: 007**
Frequency: 1 Sample Every 3 years
Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Samples last collected: 3/5/2020

Next sample must be collected between 1/1 and 12/31 within a single year by 12/31/2023

Part 5-1.52 Table 8D - Secondary Inorganic Chemicals

☐ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006**
Frequency: 1 Sample Every 3 years
Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

Samples last collected: 3/4/2020

Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023

☐ **Location: LIME HOLLOW TREATMENT PLANT ID: 007**
Frequency: 1 Sample Every 3 years
Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Samples last collected: 5/19/2020

Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023

Part 5-1.52 Table 9B - Principal Organic Chemicals

☐ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006**
Frequency: 1 Sample Yearly
Sample Point: EP-TERRACE RD PLANT
Sample Point No.: EP-001
Sample Point Type: EP-Entry Point

Last Sample Collected on or Before: 3/19/2021

Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022

☐ **Location: LIME HOLLOW TREATMENT PLANT ID: 007**
Frequency: 1 Sample Yearly
Sample Point: EP-LIME HOLLOW PLANT
Sample Point No.: EP-002
Sample Point Type: EP-Entry Point

Last Sample Collected on or Before: 3/2/2021

Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022

Part 5-1.52 Table 9C - PFOA, PFOS and 1,4-Dioxane

☐ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006**
Frequency: 1 Sample Every 18 Months
Sample Point: TERRACE RD TREATMENT PLANT #1
Sample Point No.: RW-001
Sample Point Type: RW-Raw Water Source

New Requirement.
Next sample must be collected by 12/31/2022
This requirement starts 7/1/2021.

Samples must be collected in an 18 month period. The next one is due by 10/6/22.

☐ **Location: LIME HOLLOW TREATMENT PLANT ID: 007**
Frequency: 1 Sample Every 18 Months
Sample Point: LIME HOLLOW TREATMENT PLANT
Sample Point No.: RW-002
Sample Point Type: RW-Raw Water Source

New Requirement.
Next sample must be collected by 12/31/2022
This requirement starts 7/1/2021.

Samples must be collected in an 18 month period. The next one is due by 10/6/22.

Due 2021	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Part 5-1.52 Table 9C - Synthetic Organic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 3/1/21.	Last Sample Collected on or Before: 3/3/2021	**Next sample must be collected between 7/1/2021 and 12/31/2022**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 3/1/21.	Last Sample Collected on or Before: 3/2/2021	**Next sample must be collected between 7/1/2021 and 12/31/2022**
	Sodium		
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Last Sample Collected on or Before: 3/2/2021	**Starting 1/1/2022, Next sample must be collected between 3/1 and 5/31 within a single year by 12/31/2022**

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0179

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-03	**Collection Date:**	11/01/2021 8:41

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	73.6		1.00	mg/L		11/05/21 1342	11/08/21 1330	DLO

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-04	**Collection Date:**	11/01/2021 9:17

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		11/01/21 0917	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-05	**Collection Date:**	11/01/2021 9:39

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		11/01/21 0939	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 [illegible]ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scran[illegible]PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.346.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Brian Congdon

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Brian Congdon

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Type: **	Bac T-	Sodium								Additional Notes
	Municipal BLDG.	11-1-2021	8:15 AM	1	DW	C	Sodium Thiosulfate	1									CL 0.6
	Terrace Rd well	11-1-2021	8:40 AM	1	DW	1	"	1									Raw Water
	Terrace Rd. well	11-1-2021	8:41 AM	1	DW	1			1								Raw water
	Walden Oaks BS.	11-1-2021	9:17 AM	1	DW	1	"	1									CL 0.4
	Blue Creek BS.	11-1-2021	9:39 AM	1	DW	1	"	1									CL 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-1-2021 9:54 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26

MI[illegible] AC*

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162[illegible] ain Avenue
Scr[illegible] PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RE

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 12.1
Therm ID 044
Holding Time
Samples Received on Ice Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monitoring Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Lime Hollow Well	8-5-2021	838 AM	1	DW	1	Sodium thiosulfate	1									Raw Water 125 HP
	" " "	8-5-2021	902 AM	1	DW	1	"	1									Raw Water 100 HP

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-5-2021 924 AM	[signature]	8/5/21 924
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICRO AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 No ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 18.0
Therm ID: 244
Holding Time
Samples Received on Ice: (Yes) No N/A
Custody Seals Intact: (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Disinfection Byproducts/Stage 2
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2 THM	552.2 HAA	Additional Not
	Walden Oaks BS	7-21-2021	9:55 AM	2	DW	2	Sodium thiosulfate	2		
	" " "	7-21-2021	9:56-959 AM	3	DW	3	Ammonium Chloride		3	
	1303 Fisher AVE	7-21-2021	10:26 AM	2	DW	2	Sodium Thiosulfate	2		
	1303 Fisher AVE	7-21-2021	1028+1030 AM	3	DW	3	Ammonium Chloride		3	

Cortlandville Water, Town of
PM: Shannon Weeks
J1G1466

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-21-2021 10:55 AM	[signature]	7/21/21 1057
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

LABORATORY REPORT

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

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STATE CERTIFICATION LIST

State	Certification	State	Certification
Alabama	40700	Missouri	880
Alaska	IN00035	Montana	CERT0026
Arizona	AZ0432	Nebraska	NE-OS-05-04
Arkansas	IN00035	Nevada	IN00035
California	2920	New Hampshire*	2124
Colorado	IN00035	New Jersey*	IN598
Colorado Radiochemistry	IN00035	New Mexico	IN00035
Connecticut	PH-0132	New York*	11398
Delaware	IN035	North Carolina	18700
Florida(Primary AB)*	E87775	North Dakota	R-035
Georgia	929	Ohio	87775
Hawaii	IN035	Oklahoma	D9508
Idaho	IN00035	Oregon*	4156
Illinois*	200001	Pennsylvania*	68-00466
Illinois Microbiology	17767	Puerto Rico	IN00035
Illinois Radiochemistry	IN00035	Rhode Island	LAO00343
Indiana Chemistry	C-71-01	South Carolina	95005
Indiana Microbiology	M-76-07	South Dakota	IN00035
Iowa	098	Tennessee	TN02973
Kansas*	E-10233	Texas*	T104704187
Kentucky	90056	Texas/TCEQ	TX207
Louisiana*	LA014	Utah*	IN00035
Maine	IN00035	Vermont	VT-8775
Maryland	209	Virginia*	460275
Massachusetts	M-IN035	Washington	C837
Michigan	9926	West Virginia	9927 C
Minnesota*	018-999-338	Wisconsin	999766900
Mississippi	IN035	Wyoming	IN035
EPA	IN00035		

*NELAP/TNI Recognized Accreditation Bodies

Revision date: 09/29/2020

eurofins | Eaton Analytical

NELAC NARRATIVE PAGE

Client: Microbac

Report #: 524940NP

Eurofins Eaton Analytical, LLC is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

EEA contact person: Karen Fullmer

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

Note: Sample containers were provided by the client.

There were no quality control failures.

Note: This report may not be reproduced, except in full, without written approval from EEA. EEA is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Karen Fullmer ASM 07/29/2021

Authorized Signature Title Date

eurofins | Eaton Analytical

110 South Hill Street
South Bend, IN 46617
Tel: (574) 233-4777
Fax: (574) 233-8207
1 800 332 4345

Laboratory Report

Client: Microbac

Attn: Renee Lantz
3821 Buck Drive
Cortland, NY 13045

Report: 524940
Priority: Standard Written
Status: Final
PWS ID: Not Supplied
Lab ELAP #: 11398

Sample Information

EEA ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
4961968	J1G1466-01	524.2	07/21/21 09:55	Client	07/22/21 09:00
4961969	J1G1466-01	552.2	07/21/21 09:55	Client	07/22/21 09:00
4961970	J1G1466-02	524.2	07/21/21 10:26	Client	07/22/21 09:00
4961971	J1G1466-02	552.2	07/21/21 10:26	Client	07/22/21 09:00

Report Summary

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Karen Fullmer at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from EEA. EEA is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Karen Fullmer ASM — Authorized Signature / Title

07/29/2021 — Date

Client Name: Microbac
Report #: 524940

Client Name: Microbac

Report #: 524940

Sampling Point: J1G1466-01

PWS ID: Not Supplied

Disinfection Byproducts									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	EEA ID #
75-27-4	Bromodichloromethane	524.2	---	0.5	**2.9**	ug/L	---	07/23/21 21:52	4961968
75-25-2	Bromoform	524.2	---	0.5	**2.2**	ug/L	---	07/23/21 21:52	4961968
67-66-3	Chloroform	524.2	---	0.5	**2.3**	ug/L	---	07/23/21 21:52	4961968
124-48-1	Dibromochloromethane	524.2	---	0.5	**3.9**	ug/L	---	07/23/21 21:52	4961968
---	Total Trihalomethanes	524.2	80 *	0.5	**11.3**	ug/L	---	07/23/21 21:52	4961968
631-64-1	Dibromoacetic acid	552.2	---	1.0	**1.2**	ug/L	07/28/21 06:00	07/28/21 16:53	4961969
79-43-6	Dichloroacetic acid	552.2	---	1.0	< 1.0	ug/L	07/28/21 06:00	07/28/21 16:53	4961969
79-08-3	Monobromoacetic acid	552.2	---	1.0	< 1.0	ug/L	07/28/21 06:00	07/28/21 16:53	4961969
79-11-8	Monochloroacetic acid	552.2	---	2.0	< 2.0	ug/L	07/28/21 06:00	07/28/21 16:53	4961969
76-03-9	Trichloroacetic acid	552.2	---	1.0	< 1.0	ug/L	07/28/21 06:00	07/28/21 16:53	4961969
---	Total HAA5	552.2	60 *	2.0	< 2.0	ug/L	07/28/21 06:00	07/28/21 16:53	4961969

Sampling Point: J1G1466-02

PWS ID: Not Supplied

Disinfection Byproducts									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	EEA ID #
75-27-4	Bromodichloromethane	524.2	---	0.5	**4.7**	ug/L	---	07/23/21 22:16	4961970
75-25-2	Bromoform	524.2	---	0.5	**2.4**	ug/L	---	07/23/21 22:16	496197
67-66-3	Chloroform	524.2	---	0.5	**3.9**	ug/L	---	07/23/21 22:16	496197
124-48-1	Dibromochloromethane	524.2	---	0.5	**5.0**	ug/L	---	07/23/21 22:16	4961970
---	Total Trihalomethanes	524.2	80 *	0.5	**16.0**	ug/L	---	07/23/21 22:16	4961970
631-64-1	Dibromoacetic acid	552.2	---	1.0	**1.1**	ug/L	07/28/21 06:00	07/28/21 17:29	4961971
79-43-6	Dichloroacetic acid	552.2	---	1.0	**1.0**	ug/L	07/28/21 06:00	07/28/21 17:29	4961971
79-08-3	Monobromoacetic acid	552.2	---	1.0	< 1.0	ug/L	07/28/21 06:00	07/28/21 17:29	4961971
79-11-8	Monochloroacetic acid	552.2	---	2.0	< 2.0	ug/L	07/28/21 06:00	07/28/21 17:29	4961971
76-03-9	Trichloroacetic acid	552.2	---	1.0	< 1.0	ug/L	07/28/21 06:00	07/28/21 17:29	4961971
---	Total HAA5	552.2	60 *	2.0	**2.1**	ug/L	07/28/21 06:00	07/28/21 17:29	4961971

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis. CCL, CCM, and CCH are the CCC standards at low, mid, and high concentration levels, respectively.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control. FBL, FBM, and FBH are the LFB samples at low, mid, and high concentration levels, respectively.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

If applicable, the calculation of the matrix spike (MS) or matrix spike duplicate (MSD) percent recovery is as follows: (MS or MSD value - Sample value) * 100 / spike target / dilution factor = **Recovery %**

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix. SDL, SDM, and SDH / LFSMDL, LFSMDM, and LFSMDH are the MSD or LFSMD at low, mid, and high concentration levels, respectively.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results. MSL, MSM, and MSH / LFSML, LFSMM, and LFSMH are the MS or LFSM at low, mid, and high concentration levels, respectively.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

Microbac Laboratories, Inc., New York Division

MICROBAC

431370

524940

SUBCONTRACT ORDER

J1G1466

SENDING LABORATORY:

Microbac Laboratories, Inc., New York Division
3821 Buck Dr.
Cortland, NY 13045
Phone: 607-753-3403
Lab Manager: Shannon Weeks
Email: Results: PennNYlab@microbac.com Invoices: PennNYinvoice@microbac.com

RECEIVING LABORATORY:

Eurofins Eaton Analytical, Inc. - South Bend
110 South Hill Street
South Bend, IN 46617
Phone: (574) 233-4777

Proiect Info:

Project Type: ENV-DrinkingWater
Project Location: New York
Report TAT: **7**
Due: **07/30/2021 17:00**

Sample ID: J1G1466-01

Sampled: 07/21/2021 09:55

Matrix: Drinking Water

Sampler: JM-Client

NY PWSID: NY1101755
Point:
Point No:

Sample Descript.: Walden Oaks BS
Type:
Frequency:

Analysis	Method	Analysis Due	Expires
524.2 THM (2) 4961968	**EPA 524.2, Rv. 4.1 (1995)**	**07/30/2021 08:00**	**08/04/2021 09:55**
Bromodichloromethane	0.5 ug/L	Bromoform	0.5 ug/L
Chloroform	0.5 ug/L	Dibromochloromethane	0.5 ug/L
1,2-Dichlorobenzene-d4(Surr)		*4-Bromofluorobenzene(Surr)*	
552.2 HAA (3) 4961969	**EPA 552.2, Rv. 1 (1995)**	**07/30/2021 08:00**	**08/04/2021 09:55**
Bromoacetic acid	ug/L	Chloroacetic acid	ug/L
Dibromoacetic acid	ug/L	Dichloroacetic acid	ug/L
Total Haloacetic acids (HAA5)	ug/L	Trichloroacetic acid	ug/L
2,3-Dichloropropionic acid(Surr)			

Sample ID: J1G1466-02

Sampled: 07/21/2021 10:26

Matrix: Drinking Water

Sampler: JM-Client

NY PWSID: NY1101755
Point:
Point No:

Sample Descript.: 1303 Fisher Ave
Type:
Frequency:

Analysis	Method	Analysis Due	Expires
524.2 THM (2) 4961970	**EPA 524.2, Rv. 4.1 (1995)**	**07/30/2021 08:00**	**08/04/2021 10:26**
Bromodichloromethane	0.5 ug/L	Bromoform	0.5 ug/L
Chloroform	0.5 ug/L	Dibromochloromethane	0.5 ug/L
1,2-Dichlorobenzene-d4(Surr)		*4-Bromofluorobenzene(Surr)*	
552.2 HAA (3) 4961971	**EPA 552.2, Rv. 1 (1995)**	**07/30/2021 08:00**	**08/04/2021 10:26**
Bromoacetic acid	ug/L	Chloroacetic acid	ug/L
Dibromoacetic acid	ug/L	Dichloroacetic acid	ug/L
Total Haloacetic acids (HAA5)	ug/L	Trichloroacetic acid	ug/L
2,3-Dichloropropionic acid(Surr)			

Provided Sample Container

Microbac Laboratories, Inc., New York Division

MICROBAC

431370

SUBCONTRACT ORDER

J1G1466

Client Provided Cooler's Container

IR 23

0.2°C

Released By	Date	Received By	Date
[signature]	7/21/21	[signature]	7-22-21 0900
Released By	Date	Received By	Date

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G1466

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: THM/HAA

Project / PO Number: N/A
Received: 07/21/2021
Reported: 09/27/2021

Project Special Information

NY1101755

Note

All sample results for this work order are attached to the end of this report.

Sample Summary Report

Sample Name	Laboratory ID	Client Matrix	Sample Type	Sample Begin	Sample Taken	Lab Received
Walden Oaks BS	J1G1466-01	Drinking Water	Grab		07/21/21 09:55	07/21/21 10:56
1303 Fisher Ave	J1G1466-02	Drinking Water	Grab		07/21/21 10:26	07/21/21 10:56

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G1466

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 18.4°C

Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Renee Lantz

Renee Lantz
Customer Relationship Specialist
Reported: 09/27/2021 20:27

MI AC

3821 Buck Drive	2369 Elmira Street, Suite C	162 ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scr PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RE

Number

Instructions on back

Lab Report Address

Client Name: Townof Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 18.8

Therm ID Cuy

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Disinfection By Products/stage2

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2	531.2	Additional Notes
	Walden Oaks BS	7-8-2021	~~635~~ 636	2	DW	G	Na2S2O3	2		
	" " "	7-8-2021	637-639	3	DW	C	Sodium Thios Potassium Citrate		3	
	130-3 Fisher AVE	7-8-2021	725 AM	2	DW	G	Na2S2O3	2		
	" " "	7-8-2021	726-728	3	DW	C	Sodium thios Potassium citrate		3	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Microbac lost These They called on 7/21/21 TO inform us we had TO Take again Notified Phyllis CCHD.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-8-2021 750AM	[illegible]	7/8/21 7:51
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 North Main Avenue
Scranton, PA 18508
570.347.5

4355 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECORD
Number
Instructions on back

b Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637
Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Project: Disinfection BY products/Stage 2
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

**Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2 THM	552.2 HAA									Additional Notes
	Walden Oaks BS	7-21-2021	9:55 AM	2	DW	2	Sodium Thiosulfate	2										
	" "	7-21-2021	9:56-9:57 AM	3	DW	3	Ammonium Chloride		3									
	1303 Fisher AVE	7-21-2021	10:26 AM	2	DW	2	Sodium Thiosulfate	2										
	1303 Fisher AVE	7-21-2021	10:28-10:30 AM	3	DW	3	Ammonium Chloride		3									

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-21-2021 10:55 AM	[illegible]	7/21/21 1050
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

12/26/2017

MICROBAC

3821 Buck Dr.	2369 Elmira St., Suite C	428 Route 315 Hwy	43 lestown Rd.	3719 Garrett Rd.
Cortland, NY 13045	Sayre, PA 18840	Pittston, PA 18640	Harrisburg, PA 17112	Drexel Hill, PA 19026
607.753.3403	570.888.0169	570.348.0775	717.651.9700	484.461.9722

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.9

Therm ID 04

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS, 1,4-Dioxane Testing

Location: Water Dist.

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lime Hollow well

Lab ID	Client Sample ID (Location of sample taken. Ex: Kitchen sink, bathroom sink etc.)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	EPA522 - Dioxane	EPA537 - PFOA/PFOS	Additional Notes
		4-6-2021	246 PM	2	DW	G	Trizma		X	
	Field Blank		to 251PM	1	LW	G	Trizma		X	
				2	DW	G	Na2S03/NaHS04	X		

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

PLEASE RETURN SAMPLES ON ICE.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	4-6-2021 316 PM	[signature]	4/6/21 1521
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC

3821 Buck Dr.	2369 Elmira St., Suite C	428 Route 315 Hwy	4 glestown Rd.	3719 Garrett Rd.
Cortland, NY 13045	Sayre, PA 18840	Pittston, PA 18640	Harrisburg, PA 17112	Drexel Hill, PA 19026
607.753.3403	570.888.0169	570.348.0775	717.651.9700	484.461.9722

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.5

Therm ID QUC1

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Hiteri JR

Telephone No.: 607-756-9637

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Hiteri JR

Telephone No.: 607-756-9637

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

Project: PFOA/PFOS, 1,4-Dioxane Testing

Location: Water Dist.

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Terrace Rd well

Lab ID	Client Sample ID (Location of sample taken. Ex: Kitchen sink, bathroom sink etc.)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	EPA522 - Dioxane	EPA537 - PFOA/PFOS	Additional Notes
		4-2-2021	4:31 PM to 9:35 AM							
	Field Blank			2	DW	G	Trizma		X	
				1	LW	G	Trizma		X	
				2	DW	G	Na2S03/NaHS0₄	X		

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

PLEASE RETURN SAMPLES ON ICE.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	4-2-2021 11:08 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
		AS	4/2/21 11:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C1533

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Annual Water Sampling

Project / PO Number: N/A
Received: 03/19/2021
Reported: 03/30/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1C1533-01	**Collection Date:**	03/19/2021 8:36

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Benzene	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Bromobenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Bromochloromethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
modichloromethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
Bromoform	<0.50		0.50	ug/L			03/25/21 1142	RSD
Bromomethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
tert-Butylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
sec-Butylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Carbon tetrachloride	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			03/25/21 1142	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/25/21 1142	RSD
Chloroform	<0.50		0.50	ug/L			03/25/21 1142	RSD
Chloromethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/25/21 1142	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Dibromochloromethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,4-Dichlorobenzene	<0.50	75.0 MCL	0.50	ug/L			03/25/21 1142	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/25/21 1142	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Dichlorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,2-Dichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
1,1-Dichloroethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/25/21 1142	RSD
cis-1,2-Dichloroethene	<0.50	70.0 MCL	0.50	ug/L			03/25/21 1142	RSD
1,1-Dichloroethene	<0.50	7.00 MCL	0.50	ug/L			03/25/21 1142	RSD
-Dichloropropane	<0.50		0.50	ug/L			03/25/21 1142	RSD
-Dichloropropane	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,2-Dichloropropane	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/25/21 1142	RSD

CERTIFICATE OF ANALYSIS

J1C1533

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1C1533-01	**Collection Date:**	03/19/2021 8:36

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/25/21 1142	RSD
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/25/21 1142	RSD
Hexachlorobutadiene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/25/21 1142	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/25/21 1142	RSD
Methyl tert-butyl ether (MTBE)	<0.50		0.50	ug/L			03/25/21 1142	RSD
Methylene chloride (Dichloromethane)	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Naphthalene	<0.50		0.50	ug/L			03/25/21 1142	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Styrene	<0.50	100 MCL	0.50	ug/L			03/25/21 1142	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/25/21 1142	RSD
Tetrachloroethene	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Toluene	<0.50	1000 MCL	0.50	ug/L			03/25/21 1142	RSD
1.2.4-Trichlorobenzene	<0.50	70.0 MCL	0.50	ug/L			03/25/21 1142	RSD
3-Trichlorobenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
ı, ı,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/25/21 1142	RSD
1,1,2-Trichloroethane	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Trichloroethene	<0.50	5.00 MCL	0.50	ug/L			03/25/21 1142	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Vinyl chloride	<0.50	2.00 MCL	0.50	ug/L			03/25/21 1142	RSD
m,p-Xylene	<0.50		0.50	ug/L			03/25/21 1142	RSD
o-Xylene	<0.50		0.50	ug/L			03/25/21 1142	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/25/21 1142	RSD
Surrogate: 4-Bromofluorobenzene	84.4	Limit: 70-130		% Rec			03/25/21 1142	RSD
Surrogate: 1,2-Dichlorobenzene-d4	82.0	Limit: 70-130		% Rec			03/25/21 1142	RSD

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
ug/L:	Micrograms per Liter

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C1533

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 03/30/2021 08:55

MIC .AC*

3821 Buck Drive	2369 Elmira Street, Suite C	1620 ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.8

Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524									Additional Notes
	Terrace Rd well	3-19-2021	835	2	DW	G	Hydrochloric Acid	2									Raw water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-19-2021		3/19/21 8:57
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

Page 4 of 4

J1C1533

Cortlandville Water, Town of

PM: Shannon Weeks

MI AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162[illegible] ain Avenue, Scra[illegible]A 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 1.4 8
Therm ID 044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: ANNUAL Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524										Additional Notes
	Terrace Rd well	3-19-2021	835 AM to 836 AM	2	DW	2	Hydrochloric Acid	2										Raw water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-19-2021	[illegible]	3/19/21 8:57
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0494

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Drinking Water

Project / PO Number: N/A
Received: 03/03/2021
Reported: 03/18/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1C0494-01	**Collection Date:**	03/03/2021 10:44

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 300.0, Rv. 2.1 (1993)								
Nitrite as N	<0.13	1.00 MCL	0.13	mg/L		03/05/21 0929	03/05/21 0929	BAC
Nitrate as N	1.64	10.0 MCL	0.40	mg/L		03/04/21 2122	03/04/21 2122	BAC

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv. 1.1 (1995)								
1,2-Dibromo-3-chloropropane (DBCP)	<0.0100	0.2 MCL	0.0100	ug/L		03/10/21 0800	03/11/21 0209	MRB
1,2-Dibromoethane (Ethylene dibromide, EDB)	<0.0100	0.05 MCL	0.0100	ug/L		03/10/21 0800	03/11/21 0209	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	95.5	Limit: 70-130		% Rec		03/10/21 0800	03/11/21 0209	MRB

Herbicides by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv. 1 (1996)								
2,4-D [2C]	<0.100	70 MCL	0.100	ug/L		03/11/21 0800	03/15/21 1521	CKC
Dalapon [2C]	<1.00	200 MCL	1.00	ug/L		03/11/21 0800	03/15/21 1521	CKC
Dicamba [2C]	<0.100		0.100	ug/L		03/11/21 0800	03/15/21 1521	CKC
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP) [2C]	<0.200	7 MCL	0.200	ug/L		03/11/21 0800	03/15/21 1521	CKC
Pentachlorophenol [2C]	<0.0400	1 MCL	0.0400	ug/L		03/11/21 0800	03/15/21 1521	CKC
Picloram [2C]	<0.100	500 MCL	0.100	ug/L		03/11/21 0800	03/15/21 1521	CKC
2,4,5-TP (Silvex) [2C]	<0.200	50 MCL	0.200	ug/L		03/11/21 0800	03/15/21 1521	CKC
Surrogate: 2,4-Dichloropenylacetic acid	103	Limit: 70-130		% Rec		03/11/21 0800	03/15/21 1521	CKC
Surrogate: 2,4-Dichloropenylacetic acid [2C]	102	Limit: 70-130		% Rec		03/11/21 0800	03/15/21 1521	CKC

icides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv. 2.1 (1995)								

CERTIFICATE OF ANALYSIS

J1C0494

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1C0494-01	**Collection Date:**	03/03/2021 10:44

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlordane (tech.) [2C]	<0.200	2 MCL	0.200	ug/L		03/10/21 0800	03/10/21 2043	MRB
Dieldrin [2C]	<0.0200	0.2 MCL	0.0200	ug/L		03/10/21 0800	03/10/21 2043	MRB
Endrin [2C]	<0.0100	2 MCL	0.0100	ug/L	Q2	03/10/21 0800	03/10/21 2043	MRB
Toxaphene [2C]	<1.00	3 MCL	1.00	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1016 (PCB-1016) [2C]	<0.0800		0.0800	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1221 (PCB-1221) [2C]	<20.0		20.0	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1232 (PCB-1232) [2C]	<0.500		0.500	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1242 (PCB-1242) [2C]	<0.300		0.300	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1248 (PCB-1248) [2C]	<0.100		0.100	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1254 (PCB-1254) [2C]	<0.100		0.100	ug/L		03/10/21 0800	03/10/21 2043	MRB
Aroclor-1260 (PCB-1260) [2C]	<0.100		0.100	ug/L		03/10/21 0800	03/10/21 2043	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	117	Limit: 70-130		% Rec		03/10/21 0800	03/10/21 2043	MRB

ıicides by HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ıod: EPA 531.2, Rv. 1 (2001)								
Aldicarb sulfoxide	<0.500		0.500	ug/L		03/10/21 1100	03/10/21 1633	IMM
Aldicarb sulfone	<0.800		0.800	ug/L		03/10/21 1100	03/10/21 1633	IMM
Oxamyl	<1.00	200 MCL	1.00	ug/L		03/10/21 1100	03/10/21 1633	IMM
Methomyl (Lannate)	<0.500		0.500	ug/L		03/10/21 1100	03/10/21 1633	IMM
3-Hydroxycarbofuran	<0.500		0.500	ug/L		03/10/21 1100	03/10/21 1633	IMM
Aldicarb (Temik)	<0.500		0.500	ug/L		03/10/21 1100	03/10/21 1633	IMM
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		03/10/21 1100	03/10/21 1633	IMM
Carbaryl (Sevin)	<0.500		0.500	ug/L		03/10/21 1100	03/10/21 1633	IMM
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	102	Limit: 70-130		% Rec		03/10/21 1100	03/10/21 1633	IMM

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv. 2 (1995)								
Alachlor	<0.196	2 MCL	0.196	ug/L		03/10/21 0900	03/11/21 0649	ARM
Aldrin	<0.098		0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Atrazine	<0.098	3 MCL	0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Benzo[a]pyrene	<0.020	0.2 MCL	0.020	ug/L		03/10/21 0900	03/11/21 0649	ARM
gamma-BHC (Lindane)	<0.020	0.2 MCL	0.020	ug/L		03/10/21 0900	03/11/21 0649	ARM
Butachlor	<0.098		0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
bis(2-Ethylhexyl)adipate	<0.588	400 MCL	0.588	ug/L		03/10/21 0900	03/11/21 0649	ARM
2-Ethylhexyl)phthalate	<0.588	6 MCL	0.588	ug/L		03/10/21 0900	03/11/21 0649	ARM
ıtachlor	<0.039	0.4 MCL	0.039	ug/L		03/10/21 0900	03/11/21 0649	ARM
Heptachlor epoxide	<0.020	0.2 MCL	0.020	ug/L		03/10/21 0900	03/11/21 0649	ARM
Hexachlorobenzene	<0.098	1 MCL	0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM

CERTIFICATE OF ANALYSIS

J1C0494

Client Sample ID:	Terrace Road Well		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1C0494-01	**Collection Date:**	03/03/2021 10:44

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Hexachlorocyclopentadiene	<0.098	50 MCL	0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Methoxychlor	<0.098	40 MCL	0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Metolachlor	<0.098		0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Metribuzin	<0.098		0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Propachlor (Ramrod)	<0.098		0.098	ug/L		03/10/21 0900	03/11/21 0649	ARM
Simazine	<0.069	4 MCL	0.069	ug/L		03/10/21 0900	03/11/21 0649	ARM
Surrogate: 1,3-Dimethyl-2-nitrobenzene	96.0	Limit: 70-130		% Rec		03/10/21 0900	03/11/21 0649	ARM
Surrogate: Pyrene-d10	110	Limit: 70-130		% Rec		03/10/21 0900	03/11/21 0649	ARM
Surrogate: Triphenyl phosphate	121	Limit: 70-130		% Rec		03/10/21 0900	03/11/21 0649	ARM

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 4500-Cl E-2011								
Chloride	163		8.00	mg/L			03/09/21 1804	CLW

ıls Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	71.6		1.02	mg/L		03/08/21 1258	03/08/21 1543	JDF

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
Q2:	LCS recovery is above acceptance limits. Results may be bias high.
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division	
10121	New York State Department of Health
02-00257	PA Department of Environmental Protection
	PADEP Accreditation by Rule
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0494

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/18/2021 22:47

MICROBAC

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Cortland, NY 13045
607.753.3403

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570.888.0169

162[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 1.2 & 1.6
Therm ID
Holding Times
Samples Received on Ice? Yes No N/A
Custody Seal Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Quarterly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	9B	8oc's	Nitrates	Sodium	Chloride	9C	Soc				Additional
	Terrace Rd well	3/3/2021	10:14AM		DW					1	1	1		1				
			11:01AM															

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Did not receive 8oc's.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-3-2021 11:39AM		3/3/21 12:03
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J1C04994
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0378

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Drinking Water

Project / PO Number: N/A
Received: 03/02/2021
Reported: 03/18/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	LIme Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0378-01	**Collection Date:**	03/02/2021 14:35

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 300.0, Rv. 2.1 (1993)								
Nitrite as N	<0.03	1.00 MCL	0.03	mg/L		03/03/21 2040	03/03/21 2040	DJS
Nitrate as N	2.29	10.0 MCL	0.40	mg/L		03/03/21 2040	03/03/21 2040	DJS

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 4500-Cl E-2011								
Chloride	53.4		2.00	mg/L			03/04/21 1633	CLW

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	17.8		1.02	mg/L		03/05/21 1116	03/05/21 1156	JDF

Volatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv. 1.1 (1995)								
1,2-Dibromo-3-chloropropane (DBCP)	<0.0100	0.2 MCL	0.0100	ug/L		03/05/21 0900	03/06/21 0158	MRB
1,2-Dibromoethane (Ethylene dibromide, EDB)	<0.0100	0.05 MCL	0.0100	ug/L		03/05/21 0900	03/06/21 0158	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	99.0	Limit: 70-130		% Rec		03/05/21 0900	03/06/21 0158	MRB

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Benzene	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
mobenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
mochloromethane	<0.50		0.50	ug/L			03/04/21 1753	RSD
Bromodichloromethane	<0.50	80 MCL	0.50	ug/L			03/04/21 1753	RSD
Bromoform	<0.50	80 MCL	0.50	ug/L			03/04/21 1753	RSD

CERTIFICATE OF ANALYSIS

J1C0378

Client Sample ID:	LIme Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0378-01	**Collection Date:**	03/02/2021 14:35

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Bromomethane	<0.50		0.50	ug/L			03/04/21 1753	RSD
tert-Butylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
sec-Butylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
n-Butylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Carbon tetrachloride	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
Chlorobenzene	<0.50	100 MCL	0.50	ug/L			03/04/21 1753	RSD
Chloroethane (Ethyl chloride)	<0.50		0.50	ug/L			03/04/21 1753	RSD
Chloroform	<0.50	80 MCL	0.50	ug/L			03/04/21 1753	RSD
Chloromethane	<0.50		0.50	ug/L			03/04/21 1753	RSD
2-Chlorotoluene	<0.50		0.50	ug/L			03/04/21 1753	RSD
4-Chlorotoluene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Dibromochloromethane	<0.50	80 MCL	0.50	ug/L			03/04/21 1753	RSD
Dibromomethane (Methylene bromide)	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,4-Dichlorobenzene	<0.50	75 MCL	0.50	ug/L			03/04/21 1753	RSD
1,2-Dichlorobenzene	<0.50	600 MCL	0.50	ug/L			03/04/21 1753	RSD
1,3-Dichlorobenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
ılorodifluoromethane (Freon-12)	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,2-Dichloroethane	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
1,1-Dichloroethane	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
trans-1,2-Dichloroethene	<0.50	100 MCL	0.50	ug/L			03/04/21 1753	RSD
cis-1,2-Dichloroethene	<0.50	70 MCL	0.50	ug/L			03/04/21 1753	RSD
1,1-Dichloroethene	<0.50	7 MCL	0.50	ug/L			03/04/21 1753	RSD
1,3-Dichloropropane	<0.50		0.50	ug/L			03/04/21 1753	RSD
2,2-Dichloropropane	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,2-Dichloropropane	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
1,1-Dichloropropene	<0.50		0.50	ug/L			03/04/21 1753	RSD
trans-1,3-Dichloropropene	<0.50		0.50	ug/L			03/04/21 1753	RSD
cis-1,3-Dichloropropene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Ethylbenzene	<0.50	700 MCL	0.50	ug/L			03/04/21 1753	RSD
Hexachlorobutadiene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Isopropylbenzene (Cumene)	<0.50		0.50	ug/L			03/04/21 1753	RSD
4-Isopropyltoluene (p-Isopropyltoluene)	<0.50		0.50	ug/L			03/04/21 1753	RSD
Methyl tert-butyl ether (MTBE)	<0.50	50 MCL	0.50	ug/L			03/04/21 1753	RSD
Methylene chloride (Dichloromethane)	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
Naphthalene	<0.50		0.50	ug/L			03/04/21 1753	RSD
n-Propylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Styrene	<0.50	100 MCL	0.50	ug/L			03/04/21 1753	RSD
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L			03/04/21 1753	RSD
Tetrachloroethene	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
ene	<0.50	1000 MCL	0.50	ug/L			03/04/21 1753	RSD
ı,2,4-Trichlorobenzene	<0.50	70 MCL	0.50	ug/L			03/04/21 1753	RSD
1,2,3-Trichlorobenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,1,1-Trichloroethane	<0.50	200 MCL	0.50	ug/L			03/04/21 1753	RSD

CERTIFICATE OF ANALYSIS

J1C0378

Client Sample ID:	LIme Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0378-01	**Collection Date:**	03/02/2021 14:35

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
1,1,2-Trichloroethane	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
Trichloroethene	<0.50	5 MCL	0.50	ug/L			03/04/21 1753	RSD
Trichlorofluoromethane (Freon 11)	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,2,3-Trichloropropane	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,2,4-Trimethylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
1,3,5-Trimethylbenzene	<0.50		0.50	ug/L			03/04/21 1753	RSD
Vinyl chloride	<0.50	2 MCL	0.50	ug/L			03/04/21 1753	RSD
m,p-Xylene	<0.50	10000 MCL	0.50	ug/L			03/04/21 1753	RSD
o-Xylene	<0.50	10000 MCL	0.50	ug/L			03/04/21 1753	RSD
Xylenes (total)	<0.50	10000 MCL	0.50	ug/L			03/04/21 1753	RSD
Surrogate: 4-Bromofluorobenzene	73.6	Limit: 70-130		% Rec			03/04/21 1753	RSD
Surrogate: 1,2-Dichlorobenzene-d4	72.2	Limit: 70-130		% Rec			03/04/21 1753	RSD

Herbicides by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv. 1 (1996)								
D [2C]	<0.100	70 MCL	0.100	ug/L	M1	03/08/21 0900	03/09/21 0000	CKC
Dalapon [2C]	<1.00	200 MCL	1.00	ug/L		03/08/21 0900	03/09/21 0000	CKC
Dicamba [2C]	<0.100		0.100	ug/L		03/08/21 0900	03/09/21 0000	CKC
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP) [2C]	<0.200	7 MCL	0.200	ug/L	M1	03/08/21 0900	03/09/21 0000	CKC
Pentachlorophenol [2C]	<0.0400	1 MCL	0.0400	ug/L	M1	03/08/21 0900	03/09/21 0000	CKC
Picloram [2C]	0.106	500 MCL	0.100	ug/L	M1	03/08/21 0900	03/09/21 0000	CKC
2,4,5-TP (Silvex) [2C]	<0.200	50 MCL	0.200	ug/L	M1	03/08/21 0900	03/09/21 0000	CKC
Surrogate: 2,4-Dichloropenylacetic acid	117	Limit: 70-130		% Rec		03/08/21 0900	03/09/21 0000	CKC
Surrogate: 2,4-Dichloropenylacetic acid [2C]	119	Limit: 70-130		% Rec		03/08/21 0900	03/09/21 0000	CKC

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv. 2.1 (1995)								
Chlordane (tech.) [2C]	<0.200	2 MCL	0.200	ug/L		03/05/21 0800	03/05/21 1954	MRB
Dieldrin [2C]	<0.0200	0.2 MCL	0.0200	ug/L		03/05/21 0800	03/05/21 1954	MRB
Endrin [2C]	<0.0100	2 MCL	0.0100	ug/L		03/05/21 0800	03/05/21 1954	MRB
Toxaphene [2C]	<1.00	3 MCL	1.00	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1016 (PCB-1016) [2C]	<0.0800		0.0800	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1221 (PCB-1221) [2C]	<20.0		20.0	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1232 (PCB-1232) [2C]	<0.500		0.500	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1242 (PCB-1242) [2C]	<0.300		0.300	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1248 (PCB-1248) [2C]	<0.100		0.100	ug/L		03/05/21 0800	03/05/21 1954	MRB
lor-1254 (PCB-1254) [2C]	<0.100		0.100	ug/L		03/05/21 0800	03/05/21 1954	MRB
Aroclor-1260 (PCB-1260) [2C]	<0.100		0.100	ug/L		03/05/21 0800	03/05/21 1954	MRB
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	124	Limit: 70-130		% Rec		03/05/21 0800	03/05/21 1954	MRB

CERTIFICATE OF ANALYSIS

J1C0378

Client Sample ID:	LIme Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0378-01	**Collection Date:**	03/02/2021 14:35

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst

Herbicides by HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv. 1 (2001)								
Aldicarb sulfoxide	<0.500		0.500	ug/L		03/05/21 1419	03/05/21 1915	IMM
Aldicarb sulfone	<0.800		0.800	ug/L		03/05/21 1419	03/05/21 1915	IMM
Oxamyl	<1.00	200 MCL	1.00	ug/L		03/05/21 1419	03/05/21 1915	IMM
Methomyl (Lannate)	<0.500		0.500	ug/L		03/05/21 1419	03/05/21 1915	IMM
3-Hydroxycarbofuran	<0.500		0.500	ug/L		03/05/21 1419	03/05/21 1915	IMM
Aldicarb (Temik)	<0.500		0.500	ug/L		03/05/21 1419	03/05/21 1915	IMM
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		03/05/21 1419	03/05/21 1915	IMM
Carbaryl (Sevin)	<0.500		0.500	ug/L		03/05/21 1419	03/05/21 1915	IMM
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	84.2	Limit: 70-130		% Rec		03/05/21 1419	03/05/21 1915	IMM

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv. 2 (1995)								
Alachlor	<0.198	2 MCL	0.198	ug/L		03/05/21 0800	03/08/21 2048	ARM
Aldrin	<0.099		0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Atrazine	<0.099	3 MCL	0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Benzo[a]pyrene	<0.020	0.2 MCL	0.020	ug/L		03/05/21 0800	03/08/21 2048	ARM
gamma-BHC (Lindane)	<0.020	0.2 MCL	0.020	ug/L		03/05/21 0800	03/08/21 2048	ARM
Butachlor	<0.099		0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
bis(2-Ethylhexyl)adipate	<0.594	400 MCL	0.594	ug/L		03/05/21 0800	03/08/21 2048	ARM
bis(2-Ethylhexyl)phthalate	<0.594	6 MCL	0.594	ug/L		03/05/21 0800	03/08/21 2048	ARM
Heptachlor	<0.040	0.4 MCL	0.040	ug/L		03/05/21 0800	03/08/21 2048	ARM
Heptachlor epoxide	<0.020	0.2 MCL	0.020	ug/L		03/05/21 0800	03/08/21 2048	ARM
Hexachlorobenzene	<0.099	1 MCL	0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Hexachlorocyclopentadiene	<0.099	50 MCL	0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Methoxychlor	<0.099	40 MCL	0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Metolachlor	<0.099		0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Metribuzin	<0.099		0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Propachlor (Ramrod)	<0.099		0.099	ug/L		03/05/21 0800	03/08/21 2048	ARM
Simazine	<0.069	4 MCL	0.069	ug/L		03/05/21 0800	03/08/21 2048	ARM
Surrogate: 1,3-Dimethyl-2-nitrobenzene	96.5	Limit: 70-130		% Rec		03/05/21 0800	03/08/21 2048	ARM
Surrogate: Pyrene-d10	105	Limit: 70-130		% Rec		03/05/21 0800	03/08/21 2048	ARM
Surrogate: Triphenyl phosphate	114	Limit: 70-130		% Rec		03/05/21 0800	03/08/21 2048	ARM

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0378

Definitions

M1:	Matrix spike recovery is above acceptance limits.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division	
10121	New York State Department of Health
02-00257	PA Department of Environmental Protection
	PADEP Accreditation by Rule
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/18/2021 22:49

MICI... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC(

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.9
Therm ID 014
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Quarterly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	9B	Poc's	Nitrates	Sodium	Chloride	9C	SOC				Additional
	Lime Hollow well	3/2/2021	235 PM		DW					2	1							
			300 PM															

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3/2/2021 336 PM	Jennifer Walker	3/2/21 1545
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1C0378
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A1044

Project Description

PFAS

For:

Peter Alteri

Town of Cortlandville Water

3577 Terrace Road

Cortland, NY 13045

Shannon Weeks

Customer Relationship Coordinator

Shannon Weeks

Wednesday, February 17, 2021

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac Laboratories, Inc., New York Division. If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed above.

I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the ıples analyzed as received.

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A1044

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: PFAS

Project / PO Number: N/A
Received: 01/12/2021
Reported: 02/17/2021

Sample Summary Report

Sample Name	Laboratory ID	Client Matrix	Sample Type	Sample Begin	Sample Taken	Lab Received
Lime Hollow Well	J1A1044-01	Drinking Water	Grab		01/12/21 13:30	01/12/21 14:21
Lime Hollow Well - Field Blank	J1A1044-02	Drinking Water	Grab		01/12/21 13:30	01/12/21 14:21

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A1044

Analytical Testing Parameters

Client Sample ID:	Lime Hollow Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1A1044-01	**Collection Date:**	01/12/2021 13:30

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	DF	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<0.893	0.893	1.79	ng/L	1		01/25/21 0906	02/09/21 1721	CAS
Perfluorooctane sulfonate (PFOS)	<0.893	0.893	1.79	ng/L	1		01/25/21 0906	02/09/21 1721	CAS
Surrogate: MPFHxA	62.5	Limit: 70-130		% Rec	1	S2	01/25/21 0906	02/09/21 1721	CAS
Surrogate: MPFDA	68.6	Limit: 70-130		% Rec	1	S2	01/25/21 0906	02/09/21 1721	CAS
Surrogate: d5-N-EtFOSAA	73.3	Limit: 70-130		% Rec	1		01/25/21 0906	02/09/21 1721	CAS

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	MDL	RL	Units	DF	Note	Prepared	Analyzed	Analyst
hod: EPA 522, Rv. 1 (2008)									
Dioxane	<0.100	0.0400	0.100	ug/L	1		01/21/21 0830	01/21/21 1842	ARM
Surrogate: 1,4-Dioxane-d8	84.8	Limit: 70-130		% Rec	1		01/21/21 0830	01/21/21 1842	ARM

Client Sample ID:	Lime Hollow Well - Field Blank		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1A1044-02	**Collection Date:**	01/12/2021 13:30

Analyses Subcontracted to: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	MDL	RL	Units	DF	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)									
Perfluorooctanoic acid (PFOA)	<0.893	0.893	1.79	ng/L	1		01/25/21 0906	02/09/21 1739	CAS
Perfluorooctane sulfonate (PFOS)	<0.893	0.893	1.79	ng/L	1		01/25/21 0906	02/09/21 1739	CAS
Surrogate: MPFHxA	97.2	Limit: 70-130		% Rec	1		01/25/21 0906	02/09/21 1739	CAS
Surrogate: MPFDA	81.5	Limit: 70-130		% Rec	1		01/25/21 0906	02/09/21 1739	CAS
Surrogate: d5-N-EtFOSAA	82.3	Limit: 70-130		% Rec	1		01/25/21 0906	02/09/21 1739	CAS

Definitions

MDL:	Minimum Detection Limit
ng/L:	Nanograms per Liter
RL:	Reporting Limit
S2:	Surrogate recovery is below acceptance limits.
ug/L:	Micrograms per Liter

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A1044

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 12.8°C

Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		

Project Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH 10861	New York State Department of Health
Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/17/2021 21:02

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scran[illegible], PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.4

Therm ID 2044

Holding Time:

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS + 1,4 Dioxane

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types**	537 PFOA/PFOS	522 1,4 Dioxane								Addit
	Lime Hollow Well	1-12-2021	1:30-1:31 PM	4	DW	1	Trizma	4									
		1-12-2021	1:35 PM	1	DW	1	Sodium Sulfate		1								

Cortlandville Water, Town of

PM: Shannon Weeks

J1A1044

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-12-2021 2:12 PM	Daniel Walk	1/12/2021 14:21
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0780

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: PFOA/PFOS 1,4 Dioxane

Project / PO Number: N/A
Received: 01/08/2021
Reported: 03/16/2021

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J1A0780-01
Collected By: Client
Collection Date: 01/08/2021 10:29

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)								
Perfluorooctanoic acid (PFOA)	<1.79		1.79	ng/L		01/21/21 1556	02/07/21 0511	CAS
Perfluorooctane sulfonate (PFOS)	<1.79		1.79	ng/L		01/21/21 1556	02/07/21 0511	CAS
Surrogate: MPFHxA	90.1	Limit: 70-130		% Rec		01/21/21 1556	02/07/21 0511	CAS
Surrogate: MPFDA	50.9	Limit: 70-130		% Rec	S2	01/21/21 1556	02/07/21 0511	CAS
Surrogate: d5-N-EtFOSAA	65.9	Limit: 70-130		% Rec	S2	01/21/21 1556	02/07/21 0511	CAS

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 522, Rv. 1 (2008)								
1,4-Dioxane	<0.100		0.100	ug/L		01/21/21 0830	01/22/21 0011	ARM
Surrogate: 1,4-Dioxane-d8	81.8	Limit: 70-130		% Rec		01/21/21 0830	01/22/21 0011	ARM

Client Sample ID: Terrace Rd. Well - Field Blank
Sample Matrix: Drinking Water
Lab Sample ID: J1A0780-02
Collected By: Client
Collection Date: 01/08/2021 10:30

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537, Rv. 1.1 (2009)								
Perfluorooctanoic acid (PFOA)	<1.79		1.79	ng/L		01/21/21 1556	02/07/21 0529	CAS
Perfluorooctane sulfonate (PFOS)	<1.79		1.79	ng/L		01/21/21 1556	02/07/21 0529	CAS
Surrogate: MPFHxA	98.4	Limit: 70-130		% Rec		01/21/21 1556	02/07/21 0529	CAS
Surrogate: MPFDA	72.4	Limit: 70-130		% Rec		01/21/21 1556	02/07/21 0529	CAS
Surrogate: d5-N-EtFOSAA	73.1	Limit: 70-130		% Rec		01/21/21 1556	02/07/21 0529	CAS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0780

Definitions

MDL:	Minimum Detection Limit
ng/L:	Nanograms per Liter
RL:	Reporting Limit
S2:	Surrogate recovery is below acceptance limits.
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH	
10861	New York State Department of Health
Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

he data and information on this, and other accompanying documents, represents only the ample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:



Renee Lantz
Customer Relationship Specialist
Reported: 03/16/2021 17:26

MI AC

3821 Buck Drive	2369 Elmira Street, Suite C	162[illegible] ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scr[illegible], PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RE

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9a

Therm ID 2044

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: PFOA/PFOS & 1,4 Dioxane **Location:**

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT):

Sampler Signature:

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	PFOA/PFOS	1,4 Dioxane	Ac
	Terrace Rd well	1-8-2021	10:29/10:30 HM	4	DW		Trizma	4		
		1-8-2020	10:24	1	DW		Sodium Sulfite		1	

J1A0780

Cortlandville Water, Town of

PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
[signature]	1-8-2020 11:03 HM	[signature]	1/8/2021 11:05
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ___ of ___

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0779

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Sodium

Project / PO Number: N/A
Received: 01/08/2021
Reported: 01/20/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1A0779-01	**Collection Date:**	01/08/2021 10:15

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	74.1		1.02	mg/L		01/14/21 1147	01/14/21 1615	JDF

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 01/20/2021 17:23

MIC AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.9
Therm ID 2044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Quarterly

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Sodium										Additional Nc
	Terrace Rd Well	1-8-2021	10:15 AM	1	DW	1	Nitric Acid	1										

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-8-2021 11:03 AM	David Walk	1/8/2021 11:05
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1A0779
Cortlandville Water, Town of
PM: Shannon Weeks

Annual Water Samples 2022

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2022	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Coliform, Total (TCR)		
☑	**Location: Distribution System** **Frequency: 5 Samples Monthly**		**5 Samples must be collected every month.**
	A positive total coliform (TC+) sample requires notifying the health department and collecting repeat distribution system samples within 24 hours. Unless otherwise directed by the health department, source (or raw) water before any treatment, from all active wells, must also be sampled within 24 hours.		
	Chloride		March
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
	Nitrate		March
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
	Nitrite		March
☑	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/3/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
☑	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
	Part 5-1.42 and 5-1.47 - Lead and Copper		June
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 20 Samples Every 3 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System	20 Samples Collected on or Before: 6/7/2019	**Next 20 samples must be collected between 6/1 and 9/30 within a single year by 9/30/2022**
	Sample at approved sites following correct sampling protocol and submit all certifications.		
	Part 5-1.52 Table 9A - Disinfection Byproducts/Stage 2		July
☑	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 2 Samples Yearly**	Samples last collected: 7/21/2021	**Next 2 samples must be collected between 7/1 and 7/31 within a single year by 7/31/2022**

SDWIS/State Water Sample Schedule Report

CORTLANDVILLE TOWN WATER PWS ID: NY1101755

Due 2022	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Sample Point: 1303 FISHER AVE Sample Point No.: LRAA1 Sample Point Type: DS-Distribution System Sample Point: WALDEN OAKS BOOSTER STATION Sample Point No.: LRAA2 Sample Point Type: DS-Distribution System One sample for TTHM's & one sample for HAA5's must be collected every year, at each sampling location, between 7/1 & 7/31. TTHM & HAA5 samples must be collected at the same time, at each sampling location.		
	Part 5-1.52 Table 9B - Principal Organic Chemicals		March
	☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/19/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
	☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/2/2021	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**
	Part 5-1.52 Table 9C - PFOA, PFOS and 1,4-Dioxane		March
	☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Yearly** Sample Point: TERRACE RD TREATMENT PLANT #1 Sample Point No.: RW-001 Sample Point Type: RW-Raw Water Source	Samples last collected: 4/2/2021	**Sample must be collected by 12/31/2022**
	☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly** Sample Point: LIME HOLLOW TREATMENT PLANT Sample Point No.: RW-002 Sample Point Type: RW-Raw Water Source	Samples last collected: 4/6/2021	**Sample must be collected by 12/31/2022**
	Part 5-1.52 Table 9C - Synthetic Organic Chemicals		March
	☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 9/1/22.	Samples last collected: 3/3/2021	**Sample must be collected by 12/31/2022**
	☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 18 Months** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Samples must be collected in an 18 month period. The next one is due by 9/1/22.	Samples last collected: 3/2/2021	**Sample must be collected by 12/31/2022**
	Sodium		Every Quarter
1 2 3 4	☑ **Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Quarterly** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 11/1/2021	**1 Sample must be collected each calendar quarter.**
	☑ **Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Yearly**	Samples last collected: 3/2/2021	March **Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2022**

Due 2022	Contaminant (Group)/ Sample Location/Frequency	Last Compliance Results	Sample Requirements
	Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point		
	Asbestos		
☐	**Location: DISTRIBUTION SYSTEM ID: DS001** **Frequency: 1 Sample Every 9 years** Sample Point: DISTRIBUTION VARIOUS Sample Point No.: DS-001 Sample Point Type: DS-Distribution System Sample in the area of distribution that has asbestos pipe.	Samples last collected: 3/4/2015	**Next sample must be collected by 12/31/2024**
	Part 5-1.52 Table 12 - Radiological		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 6 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 4/10/2019	**Next sample must be collected by 12/31/2025**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 6 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point Collect one radiological sample for Gross Alpha, Radium 226, and Radium 228 every six years at each entry point.	Samples last collected: 3/6/2019	**Next sample must be collected by 12/31/2025**
	Part 5-1.52 Table 8B - Primary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 3/5/2020	**Next sample must be collected between 1/1 and 12/31 within a single year by 12/31/2023**
	Part 5-1.52 Table 8D - Secondary Inorganic Chemicals		
☐	**Location: TERRACE RD TREATMENT PLANT #2 ID: 006** **Frequency: 1 Sample Every 3 years** Sample Point: EP-TERRACE RD PLANT Sample Point No.: EP-001 Sample Point Type: EP-Entry Point	Samples last collected: 3/4/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**
☐	**Location: LIME HOLLOW TREATMENT PLANT ID: 007** **Frequency: 1 Sample Every 3 years** Sample Point: EP-LIME HOLLOW PLANT Sample Point No.: EP-002 Sample Point Type: EP-Entry Point	Samples last collected: 5/19/2020	**Next sample must be collected between 3/1 and 5/31 within a single year by 5/31/2023**

Cortlandville Town Water
THHM/HAA5 WATER MONITORING PLAN

Sampling is required for disinfection byproducts, including TTHMs and HAA5 in the distribution system, as well as chlorine residual. TTHMs and HAA5 shall be sampled, annually, on the second Thursday of July. The two sampling locations, representative of high TTHM and high HAA5, is 1303 Fisher Ave., the National Grid/NIMO building, the women's bathroom sink in the break room and Walden Oaks booster station, 962 Walden Pond Ln., spigot in station. The results of the TTHM and HAA5 samples will be compared to the respective MCLs of 80 and 60 ug/L. If either the TTHM or the HAA5 MCL is exceeded, the system shall begin quarterly sampling on second Thursday in October, January and April. The results of the most recent quarterly sampling shall be added to the previous three quarters, and the average of the four quarters (running annual average) will be compared to the MCL to determine compliance. Quarterly sampling shall continue, until the Cortland County Health Department approves reduced monitoring.

The residual chlorine level shall be measured when coliform samples are taken as specified by the coliform site monitoring plan. If any residual chlorine results exceed the Maximum Residual Disinfectant Level of 4 mg/L, the results for the month will be averaged and that average added to the average of the other months of the quarter to determine the quarterly average. The quarterly average will be added to the average of the previous three quarters to determine a running annual average which will be compared to the MRDL.

Revised December 9, 2013

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0018

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Sodium Terrace Rd.

Project / PO Number: N/A
Received: 07/01/2022
Reported: 07/28/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G0018-01	**Collection Date:**	07/01/2022 7:30

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP		Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)	1ST 2nd 3rd	68.0 59.9							
Sodium		63.0		1.02	mg/L		07/07/22 1745	07/07/22 1933	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/28/2022 18:24

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0018

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Sodium Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2G0018-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-1-2022 7:30 AM

Analysis	Method	Field Results/Comments	Hold Time
200.7 Na	EPA 200.7, Rv. 4.4 (1994)	Raw water	180.00 days

Container(s): 1L-Bottle HDPE-HNO3

Designator: A

Relinquished by: / Printed Name:	Date/Time:	Received by: / Printed Name:	Date/Time:
Jeff MacLean / Jeff MacLean	7-1-2022 832 AM	[illegible]	7-1-22 8:34
Relinquished by: / Printed Name:	Date/Time:	Received by: / Printed Name:	Date/Time:
Relinquished by: / Printed Name:	Date/Time:	Received by: / Printed Name:	Date/Time:

As Received at Laboratory: On Ice (Yes) / No Temp: 1.3 °C Thermometer ID: 044 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0017

Disinfection By products

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: THM/HAA

Project / PO Number: N/A
Received: 07/06/2022
Reported: 07/22/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Fisher Ave. 1303		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G0017-01	**Collection Date:**	07/06/2022 9:38

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2, Rv. 1 (1995)								
Total Haloacetic acids (HAA5)	2.34	60 MCL	1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Chloroacetic acid [2C]	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Bromoacetic acid [2C]	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Dichloroacetic acid [2C]	1.13		1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Trichloroacetic acid [2C]	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Dibromoacetic acid	1.21		1.00	ug/L		07/12/22 1430	07/13/22 2309	ALG
Surrogate: 2,3-Dibromopropionic acid	102	Limit: 70-130		% Rec		07/12/22 1430	07/13/22 2309	ALG
Surrogate: 2,3-Dibromopropionic acid [2C]	106	Limit: 70-130		% Rec		07/12/22 1430	07/13/22 2309	ALG

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Bromodichloromethane	0.00529	0.0800 MCL	0.000500	mg/L			07/11/22 2031	RJH
Bromoform	0.00140	0.0800 MCL	0.000500	mg/L			07/11/22 2031	RJH
Chloroform	0.00616	0.0800 MCL	0.000500	mg/L			07/11/22 2031	RJH
Dibromochloromethane	0.00427	0.0800 MCL	0.000500	mg/L			07/11/22 2031	RJH
Total Trihalomethanes	0.0171	0.08 MCL	0.000500	mg/L			07/11/22 2031	RJH
Surrogate: 4-Bromofluorobenzene	119	Limit: 70-130		% Rec			07/11/22 2031	RJH
Surrogate: 1,2-Dichlorobenzene-d4	105	Limit: 70-130		% Rec			07/11/22 2031	RJH

MICROBAC®

Disinfection By-products

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0017

Client Sample ID:	Walden Oaks		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G0017-02	**Collection Date:**	07/06/2022 8:41

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 552.2, Rv. 1 (1995)								
Total Haloacetic acids (HAA5)	2.64	60 MCL	1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Chloroacetic acid	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Bromoacetic acid	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Dichloroacetic acid [2C]	1.29		1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Trichloroacetic acid [2C]	<1.00		1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Dibromoacetic acid	1.36		1.00	ug/L		07/12/22 1430	07/13/22 2330	ALG
Surrogate: 2,3-Dibromopropionic acid	97.3	Limit: 70-130		% Rec		07/12/22 1430	07/13/22 2330	ALG
Surrogate: 2,3-Dibromopropionic acid [2C]	100	Limit: 70-130		% Rec		07/12/22 1430	07/13/22 2330	ALG

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Total Trihalomethanes	0.00975	0.08 MCL	0.000500	mg/L			07/11/22 2244	RJH

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Bromodichloromethane	0.00294	0.0800 MCL	0.000500	mg/L			07/11/22 2244	RJH
Bromoform	0.000980	0.0800 MCL	0.000500	mg/L			07/11/22 2244	RJH
Chloroform	0.00327	0.0800 MCL	0.000500	mg/L			07/11/22 2244	RJH
Dibromochloromethane	0.00256	0.0800 MCL	0.000500	mg/L			07/11/22 2244	RJH
Surrogate: 4-Bromofluorobenzene	130	Limit: 70-130		% Rec			07/11/22 2244	RJH
Surrogate: 1,2-Dichlorobenzene-d4	99.6	Limit: 70-130		% Rec			07/11/22 2244	RJH

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0017

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., Pittston Division	
12150	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/22/2022 20:14

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0017

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: THM/HAA

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

Client Sample ID: Fisher Ave. 1303
Lab Sample ID: J2G0017-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-6-2022 9:36 AM - 9:38 AM

Analysis	Method	Field Results/Comments	Hold Time
524.2 THM PPM GROUP	varies		14.00 days
552.2 HAA	EPA 552.2, Rv. 1 (1995)	CL 0.2	14.00 days
		Container(s)	Designator
		40ml-Vial-Na2S2O3	A
		40ml-Vial-Na2S2O3	B
		60ml-Vial Amber-NH4CL	C
		60ml-Vial Amber-NH4CL	D
		60ml-Vial Amber-NH4CL	E

Client Sample ID: Walden Oaks
Lab Sample ID: J2G0017-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-6-2022 8:36 AM - 8:41 AM

Analysis	Method	Field Results/Comments	Hold Time
524.2 THM PPM GROUP	varies		14.00 days
552.2 HAA	EPA 552.2, Rv. 1 (1995)	CL 0.4	14.00 days
		Container(s)	Designator
		40ml-Vial-Na2S2O3	A
		40ml-Vial-Na2S2O3	B
		60ml-Vial Amber-NH4CL	C
		60ml-Vial Amber-NH4CL	D
		60ml-Vial Amber-NH4CL	E

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	7-6-2022 11:46 AM	Printed Name: Ron Bogusz	7/6/22 1146
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0017

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: THM/HAA

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

As Received at Laboratory: On Ice: (Yes) / No Temp: 16.8 °C Thermometer ID: 044 Total Containers: 10.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0377

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Sodium Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: **Terrace Rd.** Well
Lab Sample ID: **J2C0377-01**
Matrix: **Drinking Water**
Type: **Grab**

Sampled Date & Time: 4-4-2022 7:24 AM

Analysis	Method	Field Results/Comments	Hold Time
200.7 Na	EPA 200.7, Rv. 4.4 (1994)	Raw Water	180.00 days
		Container(s): 1L-Bottle HDPE-HNO3	Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	4-4-2022 8:35 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name: Amber Schutt	4/4/22 8:38
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 12.8 °C Thermometer ID: 014 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0377

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Sodium Terrace Rd.

Project / PO Number: N/A 2nd quarter
Received: 04/04/2022
Reported: 04/13/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well (Raw Water)		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0377-01	**Collection Date:**	04/04/2022 7:24

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Metals Total by ICP		Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)	1st	68.0							
Sodium	2nd	65.9		0.200	mg/L		04/08/22 2218	04/08/22 2218	SEA
	3rd	63.0							

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division
10121 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Renee Lantz
Customer Relationship Specialist
Reported: 04/13/2022 13:00

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0372

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: PFOA/PFOS 1,4 Dioxane (Terrace Rd.)
Project / PO Number: N/A
Received: 03/16/2022
Reported: 03/30/2022

Analytical Testing Parameters

Client Sample ID: Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2C0372-01
Collected By: Client
Collection Date: 03/16/2022 11:46

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537.1								
Perfluorooctanoic acid (PFOA)	<1.92		1.92	ng/L		03/22/22 0507	03/23/22 1939	JWR
Perfluorooctane sulfonate (PFOS)	<1.92		1.92	ng/L		03/22/22 0507	03/23/22 1939	JWR
Surrogate: 13C-PFOA	98.3	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1939	JWR
Surrogate: 13C-PFOS	95.3	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1939	JWR

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 522, Rv. 1 (2008)								
1,4-Dioxane	<0.100		0.100	ug/L		03/22/22 0900	03/23/22 1819	ARM
Surrogate: 1,4-Dioxane-d8	123	Limit: 70-130		% Rec		03/22/22 0900	03/23/22 1819	ARM

Client Sample ID: Field Blank of Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2C0372-02
Collected By: Client
Collection Date: 03/16/2022 11:42

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537.1								
Perfluorooctanoic acid (PFOA)	<2.17		2.17	ng/L		03/22/22 0507	03/23/22 1944	JWR
Perfluorooctane sulfonate (PFOS)	<2.17		2.17	ng/L		03/22/22 0507	03/23/22 1944	JWR
Surrogate: 13C-PFOA	98.2	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1944	JWR
Surrogate: 13C-PFOS	98.5	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1944	JWR

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0372

Definitions

ng/L:	Nanograms per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH 10861	NY State Department of Health
Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health

Report Comments

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/30/2022 15:14

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0372

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: PFOA/PFOS 1,4 Dioxane (Terrace Rd.)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2C0372-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-16-2022 11:46 Am

Analysis	Method	Field Results/Comments	Hold Time
537 PFAS	EPA 537 Rev. 1.1		14.00 days
522 Dioxane	EPA 522, Rv. 1 (2008)		28.00 days

Container(s)	Designator
1L-Bottle Glass Amber-Na2SO3, NaHSO4	A
1L-Bottle Glass Amber-Na2SO3, NaHSO4	B
250ml-Bottle HDPE-Trizma	C
250ml-Bottle HDPE-Trizma	D

Client Sample ID: Field Blank of Terrace Rd.
Lab Sample ID: J2C0372-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-16-2022 11:42 Am

Analysis	Method	Field Results/Comments	Hold Time
537 PFAS	EPA 537 Rev. 1.1		14.00 days

Container(s)	Designator
250ml-Bottle HDPE-Trizma	A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: JM MacLean	3-16-2022 2:20 PM	Printed Name: S Dewes	3.16.22 14:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 13.4 °C Thermometer ID: 044 Total Containers: 5.00

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Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0371

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: PFOA/PFOS 1,4 Dioxane (Lime Hollow)
Project / PO Number: N/A
Received: 03/17/2022
Reported: 03/30/2022

Analytical Testing Parameters

Client Sample ID: Lime Hollow
Sample Matrix: Drinking Water
Lab Sample ID: J2C0371-01
Collected By: Client
Collection Date: 03/17/2022 13:22

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537.1								
Perfluorooctanoic acid (PFOA)	<1.92		1.92	ng/L		03/22/22 0507	03/23/22 1950	JWR
Perfluorooctane sulfonate (PFOS)	<1.92		1.92	ng/L		03/22/22 0507	03/23/22 1950	JWR
Surrogate: 13C-PFOA	98.3	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1950	JWR
Surrogate: 13C-PFOS	99.8	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1950	JWR

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 522, Rv. 1 (2008)								
1,4-Dioxane	<0.100		0.100	ug/L		03/22/22 0900	03/23/22 1757	ARM
Surrogate: 1,4-Dioxane-d8	123	Limit: 70-130		% Rec		03/22/22 0900	03/23/22 1757	ARM

Client Sample ID: Field Blank of Lime Hollow
Sample Matrix: Drinking Water
Lab Sample ID: J2C0371-02
Collected By: Client
Collection Date: 03/17/2022 13:17

Analyses Performed by: Microbac Laboratories Inc., - Marietta, OH

Per and Polyfluoroalkyl Substances (PFAS) by LCMSMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 537.1								
Perfluorooctanoic acid (PFOA)	<2.17		2.17	ng/L		03/22/22 0507	03/23/22 1956	JWR
Perfluorooctane sulfonate (PFOS)	<2.17		2.17	ng/L		03/22/22 0507	03/23/22 1956	JWR
Surrogate: 13C-PFOA	101	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1956	JWR
Surrogate: 13C-PFOS	99.9	Limit: 70-130		% Rec		03/22/22 0507	03/23/22 1956	JWR

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MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0371

Definitions

ng/L:	Nanograms per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories Inc., - Marietta, OH 10861	NY State Department of Health
Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health

Report Comments

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/30/2022 15:14

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0371

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: PFOA/PFOS 1,4 Dioxane (Lime Hollow)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2C0371-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-17-2022 1:22 PM

Analysis	Method	Field Results/Comments	Hold Time
537 PFAS	EPA 537 Rev. 1.1		14.00 days
522 Dioxane	EPA 522, Rv. 1 (2008)		28.00 days

Container(s)	Designator
1L-Bottle Glass Amber-Na2SO3, NaHSO4	A
1L-Bottle Glass Amber-Na2SO3, NaHSO4	B
250ml-Bottle HDPE-Trizma	C
250ml-Bottle HDPE-Trizma	D

Client Sample ID: Field Blank of Lime Hollow
Lab Sample ID: J2C0371-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-17-2022 1:17 PM

Analysis	Method	Field Results/Comments	Hold Time
537 PFAS	EPA 537 Rev. 1.1		14.00 days

Container(s)	Designator
250ml-Bottle HDPE-Trizma	A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-17-2022 1850 PM	Printed Name: Shanna Dexter	3.17.22 13:50
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 11.9 °C Thermometer ID: 044 Total Containers: 5.00

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tes:

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0375

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: SOC (Lime Hollow)

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/21/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow
Sample Matrix: Drinking Water
Lab Sample ID: J2C0375-01
Collected By: Client
Collection Date: 03/08/2022 13:45

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv. 1.1 (1995)								
1,2-Dibromo-3-chloropropane (DBCP)	<0.00997	0.2 MCL	0.00997	ug/L		03/11/22 1335	03/12/22 0219	ALG
1,2-Dibromoethane (Ethylene dibromide, EDB)	<0.00997	0.05 MCL	0.00997	ug/L		03/11/22 1335	03/12/22 0219	ALG
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	99.5	Limit: 70-130		% Rec		03/11/22 1335	03/12/22 0219	ALG

Herbicides by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv. 1 (1996)								
2,4-D	<0.100	70 MCL	0.100	ug/L		03/11/22 1253	03/14/22 1407	ALG
Dalapon	<1.00	200 MCL	1.00	ug/L		03/11/22 1253	03/14/22 1407	ALG
Dicamba [2C]	<0.100		0.100	ug/L		03/11/22 1253	03/14/22 1407	ALG
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	<0.200	7 MCL	0.200	ug/L		03/11/22 1253	03/14/22 1407	ALG
Pentachlorophenol	<0.0400	1 MCL	0.0400	ug/L		03/11/22 1253	03/14/22 1407	ALG
Picloram [2C]	<0.100	500 MCL	0.100	ug/L		03/11/22 1253	03/14/22 1407	ALG
2,4,5-TP (Silvex)	<0.200	50 MCL	0.200	ug/L		03/11/22 1253	03/14/22 1407	ALG
Surrogate: 2,4-Dichloropenylacetic acid	119	Limit: 70-130		% Rec		03/11/22 1253	03/14/22 1407	ALG
Surrogate: 2,4-Dichloropenylacetic acid [2C]	119	Limit: 70-130		% Rec		03/11/22 1253	03/14/22 1407	ALG

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv. 2.1 (1995)								
Chlordane (tech.)	<0.200	2 MCL	0.200	ug/L		03/11/22 1132	03/11/22 2017	ALG
Dieldrin	<0.0200	0.2 MCL	0.0200	ug/L		03/11/22 1132	03/11/22 2017	ALG
Endrin	<0.0100	2 MCL	0.0100	ug/L		03/11/22 1132	03/11/22 2017	ALG
Toxaphene	<1.00	3 MCL	1.00	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1016 (PCB-1016)	<0.0800		0.0800	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1221 (PCB-1221)	<20.0		20.0	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1232 (PCB-1232)	<0.500		0.500	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1242 (PCB-1242)	<0.300		0.300	ug/L		03/11/22 1132	03/11/22 2017	ALG

CERTIFICATE OF ANALYSIS

J2C0375

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0375-01	**Collection Date:**	03/08/2022 13:45

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Aroclor-1248 (PCB-1248)	<0.100		0.100	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1254 (PCB-1254)	<0.100		0.100	ug/L		03/11/22 1132	03/11/22 2017	ALG
Aroclor-1260 (PCB-1260)	<0.200		0.200	ug/L		03/11/22 1132	03/11/22 2017	ALG
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	155	Limit: 70-130		% Rec	S1	03/11/22 1132	03/11/22 2017	ALG

Herbicides by HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv. 1 (2001)								
Aldicarb sulfoxide	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2141	RSD
Aldicarb sulfone	<0.800		0.800	ug/L		03/14/22 0720	03/14/22 2141	RSD
Oxamyl	<1.00	200 MCL	1.00	ug/L		03/14/22 0720	03/14/22 2141	RSD
Methomyl (Lannate)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2141	RSD
3-Hydroxycarbofuran	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2141	RSD
Aldicarb (Temik)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2141	RSD
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		03/14/22 0720	03/14/22 2141	RSD
Carbaryl (Sevin)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2141	RSD
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	102	Limit: 70-130		% Rec		03/14/22 0720	03/14/22 2141	RSD

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv. 2 (1995)								
Alachlor	<0.200	2 MCL	0.200	ug/L		03/14/22 0900	03/16/22 0019	ARM
Aldrin	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Atrazine	<0.100	3 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Benzo[a]pyrene	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0019	ARM
gamma-BHC (Lindane)	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0019	ARM
Butachlor	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
bis(2-Ethylhexyl)adipate	<0.600	400 MCL	0.600	ug/L		03/14/22 0900	03/16/22 0019	ARM
bis(2-Ethylhexyl)phthalate	<0.600	6 MCL	0.600	ug/L		03/14/22 0900	03/16/22 0019	ARM
Heptachlor	<0.040	0.4 MCL	0.040	ug/L		03/14/22 0900	03/16/22 0019	ARM
Heptachlor epoxide	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0019	ARM
Hexachlorobenzene	<0.100	1 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Hexachlorocyclopentadiene	<0.100	50 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Methoxychlor	<0.100	40 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Metolachlor	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Metribuzin	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Propachlor (Ramrod)	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0019	ARM
Simazine	<0.070	4 MCL	0.070	ug/L		03/14/22 0900	03/16/22 0019	ARM
Surrogate: 1,3-Dimethyl-2-nitrobenzene	95.0	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0019	ARM
Surrogate: Pyrene-d10	112	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0019	ARM
Surrogate: Triphenyl phosphate	119	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0019	ARM

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0375

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0375-01	**Collection Date:**	03/08/2022 13:45

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
S1:	Surrogate recovery is above acceptance limits.
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville

11549 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks

Customer Relationship Coordinator

Reported: 03/21/2022 15:30

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0375

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: SOC (Lime Hollow)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2C0375-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022 1:45 PM

Analysis	Method	Field Results/Comments	Hold Time
505 PEST PCB Group	NA		14.00 days
515 Cl Acids	EPA 515.3, Rv. 1 (1996)		14.00 days
531.2 Carbamates	EPA 531.2, Rv. 1 (2001)		28.00 days
505 PCB	EPA 505, Rv. 2.1 (1995)		14.00 days
505 PEST	EPA 505, Rv. 2.1 (1995)		14.00 days
525 SVOC STD	EPA 525.2, Rv. 2 (1995)		14.00 days
504.1 EDB DBCP	EPA 504.1, Rv. 1.1 (1995)		14.00 days

Container(s)	Designator
40ml-Vial-Na2S2O3	A
40ml-Vial-Na2S2O3	B
40ml-Vial-Na2S2O3	C
40ml-Vial-Na2S2O3	D
250ml-Bottle Glass Amber-Na2S2O3	E
1L-Bottle Glass Amber-Na2SO3, HCL	F
1L-Bottle Glass Amber-Na2SO3, HCL	G
40ml-Vial Amber-Na2S2O3, KDHP	H
40ml-Vial Amber-Na2S2O3, KDHP	I
40ml-Vial Amber-Na2S2O3, KDHP	J

Client Sample ID: Trip Blank
Lab Sample ID: J2C0375-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022

Analysis	Method	Field Results/Comments	Hold Time
504.1 EDB DBCP	EPA 504.1, Rv. 1.1 (1995)		14.00 days

Container(s)	Designator
40ml-Vial-Na2S2O3	A

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0375

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: SOC (Lime Hollow)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Relinquished by: Jeff MacLean	Date/Time: 3-8-2022 2:22PM	Received by:	Date/Time:
Printed Name: Jeff MacLean		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time: 3/8/22 1426
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 13.1 °C Thermometer ID: DW4 Total Containers: 11.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0376

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: SOC (Terrace Rd.)

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/21/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2C0376-01
Collected By: Client
Collection Date: 03/09/2022 9:08

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Volatile Organic Compounds by GC/ECD (SOC's)	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv. 1.1 (1995)								
1,2-Dibromo-3-chloropropane (DBCP)	<0.00994	0.2 MCL	0.00994	ug/L		03/11/22 1335	03/12/22 0239	ALG
1,2-Dibromoethane (Ethylene dibromide, EDB)	<0.00994	0.05 MCL	0.00994	ug/L		03/11/22 1335	03/12/22 0239	ALG
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	102	Limit: 70-130		% Rec		03/11/22 1335	03/12/22 0239	ALG

Herbicides by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv. 1 (1996)								
2,4-D	<0.100	70 MCL	0.100	ug/L		03/11/22 1253	03/14/22 1424	ALG
Dalapon	<1.00	200 MCL	1.00	ug/L		03/11/22 1253	03/14/22 1424	ALG
Dicamba [2C]	<0.100		0.100	ug/L		03/11/22 1253	03/14/22 1424	ALG
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	<0.200	7 MCL	0.200	ug/L		03/11/22 1253	03/14/22 1424	ALG
Pentachlorophenol	<0.0400	1 MCL	0.0400	ug/L		03/11/22 1253	03/14/22 1424	ALG
Picloram [2C]	<0.100	500 MCL	0.100	ug/L		03/11/22 1253	03/14/22 1424	ALG
2,4,5-TP (Silvex)	<0.200	50 MCL	0.200	ug/L		03/11/22 1253	03/14/22 1424	ALG
Surrogate: 2,4-Dichloropenylacetic acid	117	Limit: 70-130		% Rec		03/11/22 1253	03/14/22 1424	ALG
Surrogate: 2,4-Dichloropenylacetic acid [2C]	118	Limit: 70-130		% Rec		03/11/22 1253	03/14/22 1424	ALG

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv. 2.1 (1995)								
Chlordane (tech.)	<0.200	2 MCL	0.200	ug/L		03/11/22 1132	03/11/22 2031	ALG
Dieldrin	<0.0200	0.2 MCL	0.0200	ug/L		03/11/22 1132	03/11/22 2031	ALG
Endrin	<0.0100	2 MCL	0.0100	ug/L		03/11/22 1132	03/11/22 2031	ALG
Toxaphene	<1.00	3 MCL	1.00	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1016 (PCB-1016)	<0.0800		0.0800	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1221 (PCB-1221)	<20.0		20.0	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1232 (PCB-1232)	<0.500		0.500	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1242 (PCB-1242)	<0.300		0.300	ug/L		03/11/22 1132	03/11/22 2031	ALG

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0376

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0376-01	**Collection Date:**	03/09/2022 9:08

Pesticides and Polychlorinated Biphenyls (PCBs) by GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Aroclor-1248 (PCB-1248)	<0.100		0.100	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1254 (PCB-1254)	<0.100		0.100	ug/L		03/11/22 1132	03/11/22 2031	ALG
Aroclor-1260 (PCB-1260)	<0.200		0.200	ug/L		03/11/22 1132	03/11/22 2031	ALG
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	157	Limit: 70-130		% Rec	S1	03/11/22 1132	03/11/22 2031	ALG

Herbicides by HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv. 1 (2001)								
Aldicarb sulfoxide	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2210	RSD
Aldicarb sulfone	<0.800		0.800	ug/L		03/14/22 0720	03/14/22 2210	RSD
Oxamyl	<1.00	200 MCL	1.00	ug/L		03/14/22 0720	03/14/22 2210	RSD
Methomyl (Lannate)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2210	RSD
3-Hydroxycarbofuran	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2210	RSD
Aldicarb (Temik)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2210	RSD
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		03/14/22 0720	03/14/22 2210	RSD
Carbaryl (Sevin)	<0.500		0.500	ug/L		03/14/22 0720	03/14/22 2210	RSD
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	104	Limit: 70-130		% Rec		03/14/22 0720	03/14/22 2210	RSD

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 525.2, Rv. 2 (1995)								
Alachlor	<0.200	2 MCL	0.200	ug/L		03/14/22 0900	03/16/22 0048	ARM
Aldrin	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Atrazine	<0.100	3 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Benzo[a]pyrene	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0048	ARM
gamma-BHC (Lindane)	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0048	ARM
Butachlor	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
bis(2-Ethylhexyl)adipate	<0.600	400 MCL	0.600	ug/L		03/14/22 0900	03/16/22 0048	ARM
bis(2-Ethylhexyl)phthalate	<0.600	6 MCL	0.600	ug/L		03/14/22 0900	03/16/22 0048	ARM
Heptachlor	<0.040	0.4 MCL	0.040	ug/L		03/14/22 0900	03/16/22 0048	ARM
Heptachlor epoxide	<0.020	0.2 MCL	0.020	ug/L		03/14/22 0900	03/16/22 0048	ARM
Hexachlorobenzene	<0.100	1 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Hexachlorocyclopentadiene	<0.100	50 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Methoxychlor	<0.100	40 MCL	0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Metolachlor	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Metribuzin	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Propachlor (Ramrod)	<0.100		0.100	ug/L		03/14/22 0900	03/16/22 0048	ARM
Simazine	<0.070	4 MCL	0.070	ug/L		03/14/22 0900	03/16/22 0048	ARM
Surrogate: 1,3-Dimethyl-2-nitrobenzene	101	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0048	ARM
Surrogate: Pyrene-d10	113	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0048	ARM
Surrogate: Triphenyl phosphate	121	Limit: 70-130		% Rec		03/14/22 0900	03/16/22 0048	ARM

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0376

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0376-01	**Collection Date:**	03/09/2022 9:08

Semivolatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
S1:	Surrogate recovery is above acceptance limits.
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville

11549 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks

Customer Relationship Coordinator

Reported: 03/21/2022 15:30

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0376

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: SOC (Terrace Rd.)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2C0376-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-9-2022 908AM

Analysis	Method	Field Results/Comments	Hold Time
505 PEST PCB Group	NA		14.00 days
515 Cl Acids	EPA 515.3, Rv. 1 (1996)		14.00 days
531.2 Carbamates	EPA 531.2, Rv. 1 (2001)		28.00 days
505 PCB	EPA 505, Rv. 2.1 (1995)		14.00 days
505 PEST	EPA 505, Rv. 2.1 (1995)		14.00 days
525 SVOC STD	EPA 525.2, Rv. 2 (1995)		14.00 days
504.1 EDB DBCP	EPA 504.1, Rv. 1.1 (1995)		14.00 days

Container(s)	Designator
40ml-Vial-Na2S2O3	A
40ml-Vial-Na2S2O3	B
40ml-Vial-Na2S2O3	C
40ml-Vial-Na2S2O3	D
250ml-Bottle Glass Amber-Na2S2O3	E
1L-Bottle Glass Amber-Na2SO3, HCL	F
1L-Bottle Glass Amber-Na2SO3, HCL	G
40ml-Vial Amber-Na2S2O3, KDHP	H
40ml-Vial Amber-Na2S2O3, KDHP	I
40ml-Vial Amber-Na2S2O3, KDHP	J

Client Sample ID: Trip Blank
Lab Sample ID: J2C0376-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-9-2022 9:29AM

Analysis	Method	Field Results/Comments	Hold Time
504.1 EDB DBCP	EPA 504.1, Rv. 1.1 (1995)		14.00 days

Container(s)	Designator
40ml-Vial-Na2S2O3	A

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0376

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: SOC (Terrace Rd.)

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Relinquished by: Jeff MacLean	Date/Time: 3-9-2022 953AM	Received by: SWeeks	Date/Time: 3/9/22 953
Printed Name: Jeff MacLean		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 3.2 °C Thermometer ID: 014 Total Containers: 11.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0374

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: POC Terrace Rd.

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/21/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0374-01	**Collection Date:**	03/09/2022 9:16

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Volatile Organic Compounds by GCMS POC's	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995)								
Benzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Bromobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Bromochloromethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
n-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
tert-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
sec-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Carbon tetrachloride	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Chlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Chloroethane (Ethyl chloride)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
2-Chlorotoluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
4-Chlorotoluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Dibromomethane (Methylene bromide)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,4-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,3-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Dichlorodifluoromethane (Freon-12)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1-Dichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2-Dichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
I,1-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0374

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0374-01	**Collection Date:**	03/09/2022 9:16

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
cis-1,2-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
trans-1,2-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
2,2-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,3-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
cis-1,3-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
trans-1,3-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Ethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Hexachlorobutadiene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Isopropylbenzene (Cumene)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
4-Isopropyltoluene (p-Isopropyltoluene)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Methyl bromide (Bromomethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Methyl tert-butyl ether (MTBE)	<0.000500	0.0500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Methyl chloride (Chloromethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Methylene chloride (Dichloromethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Naphthalene	<0.000500	0.0500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
n-Propylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Styrene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1,2,2-Tetrachloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1,1,2-Tetrachloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Tetrachloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Toluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2,4-Trichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2,3-Trichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1,2-Trichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,1,1-Trichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0374

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0374-01	**Collection Date:**	03/09/2022 9:16

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Trichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Trichlorofluoromethane (Freon 11)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2,3-Trichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,3,5-Trimethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
1,2,4-Trimethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Vinyl chloride	<0.000500	0.00200 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
m,p-Xylene	<0.00100	0.00500 MCL	0.00100	mg/L		03/16/22 0459	03/16/22 1043	RJH
o-Xylene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1043	RJH
Xylenes (total)	<0.00150	0.00500 MCL	0.00150	mg/L		03/16/22 0459	03/16/22 1043	RJH
Surrogate: 4-Bromofluorobenzene	84.6	Limit: 70-130		% Rec		03/16/22 0459	03/16/22 1043	RJH
Surrogate: 1,2-Dichlorobenzene-d4	99.2	Limit: 70-130		% Rec		03/16/22 0459	03/16/22 1043	RJH

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc., Pittston Division
12150 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/21/2022 16:34

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0374

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: POC Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2C0374-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-9-2022 9:16 AM

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv. 4.1 (1995)		14.00 days
		Container(s)	Designator
		40ml-Vial-Ascorbic, HCL	A
		40ml-Vial-Ascorbic, HCL	B

Client Sample ID: Trip Blank
Lab Sample ID: J2C0374-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: _____

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv. 4.1 (1995)		14.00 days
		Container(s)	Designator
		40ml-Vial-Ascorbic, HCL	A

Relinquished by: Jeff MacLean	Date/Time:	Received by: S Weeks	Date/Time: 3-9-22 953
Printed Name: Jeff MacLean		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 3.2 °C Thermometer ID: DH Total Containers: 3.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0373

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: POC Lime Hollow

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/21/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0373-01	**Collection Date:**	03/08/2022 14:01

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 524.2, Rv. 4.1 (1995) VOC POC's								
Benzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Bromobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Bromochloromethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
n-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
tert-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
sec-Butylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Carbon tetrachloride	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Chlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Chloroethane (Ethyl chloride)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
2-Chlorotoluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
4-Chlorotoluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Dibromomethane (Methylene bromide)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,4-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,3-Dichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Dichlorodifluoromethane (Freon-12)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1-Dichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2-Dichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH

CERTIFICATE OF ANALYSIS

J2C0373

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0373-01	**Collection Date:**	03/08/2022 14:01

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
cis-1,2-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
trans-1,2-Dichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
2,2-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,3-Dichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
cis-1,3-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
trans-1,3-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1-Dichloropropene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Ethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Hexachlorobutadiene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
sopropylbenzene (Cumene)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
4-Isopropyltoluene (p-Isopropyltoluene)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Methyl bromide (Bromomethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Methyl tert-butyl ether (MTBE)	<0.000500	0.0500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Methyl chloride (Chloromethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Methylene chloride (Dichloromethane)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Naphthalene	<0.000500	0.0500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
n-Propylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Styrene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1,2,2-Tetrachloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1,1,2-Tetrachloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Tetrachloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Toluene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2,4-Trichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2,3-Trichlorobenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,1,2-Trichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
,1,1-Trichloroethane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0373

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0373-01	**Collection Date:**	03/08/2022 14:01

Volatile Organic Compounds by GCMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Trichloroethene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Trichlorofluoromethane (Freon 11)	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2,3-Trichloropropane	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,3,5-Trimethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
1,2,4-Trimethylbenzene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Vinyl chloride	<0.000500	0.00200 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
m,p-Xylene	<0.00100	0.00500 MCL	0.00100	mg/L		03/16/22 0459	03/16/22 1517	RJH
o-Xylene	<0.000500	0.00500 MCL	0.000500	mg/L		03/16/22 0459	03/16/22 1517	RJH
Xylenes (total)	<0.00150	0.00500 MCL	0.00150	mg/L		03/16/22 0459	03/16/22 1517	RJH
Surrogate: 4-Bromofluorobenzene	83.4	Limit: 70-130		% Rec		03/16/22 0459	03/16/22 1517	RJH
Surrogate: 1,2-Dichlorobenzene-d4	91.6	Limit: 70-130		% Rec		03/16/22 0459	03/16/22 1517	RJH

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
ug/L:	Micrograms per Liter

Project Requested Certification(s)

Microbac Laboratories, Inc., Pittston Division
12150 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/21/2022 16:34

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0373

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: POC Lime Hollow

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2C0373-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022 2:01 PM

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv. 4.1 (1995)	Container(s) 40ml-Vial-Ascorbic, HCL 40ml-Vial-Ascorbic, HCL	14.00 days Designator A B

Client Sample ID: Trip Blank
Lab Sample ID: J2C0373-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022

Analysis	Method	Field Results/Comments	Hold Time
524.2 VOC NY	EPA 524.2, Rv. 4.1 (1995)	Container(s) 40ml-Vial-Ascorbic, HCL	14.00 days Designator A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-8-2022 2:29PM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	3/8/22 1428
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 16.3 °C Thermometer ID: 044 Total Containers: 3.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0370

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Nitrates Terrace Rd.

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/15/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0370-01	**Collection Date:**	03/09/2022 9:05

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv. 2 (1993)								
Nitrate as N (Calc)	1.83		0.0500	mg/L		03/11/22 0820	03/11/22 1055	EDP

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv. 2 (1993)								
Nitrate-Nitrite as N	1.83	10.0 MCL	0.0500	mg/L		03/11/22 0820	03/11/22 1055	EDP
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		03/10/22 0830	03/10/22 1657	EDP

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., Pittston Division
12150 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/15/2022 16:37

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0370

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Nitrates Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2C0370-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-9-2022 9:05 AM

Analysis	Method	Field Results/Comments	Hold Time
NO3 EPA Group	NA		2.00 days
		Container(s)	Designator
		250ml-Bottle HDPE	A
		250ml-Bottle HDPE-H2SO4	B

Relinquished by: Jeff MacLean	Date/Time: 3-9-2022 952 AM	Received by:	Date/Time: 9/9/22 953
Printed Name: Jeff MacLean		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 3.2 °C Thermometer ID: OH Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0369

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Nitrates Lime Hollow

Project / PO Number: N/A
Received: 03/08/2022
Reported: 03/15/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0369-01	**Collection Date:**	03/08/2022 13:44

Analyses Performed by: Microbac Laboratories, Inc., Pittston Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 353.2, Rv. 2 (1993)								
Nitrate as N (Calc)	2.19		0.0500	mg/L		03/09/22 1400	03/09/22 1803	EDP
Nitrate-Nitrite as N	2.19	10.0 MCL	0.0500	mg/L		03/09/22 1400	03/09/22 1803	KHP
Nitrite as N	<0.0250	1.00 MCL	0.0250	mg/L		03/09/22 1400	03/09/22 1555	EDP

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., Pittston Division
12150 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/15/2022 14:25

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0369

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Nitrates Lime Hollow

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2C0369-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022 1:44 PM

Analysis	Method	Field Results/Comments	Hold Time
NO3 EPA Group	NA		2.00 days
		Container(s)	Designator
		250ml-Bottle HDPE	A
		250ml-Bottle HDPE-H2SO4	B

Relinquished by: Jeff MacLean	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-8-2022 2:27 PM	Printed Name:	
elinquished by:	Date/Time:	Received by:	Date/Time:
inted Name:		Printed Name: Amber L	3/3/22 1426
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 0.4 °C IR Thermometer ID: 044 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0399

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Chloride Lime Hollow

Project / PO Number: N/A
Received: 03/08/2022
Reported: 03/21/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0399-01	**Collection Date:**	03/08/2022 13:41

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 300.0, Rv. 2.1 (1993)								
Chloride	45.7	250	0.50	mg/L	**A2, M2**		03/15/22 1053	BAC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

A2:	Sample was not received on ice.
M2:	Matrix spike recovery is below acceptance limits.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
SMCL:	US EPA Secondary Maximum Contaminant Level

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division
10121 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/21/2022 15:29

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0399

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Chloride Lime Hollow

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2C0399-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022 1:41 PM

Analysis	Method	Field Results/Comments	Hold Time
Chloride EPA300	EPA 300.0, Rv. 2.1 (1993)	Container(s): 120ml-Bottle HDPE	28.00 days Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-8-2022 2:26 PM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name: Amber Scott	3/8/22 1426
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 13.8 °C Thermometer ID: 044 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0400

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Chloride Terrace Rd.

Project / PO Number: N/A
Received: 03/09/2022
Reported: 03/14/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2C0400-01	**Collection Date:**	03/09/2022 9:04

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Inorganics Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 300.0, Rv. 2.1 (1993)								
Chloride	86.7	250	2.50	mg/L			03/10/22 1340	BAC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
SMCL:	US EPA Secondary Maximum Contaminant Level

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division
10121 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/14/2022 09:25

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2C0400

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Chloride Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 3/7/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2C0400-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-9-2022 9:04 Am

Analysis	Method	Field Results/Comments	Hold Time
Chloride EPA300	EPA 300.0, Rv. 2.1 (1993)	Container(s): 250ml-Bottle HDPE	28.00 days Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-9-2022 9:53 Am	Printed Name:	3/9/22 1653
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 13.2 °C Thermometer ID: 044 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2D0042

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Sodium Lime Hollow

Project / PO Number: N/A
Received: 03/08/2022
Reported: 03/29/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Lime Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2D0042-01	**Collection Date:**	03/08/2022 13:43

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	18.6		0.200	mg/L		03/14/22 1418	03/14/22 1418	SEA

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division
10121 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/29/2022 14:08

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2D0042

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Sodium Lime Hollow

Project/PO Number: N/A
Tenatively Scheduled: 4/4/2022
Route:

Client Sample ID: Lime Hollow
Lab Sample ID: J2D0042-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 3-8-2022 1:43 PM

Analysis	Method	Field Results/Comments	Hold Time
200.7 Na	EPA 200.7, Rv. 4.4 (1994)	Container(s): 500ml-Bottle HDPE-HNO3	180.00 days Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	3-8-2022 2:26 PM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
nted Name:		Printed Name:	3/8/22 1426
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 13.4 °C Thermometer ID: C44 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0565

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/10/2022
Reported: 01/19/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J2A0565-01
Collected By: Client
Collection Date: 01/10/2022 9:04

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	68.0		1.00	mg/L		01/13/22 1332	01/14/22 1445	DLO

1ST Quarter

Client Sample ID: Red Apple Rte. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2A0565-02
Collected By: Client
Collection Date: 01/10/2022 9:17

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG
Escherichia coli	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/10/22 0917	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0565

Client Sample ID:	Cortlandville Highway Garage Rte. 41 Polkville	**Collected By:**	Client
Sample Matrix:	Drinking Water	**Collection Date:**	01/10/2022 10:26
Lab Sample ID:	J2A0565-03		

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG
Escherichia coli	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		01/10/22 1026	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

nitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 01/19/2022 11:04

Annual Water Samples Misc.

Samples taken for Baseline Data in preparation for Cuille mining.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
Empire State Plaza
Albany, NY 12237-0012
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS2100080274-SR-1**
Report Date: **08/16/2021**
Report retrieved via NYSDOH Health Commerce System by hinmxr26 on 08/16/2021

REQUESTED BY: DIRECTOR-CEHBWSP

DIRECTOR'S OFFICE
BUREAU OF WATER SUPPLY PROTECTION
ROOM 1110
CORNING TOWER - EMPIRE STATE PLAZA
ALBANY NY 12237

Public Water Systems (BWSP)

County: CORTLAND
City (or) Town: CORTLANDVILLE
Submitted by: MIKE YOUNG
Collected by: MIKE YOUNG

Grab/Collection Date: 08/05/2021 08:20
Date received: 08/06/2021 10:20

Location/Project/Facility Name: NY1101755, CORTLANDVILLE TOWN WATER - CORTLANDVILLE (T)
Sampling Location Details: LIMEHOLLOW WELL 2
Chlorinated: No

[redacted]

Biggs Laboratory
NYS ELAP ID: 10765

Environmental Biology Laboratory
Lab Director: Dr. Theresa K. Hattenrath
518-473-0649
Contact: Christine Minihane 518-474-4192

Sample Id: EHS2100080274-01

Sample Type: Raw Water

Microscopic Examination for Microorganisms

Analysis Date: 08/11/21 15:45

Volume of Sample Settled: **10000 mL**

Organisms Identified in Settled Sample: **Iron Bacteria - Gallionella sp.**

Algae are defined as (Phylum) Genus species, if possible
+ Indicates genera may be associated with taste/odor problems
sp. or spp. for species indicates identification only to genus

NOTES:

[1] No chlorophyll-containing organisms observed.
Results were reported to the Central NY RO on August 12, 2021 at 4:00 p.m.

[redacted]

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
Empire State Plaza
Albany, NY 12237-0012
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS2100080276-SR-1**

Report Date: **08/16/2021**

Report retrieved via NYSDOH Health Commerce System by hinmxr26 on 08/16/2021

REQUESTED BY: DIRECTOR-CEHBWSP

DIRECTOR'S OFFICE
BUREAU OF WATER SUPPLY PROTECTION
ROOM 1110
CORNING TOWER - EMPIRE STATE PLAZA
ALBANY NY 12237

Public Water Systems (BWSP)

County: CORTLAND
City (or) Town: CORTLANDVILLE
Submitted by: MIKE YOUNG
Collected by: MIKE YOUNG

Grab/Collection Date: 08/05/2021 08:40
Date received: 08/06/2021 10:20

Location/Project/Facility Name: NY1101755, CORTLANDVILLE TOWN WATER - CORTLANDVILLE (T)
Sampling Location Details: LIMEHOLLOW WELL 7
Chlorinated: No

[redacted]

Biggs Laboratory
NYS ELAP ID: 10765

Environmental Biology Laboratory
Lab Director: Dr. Theresa K. Hattenrath
518-473-0649
Contact: Christine Minihane 518-474-4192

Sample Id: EHS2100080276-01

Sample Type: Raw Water

Microscopic Examination for Microorganisms

Analysis Date: 08/11/21 15:00

Volume of Sample Settled: **10000 mL**

Organisms Identified in Settled Sample: **Iron Bacteria - Gallionella sp.**

Algae are defined as (Phylum) Genus species, if possible
+ Indicates genera may be associated with taste/odor problems
sp. or spp. for species indicates identification only to genus

NOTES:

[1] No chlorophyll-containing organisms were observed.
Results were reported to the Central NY RO on August 12, 2021 at 4:00 p.m.

[redacted]

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
Empire State Plaza
Albany, NY 12237-0012
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS2100080274-SR-1**

Report Date: **08/16/2021**

Report retrieved via NYSDOH Health Commerce System by hinmxr26 on 08/16/2021

REQUESTED BY: DIRECTOR-CEHBWSP

DIRECTOR'S OFFICE
BUREAU OF WATER SUPPLY PROTECTION
ROOM 1110
CORNING TOWER - EMPIRE STATE PLAZA
ALBANY NY 12237

Public Water Systems (BWSP)

County: CORTLAND
City (or) Town: CORTLANDVILLE
Submitted by: MIKE YOUNG
Collected by: MIKE YOUNG

Grab/Collection Date: 08/05/2021 08:20
Date received: 08/06/2021 10:20

Location/Project/Facility Name: NY1101755, CORTLANDVILLE TOWN WATER - CORTLANDVILLE (T)
Sampling Location Details: LIMEHOLLOW WELL 2
Chlorinated: No

[redacted]

Biggs Laboratory
NYS ELAP ID: 10765

Environmental Biology Laboratory
Lab Director: Dr. Theresa K. Hattenrath
518-473-0649
Contact: Christine Minihane 518-474-4192

Sample Id: EHS2100080274-01

Sample Type: Raw Water

Microscopic Examination for Microorganisms

Analysis Date: 08/11/21 15:45

Volume of Sample Settled: **10000 mL**

Organisms Identified in Settled Sample: **Iron Bacteria - Gallionella sp.**

Algae are defined as (Phylum) Genus species, if possible
+ Indicates genera may be associated with taste/odor problems
sp. or spp. for species indicates identification only to genus

NOTES:

[1] No chlorophyll-containing organisms observed.
Results were reported to the Central NY RO on August 12, 2021 at 4:00 p.m.

[redacted]

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
Empire State Plaza
Albany, NY 12237-0012
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS2100080276-SR-1**

Report Date: **08/16/2021**

Report retrieved via NYSDOH Health Commerce System by hinmxr26 on 08/16/2021

REQUESTED BY: DIRECTOR-CEHBWSP

DIRECTOR'S OFFICE
BUREAU OF WATER SUPPLY PROTECTION
ROOM 1110
CORNING TOWER - EMPIRE STATE PLAZA
ALBANY NY 12237

Public Water Systems (BWSP)

County: CORTLAND
City (or) Town: CORTLANDVILLE
Submitted by: MIKE YOUNG
Collected by: MIKE YOUNG

Grab/Collection Date: 08/05/2021 08:40
Date received: 08/06/2021 10:20

Location/Project/Facility Name: NY1101755, CORTLANDVILLE TOWN WATER - CORTLANDVILLE (T)
Sampling Location Details: LIMEHOLLOW WELL 7
Chlorinated: No

[redacted]

Biggs Laboratory
NYS ELAP ID: 10765

Environmental Biology Laboratory
Lab Director: Dr. Theresa K. Hattenrath
518-473-0649
Contact: Christine Minihane 518-474-4192

Sample Id: EHS2100080276-01

Sample Type: Raw Water

Microscopic Examination for Microorganisms

Analysis Date: 08/11/21 15:00

Volume of Sample Settled: **10000 mL**

Organisms Identified in Settled Sample: **Iron Bacteria - Gallionella sp.**

Algae are defined as (Phylum) Genus species, if possible
+ Indicates genera may be associated with taste/odor problems
sp. or spp. for species indicates identification only to genus

NOTES:

[1] No chlorophyll-containing organisms were observed.
Results were reported to the Central NY RO on August 12, 2021 at 4:00 p.m.

[redacted]

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

MI[illegible]AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162[illegible] [illegible]ain Avenue
Scra[illegible], PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC[illegible]

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 18.0
Therm ID CU4
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Disinfection By products/stage 2
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2	531.2								Additional Notes
	Walden Oaks BS	7-8-2021	635 ~~639~~	2	DW	2	Na2S2O3	2									
	" " "	7-8-2021	637+639	3	DW	3	Sodium Thios Potassium Citrate		3								
	1303 Fisher AVE	7-8-2021	725 AM	2	DW	2	Na2S2O3	2									
	" " "	7-8-2021	726+728	3	DW	3	Sodium thios Potassium Citrate		3								

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments
Microbac lost These - They called on 7/21/21 To inform us we had To Take again - Notified Phyllis CCHD.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-8-2021 750 AM	[signature]	7/8/21 7:51

rev.12/26/2017

Page ____ of ____

MICR. AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible] ain Avenue
Scran[illegible] A 18508
570.34[illegible] 75

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC[illegible]
Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

b Report Address
lient Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Project: Disinfection BY products/Stage 2

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

Sampled by (PRINT): Jeff MacLean

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

**Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	524.2 THM	552.2 HAA								Additional Notes
	Walden Oaks BS	7-21-2021	9:55 AM	2	DW	2	Sodium Thiosulfate	2									
	" " "	7-21-2021	9:56-959 AM	3	DW	3	Ammonium Chloride		3								
	1303 Fisher AVE	7-21-2021	10:26 AM	2	DW	2	Sodium Thiosulfate	2									
	1303 Fisher AVE	7-21-2021	10:28-1030 AM	3	DW	3	Ammonium Chloride		3								

ossible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

omments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-21-2021 10:55 AM	[signature]	7/21/21 1050
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

12/26/2017

Pete Alteri

From: Phyllis E. Guest <peguest@cortland-co.org>
Sent: Thursday, December 19, 2019 1:28 PM
To: Pete Alteri
Subject: RE: Annual Samples

Pete,
The only thing I see that we do not have results for is Raiological samples. Please sample or submit results to us.
Thanks,

Phyllis Guest
Public Health Sanitarian
Cortland County Heath Dept.
60 Central Ave, Room #120
Cortland, NY 13045
Phone: 607-753-5035
Fax: 607-758-5578
peguest@cortland-co.org

Public Health
Prevent. Promote. Protect.
Cortland County Health Department

From: Pete Alteri [mailto:palteri@cortlandville.org]
Sent: Friday, December 06, 2019 6:11 AM
To: Phyllis E. Guest
Subject: Annual Samples

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Good Morning Phyllis,
When you get a chance, could you look through our annual samples and let me know
If I have missed any for 2019? We just took our last sodium sample.

Thank you.
Pete Alteri Jr.

This email, including attachments, may include confidential and/or proprietary information and is intended for persons sent to only. If the reader of this email is not the intended recipient or his or her authorized agent, the reader is hereby notified that any dissemination, distribution, or copying of this email is prohibited. If you have received this email in error, please notify the sender by replying to this message and deleting this email immediately.

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 01/31/2019

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IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Willis of Pennsylvania, Inc. c/o 26 Century Blvd P.O. Box 305191 Nashville, TN 372305191 USA	CONTACT NAME: PHONE (A/C, No, Ext): 1-877-945-7378 FAX (A/C, No): 1-888-467-2378 E-MAIL ADDRESS: certificates@willis.com
INSURED Microbac Laboratories, Inc. One Allegheny Square, Suite 400 Pittsburgh, PA 152125325	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A: Travelers Casualty and Surety Company of A — 31194 INSURER B: Phoenix Insurance Company — 25623 INSURER C: Travelers Casualty Insurance Company of Am — 19046 INSURER D: INSURER E: INSURER F:

COVERAGES **CERTIFICATE NUMBER:** W10024905 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR X Contractual Liab. X XCU GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [X] LOC OTHER:			P-630 3L071630-18	10/01/2018	10/01/2019	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 1,000,000 $ 1,000,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY			810-3L084428-18-43-G	10/01/2018	10/01/2019	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
A	X UMBRELLA LIAB [X] OCCUR EXCESS LIAB CLAIMS-MADE DED [X] RETENTION $ 0			CUP 3L121871	10/01/2018	10/01/2019	EACH OCCURRENCE AGGREGATE $	$ 10,000,000 $ 10,000,000 $
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N No (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		UB-3L082379-18-43-G	10/01/2018	10/01/2019	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Division/Location: Cortland NY or New York Division.

RECEIVED
FEB - 1 2019
CORTLANDVILLE TOWN CLERK'S OFFICE

CERTIFICATE HOLDER

Town of Cortlandville
3577 Terrace Road
Cortland, NY 13045

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Copper and Lead Testing

Copper and Lead Testing 2019

2019 Lead Testing Results

Sample	Results mg/l	Sampling Site
1	0.0010	Allen Dr 3673
2	0.0010	Allen Dr 3644
3	0.0010	Delaware 3694
4	0.0010	N Lamont Circle 838
5	0.0010	Glenwood Ave 3635
6	0.0010	Isabel Dr 1228
7	0.0010	Rural Ave 3994
8	0.0010	Allen Dr 3704
9	0.0010	N Lamont Circle 822
10	0.0010	Isabel Dr 1254
11	0.0011	Starr Rd 1318
12	0.0012	Starr Rd 1285
13	0.0013	SleepyHollow 776
14	0.0013	Starr Rd 1278
15	0.0013	Starr Rd 1240
16	0.0014	Fairview Dr 3636
17	0.0021	Meadow Lane 4361
18	**0.0024**	**Bowling Green 730**
19	0.0053	E River Rd 1385
20	0.0060	Bowling Green 748

System Name: Cortlandville Town Water **Federal ID #:** NY1101755
Address: 3577 Terrace Road Cortland, New York 13045
Phone: 607-756-9637 **Fax:** 607-758-9637 **System Size:** 3,301 – 10,000
Contact Person: Peter Alteri Jr. **Sampling Month:** June **# Samples Required:** 20
90th Percentile level:
Lead: 0.0024mg/l

2019 Copper Testing Results

Sample	Results mg/l	Sampling Site
1	0.016	Glenwood Ave 3635
2	0.020	Allen Dr 3644
3	0.025	Delaware 3694
4	0.040	Starr Rd 1285
5	0.044	Fairview Dr 3636
6	0.057	SleepyHollow 776
7	0.058	N Lamont Circle 838
8	0.062	Rural Ave 3994
9	0.062	Bowling Green 730
10	0.064	Allen Dr 3673
11	0.064	Bowling Green 748
12	0.067	Isabel Dr 1254
13	0.068	Allen Dr 3704
14	0.070	Starr Rd 1240
15	0.080	Starr Rd 1278
16	0.085	Starr Rd 1318
17	0.089	N Lamont Circle 822
18	**0.099**	**Meadow Lane 4361**
19	0.107	Isabel Dr 1228
20	0.172	E River Rd 1385

System Name: Cortlandville Town Water **Federal ID #:** NY1101755
Address: 3577 Terrace Road Cortland, New York 13045
Phone: 607-756-9637 **Fax:** 607-758-9637 **System Size:** 3,301 – 10,000
Contact Person: Peter Alteri Jr. **Sampling Month:** June **# Samples Required**: 20
90th Percentile level:
Copper: 0.099 mg/l

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0599

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Lead & Copper

Project / PO Number: N/A
Received: 06/07/2019
Reported: 06/14/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	776 Sleepy Hollow		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0599-01	**Collection Date:**	06/07/2019 11:36

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0566	1.30 AL	0.0010	mg/L		06/13/19 1452	06/13/19 1705	DLO
Lead	0.0013	0.0150 AL	0.0010	mg/L		06/13/19 1452	06/13/19 1705	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

AL:	US EPA Action Level
RL:	Reporting Limit
SMCL:	US EPA Secondary Maximum Contaminant Level

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Chris Long
Director
Reported: 06/14/2019 17:49

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0400

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Lead + Copper Test

Project / PO Number: N/A
Received: 06/05/2019
Reported: 06/14/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 3644 Allen Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-01
Collected By: HO
Collection Date: 06/05/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0199	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1730	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1730	DLO

Client Sample ID: 3673 Allen Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-02
Collected By: HO
Collection Date: 06/05/2019 7:19

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0636	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1735	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1735	DLO

Client Sample ID: 3704 Allen Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-03
Collected By: HO
Collection Date: 06/05/2019 5:30

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0683	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1737	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1737	DLO

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0400

Client Sample ID:	1385 East River Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-04	**Collection Date:**	06/05/2019 5:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.172	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1739	DLO
Lead	0.0053	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1739	DLO

Client Sample ID:	730 Bowling Green		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-05	**Collection Date:**	06/05/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0619	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1741	DLO
Lead	0.0024	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1741	DLO

Client Sample ID:	748 Bowling Green		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-06	**Collection Date:**	06/05/2019 7:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0636	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1743	DLO
Lead	0.0060	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1743	DLO

Client Sample ID:	3694 Delaware		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-07	**Collection Date:**	06/05/2019 5:30

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0250	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1748	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1748	DLO

CERTIFICATE OF ANALYSIS

J9F0400

Client Sample ID: 3636 Farview Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-08
Collected By: HO
Collection Date: 06/05/2019 7:15

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0435	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1750	DLO
Lead	0.0014	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1750	DLO

Client Sample ID: 3635 Glenwood
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-09
Collected By: HO
Collection Date: 06/05/2019 7:15

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0161	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1752	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1752	DLO

Client Sample ID: 3994 Rual Ave.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-10
Collected By: HO
Collection Date: 06/05/2019 8:08

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0617	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1754	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1754	DLO

Client Sample ID: 1254 Isabel Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0400-11
Collected By: HO
Collection Date: 06/05/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0670	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1756	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1756	DLO

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0400

Client Sample ID:	4361 Meadow Ln		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-12	**Collection Date:**	06/05/2019 6:25

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0990	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1759	DLO
Lead	0.0021	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1759	DLO

Client Sample ID:	822 N.Lamont Circle		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-13	**Collection Date:**	06/05/2019 5:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0885	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1801	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1801	DLO

Client Sample ID:	1240 Starr Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-14	**Collection Date:**	06/05/2019 8:30

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0700	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1803	DLO
Lead	0.0013	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1803	DLO

Client Sample ID:	1278 Starr Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-15	**Collection Date:**	06/05/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0795	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1805	DLO
Lead	0.0013	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1805	DLO

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0400

Client Sample ID:	1285 Starr Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-16	**Collection Date:**	06/05/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0396	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1811	DLO
Lead	0.0012	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1811	DLO

Client Sample ID:	1318 Starr Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	HO
Lab Sample ID:	J9F0400-17	**Collection Date:**	06/05/2019 8:30

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0851	1.30 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1812	DLO
Lead	0.0011	0.0150 AL	0.0010	mg/L		06/11/19 1314	06/11/19 1812	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

AL:	US EPA Action Level
RL:	Reporting Limit
SMCL:	US EPA Secondary Maximum Contaminant Level

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Chris Long

Director

Reported: 06/14/2019 17:54

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0445

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Lead + Copper Test

Project / PO Number: N/A
Received: 06/06/2019
Reported: 06/14/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 1228 Isabel Dr.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0445-01
Collected By: HO
Collection Date: 06/05/2019 18:58

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.107	1.30 AL	0.0010	mg/L		06/11/19 1058	06/11/19 1512	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1058	06/11/19 1512	DLO

Client Sample ID: ~~730~~ 830 N.Lamont
Sample Matrix: Drinking Water
Lab Sample ID: J9F0445-02
Collected By: HO
Collection Date: 06/06/2019 6:00

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total - ICP/MS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4								
Copper	0.0575	1.30 AL	0.0010	mg/L		06/11/19 1058	06/11/19 1518	DLO
Lead	<0.0010	0.0150 AL	0.0010	mg/L		06/11/19 1058	06/11/19 1518	DLO

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

AL: US EPA Action Level
RL: Reporting Limit
SMCL: US EPA Secondary Maximum Contaminant Level

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0445

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Chris Long

Director

Reported: 06/14/2019 17:53

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N. ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 19.6
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Lead & Copper Test
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): ~~DOR~~ Homeowner
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Homeowner Sampled

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Lead & Copper											Additio
	1228 Isabel DR	6-5-19	658 PM	1	DW	1	None	1											
	~~730~~ 830 N. Lamont	6-6-19	600 AM	1	DW	1	"	1											

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
JM McLean	6-6-19 856 AM	Dorothy Nashdell	6-6-19 8:56am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Cortlandville Water, Town of

Page 3 of 3

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
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1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 22.9

Therm ID

Holding Time

Samples Received on Ice? Yes (No) N/A

Custody Seals Intact? Yes (No) N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Lead & Copper Test

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):

Sampler Signature:

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Home owner Sampled)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Lead & Copper	Additional
	1254 Isabel DR	6-5-19	600 AM	1	DW	G	None	1	
	4361 Meadow LN	6-5-19	625 AM	1	"	G	"	1	
	822 N. Lamont Circle	6-5-19	500 AM	1	"	G	"	1	
	1240 STARR Rd	6-5-19	830 AM	1	"	G	"	1	
	1278 STARR Rd	6-5-19	600 AM	1	"	G	"	1	
	1285 STARR Rd	6-5-19	600 AM	1	"	G	"	1	
	1318 STARR Rd	6-5-19	830 AM	1	"	G	"	1	

Cortlandville Water, Town of

J9F040000

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [X] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-5-19 12:00 PM	Amber Schuff	6/5 12:00
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page of

MICROBAC

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4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 22.9
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Project: Lead & Copper Test
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Home Owner Sampled

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Lead & Copper	Additional
	3644 ALLEN DR.	6-5-19	600 AM	1	DW	G	None	1	
	3673 ALLEN DR.	6-5-19	719 AM	1	"	G	"	1	
	3704 ALLEN DR.	6-5-19	530 AM	1	"	G	"	1	
	1385 EAST RIVER Rd.	6-5-19	500 AM	1	"	G	"	1	
	730 Bowling Green	6-5-19	600 AM	1	"	G	"	1	
	748 Bowling Green	6-5-19	700 AM	1	"	G	"	1	
	3694 Delaware	6-5-19	530 AM	1	"	G	"	1	
	3636 Fairview DR.	6-5-19	715 AM	1	"	G	"	1	
	3635 Glenwood	6-5-19	715 AM	1	"	G	"	1	
	3994 Rual AVE.	6-5-19	8:08 AM	1	"	G	"	1	

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature) Jeff MacLean Date/Time 6-5-19 1200 PM
Relinquished By (signature) Date/Time
Relinquished By (signature) Date/Time

Received By (signature) Amber Date/Time 6/5/19 12:00
Received By (signature) Date/Time
Received By (signature) Date/Time

Page of

Cortlandville Water, Town of

J9F0400

Page 6 of 7

MICROBAC

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1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 26.0
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Lead + Copper Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Home Owner
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Lead + Copper	Add
	Home owner								
	776 Sleepy Hollow	6-7-19	1136 AM	1	DW	1	None	1	

Cortlandville Water, Town of

J9F0599

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive
Comments

Relinquished By (signature)	Date/Time 6-7-19 303PM	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time 6-7-19 15:03
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page 2 of 2

Page of

Copper and Lead Testing 2020-2022

2022 Copper Testing Results

Sample #	Sampleing Site	Copper Results mg/l
1	838 N. Lamont Circle	0.0217
2	3694 Delaware Ave	0.023
3	1254 Isabel Dr	0.0343
4	1285 Starr Rd	0.0363
5	1318 Starr Rd	0.0371
6	3635 Glennwood Ave	0.0484
7	748 Bowling Green	0.0514
8	730 Bowling Green	0.0571
9	3636 Fairview Dr.	0.0584
10	3673 Allen Dr.	0.0717
11	3704 Allen Dr.	0.0721
12	3994 Rural Ave.	0.0738
13	3664 Allen Dr.	0.0746
14	4361 Meadow Lane	0.0773
15	1278 Starr Rd	0.0793
16	1228 Isabel Dr.	0.08
17	776 Sleepy Hollow Rd	0.0812
18	1240 Starr Rd	0.0963
19	1385 E. River Rd	0.104
20	822 N. Lamont Circle	0.113

System Name: Town of Cortlandville **Federal ID #** NY1101755
Address: 3577 Terrace Rd Cortland, NY 13045
Phone: 607-756-7637 **Fax:** 607-758-9637 **System Size:** 3,301-10,000
Contact Person: Brian R. Congdon **Sampling Month:** July **# Samples Required:** 20
90th Percentile Level:
Copper: 0.0963

2022 Lead Testing Results

Sample #	Sampleing Site	Lead Results mg/l
1	3644 Allen Dr	0.001
2	3673 Allen Dr	0.001
3	3704 Allen Dr	0.001
4	748 Bowling Green	0.001
5	3694 Delaware Ave	0.001
6	3636 Fairview Dr.	0.001
7	3635 Glennwood Ave	0.001
8	3994 Rural Ave	0.001
9	1254 Isabel Dr	0.001
10	1228 Isabel Dr	0.001
11	822 N. Lamont Circle	0.001
12	838 N. Lamont Circle	0.001
13	776 Sleepy Hollow Rd	0.001
14	1278 Starr Rd	0.001
15	1285 Starr Rd	0.001
16	1318 Starr Rd	0.001
17	730 Bowling Green	0.0019
18	1240 Starr Rd	0.0022
19	4361 Meadow Lane	0.0027
20	1385 E. River Rd	0.0036

System Name: Town of Cortlandville **Federal ID #** NY1101755
Address: 3577 Terrace Rd Cortland, NY 13045
Phone: 607-756-7637 **Fax:** 607-758-9637 **System Size:** 3,301-10,000
Contact Person: Brian R. Congdon **Sampling Month:** July **# Samples Required:** 20
90th Percentile Level:
Lead: 0.0022

2020 Lead / Copper Sampling sites:

1. Allen Drive 3644 Current Resident (Paul Dennis)
2. Allen Drive (18) 3673 Current Resident (Harry Reddick)
3. Allen Drive 3704 (Jeremy Mowers)
4. East River Rd 1385 (Coles Williams)
5. Bowling Green 730 (Eugene Zylinski)
6. Bowling Green (748 ~~Robert~~ Russell) Rosanne
7. Delaware 3694 (David Hobart)
8. Fairview Drive 3636 Current Resident (Gene Craig)
9. Glenwood 3635 (John Marvin)
10. Rural Ave 3994 (Alexis Brown)
11. Isabel Drive 1254 (Kenneth Munro)
12. Isabel Drive 1228 (Heather Peterson)
13. Meadow Lane 4361 (Michael Biviano)
14. N. Lamont Circle 822 (Ilse Beebe)
15. N. Lamont Circle 838 /730 (April Congdon & Michele Harder)
16. Sleepy-Hollow Road 776 (John Banas)
17. Starr Road 1240 (John Buttino)
18. Starr Road 1278 (Jim Oros)
19. Starr Road 1285 (Irene King)
20. Starr Road 1318 (Joseph Ferro)

7-13-2022

2022

~~2019~~ Lead / Copper Sampling sites:

		Out	IN
1. Allen Drive 3644 Current Resident	(Paul Dennis)	✓	✓
2. Allen Drive (18) 3673 Current Resident	(Harry Reddick)	✓	✓
No paperwork 3. Allen Drive 3704	(Jeremy Mowers)	✓	✓
4. East River Rd 1385	(Coles Williams)	✓	✓
5. Bowling Green 730	(Eugene Zylinski)	✓	✓
6. Bowling Green	(748 ~~Robert~~ Russell) Rosanne	✓	✓
7. Delaware 3694	(David Hobart)	✓	✓
8. Fairview Drive 3636 Current Resident	(Gene Craig)	✓	✓
9. Glenwood 3635	(John Marvin)	✓	✓
10. Rural Ave 3994	(Alexis Brown)	✓	✓
11. Isabel Drive 1254	(Kenneth Munro)	✓	✓
12. Isabel Drive 1228	(Heather Peterson)	✓	✓
1:20 PM 13. Meadow Lane 4361	(Michael Biviano)	✓	✓
14. N. Lamont Circle 822	(Ilse Beebe)	✓	✓
15. N. Lamont Circle 838 /730	(April Congdon & Michele Harder)	✓	✓
16. Sleepy-Hollow Road 776	(John Banas)	✓	✓
17. Starr Road 1240	(John Buttino)	✓	✓
18. Starr Road 1278	(Jim Oros)	✓	✓
19. Starr Road 1285	(Irene King)	✓	✓
20. Starr Road 1318	(Joseph Ferro)	✓	✓

MICR .C^ | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 1620 N[illegible]in Avenue, Scranto[illegible], 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number _____

Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Lead and Copper Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Lead+Copper									Additional Notes
	3704 ALLEN DR.	7-14-2022	5:15 AM	1	DW	1		1									Homeowner Sampled
	4361 Meadow Lane	7-13-2022	1:20 PM	1	1	1		1									Jeff MacLean Sampled
	1285 Starr Rd	7-14-2022	7:40 AM	1	1	1		1									
	1318 Starr Rd	7-14-2022	6:30 AM	1	1	1		1									
	1385 East River Rd	7-14-2022	5:15 AM	1	1	1		1									
	730 Bowling Green	7-14-2022	7:15 AM	1	1	1		1									
	1240 Starr Rd	7-14-2022	7:55 AM	1	1	1		1									
	776 Sleepy Hollow Rd	7-14-2022	8:15 AM	1	1	1		1									
	822 N. Lamont Circle	7-14-2022	8:00 AM	1	1	1		1									
	3635 Glenwood	7-15-2022	4:30 AM	1	1	1		1									

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-15-2022 2:39 PM		7/15/22 14:39
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICRO C*

3821 Buck Drive	2369 Elmira Street, Suite C	1620 N[illegible]	n Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton	8508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775		717.651.9700

CHAIN OF CUSTODY RECO

Number _____

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Brian Congdon

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Brian Congdon

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (C)

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Lead + Copper Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Lead + Copper									Additional Notes
	1228 Isabel Drive	7-15-2022	700 AM	1	DW	1		1									Home Owner Sampled
	1254 Isabel Drive	7-15-2022	630 AM	1	DW	1		1									
	3644 Allen Drive	7-15-2022	700 AM	1	DW	1		1									
	3673 Allen Drive	7-15-2022	6:27 AM	1	DW	1		1									
	3636 Fair View Drive	7-15-2022	747 AM	1	DW	1		1									
	748 Bowling Green	7-15-2022	830 AM	1	DW	1		1									
	3694 Delaware Ave	7-15-2022	600 AM	1	DW	1		1									
	838 Nilament Circle	7-15-2022	1:10 PM	1	DW	1		1									
	1278 Starr Rd	7-15-2022	6:15 AM	1	DW	1		1									
	3994 Rural AVE	7-15-2022	2:28 PM	1	DW	1		1									

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-15-2022 239 PM		7/15/22 14:39
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G1244

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Drinking Water

Project / PO Number: N/A
Received: 07/15/2022
Reported: 08/04/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 3704 Allen Dr
Sample Matrix: Drinking Water
Lab Sample ID: J2G1244-01
Collected By: Client
Collection Date: 07/14/2022 5:15

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0721	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0915	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0915	MMC

Client Sample ID: 4361 Meadown Lane
Sample Matrix: Drinking Water
Lab Sample ID: J2G1244-02
Collected By: Client
Collection Date: 07/13/2022 13:20

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0773	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0919	MMC
Lead	0.0027	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0919	MMC

Client Sample ID: 1285 Starr Rd
Sample Matrix: Drinking Water
Lab Sample ID: J2G1244-03
Collected By: Client
Collection Date: 07/14/2022 7:40

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0363	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0921	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0921	MMC

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G1244

Client Sample ID:	1318 Starr Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-04	**Collection Date:**	07/14/2022 6:30

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0371	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0922	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0922	MMC

Client Sample ID:	1385 East River Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-05	**Collection Date:**	07/14/2022 5:15

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.104	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0924	MMC
Lead	0.0036	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0924	MMC

Client Sample ID:	730 Bowling Green		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-06	**Collection Date:**	07/14/2022 7:15

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0571	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0925	MMC
Lead	0.0019	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0925	MMC

Client Sample ID:	1240 Starr Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-07	**Collection Date:**	07/14/2022 7:55

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0963	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0930	MMC
Lead	0.0022	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0930	MMC

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CERTIFICATE OF ANALYSIS

J2G1244

Client Sample ID:	776 Sleepy Hollow Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-08	**Collection Date:**	07/14/2022 8:15

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0812	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0931	MMC
Lead	0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0931	MMC

Client Sample ID:	822 N.Lamont Circle		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-09	**Collection Date:**	07/14/2022 8:00

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.113	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0933	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0933	MMC

Client Sample ID:	3635 Glen Wood		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-10	**Collection Date:**	07/15/2022 4:30

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0484	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0934	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0934	MMC

Client Sample ID:	1228 Isabel Drive		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-11	**Collection Date:**	07/15/2022 7:00

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0800	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0936	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0936	MMC

CERTIFICATE OF ANALYSIS

J2G1244

Client Sample ID:	748 Bowling Green		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-16	**Collection Date:**	07/15/2022 8:30

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0514	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0947	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0947	MMC

Client Sample ID:	3694 Delaware Ave		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-17	**Collection Date:**	07/15/2022 6:00

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0230	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0948	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0948	MMC

Client Sample ID:	838 Nilamont Circle		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-18	**Collection Date:**	07/15/2022 13:30

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0217	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0950	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0950	MMC

Client Sample ID:	1278 Starr Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-19	**Collection Date:**	07/15/2022 6:15

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0793	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0951	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0951	MMC

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G1244

Client Sample ID:	3994 Rural Ave		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G1244-21	**Collection Date:**	07/15/2022 14:28

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICPMS	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.8, Rv. 5.4 (1994)								
Copper	0.0738	1.30 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0953	MMC
Lead	<0.0010	0.0150 AL	0.0010	mg/L		07/21/22 1149	07/25/22 0953	MMC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

AL:	US EPA Action Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
SMCL:	US EPA Secondary Maximum Contaminant Level

'oject Requested Certification(s)

Microbac Laboratories, Inc. - Dayville
11549 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 08/04/2022 18:39

Water Operations Reports

Water Operations Reports 2018

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	12/2018 (MM YYYY)	01/02/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
			66.7			.8		31.4		
1		590	63.3	3.4		.8	.3	32.7	on	9:50
2		646	60.4	2.9		.8	.3	32.8	on	7:40
3		1,075	54.4	6.0		.8	.3	32.0	on	7:40
4		541	51.4	3.0		.8	.3	34.0	off	7:50
5		961	47.0	4.4		.8	.3	33.0	on	8:00
6		485	44.9	2.1		.8	.3	34.3	off	800
7		804	40.2	4.7		.8	.3	32.4	on	9:00
8		375	36.6	3.6		.8	.3	34.2	off	6:00
9		475	34.0	2.6		.8	.3	32.7	on	7:30
10		1,096	29.0	5.0		.6	.3	34.2	off	7:30
11		500	26.7	2.3		.6	.3	34.4	off	8:00
12		877	23.3	3.4		.6	.3	34.3	off	7:30
13		464	21.5	1.8		.6	.3	34.4	off	715
14		929	18.7	2.8		.6	.3	32.5	on	645
15		763	13.2	5.5		.6	.3	34.3	off	545
16		599	10.6	2.7		.6	.3	32.5	on	7:45
17		831	7.5	3.0		.6	.3	34.2	off	8:30
18		542	146.9 143.9 7.5	3.0		.6	.3	34.3	off	815
19		965	143.6	0.3		.6	.3	33.8	off	8:00
20		661	138.5	4.9		.6	.3	34.3	off	715
21		694	139.6	3.9		.6	.3	32.7	on	8:30
22		406	130.8	3.8		.6	.3	34.4	off	9:30
23		786	128.8	2.0		.6	.3	34.5	off	6:45
24		613	125.2	3.6		.6	.3	34.6	off	7:30
25		440	122.7	2.5		.6	.3	33.8	on	715
26		926	118.5	4.2		.6	.3	34.4	off	7:30
27		479	116.3	2.2		.6	.3	34.6	off	715
28		1,024	110.5	5.8		.6	.3	34.2	off	8:50
29		533	107.3	3.2		.6	.3	34.5	off	9:30
30		461	103.4	3.9		.6	.3	32.5	on	9:10
31		971	99.8	3.6		.6	.3	34.4	off	8:30
TOTAL		21,512								
AVG.		694								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: N/S operator NYSDOH Operator Certification Number: NY0030046

Signature: [signature] Date: 1/2/2019 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Big	12/3/18	1	YES ~~NO~~ ✓	YES ~~NO~~ ✓	0.5
Walden ORB Booster	12/3/18	1	YES ~~NO~~ ✓	YES ~~NO~~ ✓	0.6
Blue Creek Booster	12/3/18	1	YES ~~NO~~ ✓	YES ~~NO~~ ✓	0.5
Rte 208 AT 13 / McLean Rd	12/10/18	1	YES ~~NO~~ ✓	YES ~~NO~~ ✓	0.7
Quaker Highway AT 41	12/10/18	1	YES ~~NO~~ ✓	YES ~~NO~~ ✓	0.3
Terrace Rd well			YES NO	YES NO	
Raw (off line)	12/10/18	2	~~YES~~ ✓ NO	YES ~~NO~~ ✓	Ø
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Machem

Name of NYSDOH Certified Laboratory: Microbac LABS

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: No.

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg	400	15709.5	14.0	31.4	—	9727.7	—	22.6	44913.72	13.46
12/1/2018	590	15718.6	9.6	32.7	—	9727.7	—	16.2	44922.97	9.25
12/2/2018	—	15718.6	—	32.8	646	9735.5	7.8	23.5	44930.63	7.66
12/3/2018	1075	15735.2	16.6	32.0	—	9735.5	—	23.0	44947.20	16.57
12/4/2018	541	15743.6	8.4	34.0	—	9735.5	—	24.2	44955.51	8.31
12/5/2018	—	15743.6	—	33.0	961	9747.0	11.6	16.6	44967.00	11.49
12/6/2018	—	15743.6	—	34.3	484	9752.9	5.9	24.4	44972.87	5.87
12/7/2018	804	15756.1	12.5	32.4	—	9752.9	—	23.6	44985.30	12.43
12/8/2018	375 —	15761.8	5.7	34.2	—	9752.9	—	24.4	44994.21	8.91
12/9/2018	—	15761.8	—	32.7	475	9762.2	9.3	23.8	45001.34	7.13
12/10/2018	1,096	15777.4	15.6	34.2	—	9762.2	—	24.3	45015.99	14.65
12/11/2018	500	15785.1	7.7	34.1	—	9762.2	—	24.6	45023.69	7.7
12/12/2018	—	15785.1	—	34.3	877	9772.8	10.2	24.1	45034.25	10.56
12/13/2018	—	15785.1	—	34.4	464	9778.4	5.6	24.6	45039.83	8.58
12/14/2018	929	15799.5	14.4	32.5	—	9778.4	—	23.6	45054.85	14.32
12/15/2018	713	15810.4	10.9	34.3	541	9779.0	.6	24.4	45065.77	11.62
12/16/2018	—	15810.4	—	32.5	549	9784.3	5.3	23.7	45073.57	7.8
12/17/2018	831	15825.8	15.4	34.2	—	9784.3	—	24.3	45086.40	12.83
12/18/2018	542	15834.2	8.4	34.3	—	9784.3	—	24.4	45094.73	8.33
12/19/2018	—	15834.2	—	33.8	965	9796.0	11.7	24.0	45106.35	11.62
12/20/2018	203	15837.3	3.1	34.3	458	9801.5	5.5	24.4	4511503	8.68
12/21/2018	644	15848.1	10.3	32.7	—	9801.5	—	23.8	45125.71	10.71
12/22/2018	406	15854.7	6.8	34.4	—	9801.5	—	24.5	45136.01	10.24
12/23/2018	—	15854.4	—	34.5	786	9811.0	9.5	24.7	45141.57	5.56
12/24/2018	613	15863.8	9.4	34.6	—	9811.0	—	24.7	45151.00	9.43
12/25/2018	440	15870.7	6.9	33.8	—	9811.0	—	17.3	45157.97	6.97
12/26/2018	—	15870.7	—	34.4	926	9822.2	11.2	24.5	45168.99	11.02
12/27/2018	—	15870.7	—	34.6	479	9828.0	5.8	24.7	45174.74	5.75
12/28/2018	1,024	15886.5	15.8	34.2	—	9828.0	—	24.4	45190.52	15.78
12/29/2018	533	15894.7	8.2	34.5	—	9828.0	—	24.6	45198.89	8.37
12/30/2018	—	15894.7	—	32.5	461	9833.6	5.6	23.6	46209.51	10.62
12/31/2018	471	15909.8	15.1	34.4	—	9833.6	—	24.6	46219.31	9.8
	12809				5632		105.7			306
AVERAGE	413		260.3		278					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	12018 (MM YYYY)	01/02/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl 3	WELL Level	Pump On/Off	Time
			127.2 (lbs.)			.8				
1		—	127.2	—		.8	.3	25.0	off	10:00
2		—	127.2	—		.8	.3	25.0	off	7:20
3		—	127.2	—		.8	.3	25.0	off	7:30
4		—	127.2	—		.8	.3	25.0	off	7:35
5		—	127.2	—		.8	.3	25.0	off	7:30
6		—	127.2	—		.8	.3	25.0	off	7:45
7		—	127.2	—		.8	.3	25.0	off	9:20
8		—	127.2	—		.8	.3	25.0	off	6:15
9		—	127.2	—		.8	.3	25.0	off	7:30
10		—	127.2	—		.6	.3	24.9	off	7:30
11		—	127.2	—		.6	.3	24.5	off	7:30
12		—	127.1	—		.6	.3	24.4	off	7:30
13		—	127.1	—		.6	.3	24.1	off	700
4		—	127.1	—		.6	.3	24.1	off	700
5		—	127.1	—		.6	.3	24.0	off	530
16		—	127.1	—		.6	.3	23.9	off	7:30
17		—	127.1	—		.6	.3	23.1	off	8:10
18		—	127.1	—		.6	.3	23.5	off	7:00
19		—	127.1	—		.6	.3	23.5	off	7:40
20		—	127.1	—		.6	.3	23.8	off	700
21		—	127.1	—		.6	.3	24.2	off	9:00
22		—	127.1	—		.6	.3	24.2	off	9:15
23		—	127.1	—		.6	.3	24.5	off	6:15
24		—	127.1	—		.6	.3	24.5	off	7:15
25		—	127.1	—		.6	.3	24.4	off	745
26		—	127.1	—		.6	.3	24.0	off	7:15
27		—	127.1	—		.6	.3	24.3	off	700
28		—	127.1	—		.6	.3	24.2	off	9:00
29		—	127.1	—		.6	.3	24.2	off	8:40
30		—	127.1	—		.6	.3	24.1	off	9:20
31		—	127.1	—		.6	.3	24.2	off	9:00
TOTAL										
AVG.										

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Paul Attig Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0036446

Signature: Paul Attig Date: 1/2/2019 Operator Grade Level: D3

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.	—		22295.1	
12/1/2018	—	—	22295.1	—
12/2/2018	—	—	22295.1	—
12/3/2018	—	—	22295.2	Ran for sodium sample.
12/4/2018	—	—	22295.2	—
12/5/2018	—	—	22295.2	—
12/6/2018			22295.2	—
12/7/2018	—	—	22295.2	—
12/8/2018		—	22295.2	—
12/9/2018		—	22295.2	—
12/10/2018		—	22295.3	#1 Ran for Sample
12/11/2018		-	22295.3	—
12/12/2018		-	22295.3	—
12/13/2018		—	22295.3	—
12/14/2018		—	22295.3	—
12/15/2018		—	22295.3	—
12/16/2018		—	22295.3	—
12/17/2018		—	22295.3	—
12/18/2018		—	22295.3	
12/19/2018		—	22295.3	—
12/20/2018		—	22295.3	—
12/21/2018		—	22295.3	—
12/22/2018		—	22295.3	—
12/23/2018		—	22295.3	—
12/24/2018		—	22295.3	—
12/25/2018		—	22295.3	—
12/26/2018		—	22295.3	—
12/27/2018		—	22295.3	—
12/28/2018		—	22295.3	
12/29/2018		—	22295.3	—
12/30/2018		—	22295.3	—
12/31/2018		—	22295.3	—
Total				
Average				
Rev 11/23/16 PA				

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8L0157

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/03/2018
Reported: 12/04/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J8L0157-01
Collected By: JM-Client
Collection Date: 12/03/2018 7:44

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB
Escherichia coli	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB

Analyses Performed by: Customer

. ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		12/03/18 0744	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J8L0157-02
Collected By: JM-Client
Collection Date: 12/03/2018 8:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB
Escherichia coli	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/03/18 0800	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8L0157

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8L0157-03	**Collection Date:**	12/03/2018 8:28

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB
Escherichia coli	Absent			in 100mL		12/03/18 1547	12/04/18 1057	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		12/03/18 0828	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

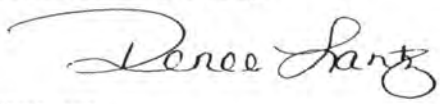
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Renee Lantz
Customer Relationship Specialist
Reported: 12/04/2018 19:00

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8L0701

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/10/2018
Reported: 12/12/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt/13 McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J8L0701-01
Collected By: JM-Client
Collection Date: 12/10/2018 10:05

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		12/10/18 1522	12/11/18 1042	EDB
Escherichia coli	Absent			in 100mL		12/10/18 1522	12/11/18 1042	EDB

Analyses Performed by: Customer

..eld Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.70	4.00 MCL		mg/L	Y1		12/10/18 1005	CUS

Client Sample ID: C-Ville Highway Garage/Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8L0701-02
Collected By: JM-Client
Collection Date: 12/10/2018 11:41

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		12/10/18 1522	12/11/18 1042	EDB
Escherichia coli	Absent			in 100mL		12/10/18 1522	12/11/18 1042	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		12/10/18 1141	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8L0701

Client Sample ID:	Terrace Rd. 60 HP		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8L0701-03	**Collection Date:**	12/10/2018 9:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		12/10/18 1522	12/11/18 1042	EDB
Escherichia coli	Absent			in 100mL		12/10/18 1522	12/11/18 1042	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Environmental Operations Manager
Reported: 12/12/2018 11:50

SRBC #30D
Revised 02/02

RECORD OF DAILY GROUND-WATER PUMPAGE AND WEEKLY WATER LEVELS

Project Name: _____
Well ID[1]: _____
Report Period: _____
Description of water level measurement point[2]: _____
Prepared By: _____
Signature & Date: _____

Month/ Day Oct 2018	Daily Pumpage (gallons)	Weekly Depth to Water (ft.)[3]	Month/ Day Nov 2018	Daily Pumpage (gallons)	Weekly Depth to Water (ft.)[3]	Month/ Day Dec. 2018	Daily Pumpage (gallons)	Weekly Depth to Water (ft.)
1	768	19.3	1	—	23.4	1	—	25.0
2	—	15.3	2	—	23.7	2	—	25.0
3	729	20.3	3	—	23.8	3	—	25.0
4	—	15.6	4	—	23.8	4	—	25.0
5	850	20.4	5	—	23.6	5	—	25.0
6	—	20.9	6	—	23.8	6	—	25.0
7	—	16.1	7	—	23.8	7	—	25.0
8	936	20.5	8	—	23.7	8	—	25.0
9	—	20.8	9	—	23.8	9	—	25.0
10	—	21.1	10	—	23.8	10	—	24.9
11	—	22.0	11	—	23.8	11	—	24.5
12	—	22.1	12	—	23.6	12	—	24.4
13	—	22.1	13	—	23.4	13	—	24.1
14	—	20.8	14	—	23.5	14	—	24.1
15	—	22.1	15	—	23.4	15	—	24.6
16	—	22.0	16	—	23.5	16	—	23.9
17	—	21.9	17	—	23.5	17	—	23.4
18	—	21.9	18	—	23.5	18	—	23.5
19	—	21.9	19	—	23.5	19	—	23.5
20	—	21.9	20	—	23.5	20	—	23.8
21	—	21.9	21	—	23.4	21	—	24.2
22	—	21.9	22	—	23.1	22	—	24.2
23	—	21.6	23	—	23.2	23	—	24.5
24	—	21.8	24	—	23.4	24	—	24.5
25	—	21.5	25	—	23.6	25	—	24.4
26	—	21.7	26	—	24.4	26	—	24.0
27	—	22.5	27	—	24.7	27	—	24.3
28	—	22.8	28	—	25.0	28	—	24.2
29	—	23.0	29	—	24.9	29	—	24.2
30	—	23.1	30	—	25.0	30	—	24.1
31	—	23.1	31			31	—	24.2
Totals								

[1] Submit a separate form for each well.
[2] Measuring point could be ground level, top of casing, or some other (please describe), and give correction distance to ground level.
[3] Water levels in wells must be reported as depth to water (not height of water above the pump).

RECORD OF DAILY GROUNDWATER PUMPAGE AND WEEKLY WATER LEVELS

Project Name: Town of Cortlandville-19880902 and 20021201
Well ID: Lime Hollow Well 2 (19880902) and Lime Hollow Well 7 (20021201)
Report Period: 2018
Description of water level measurement point: 92' Monitoring Well 3' from well

Prepared By: Peter Alteri Jr.
Signature and Date:

Date	Well 2 Daily Pumpage (Gallons)	Weekly Water Level (ft.)	Well 2 30-day Average	Well 7 Daily Pumpage (Gallons)	Daily Water Level (ft.)	Well 7 30-day Average	Daily Sum Wells 2 & 7 (Gallons)	Wells 2 & 7 30-day Average
12/3/2018	1075	32.0		—	23.0			
12/4/2018	541	34.0		—	24.2			
12/5/2018	—	33.0		961	16.6			
12/6/2018	—	34.3		485	24.4			
12/7/2018	804	32.4		—	23.6			
12/8/2018	375	34.7		~~3~~	24.4			
12/9/2018	—	32.7		475	23.8			
12/10/2018	1,096	34.2		—	24.3			
12/11/2018	500	34.4		—	24.6			
12/12/2018	—	34.3		877	24.4			
12/13/2018	—	34.4		464	24.6			
12/14/2018	929	32.5		—	23.6			
12/15/2018	712	34.3		51	24.4			
12/16/2018	—	32.5		599	23.7			
12/17/2018	831	34.2		—	24.3			
12/18/2018	542	34.3		—	24.4			
12/19/2018	—	33.8		465	24.0			
12/20/2018	203	34.4		458	24.4			
12/21/2018	674	32.7		—	23.8			
12/22/2018	406	34.4		—	24.4			
12/23/2018	—	34.5		786	24.7			
12/24/2018	613	34.6		—	24.7			
12/25/2018	440	33.8		—	17.3			
12/26/2018	—	34.4		926	24.5			
12/27/2018	—	34.6		479	24.7			
12/28/2018	1,024	34.2		—	24.4			
12/29/2018	533	34.5		—	24.6			
12/30/2018	—	32.5		461	23.7			
12/31/2018	971	34.4		—	24.6			
Totals:								

Max. 30-day Avg. Well 2:	**0**	**Approved Amount=1,000,000**
Max. 30-day Avg. Well 7:	**0**	**Approved Amount=1,000,000**
Max. 30-day Avg. Wells 2 & 7:	**0**	**Approved Amount=1,000,000**

7-9

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 No... ...n Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

Temperature Upon Receipt (°C) 7.9
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **							Additional Notes
	Red Apple Rt 13/McLean Rd	12-10-18	[illegible] AM	1	DW	1	Na2S203							Cl 0.7
	C-Ville Highway Garage Rt 41 Polkville	12-10-18	1141 AM	1	DW	1	Na2S203							Cl 0.3
	Terrace Rd well 60 HP	12-10-18	940 AM	1	DW	1	Na2S203							RAW Water

J8L0701
Cortlandville Water, Town of

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-10-18 1151 AM	[signature]	12-10-18 1181
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

5-7

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 Nor[illegible]n Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.2

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID Town of Cortlandville	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAET	Additional Notes
	Municipal BLDG.	12-3-18	744 AM	1	DW	1	Na2S2O3	1	C10.5
	Walden Oaks BS.	12-3-18	800 AM	1	DW	1	"	1	C10.6
	Blue Creek BS.	12-3-18	828 AM	1	DW	1	"	1	C10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-3-18 848 AM	[signature]	12/3/18 8:48 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

Page 3 of 3

J8L0157

Cortlandville Water, Town of

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.2
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAET										Additional Notes
	Municipal BLDG.	12-3-18	744 AM	1	DW	1	Na2S2O3	1										C10.5
	Walden Oaks BS.	12-3-18	800 AM	1	DW	1	"	1										C10.6
	Blue Creek B.S.	12-3-18	828 AM	1	DW	1	"	1										C10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-3-18 848 AM	[signature]	12/3/18 8:48 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	11/2018 (MM YYYY)	12/03/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 34.7	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .8	Other Treatments / Readings: End of System Cl. .3	WELL Level 31.3	Pump On/OfF	Time
1		464	30.9	3.2		.8	.3	29.9	on	7:45
2		1,000	23 7	7.2		.8	.3	29.6	on	8:00
3		584	19.8	3.9		.8	.3	31.7	off	8:00
4		670	16.3	4.5		.8	.3	30.1	on	7:15
5		1,089	7.6	7.7		.8	.3	31.7	off	8:45
6		519	5.3	2.3		.8	.3	31.9	off	7:15
7		849	152.3	2.0		.8	.3	31.9	off	7:45
8		414	150.5	1.8		.8	.3	31.2	off	715
9		843	145.9	4.6		.8	.3	30.2	ON	5:00
10		670	142.5	3.4		.8	.3	32.1	off	5:30
11		634	140.0	2.5		.8	.3	32.2	off	5:15
12		1,055	134.3	5.7		.8	.3	30.3	ON	7:30
13		502	131.7	2.6		.8	.3	32.3	off	8:00
14		1,022	127.3	4.4		.8	.3	32.0	off	8:00
15		445	125.3	2.0		.8	.3	32.5	off	8:45
16		824	121.7	3.6		.8	.3	30.8	ON	515
17		869	117.1	4.6		.8	.3	32.3	off	545
18		432	114.0	3.1		.8	.3	30.6	on	7:30
19		1,156	108.5	5.5		.8	.3	32.2	off	8:30
20		498	105.7	2.8		.8	.3	32.5	off	7:45
21		930	101.7	4.0		.8	.3	32.4	off	10:00
22		382	99.7	2.0		.8	.3	32.6	off	845
23		959	94.1	5.6		.8	.3	30.6	on	8:45
24		538	90.3	3.8		.8	.3	32.5	off	7:30
25		743	87.1	3.2		.8	.3	30.8	on	8:05
26		221	81.2	5.9		.8	.3	32.8	off	9:50
27		455	78.5	2.7		.8	.3	33.0	off	8:00
28		590	74.4	4.1		.8	.3	33.0	off	8:24
29		470	71.7	2.7		.8	.3	31.7	ON	715
30		900	66.7	5.0		.8	.3	31.4	on	6:00
31										
TOTAL		20,555								
AVG.		685								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr- Title: w/s operator NYSDOH Operator Certification Number: N.Y. 0030346

Signature: Peter Alteri Date: 12/3/18 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	11-2-18	1	YES [X] NO	YES [X] NO	1.0
Walden Oaks Booster STA.	11-2-18	1	YES [X] NO	YES [X] NO	.9
Blue Circle Booster STA.	11-2-18	1	YES [X] NO	YES [X] NO	.6
Red Apple RT13/McLean Rd	11-7-18	1	YES [X] NO	YES [X] NO	.6
Cville Highway RT 41	11-7-18	1	YES [X] NO	YES [X] NO	.3
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System " copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac LABS.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: No

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg	—	15503.1	—	31.3	~~930~~	9621.5	12.2	21.5	44601.65	12.18
11/1/2018	—	15503.1	—	29.9	464	9627.1	5.6	21.0	44608.40	6.75
11/2/2018	1,000	15519.7	16.1	24.6	—	9627.1	—	20.9	44623.35	14.95
11/3/2018	584	15527.7	8.5	31.7	—	9627.1	—	21.9	44631.83	8.48
11/4/2018	—	15527.7	—	30.1	690	9635.3	8.2	21.3	44640.84	9.01
11/5/2018	1089	15544.6	16.9	31.7	—	9635.3	—	21.8	44656.81	15.97
11/6/2018	519	15552.6	8.0	31.9	—	9635.3	—	22.1	44664.86	8.05
11/7/2018	—	15552.6	—	31.9	849	9645.6	10.3	22.0	44675.17	10.31
11/8/2018	—	15552.6	—	32.1	414	9651.1	5.5	22.3	44680.09	4.92
11/9/2018	843	15565.8	13.2	30.2	—	9651.1	—	21.4	44693.87	13.78
11/10/2018	670	15576.2	10.4	32.1	—	9651.1	—	22.3	44704.19	10.32
11/11/2018	—	15576.2	—	32.2	634	9658.8	7.7	22.4	44711.86	7.67
11/12/2018	1,055	15592.6	16.14	30.3	—	9658.8	—	21.5	44728.24	16.38
11/13/2018	502	15600.4	7.8	32.3	—	9658.8	—	22.5	44736.02	7.78
11/14/2018	—	15600.4	—	32.0	1,022	9671.1	12.3	22.2	44748.33	12.31
11/15/2018	—	15600.4	—	32.5	445	9676.5	5.4	22.6	44753.71	5.38
11/16/2018	623	15610.0	9.6	30.8	—	9676.5	—	22.0	44763.35	9.64
11/17/2018	665	15620.4	10.4	32.3	202	9679.2	2.7	22.5	44776.17	12.82
11/18/2018	—	15620.4	—	30.6	432	9684.3	5.1	21.8	44784.76	8.59
11/19/2018	1,182	15638.7	18.3	32.2	—	9684.3	—	22.4	44799.74	14.98
11/20/2018	498	15646.5	7.8	32.5	—	9684.3	—	22.7	44807.48	7.74
11/21/2018	—	15646.5	—	32.4	930	9695.5	11.2	22.5	44818.70	11.22
11/22/2018	—	15646.5	—	32.6	382	9700.2	4.7	22.7	44823.34	4.64
11/23/2018	955	15661.4	14.9	30.6	—	9700.2	—	21.7	44838.23	14.89
11/24/2018	538	15669.7	8.3	32.5	—	9700.2	—	22.7	44849.11	10.88
11/25/2018	—	15669.7	—	30.8	745	9709.2	9.0	21.9	44857.91	8.8
11/26/2018	221	15688.6	18.9	32.8	—	9709.2	—	23.0	44874.36	16.45
11/27/2018	455	15695.6	7.0	33.0	—	9709.2	—	23.2	44881.81	7.45
11/28/2018	—	15695.6	—	33.0	590	9722.1	12.9	23.2	44894.11	12.3
11/29/2018	—	15695.6	—	31.7	470	9727.7	5.6	22.8	44900.26	6.15
11/30/2018	900	16709.5	14.0	31.4	—	9727.7	—	22.6	44913.72	13.46
	12,299		206		9183		106.2			312.01
AVERAGE	410				306					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	11/2018 (MM YYYY)	12/03/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			127.2			.6	.3	23.1		
1		—	127.2	—		.8	.3	23.4	off	7:30
2		—	127.2	—		.8	.3	23.7	off	8:15
3		—	127.2	—		.8	.3	23.8	off	8:15
4		—	127.2	—		.8	.3	23.8	off	7:00
5		—	127.2	—		.8	.3	23.6	off	9:00
6		—	127.2	—		.8	.3	23.8	off	7:00
7		—	127.2	—		.8	.3	23.8	off	7:30
8		—	127.2	—		.8	.3	23.7	off	7:00
9		—	127.2	—		.8	.3	23.8	off	5:30
10		—	127.2	—		.8	.3	23.8	off	5:30
11		—	127.2	—		.8	.3	23.8	off	5:30
12		—	127.2	—		.8	.3	23.6	off	7:30
13		—	127.2	—		.8	.3	23.6	off	8:00
14		—	127.2	—		.8	.3	23.5	off	9:00
15		—	127.2	—		.8	.3	23.4	off	9:00
16		—	127.2	—		.8	.3	23.5	off	5:30
17		—	127.2	—		.8	.3	23.5	off	6:00
18		—	127.2	—		.8	.3	23.5	off	7:15
19		—	127.2	—		.8	.3	23.5	off	8:15
20		—	127.2	—		.8	.3	23.5	off	7:30
21		—	127.2	—		.8	.3	23.4	off	10:10
22		—	127.2	—		.8	.3	23.1	off	8:30
23		—	127.2	—		.8	.3	23.2	off	8:15
24		—	127.2	—		.8	.3	23.4	off	9:45
25		—	127.2	—		.8	.3	23.6	off	7:45
26		—	127.2	—		.8	.3	24.4	off	7:15
27		—	127.2	—		.8	.3	24.7	off	7:30
28		—	127.2	—		.8	.3	25.00	off	7:15
29		—	127.2	—		.8	.3	24.9	off	7:00
30		—	127.2	—		.8	.3	25.0	off	6:25
31										
TOTAL										
AVG.										

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Artesi Jr. Title: W/S operator NYSDOH Operator Certification Number: NY 0030046

Signature: [signature] Date: 12/3/18 Operator Grade Level: IIB

Terrace Rd Well Daily Pump Record

Location					
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**	
Prev. Rdg.			22294.6		
11/1/2018	ran for flushing well	—	22294.9	—	
11/2/2018		—	22294.9	—	
11/3/2018		—	22294.9	—	
11/4/2018		—	22294.9	—	
11/5/2018		—	22294.9	—	
11/6/2018		—	22294.9	—	
11/7/2018		—	22294.9	—	
11/8/2018		—	22294.9		
11/9/2018		—	22294.9	—	
11/10/2018		—	22294.9	—	
11/11/2018		—	22294.9	—	
11/12/2018		—	22294.9	—	
11/13/2018		—	22294.9	—	
11/14/2018		—	22294.9	—	
11/15/2018		—	22294.9	—	
11/16/2018		—	22294.9		
11/17/2018		—	22294.9	—	
11/18/2018		—	22294.9	—	
11/19/2018		—	22294.9	—	
11/20/2018		—	22294.9	—	
11/21/2018		—	22294.9	—	
11/22/2018		—	22294.9	—	
11/23/2018		—	22294.9	—	
11/24/2018		—	22294.9	—	
11/25/2018		—	22294.9	—	
11/26/2018		—	22295.1	.2	Flushing
11/27/2018		—	22295.1	—	
11/28/2018		—	22295.1	—	
11/29/2018		—	22295.1	—	
11/30/2018		—	22295.1	—	
Total					
Average					
Rev 11/23/16 PA					

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8K0513

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/07/2018
Reported: 11/09/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13/McLean
Sample Matrix: Drinking Water
Lab Sample ID: J8K0513-01
Collected By: JM-Client
Collection Date: 11/07/2018 11:39

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/07/18 1629	11/08/18 1041	EDB
Escherichia coli	Absent			in 100mL		11/07/18 1629	11/08/18 1041	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		11/07/18 1139	CUS

Client Sample ID: C-Ville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J8K0513-02
Collected By: JM-Client
Collection Date: 11/07/2018 14:42

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/07/18 1629	11/08/18 1041	EDB
Escherichia coli	Absent			in 100mL		11/07/18 1629	11/08/18 1041	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		11/07/18 1442	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8K0250

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/02/2018
Reported: 11/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Blue
Sample Matrix: Drinking Water
Lab Sample ID: J8K0250-01
Collected By: JM-Client
Collection Date: 11/02/2018 9:46

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB
Escherichia coli	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	1.00	4.00 MCL		mg/L	Y1		11/02/18 0946	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8K0250-02
Collected By: JM-Client
Collection Date: 11/02/2018 10:08

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB
Escherichia coli	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.90	4.00 MCL		mg/L	Y1		11/02/18 1008	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8K0250

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8K0250-03	**Collection Date:**	11/02/2018 10:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB
Escherichia coli	Absent			in 100mL		11/02/18 1652	11/03/18 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		11/02/18 1034	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 11/05/2018 10:00

4-6

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 No[illegible]in Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.6

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortland ville

Address: 3579 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BHCT	Additional Notes
	Municipal Blue	11-2-18	946 AM	1	DW	G		1	Cl. 1.0
	Water Works BS	11-2-18	1008 AM	1	DW	G		1	Cl. .9
	Blue Creek BS	11-2-18	1034 AM	1	DW	G		1	Cl .6

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-2-18 1052 AM	[illegible]	11/2/18 10:52
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

Page 3 of 3

J8K0250

Cortlandville Water, Town of

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8K0513

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

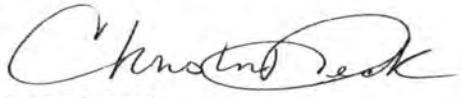
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Christine Pechacek
Environmental Operations Manager
Reported: 11/09/2018 10:09

2+3

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 Nor... ...in Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 16.6
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT						Additional Notes
	Red Apple Rt13/McLean Rd.	11-7-18	1139 AM	1	DW	1	✓	1						C10.6
	C-Ville Highway Garage	11-7-18	2:42 pm	1	DW	1	✓	1						C10.3

J8K0513
Cortlandville Water, Town of

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments
Hwy Garage time taken from bottle EDB 11/8/18

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-7-18 255 PM	[signature]	11/7/18 14:55
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

10/25/2018 CALL TO Mike Ryan.
11:45 AM

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	10/2018 (MM YYYY)	11/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/Off	Time
			-20.4			.6	.3	28.4	off	
1		—	-20.4	—		.6	.3	28.6	off	7:45
2		639	-23.3	2.9		.6	.3	28.6	off	7:45
3		—	-23.3	—		.6	.3	28.8	off	7:45
4		698	154.3 151.2	3.1		.6	.3	28.9	off	730
5		—	151.2	—		.6	.3	29.1	off	8:00
6		660	147.3	3.9		.6	.3	29.1	off	7:30
7		547	144.6	2.7		.6	.3	29.2	off	8:40
8		—	144.6	—		.6	.3	29.4	off	8:15
9		664	140.6	4.0		.6	.3	29.4	off	7:15
10		807	136.1	4.5		.8	.3	28.4	on	7:10
11		572	132.7	3.4		.8	.3	29.7	off	8:00
12		584	128.3	4.4		.8	.3	29.8	off	6:00
13		523	124.0	4.3		.8	.3	29.8	ON	5:30
14		871	119.0	5.0		.8	.3	30.0	off	7:30
15		639	111.41	4.6		.8	.3	30.1	off	7:30
16		541	107.6	6.8		.8	.3	29.0	ON	7:30
17		949	104.8	2.8		.8	.3	29.8	off	1:45PM
18		658	99.2	5.6		.8	.3	30.2	off	7:40
19		848	94.6	4.6		.8	.3	30.4	off	830
20		532	88.7	5.9		.8	.3	30.3	off	845
21		786	86.1	2.6		.8	.3	30.5	off	7:20
22		986	78.7	7.4		.8	.3	28.6	ON	8:00
23		503	74.7	4.0		.8	.3	29.8	ON	11:40
24		889	69.7	5.0		.8	.3	29.5	ON	730
25		546	66.5	3.2		.8	.3	30.7	off	8:30
26		904	59.7	6.8		.8	.3	28.9	on	9:15
27		376	55.7	4.0		.8	.3	30.4	off	9:30
28		813	51.4	4.3		.8	.3	29.4	on	7:35
29		756	44.5	6.9		.8	.3	29.3	on	7:30
30		659	40.0	4.5		.8	.3	31.3	off	7:30
31		930	34.1	5.9		.8	.3	31.3	off	7:30
TOTAL		18856								
AVG.		609								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock

Reported by: Peter Allen Jr. Title: W/S operator NYSDOH Operator Certification Number: N.Y. 03004

Signature: Peter Allen Date: 11/1/2018 Operator Grade Level: T1B

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg	—	15346.3	—	28.4	578	9509.9	7.1	18.6	44333.68	7.05
10/1/2018	—	15346.3	—	28.6	—	9509.9	—	18.8	44333.68	—
10/2/2018	639	15356.3	10.0	28.6	—	9509.9	—	18.9	44343.65	9.97
10/3/2018	—	15356.3	—	28.8	—	9509.9	—	19.0	44343.65	—
10/4/2018	—	15356.3	—	28.9	698	9518.6	8.7	19.1	44352.34	8.69
10/5/2018	—	15356.3	—	29.1	—	9518.6	—	19.3	44352.34	—
10/6/2018	660	15366.5	10.2	29.1	—	9518.6	—	19.3	44362.62	10.28
10/7/2018	—	15366.5	—	29.2	547	9525.3	6.7	19.5	44369.31	6.69
10/8/2018	—	15366.5	—	29.4	—	9525.3	—	19.7	44369.31	—
10/9/2018	664	15376.9	10.4	29.4	—	9525.3	—	19.7	44379.67	10.36
10/10/2018	—	15376.9	—	28.4	807	9535.3	10	12.0	44389.54	9.87
10/11/2018	—	15376.9	—	29.7	573	9542.2	6.9	19.9	44396.53	6.99
10/12/2018	584	15386.0	9.1	29.8	—	9542.2	—	20.0	44405.62	9.09
10/13/2018	523	15394.2	8.2	29.8	—	9542.2	—	20.0	44413.90	8.28
10/14/2018	—	15394.2	—	30.0	821	9552.8	10.6	20.2	44424.43	10.53
10/15/2018	639	15404.2	10	30.1	—	9552.8	—	20.3	44434.33	9.9
10/16/2018	541	15412.6	8.4	29.1	—	9552.8	—	12.2	44443.22	8.89
10/17/2018	—	15412.6	—	29.8	949	9564.3	11.5	20.0	44454.30	11.08
10/18/2018	—	15412.6	—	30.2	658	9572.4	8.1	20.4	44466.74	11.44
10/19/2018	848	15425.9	13.3	30.4	—	9572.4	—	20.6	44475.53	9.79
10/20/2018	532	15434.2	8.3	30.3	—	9572.4	—	20.5	44487.85	12.32
10/21/2018	—	15434.2	—	30.5	786	9582.0	9.6	20.7	44493.40	5.55
10/22/2018	986	15449.6	15.4	28.5	—	9582.0	—	19.8	44508.74	15.34
10/23/2018	503	15457.4	7.8	29.8	—	9582.0	—	13.3	44517.10	8.36
10/24/2018	—	15457.4	—	29.5	889	9592.8	10.8	13.2	44527.36	10.26
10/25/2018	—	15457.4	—	30.7	546	9599.4	6.6	20.9	44533.99	6.63
10/26/2018	904	15471.5	14.1	28.9	—	9599.4	—	20.0	44548.04	14.05
10/27/2018	376	15477.4	5.9	30.9	—	9599.4	—	21.1	44557.89	9.85
10/28/2018	—	15477.4	—	29.4	813	9609.3	9.9	20.5	44565.70	7.81
10/29/2018	756	15493.5	16.1	29.3	—	9609.3	—	20.5	44579.96	14.26
10/30/2018	659	15503.1	9.6	31.3	—	9609.3	—	21.5	44589.47	9.51
10/31/2018	—	15503.1	—	31.3	936	9621.5	12.2	21.5	44601.65	12.18
	4814		156.8		9650		111.6			267.97
AVERAGE	317				311					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	10/2018 (MM YYYY)	11/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/Off	Time
			144.9			.6		14.8	on	
1		768	141.0	3.9		.6	.3	19.3	off	7:15
2		—	141.0	—		.6	.3	15.3	on	7:30
3		729	137.0	4.0		.6	.3	20.3	off	7:30
4		—	137.0	—		.6	.3	15.6	on	8:15
5		850	132.5	4.5		.6	.3	20.4	off	8:15
6		—	132.5	—		.6	.3	20.9	off	7:45
7		—	132.5	—		.6	.3	16.1	on	8:55
8		936	127.2	5.3		.6	.3	20.5	off	7:00
9		—	127.2	—		.8	.3	20.8	off	7:00
10		—	127.2	—		.8	.3	21.1	off	7:00
11		—	127.2	—		.8	.3	22.0	off	7:30
12		—	127.2	—		.8	.3	22.1	off	5:45
13		—	127.2	—		.8	.3	22.1	off	5:45
14		—	127.2	—		.8	.3	20.8	off	9:00
15		—	127.2	—		.8	.3	22.0	off	9:00
16		—	127.2	—		.8	.3	21.9	off	7:30
17		—	127.2	—		.8	.3	21.9	off	8:00
18		—	127.2	—		.8	.3	21.9	off	7:15
19		—	127.2	—		.8	.3	21.9	off	800
20		—	127.2	—		.8	.3	21.9	off	900
21		—	127.2	—		.8	.3	21.9	off	7:15
22		—	127.2	—		.8	.3	21.9	off	8:00
23		—	127.2	—		.8	.3	21.6	off	11:50
24		—	127.2	—		.8	.3	21.8	off	700
25		—	127.2	—		.5	.3	21.5	off	8:15
26		—	127.2	—		.8	.3	21.7	off	9:30
27		—	127.2	—		.8	.3	22.5	off	9:15
28		—	127.2	—		.8	.3	22.8	off	7:30
29		—	127.2	—		.8	.3	23.0	off	7:15
30		—	127.2	—		.8	.3	23.1	off	7:15
31		—	127.2	—		.8	.3	23.1	off	7:15
TOTAL		3283								
AVG.		106								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Peter Aiten Jr Title: W/S Operator NYSDOH Operator Certification Number: NY 0036041

Signature: Peter Aiten Date: 11/1/18 Operator Grade Level: III

Microbiological Samples and Free Chlorine Residual

Pg 1

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg. Terrace Rd	10-1-18	1	X NO	YES X	.6
Walden OAKS Booster STA.	10-1-18	1	YES X	YES X	.4
Blue Creek Booster	10-1-18	1	YES X	YES X	.3
Municipal Bldg Terrace Rd	10-3-18	2	YES X	YES X	.6
3577 Terrace Rd Town Hall	10-3-18	1	YES X	YES X	.6
Red Apple RT 13/ McLean Rd	10-3-18	1	YES X	YES X	.6
Terrace Rd Well Raw	10-3-18	2	X NO	X NO	RAW.
Terrace Rd well 5 SAMPLES	10-5-18	2	X NO	X NO	Raw
Municipal Bldg	10-5-18	2	YES X	YES X	.6
Walden OAKS Booster STA.	10-5-18	2	YES X	YES X	.3
Red Apple RT 13/ McLean Rd	10-5-18	2	YES X	YES X	.6
Blue Creek Booster STA.	10-5-18	2	YES X	YES X	.3
Quilt Highway RT 41	10-5-18	2	YES X	YES X	.3
Municipal Bldg	10-9-18	2	YES X	YES X	.4
260 Mclean Rd	10-9-18	2	YES X	YES X	.4
Big Lots	10-9-18	2	YES X	YES X	.4
443 McLean Rd	10-9-18	2	YES X	YES X	.4
Terrace Rd Well Raw	10-9-18	2	X NO	YES X	Raw

Population Served: 4/000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 23

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

X For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Brian Congdon / Jeff MacLean.

Name of NYSDOH Certified Laboratory: Microbac.

Did any MCL violation occur? If so, please describe: Total Coliform / E coli Positive from Terrace Rd. Well - Health Dept Notified, Repeat Samples Taken. Well Taken off line. Public Notice Mailed out & Press conf Held. - Well Disinfected According To local Health Dept. Guidlines. Two Consecutive Samples Take from Well came Back Clean.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments: SEE Attached Continuation of Microbiological Samples. Pg 2.

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			22207.0	
10/1/2018		768	22226.7	19.7
10/2/2018		—	22226.7	—
10/3/2018		729	22245.4	18.7
10/4/2018		—	22245.4	—
10/5/2018		850	22267.2	21.8
10/6/2018		—	22267.2	—
10/7/2018		—	22267.2	—
10/8/2018		936	22291.2	24
10/9/2018		—	22291.2	—
10/10/2018		—	22291.2	—
10/11/2018	pumped to blow off	—	22293.4	2.2
10/12/2018		—	22293.4	—
10/13/2018		—	22293.4	—
10/14/2018		—	22293.4	—
10/15/2018	Pumped to blow off	—	22293.8	.4
10/16/2018	Pumped to blow off	—	22294.3	.5
10/17/2018	Bumped for cl. test	—	22294.4	.1
10/18/2018		—	22294.4	—
10/19/2018		—	22294.4	—
10/20/2018		—	22294.4	—
10/21/2018		—	22294.4	—
10/22/2018		—	22294.4	—
10/23/2018	Bumped for sample	—	22294.6	.2
10/24/2018		—	22294.6	—
10/25/2018		—	22294.6	—
10/26/2018		—	22294.6	—
10/27/2018		—	22294.6	—
10/28/2018		—	22294.6	—
10/29/2018		—	22294.6	—
10/30/2018		—	22294.6	—
10/31/2018		—	22294.6	—
Total		3283		87.6
Average		106		
Rev 11/23/16 PA				

Microbiological Samples and Free Chlorine Residual Continued - Pg 2

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	10-15-18	2	YES ~~NO~~	YES ~~NO~~	.6
Terrace Rd Well RAW	10-15-18	2	~~YES~~ NO	YES ~~NO~~	RAW
Terrace Rd Well RAW	10-16-18	2	~~YES~~ NO	YES ~~NO~~	RAW
Terrace Rd Well RAW	10-22-18	2	YES ~~NO~~	YES ~~NO~~	RAW
Terrace Rd Well RAW	10-23-18	2	YES ~~NO~~	YES ~~NO~~	RAW
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: _____

Number of microbiological monitoring samples required: _____

Number of microbiological monitoring samples taken: _____

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): _____

Name of NYSDOH Certified Laboratory: _____

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: _____

Comments: _____

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

TOWN OF CORTLANDVILLE WATER CUSTOMERS

Town of Cortlandville's Terrace Rd Well Tested Positive for Fecal Indicator

Our water system recently detected a fecal indicator of E. *coli*, from the Terrace Rd Well. As our customers, you have a right to know what happened and what we are doing to correct this situation. On 10/3/2018, we collected a raw water sample from the Terrace Rd Well. The sample tested positive for *E. coli*. On 10/5/2018 five more samples were taken, one sample, from the well (raw water) and 4 from the distribution system after the chlorine injection point (disinfected water). The raw water sample from the well came back positive for E.*coli*, but the distribution samples (disinfected water) came back clean (negative for total coliform and E.*coli*). This means that at no time was the public health was compromised. As a precaution however, the Terrace Rd. Well was immediately taken off line.

What should I do?

- You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

This is not an emergency due to the immediate corrective action taken and the extensive distribution sampling conducted. If it had been you would have been notified within 24 hours.
Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

What is being done?

At this time we have taken the necessary steps to totally disinfect the well casing with a solution of chlorine. We anticipate resolving the problem within the next week. The well will not be turned back on until tests show no *E. coli*, and monthly raw water sampling will continue to ensure its safety.

For more information, please contact Peter Alteri Jr., Town of Cortlandville at 607-756-9637. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1-800-426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the Town of Cortlandville. State Water System ID#: NY 1101755.
Date distributed: 10/17/2018.

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection
Public Notice Certification Form

System name: Town of Cortlandville.

PWSID no: NY 1101755

Monitoring period to which the notice applies (e.g., June – Sept. 2017): _____

Date NOV was received: Pending per e-coli Results Recieved 10/9/2018

Date PN was provided to consumers: 10-17-2018

The water system certifies that the public notification was provided to each customer within 30 days of receiving the notice of violation:

X The maximum contaminant levels and the definitions of where contaminants are found.
X An explanation of the health effects.
X Steps the water supply is making to comply with NOV.
X Contact information for your water utility.

Certified by:

Name Peter Altieri Jr.

Signature Peter Altieri Jr

Title W/S Superintendent.

Phone # 607-756-9637 Date 10-12-2018

X Notice was distributed by mail or other direct delivery. Specify other direct delivery methods: _____

___ electronic mail
X posting the notice on the Internet at www. Cortlandville.org
___ posting the notice in public places (attach a list of locations)
___ delivery of multiple copies to single bill addresses serving several persons such as: apartments, businesses, and large private employers
X other methods – Had a press Conf. Article Appeared in Cortland STAndard 10-16-2018

MICROBAC®

DRAFT REPORT

CERTIFICATE OF ANALYSIS

J8J1492

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/22/2018
Reported: 10/23/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. 60HP Well Raw Water Tap		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J8J1492-01	**Collection Date:**	10/22/2018 10:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/23/2018 15:56

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 North Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number 1

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.1

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian L. Conyden

Sampler Signature: B.L. Conyden

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacterial	Additional Notes
1	Terrace Rd 60 Hp Well Raw Water Tap	10-22-18	10:20 AM	1		G		1	Chlorine NONE

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.L. Conyden	10-22-18 10:35 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
	10		10/22/18 10:35 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

J8J1492

rev.12/26/2017

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N... ...ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR_

Number

Instructions on back

19

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.2
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Comden

Sampler Signature: B.R. Comden

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria	Additional Notes
1	Terrace Rd 60 Hp Raw Water Tap	10-23-18	1:00 PM	1		G		1	Chlorine zero

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R. Comden	10-23-18 1:25 PM		10/23/18 1:25 PM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Page 2 of 2

J8J1588

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J1588

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/23/2018
Reported: 10/25/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. 60hp Raw Water Tap		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J8J1588-01	**Collection Date:**	10/23/2018 13:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/23/18 1554	10/24/18 1032	EDB
Escherichia coli	Absent			in 100mL		10/23/18 1554	10/24/18 1032	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Quality Assurance Officer
Reported: 10/25/2018 11:58

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N... ...ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR...

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.1
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian L Congdon

Sampler Signature: B. L. Congdon

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (SY, Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacti										Additional Notes
1	Terrace Rd 60 Hp Well Raw Water Tap	10-22-18	10:20 AM	1		G		1										Chlorine None

J8J1492

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. L. Congdon	10-22-18 10:35 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
	10-		10/22/18 10:35 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ... of ...

Page 2 of 2

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J1492

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/22/2018
Reported: 10/25/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. 60HP Well Raw Water Tap		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J8J1492-01	**Collection Date:**	10/22/2018 10:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/25/2018 11:34

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scra[illegible]A 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC[illegible]

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 9-1
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian L. Congdon

Sampler Signature: B. L. Congdon

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacterial									Additional Notes
1	Terrace Rd 60 Hp Well Raw Water Tap	10-22-18	10:20 AM	1		G		1									Chlorine NONE

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. L. Congdon	10-22-18 10:35 AM	[illegible]	10/22/18 10:35AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
	10-		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

DRAFT REPORT

CERTIFICATE OF ANALYSIS

J8J1492

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/22/2018
Reported: 10/23/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. 60HP Well Raw Water Tap		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J8J1492-01	**Collection Date:**	10/22/2018 10:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/22/18 1540	10/23/18 1014	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/23/2018 15:56

7

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 Nc... ...in Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR_

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.4
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon
Sampler Signature: B. R. Gh
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacterial									Additional Notes
1	Terrace Rd 60HP Well	10-16-18	11:10 AM	1		G		-									Chlorine none

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. R. Gh	10-16-18 11:50 AM	[signature]	10/16/18 16:50
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

J8J1197

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J1197

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/16/2018
Reported: 10/18/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. 60 HP Well		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J8J1197-01	**Collection Date:**	10/16/2018 11:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/16/18 1748	10/17/18 1158	EDB
Escherichia coli	Absent			in 100mL		10/16/18 1748	10/17/18 1158	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/18/2018 10:43

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 North Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back
TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 123
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian Congdon
Sampler Signature: B. R. Congdon
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria	Additional Notes
1	Water Gauge Map Room Sink	10-15-18	8:20 AM	1		G		1	Chlorine .60
2	Well Raw Water 60 HP	10-15-18	8:50 AM	1		G		1	Chlorine NONE

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. R. Congdon	10-15-18 9:10 AM		10/15 9:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J8J1062

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J1062

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/15/2018
Reported: 10/17/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Water Garage Mop Room Sink
Sample Matrix: Drinking Water
Lab Sample ID: J8J1062-01
Collected By: BC-Client
Collection Date: 10/15/2018 8:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/15/18 1627	10/16/18 1111	EDB
Escherichia coli	Absent			in 100mL		10/15/18 1627	10/16/18 1111	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/15/18 0820	CUS

Client Sample ID: Well Raw Water 60 hp
Sample Matrix: Drinking Water
Lab Sample ID: J8J1062-02
Collected By: BC-Client
Collection Date: 10/15/2018 8:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/15/18 1627	10/16/18 1111	EDB
Escherichia coli	Absent			in 100mL		10/15/18 1627	10/16/18 1111	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit
Y1: Accreditation is not offered by the accrediting body for this analyte.

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J1062

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/17/2018 09:46

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]in Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 9.4
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: -
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortland ville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Municipal BLDG	10-1-18	745 AM	1	DW	1	Na2S203	C10.6
	Walden Oaks BS	10-1-18	804 AM	1	DW	1	Na2S203	C10.4
	Blue Creek BS	10-1-18	838 AM	1	DW	1	Na2S203	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-1-18 906 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			10/1/18 9:13 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

Page 3 of 3

J8J0097

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0097

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/01/2018
Reported: 10/03/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG.
Sample Matrix: Drinking Water
Lab Sample ID: J8J0097-01
Collected By: JM-Client
Collection Date: 10/01/2018 7:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/01/18 1823	10/02/18 1242	EDB
Escherichia coli	Absent			in 100mL		10/01/18 1823	10/02/18 1242	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/01/18 0745	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8J0097-02
Collected By: JM-Client
Collection Date: 10/01/2018 8:04

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/01/18 1823	10/02/18 1242	EDB
Escherichia coli	Absent			in 100mL		10/01/18 1823	10/02/18 1242	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/01/18 0804	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0097

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0097-03	**Collection Date:**	10/01/2018 8:38

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/01/18 1823	10/02/18 1242	EDB
Escherichia coli	Absent			in 100mL		10/01/18 1823	10/02/18 1242	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		10/01/18 0838	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/03/2018 11:02

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 North Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

69-72

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland Ny. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.1
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Additional Notes
	Municipal BLDG	10-3-18	906 AM	1	DW	1		Cl.06
	3577 Terrace Rd	10-3-18	924 AM	1	DW	1		Cl.06
*	Red Apple / RT 13	10-3-18	1009 AM	1	DW	1		Cl.06
	Terrace Rd well	10-3-18	957 AM	1	DW	1		RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

* sample location taken from bottle - EWB 10/3/18

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-3-18 1023 Hrs	[signature]	10/3/18 10:23 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

Page 3 of 3

J8J0409

Cortlandville Water, Town of

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0409

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/03/2018
Reported: 10/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J8J0409-01
Collected By: JM-Client
Collection Date: 10/03/2018 9:06

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB
Escherichia coli	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.06	4.00 MCL		mg/L	Y1		10/03/18 0906	CUS

Client Sample ID: 3577 Terrace Rd
Sample Matrix: Drinking Water
Lab Sample ID: J8J0409-02
Collected By: JM-Client
Collection Date: 10/03/2018 9:24

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB
Escherichia coli	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.06	4.00 MCL		mg/L	Y1		10/03/18 0924	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0409

Client Sample ID:	Red Apple - Rt. 13 McLean		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0409-03	**Collection Date:**	10/03/2018 10:09

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB
Escherichia coli	Absent			in 100mL		10/03/18 1844	10/04/18 1342	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.06	4.00 MCL		mg/L	Y1		10/03/18 1009	CUS

Client Sample ID:	Terrace Rd Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0409-04	**Collection Date:**	10/03/2018 9:57

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
lethod: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/03/18 1844	10/04/18 1342	EDB
Escherichia coli	**Present**			in 100mL		10/03/18 1844	10/04/18 1342	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/05/2018 09:41

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 North Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number 24-28

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.6
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Terrace Rd Well	10-5-18	AM 1027-1028 AM	5	DW	V	V	RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-5-18 1045 AM	DW	10/5/18 10:45AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Page 3 of 3

J8J0563
Cortlandville Water, Town of

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0563

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/05/2018
Reported: 10/09/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J8J0563-01
Collected By: JM-Client
Collection Date: 10/05/2018 10:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J8J0563-02
Collected By: JM-Client
Collection Date: 10/05/2018 10:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J8J0563-03
Collected By: JM-Client
Collection Date: 10/05/2018 10:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0563

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0563-04	**Collection Date:**	10/05/2018 10:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0563-05	**Collection Date:**	10/05/2018 10:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	**Present**			in 100mL		10/05/18 1557	10/06/18 1014	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/09/2018 15:38

19-23

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 North Main Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 12.7
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **										Additional Notes
	Municipal BLDG.	10-5-18	11:29 AM	1	DW	1											C10.6
	Walden Oaks BS.	10-5-18	1209 PM	1	DW	1											C10.3
	Red Apple Rt 13/McLean Rd	10-5-18	1224 PM	1	DW	1											C10.6
	Blue Creek BS.	10-5-18	1242 PM	1	DW	1											C10.3
	C-Ville Highway Garage Rt 41 Polkville	10-5-18	230 PM	1	DW	1											C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
[signature]	10-5-18 14:31	[signature]	10/5/18 14:31
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

J8J0562
Cortlandville Water, Town of

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0562

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/05/2018
Reported: 10/08/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J8J0562-01
Collected By: JM-Client
Collection Date: 10/05/2018 11:29

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/05/18 1129	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8J0562-02
Collected By: JM-Client
Collection Date: 10/05/2018 12:09

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		10/05/18 1209	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0562

Client Sample ID:	Red Apple - Rt. 13 McLean Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0562-03	**Collection Date:**	10/05/2018 12:24

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/05/18 1224	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0562-04	**Collection Date:**	10/05/2018 12:42

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
lethod: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		10/05/18 1242	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0562

Client Sample ID:	C-Ville Highway Garage - Rt. 41, Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8J0562-05	**Collection Date:**	10/05/2018 14:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB
Escherichia coli	Absent			in 100mL		10/05/18 1557	10/06/18 1014	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		10/05/18 1430	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/08/2018 10:56

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 No n Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number 14-18

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.9

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville Water Dept.

Address: 3577 TERRACE St

City, State, Zip: Cortland N.Y. 13045

Contact: Brian Congdon

Telephone No.: 591-2770

Invoice Address

Client Name:

Address:

City, State, Zip:

Contact:

Telephone No.:

Turnaround Time

[ ] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[ ]Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

Send Report via: [ ] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [ ] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):

Sampler Signature:

Sampler Phone No.:

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria						Additional Notes
1	Water Garage Mechanic Room Sink	10-9-18	1:00 pm	1		G		1						Chlorine .40
2	200 McLean Rd Kitchen Sink	10-9-18	1:10 pm	1		G		1	8					Chlorine .40
3	Big Lots Bathroom Sink 5662 RF22	10-9-18	1:15 pm	1		G		1						Chlorine .40
4	443 McLean Rd Tarson parts Bathroom Sink	10-9-18	1:25 pm	1		G		1						Chlorine .40
5	Terrace Rd 60 HP Well Raw Water	10-9-18	1:35 pm	1		G		1						

J8J0730

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R.G.	10-9-18 2:21 pm		10/9/18 1421
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page of

rev.12/26/2017

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0730

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/09/2018
Reported: 10/11/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Water Garage - Meter Room Sink
Sample Matrix: Drinking Water
Lab Sample ID: J8J0730-01
Collected By: BG-Client
Collection Date: 10/09/2018 13:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB
Escherichia coli	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/09/18 1300	CUS

Client Sample ID: 200 Mclean Rd. - Kitchen Sink
Sample Matrix: Drinking Water
Lab Sample ID: J8J0730-02
Collected By: BG-Client
Collection Date: 10/09/2018 13:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB
Escherichia coli	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/09/18 1310	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0730

Client Sample ID:	Big Lots - Bathroom Sink		
Sample Matrix:	Drinking Water	**Collected By:**	BG-Client
Lab Sample ID:	J8J0730-03	**Collection Date:**	10/09/2018 13:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB
Escherichia coli	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/09/18 1315	CUS

Client Sample ID:	943 Mclean Rd - Tarson Pools Bathroom Sink		
Sample Matrix:	Drinking Water	**Collected By:**	BG-Client
Lab Sample ID:	J8J0730-04	**Collection Date:**	10/09/2018 13:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
lethod: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB
Escherichia coli	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/09/18 1325	CUS

Client Sample ID:	Terrace Rd. 60 HP Well Raw Water		
Sample Matrix:	Drinking Water	**Collected By:**	BG-Client
Lab Sample ID:	J8J0730-05	**Collection Date:**	10/09/2018 13:35

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		10/09/18 1634	10/10/18 1128	EDB
Escherichia coli	Absent			in 100mL		10/09/18 1634	10/10/18 1128	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8J0730

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 10/11/2018 14:47

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	09/2018 (MM YYYY)	10/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H. Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		617	24.2	2.9		.6	.3	28.6	off	7:10
2		542	22.2	2.0		.6	.3	28.5	off	7:15
3		—	22.2	—		.6	.3	28.5	off	7:30
4		692	19.0	3.2		.6	.3	28.3	off	6:30
5		—	19.0	—		.6	.3	28.4	off	6:45
6		637	16.5	2.5		.6	.3	28.2	off	6:15
7		—	16.5	—		.6	.3	28.2	off	7:00
8		639	13.6	3.0		.6	.3	28.0	off	9:00
9		577	11.3	2.2		.6	.3	28.0	off	7:30
10		—	11.3	—		.6	.3	28.2	off	6:45
11		616	8.4	2.9		.6	.3	28.0	off	6:50
12		—	8.4	—		.6	.3	28.2	off	7:10
13		579				.6	.3	28.1	off	7:00
14		—		—		.6	.3	28.1	off	8:30
15		676	3.0	5.4		.6	.3	28.0	off	8:30
16		583	.7	2.3		.6	.3	27.9	off	7:30
17		—	.7	—		.6	.3	28.0	off	7:30
18		675	-2.4	3.1		.6	.3	27.9	off	7:30
19		—	-2.4	—		.6	.3	28.0	off	7:30
20		581	-4.5	2.1		.6	.3	27.9	off	6:30
21		—	-4.5	—		.6	.3	28.1	off	8:00
22		618	-7.3	2.8		.6	.3	27.9	off	8:00
23		558	-9.4	2.1		.6	.3	27.9	off	6:45
24		—	-9.4			.6	.3	28.1	off	6:30
25		634	-12.4	3.0		.6	.3	28.0	off	7:15
26		—	-12.4	—		.6	.3	28.2	off	6:30
27		444	-14.4	2.0		.6	.3	28.3	off	6:30
28		—	-14.4	—		.6	.3	28.3	off	9:00
29		837	-18.4	4.0		.6	.3	28.3	off	9:45
30		578	-20.4	2.0		.6	.3	28.4	off	7:35
31										
TOTAL		11083								
AVG.		369								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aiten Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY. 0036446

Signature: Peter Aiten Jr. Date: 10/1/18 Operator Grade Level: II-3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	9-5-18	1	YES ~~NO~~	YES ~~NO~~	0.6
Wooden Oaks Booster	9-5-18	1	YES ~~NO~~	YES ~~NO~~	0.4
Blue Oak Booster	9-5-18	1	YES ~~NO~~	YES ~~NO~~	0.4
Red Apple McLean / RT 13	9-11-18	1	YES ~~NO~~	YES ~~NO~~	0.4
Oville Hgwy RT 41	9-11-18	1	YES ~~NO~~	YES ~~NO~~	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	09/2018 (MM YYYY)	10/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
		757	51.4			.6		18.2	off	
1		—	51.4	—		.6	.3	18.4	off	7:20
2		—	51.4	—		.6	.3	13.4	on	7:05
3		897	46.4	5.0		.6	.3	17.9	off	7:10
4		—	46.4	—		.6	.3	13.4	on	6:20
5		761	42.2	4.2		.6	.3	17.6	off	6:40
6		—	42.2	—		.6	.3	13.1	ON	600
7		865	37.9	4.3		.6	.3	17.5	off	7:10
8		—	37.9	—		.6	.3	17.8	off	9:10
9		—	37.9	—		.6	.3	12.9	on	7:15
10		815	33.7	4.2		.6	.3	18.6	off	6:20
11		—	33.7	—		.6	.3	14.3	on	6:10
12		745	29.4	4.3		.6	.3	18.8	off	7:00
13		—	29.4	—		.6	.3	13.9	on	6:40
4		936	24.1	5.3		.6	.3	18.3	off	8:30
5		—	24.1	—		.6	.3	18.6	off	9:00
16		—	24.1	—		.6	.3	13.6	ON	7:30
17		932	19.2	4.9		.6	.3	18.3	off	7:30
18		—	19.2	—		.6	.3	14.5	ON	7:30
19		748	15.4	3.8		.6	.3	18.7	off	7:30
20		—	15.4	—		.6	.3	13.9	ON	615
21		854	10.7	4.7		.6	.3	18.6	off	815
22		—	10.7	—		.6	.3	18.9	off	815
23		—	10.7	—		.6	.3	13.8	on	6:30
24		916	6.1	4.6		.6	.3	18.3	off	635
25		—	6.1	—		.6	.3	15.4	ON	615
26		714	1.1	5.0		.6	.3	19.2	off	600
27		—	1.1	—		.6	.3	14.9	ON	600
28		936	144.9	5.1		.6	.3	19.5	off	9:15
29		—	144.9	—		.6	.3	14.8	off	9:30
30		—	144.9	—		.6	.3	14.8	on	7:15
31										
TOTAL		10,119								
AVG.		337								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aiken Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY. CO3004-16

ture: Peter Aiken Date: 10/1/18 Operator Grade Level: WB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8I0338

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/05/2018
Reported: 09/21/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municiple Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J8I0338-01
Collected By: JM-Client
Collection Date: 09/05/2018 6:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB
Escherichia coli	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		09/05/18 0625	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8I0338-02
Collected By: JM-Client
Collection Date: 09/05/2018 6:48

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB
Escherichia coli	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		09/05/18 0648	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8I0338

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8I0338-03	**Collection Date:**	09/05/2018 7:16

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB
Escherichia coli	Absent			in 100mL		09/05/18 1928	09/06/18 1336	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		09/05/18 0716	CUS

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8I0338-04	**Collection Date:**	09/05/2018 8:28

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	66.4		1.02	mg/L		09/13/18 1313	09/13/18 1517	CMK

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8I0854

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/11/2018
Reported: 09/13/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13 McLean
Sample Matrix: Drinking Water
Lab Sample ID: J8I0854-01
Collected By: JM-Client
Collection Date: 09/11/2018 7:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/11/18 1615	09/12/18 1120	EDB
Escherichia coli	Absent			in 100mL		09/11/18 1615	09/12/18 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		09/11/18 0753	CUS

Client Sample ID: C-Ville Highway Garage - Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8I0854-02
Collected By: JM-Client
Collection Date: 09/11/2018 9:23

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/11/18 1615	09/12/18 1120	EDB
Escherichia coli	Absent			in 100mL		09/11/18 1615	09/12/18 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		09/11/18 0923	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			21947.5	
9/1/2018		—	21947.5	—
9/2/2018		—	21947.5	—
9/3/2018		897	21970.5	23
9/4/2018		—	21970.5	—
9/5/2018		761	21990.0	19.5
9/6/2018		—	21990.0	—
9/7/2018		865	22012.2	22.2
9/8/2018		—	22012.2	—
9/9/2018		—	22012.2	—
9/10/2018		815	22033.1	20.9
9/11/2018		—	22033.1	—
9/12/2018		748	22052.2	19.1
9/13/2018		—	22052.2	—
9/14/2018		936	22076.2	24.0
9/15/2018		—	22076.2	—
9/16/2018		—	22076.2	—
9/17/2018		932	22100.1	23.9
9/18/2018		—	22100.1	—
9/19/2018		748	22119.3	19.2
9/20/2018		—	22119.3	—
9/21/2018		854	22141.2	21.9
9/22/2018		—	22141.2	—
9/23/2018		—	22141.2	—
9/24/2018		916	22164.7	23.5
9/25/2018		—	22164.7	—
9/26/2018		714	22183.0	18.3
9/27/2018		—	22183.0	—
9/28/2018		936	22207.0	24
9/29/2018		—	22207.0	—
9/30/2018		—	22207.0	—
Total		10,119		259
Average		337		
Rev 11/23/16 PA				

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg	—	15252.2	—	28.7	—	9447.4	—	19.0	44177.45	—
9/1/2018	617	15261.8	9.6	28.6	—	9447.4	—	18.8	44187.07	9.62
9/2/2018	—	15261.8	—	28.5	542	9454.1	6.7	18.7	44193.70	6.63
9/3/2018	—	15261.8	—	28.5	—	9454.1	—	18.8	44193.70	—
9/4/2018	692	15272.6	10.8	28.3	—	9454.1	—	18.6	44204.46	10.76
9/5/2018	—	15272.6	—	28.4	—	9454.1	—	18.6	44204.46	—
9/6/2018	—	15272.6	—	28.2	637	9462.0	7.9	18.5	44212.33	7.87
9/7/2018	—	15272.6	—	28.2	—	9462.0	—	18.5	44212.33	—
9/8/2018	639	15281.6	10.0	28.0	—	9462.0	—	18.3	44222.32	9.99
9/9/2018	—	15282.6	—	28.0	577	9469.0	7.0	18.2	44229.37	7.05
9/10/2018	—	15282.6	—	28.2	—	9469.0	—	18.4	44229.37	—
9/11/2018	616	15292.3	9.7	28.0	—	9469.0	—	18.3	44238.99	9.62
9/12/2018	—	15292.3	—	28.2	—	9469.0	—	18.4	44238.99	—
9/13/2018	—	15292.3	—	28.1	579	9476.1	7.1	18.3	44246.08	7.09
9/14/2018	—	15292.3	—	28.1	—	9476.1	—	18.3	44246.08	—
9/15/2018	676	15302.9	10.6	28.0	—	9476.1	—	18.2	44256.72	10.64
9/16/2018	—	15302.9	—	27.9	583	9483.3	7.2	18.2	44263.88	7.16
9/17/2018	—	15302.9	—	28.0	—	9483.3	—	18.3	44263.88	—
9/18/2018	675	15313.5	10.6	27.9	—	9483.3	—	18.1	44274.47	10.59
9/19/2018	—	15313.5	—	28.0	—	9483.3	—	18.3	44274.47	—
9/20/2018	—	15313.5	—	27.9	581	9490.5	7.2	18.2	44281.65	7.18
9/21/2018	—	15313.5	—	28.1	—	9490.5	—	18.3	44281.65	—
9/22/2018	618	15323.2	9.7	27.9	—	9490.5	—	18.2	44291.33	9.68
9/23/2018	—	15323.2	—	27.9	558	9497.4	6.9	18.2	44298.17	6.84
9/24/2018	—	15323.2	—	28.1	—	9497.4	—	18.3	44298.17	—
9/25/2018	634	15333.1	9.9	28.0	—	9497.4	—	18.3	44308.07	9.90
9/26/2018	—	15333.1	—	28.2	—	9497.4	—	18.5	44308.07	—
9/27/2018	—	15333.1	—	28.3	444	9502.8	5.4	18.5	44313.51	5.44
9/28/2018	—	15333.1	—	28.3	—	9502.8	—	18.6	44313.51	—
9/29/2018	836	15346.3	13.2	28.3	—	9502.8	—	18.5	44326.63	13.12
9/30/2018	—	15346.3	—	28.4	578	9509.9	7.1	18.6	44333.68	7.05
	6003		94.1		5078		62.5			154.43
AVERAGE	200				169					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8I0338

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Quality Assurance Officer
Reported: 09/21/2018 13:25

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.9
Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Courtland NY. 13045
Contact: Peter Alteri JR
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Proje** Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **		Additional Notes
	Municipal BLDG.	9-5-18	625 AM	1	DW		Na2S2O3		C10.6
	Walden Oaks BS.	9-5-18	648 AM	1	DW		"		C10-4
	Blue Creek BS	9-5-18	716 AM	1	DW		"		C10.4
	Terrace Rd well	9-5-18	~~828~~ AM	1	DW			Sodium	Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-5-18 841	Amber Schmidt	9-5-18 8:41
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

Page 4 of 4

J8I0338

Cortlandville Water, Town of

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8I0854

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 09/13/2018 09:55

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 No[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back
TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 16.6
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **										Additional Notes
	Town of Cortlandville																
	Red Apple Rt13/McLean Rd	9-11-18	7:53 AM	1	DW		Na2S2O3										Clo.4
	C-Ville Highway Garage Rt41 Polkville	9-11-18	9:23 AM	1	DW		Na2S2O3										Clo.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-11-18 9:33 AM	[signature]	9/11/18 9:31 am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N... ...tin Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back
TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.9
Therm ID

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **		Additional Notes
	Municipal BLDG.	9-5-18	625 AM	1	DW		Na2S2O3		C10.6
	Walden Oaks BS.	9-5-18	648 AM	1	DW		"		C10.4
	Blue Creek BS	9-5-18	716 AM	1	DW		"		C10.4
	Terrace Rd well	9-5-18	~~728~~ AM	1	DW			Sodium	Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-5-18 841	Amber Schmidt	9-5-18 8:41
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	08/2018 (MM YYYY)	09/05/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrac R2	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
			116.5			.6	.3	19.4		
1		819	112.7	3.8		.6	.3	19.2	off	600
2		—	112.7	—		.6	.3	14.5	oN	600
3		897	107.9	4.8		.6	.3	18.8	off	7:50
4		—	107.7	—		.6	.3	18.9	off	9:45
5		—	107.9	—		.6	.3	14.0	on	7:00
6		936	102.6	5.3		.6	.3	18.4	off	6:45
7		—	102.6	—		.6	.3	13.6	on	6:45
8		936	97.7	4.9		.6	.3	18.9	off	6:45
9		—	97.7	—		.6	.3	14.6	oN	600
10		788	93.6	4.1		.6	.3	18.7	off	740
11		—	93.6	—		.6	.3	19.9	off	845
12		—	93.6	—		.6	.3	14.9	oN	7:00
13		936	88.6	5		.6	.3	19.5	off	600
14		—	88.6	—		.6	.3	15.0	oN	600
15		936	83.4	5.2		.6	.3	19.3	off	600
16		—	83.4	—		.6	.3	14.4	oN	600
17		932	78.3	5.1		.6	.3	18.4	off	7:00
18		—	78.3	—		.6	.3	19.7	off	3:00
19		—	78.3	—		.6	.3	19.3	off	7:30
20		783	74.2	4.1		.6	.3	19.1	off	7:30
21		—	74.2	—		.6	.3	14.3	oN	6:00
22		916	69.5	4.7		.6	.3	18.8	off	7:30
23		—	69.5	—		.6	.3	14.0	on	6:00
24		936	64.5	5.0		.6	.3	18.4	off	8:10
25		—	64.5	—		.6	.3	18.7	off	9:30
26		—	64.5	—		.6	.3	13.7	on	9:15
27		936	59.1	5.4		.6	.3	18.0	off	6:10
28		—	59.1	—		.6	.3	14.4	on	6:15
29		721	55.2	3.9		.6	.3	18.3	off	7:00
30		—	55.2	—		.6	.3	13.6	on	6:00
31		757	51.4	3.8		.6	.3	18.2	off	8:45
TOTAL		12,229								
AVG.		394								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aitch Jr. Title: W/S operator NYSDOH Operator Certification Number: NY00306446

Signature: Peter Aitch Date: 09/05/2018 Operator Grade Level: T1B

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			21633.9	
8/1/2018		819	21654.9	21.0
8/2/2018		—	21654.9	
8/3/2018		897	21677.9	23
8/4/2018		—	21677.9	—
8/5/2018		—	21677.9	—
8/6/2018		936	21701.9	24
8/7/2018		—	21701.9	—
8/8/2018		936	21725.9	24
8/9/2018		—	21725.9	—
8/10/2018		788	21746.1	20.2
8/11/2018		—	21746.1	
8/12/2018		—	21746.1	—
8/13/2018		936	21770.1	24.0
8/14/2018		—	21770.1	—
8/15/2018		936	21794.1	24.0
8/16/2018		—	21794.1	—
8/17/2018		932	21818.0	23.9
8/18/2018		—	21818.0	—
8/19/2018		—	21818.0	—
8/20/2018		783	21838.1	20.1
8/21/2018		—	21838.1	—
8/22/2018		916	21861.6	23.5
8/23/2018		—	21861.6	—
8/24/2018		936	21885.6	24
8/25/2018		—	21885.6	—
8/26/2018		—	21885.6	—
8/27/2018		936	21909.6	24
8/28/2018		—	21909.6	—
8/29/2018		721	21928.1	18.5
8/30/2018		—	21928.1	~~13.6~~
8/31/2018		~~757~~	21947.5	19.4
Total		12,229		313.6
Average		394		
Rev 11/23/16 PA				

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	08/2018 (MM YYYY)	09/05/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		—	93.4	—		.6		28.6		
2		979	89.8	3.6		.6	.3	28.6	off	615
3		—	89.8	—		.6	.3	28.7	off	630
4		1,023	84.7	5.1		.6	.3	28.6	off	7:40
5		752	82.0	2.7		.6	.3	27.8	on	9:30
6		—	82.0	—		.6	.3	28.5	off	7:10
7		1.091	76.9	5.1		.6	.3	26.5	on	7:18
8		—	76.9	—		.6	.3	28.4	off	7:08
9		1380	71.7	5.2		.6	.3	27.2	on	7:00
10		—	71.7	—		.6	.3	27.3	off	645
11		1036	66.1	5.6		.6	.3	26.4	on	730
12		840	63.5	2.6		.6	.3	28.3	off	900
13		—	63.5	—		.6	.3	28.4	off	7:00
14		1072	58.4	5.1		.6	.3	28.2	off	615
15		—	58.4	—		.6	.3	28.4	off	615
16		950	54.9	3.5		.6	.3	28.5	off	615
17		—	54.9	—		.6	.3	28.6	off	615
18		1060	49.9	5.0		.6	.3	27.3	on	12:30
19		1,245	45.2	4.7		.6	.3	27.9	on	3:00
20		—	45.2	—		.6	.3	28.5	off	7:45
21		1034	40.4	4.8		.6	.3	26.9	on	9:30
22		—	40.4	—		.6	.3	28.6	off	6:00
23		654	37.7	2.7		.6	.3	28.9	off	7:30
24		—	37.7	—		.6	.3	28.8	off	6:10
25		599	35.0	2.7		.6	.3	28.9	off	8:00
26		513	33.2	1.8		.6	.3	28.8	off	9:15
27		—	33.2	—		.6	.3	28.8	off	9:25
28		776	29.3	3.9		.6	.3	28.8	off	6:00
29		—	29.3	—		.6	.3	28.6	off	6:30
30		605	27.1	2.2		.6	.3	28.7	off	7:15
31		—	27.1	—		.6	.3	28.6	off	6:10
TOTAL		15309						28.7	off	8:50
AVG.		493								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S operator NYSDOH Operator Certification Number: NY003046

Signature: Peter Allen Date: 09/05/2018 Operator Grade Level: T3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd.	8-2-18	1	YES NO	YES NO	0.6
Walton Civic Booster Sta.	8-2-18	1	YES NO	YES NO	0.3
Blyt Creek Booster	8-2-18	1	YES NO	YES NO	0.3
Red Apple Kitchen Rd / RT 13	8-7-18	1	YES NO	YES NO	0.6
Cville Highway RT 41	8-7-18	1	YES NO	YES NO	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: ___

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health departmer the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO -

Comments: _____

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		15131.4		28.6		9349.6		18.9	43960.19	
8/1/2018	—	15131.4	—	28.6	—	9349.6	—	18.8	43960.19	—
8/2/2018	—	15131.4	—	28.7	979	9361.7	12.1	18.9	43972.24	12.05
8/3/2018	—	15131.4	—	28.6	—	9361.7	—	18.9	43972.24	—
8/4/2018	1,023	15147.5	16.1	27.8	—	9361.7	—	11.2	43988.72	16.48
8/5/2018	—	15147.5	—	28.5	752	9370.9	9.2	18.8	43997.47	8.75
8/6/2018	—	15147.5	—	26.5	—	9370.9	—	17.7	43997.47	—
8/7/2018	1,091	15164.5	17	28.4	—	9370.9	—	18.6	44014.49	17.02
8/8/2018	—	15164.5	—	27.2	—	9370.9	—	11.1	44014.49	—
8/9/2018	—	15164.5	—	27.3	1380	9387.8	16.9	18.5	44031.36	16.87
8/10/2018	—	15164.5	—	26.4	—	9387.8	—	17.6	44031.36	—
8/11/2018	1038	15180.7	16.2	28.3	—	9387.8	—	18.6	44049.42	18.06
8/12/2018	—	15180.7	—	28.4	840	9398.2	10.4	18.7	44057.89	8.47
8/13/2018	—	15180.7	—	28.2	—	9398.2	—	18.4	44057.89	—
8/14/2018	1072	15197.5	16.8	28.4	—	9398.2	—	18.7	44074.66	16.77
8/15/2018	—	15197.5	—	28.5	—	9398.2	—	18.8	44074.66	—
8/16/2018	—	15197.5	—	28.6	950	9409.9	11.7	18.8	44086.35	11.69
8/17/2018	—	15197.5	—	27.3	—	9409.9	—	18.5	44086.35	—
8/18/2018	1060	15214.4	16.9	27.9	—	9409.9	—	18.6	44102.82	16.47
8/19/2018	—	15214.4	[illegible]	28.5	1245	9425.6	15.7	18.8	44117.98	15.16
8/20/2018	—	15214.4	—	26.7	—	9425.6	—	17.9	44117.98	—
8/21/2018	1031	15230.6	16.2	28.6	—	9425.6	—	18.9	44134.16	16.18
8/22/2018	—	15230.6	—	28.9	—	9425.6	—	19.1	44134.16	—
8/23/2018	—	15230.6	—	28.8	654	9433.6	8.0	19.0	44142.13	7.97
8/24/2018	—	15230.6	—	28.9	—	9433.6	—	19.1	44142.13	—
8/25/2018	549	15240.1	9.5	28.8	—	9433.6	—	19.0	44151.52	9.39
8/26/2018	—	15240.1	—	28.8	513	9439.9	6.3	19.0	44157.82	6.3
8/27/2018	—	15240.1	—	28.8	—	9439.9	—	19.0	44157.82	—
8/28/2018	776	15252.2	12.1	28.6	—	9439.9	—	18.9	44169.95	12.13
8/29/2018	—	15252.2	—	28.7	—	9439.9	—	19.0	44169.95	—
8/30/2018	—	15252.2	—	28.6	605	9447.4	7.5	18.9	44177.45	7.50
8/31/2018	—	15252.2	—	28.7	—	9447.4	—	19.0	44177.45	—
	7691		120.8		7918		92.8			217.26
AVERAGE	248				255					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8H0424

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/02/2018
Reported: 08/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J8H0424-01
Collected By: JM-Client
Collection Date: 08/02/2018 7:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH
Escherichia coli	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/02/18 0710	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8H0424-02
Collected By: JM-Client
Collection Date: 08/02/2018 7:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH
Escherichia coli	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		08/02/18 0727	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8H0424

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8H0424-03	**Collection Date:**	08/02/2018 7:55

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH
Escherichia coli	Absent			in 100mL		08/02/18 1702	08/03/18 1118	EXH

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		08/02/18 0755	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Environmental Operations Manager
Reported: 08/05/2018 21:21

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8H0721

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/07/2018
Reported: 08/09/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13 McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J8H0721-01
Collected By: JM-Client
Collection Date: 08/07/2018 8:54

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/07/18 1903	08/08/18 1327	EDB
Escherichia coli	Absent			in 100mL		08/07/18 1903	08/08/18 1327	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/07/18 0854	CUS

Client Sample ID: C-Ville Highway Garage - Rt. 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8H0721-02
Collected By: JM-Client
Collection Date: 08/07/2018 10:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/07/18 1903	08/08/18 1327	EDB
Escherichia coli	Absent			in 100mL		08/07/18 1903	08/08/18 1327	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		08/07/18 1030	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8H0721

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 08/09/2018 12:28

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 Nor[illegible]in Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 4.7
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Red Apple Rt13/McLean Rd	8-7-18	854AM	1	DW		Na2S2O3	C10.6
	C-ville Highway Garage Rt 41 Polkville	8-7-18	1030 AM	1	DW		"	C10.3

J8H0721

Cortlandville Water, Town of

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-7-18 1101 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			8/7/16 11:01am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 15.5

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT	Additional Notes
	Municipal BLDG.	8-2-18	710 AM	1	DW		Na2S2O3		C10.6
	Walden Oaks BS	8-2-18	727 AM	1	DW		"		C10.3
	Blue Creek BS.	8-2-18	755 AM	1	DW		"		C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-2-18 8:14am		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			8-2-18 8:14am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2018 (MM YYYY)	08/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
	Lime Hollow well		47.0					29.5		
1		574	44.3	2.7		.6	.3	29.4	off	7:30
2		—	44.3	—		.6	.3	29.4	off	7:00
3		824	39.5	4.8		.6	.3	29.4	off	9:15
4		—	39.5	—		.6	.3	29.4	off	7:00
5		540	37.0	2.5		.6	.3	29.3	off	6:15
6		—	37.0	—		.6	.3	29.3	off	2:00
7		589	32.8	4.2		.6	.3	28.1	on	9:45
8		623	30.6	2.2		.6	.3	29.1	off	6:45
9		—	30.6	—		.6	.3	27.0	on	6:15
10		1,059	24.4	6.2		.6	.3	28.8	off	7:00
11		—	24.4	—		.6	.3	28.8	off	6:45
12		848	20.5	3.9		.6	.3	28.7	off	6:15
13		—	20.5	—		.6	.3	28.5	off	8:30
14		1,066	13.9	6.6		.6	.3	28.4	off	8:40
15		869	10.3	3.6		.6	.3	28.3	off	7:20
16		—	10.3	—		.6	.3	26.4	on	6:45
17		1,058	124.2	5.7		.6	.3	28.4	off	6:30
18		—	124.2	—		.6	.3	28.5	off	6:15
19		832	121.2	3.0		.6	.3	28.6	off	6:15
20		—	121.2	—		.6	.3	28.4	off	9:30
21		1,075	116.3	4.9		.6	.3	28.4	off	9:15
22		705	114.0	2.3		.6	.3	28.4	off	8:00
23		—	114.0	—		.6	.3	28.2	off	7:30
24		1,044	109.1	4.9		.6	.3	28.3	off	8:00
25		—	109.1	—		.6	.3	28.4	off	7:15
26		923	105.5	3.6		.6	.3	28.6	off	6:15
27		—	105.5	—		.6	.3	28.7	off	9:00
28		1036	100.7	5.2		.6	.3	28.6	off	8:00
29		670	98.2	2.5		.6	.3	28.6	off	7:15
30		—	98.2	—		.6	.3	28.6	off	6:15
31		1037	93.4	4.8		.6	.3	28.6	off	6:30
TOTAL		15372								
AVG.		496								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0036046

Signature: Peter Allen Date: 8/1/2018 Operator Grade Level: III

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		14993.8		29.5		9268.5		19.7	4374190	
7/1/2018	—	14993.8	—	29.4	574	9275.6	7.1	19.6	43748.93	7.03
7/2/2018	—	14993.8	—	29.4	—	9275.6	—	19.6	43748.93	—
7/3/2018	824	15006.8	13.0	29.4	—	9275.6	—	19.6	43761.84	12.91
7/4/2018	—	15006.8	—	29.4	—	9275.6	—	19.7	43761.84	—
7/5/2018	—	15006.8	—	29.3	540	9282.2	6.6	19.6	43768.46	6.62
7/6/2018	—	15006.8	—	29.3	—	9282.2	—	19.6	43768.46	—
7/7/2018	589	15016.0	9.2	28.1	—	9282.2	—	11.8	43779.43	10.97
7/8/2018	—	15016.0	—	29.1	623	9289.8	7.6	19.3	43785.30	5.87
7/9/2018	—	15016.0	—	27.0	—	9289.8	—	18.3	43785.30	—
7/10/2018	1,059	15032.5	16.5	28.8	—	9289.8	—	18.8	43801.79	16.49
7/11/2018	—	15032.5	—	28.8	—	9289.8	—	19.1	43801.79	—
7/12/2018	—	15032.5	—	28.7	848	9300.3	10.5	18.9	43812.23	10.44
7/13/2018	—	15032.5	—	28.5	—	9300.3	—	18.7	43812.23	—
7/14/2018	1,066	15049.2	16.7	28.4	—	9300.3	—	18.6	43829.92	17.69
7/15/2018	—	15049.2	—	28.3	869	9311.0	10.7	18.5	43839.55	9.63
7/16/2018	—	15049.2	—	26.4	—	9311.0	—	17.7	43839.55	—
7/17/2018	1,058	15065.7	16.5	28.4	—	9311.0	—	18.7	43856.06	16.51
7/18/2018	—	15065.7	—	28.5	—	9311.0	—	18.8	43856.06	—
7/19/2018	—	15065.7	—	28.6	832	9321.3	10.3	18.8	43866.32	10.26
7/20/2018	—	15065.7	—	28.4	—	9321.3	—	18.6	43866.32	—
7/21/2018	1,075	15082.5	16.8	28.4	—	9321.3	—	18.7	43883.87	17.55
7/22/2018	—	15082.5	—	28.4	705	9329.9	8.6	18.7	43891.78	7.91
7/23/2018	—	15082.5	—	28.2	—	9329.9	—	18.5	43891.78	—
7/24/2018	1,044	15098.4	16.4	28.3	—	9329.9	—	18.6	43908.15	16.37
7/25/2018	—	15098.9	—	28.4	—	9329.9	—	18.7	43908.15	—
7/26/2018	—	15098.9	—	28.6	923	9341.4	11.5	18.8	43919.56	11.41
7/27/2018	—	15098.9	—	28.7	—	9341.4	—	18.9	43919.56	—
7/28/2018	1036	15115.2	16.3	28.6	—	9341.4	—	18.9	43935.78	16.22
7/29/2018	—	15115.2	—	28.7	670	9349.6	8.2	18.8	43943.97	8.19
7/30/2018	—	15115.2	—	28.6	—	9349.6	—	18.8	43943.97	—
7/31/2018	1037	15131.4	16.2	28.6	—	9349.6	—	18.9	43960.19	16.22
	8788,000		142.6		6584		81.1			216.29
AVERAGE	283				212					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2018 (MM YYYY)	08/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace R2	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/Off	Time
1		—	26.2			.6	.3	18.3		
2		936	21.1	5.1		.6	.3	13.7	on	6:30
3		—	21.1	—		.6	.3	19.3	off	6:30
4		663	18.0	3.1		.6	.3	15.0	on	900
5		—	18.0	—		.6	.3	19.2	off	6:30
6		803	14.5	3.5		.6	.3	14.7	on	6:00
7		—	14.5	—		.6	.3	19.1	off	9:15
8		—	14.5	—		.6	.3	19.1	off	10:00
9		936	10.1	4.4		.6	.3	14.2	on	6:30
10		—	10.1	—		.6	.3	18.6	off	6:00
11		936	5.7	4.4		.6	.3	13.9	on	6:30
12		—	5.7	—		.6	.3	18.2	off	6:30
13		936	3.0	2.7		.6	.3	13.6	on	6:00
14		—	2.9	—		.6	.3	17.9	off	8:45
15		—	146.4	—		.6	.3	18.1	off	9:00
16		912	142.1	4.3		.6	.3	13.2	on	7:00
17		—	142.1	—		.6	.3	19.5	off	6:30
18		936	138.2	3.9		.6	.3	15.9	on	6:00
19		—	138.2	—		.6	.3	20.1	off	6:00
20		936	133.6	4.6		.6	.3	15.2	on	6:00
21		—	133.6	—		.6	.3	19.5	off	9:30
22		—	133.6	—		.6	.3	19.5	off	8:00
23		936	129.2	4.4		.6	.3	14.6	on	8:00
24		—	129.2	—		.6	.3	19.1	off	2:15
25		764	125.4	3.8		.6	.3	16.1	on	8:00
26		—	125.4	—		.6	.3	20.8	off	7:00
27		936	121.0	4.4		.6	.3	16.3	on	6:00
28		—	121.0	—		.6	.3	20.6	off	845
29		—	121.0	—		.6	.3	20.5	off	745
30		936	116.5	4.5		.6	.3	15.6	on	7:00
31		—	116.5	—		.6	.3	19.7	off	600
TOTAL		11,566						19.4	off	600
AVG.		373								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen, Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0030046

ure: Peter Allen Date: 08/01/2018 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	7-10-15	1	YES NO	YES NO	0.6
Walden Oaks Booster STA.	7-10-15	1	YES NO	YES NO	0.5
Blue Creek Booster STA.	7-10-15	1	YES NO	YES NO	0.4
Rec Apple Mclean / 2713	7-17-15	1	YES NO	YES NO	0.6
Quilic Highway RT 41	7-17-15	1	YES NO	YES NO	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: <1000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System." copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MICROBAC.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments:

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			21337.3	
7/1/2018		—	21337.3	—
7/2/2018		936	24361.3	24
7/3/2018		—	21361.3	—
7/4/2018		663	21378.3	17
7/5/2018		—	21378.3	—
7/6/2018		803	21398.9	20.6
7/7/2018		—	21398.9	—
7/8/2018		—	21398.9	—
7/9/2018		936	21422.9	24
7/10/2018		—	21422.9	—
7/11/2018		936	21446.9	24
7/12/2018		—	21446.9	—
7/13/2018		936	21470.9	24
7/14/2018		—	21470.9	—
7/15/2018		—	21470.9	—
7/16/2018		912	21494.3	23.4
7/17/2018		—	21494.3	—
7/18/2018		936	21518.3	24
7/19/2018		—	21518.3	—
7/20/2018		936	21542.3	24
7/21/2018		—	21542.3	—
7/22/2018		—	21542.3	—
7/23/2018		936	21566.3	24
7/24/2018		—	21566.3	—
7/25/2018		764	21585.9	19.6
7/26/2018		—	21585.9	—
7/27/2018		936	21609.9	24.0
7/28/2018		—	21609.9	—
7/29/2018		—	21609.9	—
7/30/2018		936	21633.9	24.0
7/31/2018		~~936~~	21633.9	
Total		11,566		
Average		373		296.6
Rev 11/23/16 PA				

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8G0750

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/10/2018
Reported: 07/12/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J8G0750-01
Collected By: JM-Client
Collection Date: 07/10/2018 6:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB
Escherichia coli	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB

Analyses Performed by: Customer

. .eld Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/10/18 0645	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8G0750-02
Collected By: JM-Client
Collection Date: 07/10/2018 7:07

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB
Escherichia coli	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/10/18 0707	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8G0750

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8G0750-03	**Collection Date:**	07/10/2018 7:36

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB
Escherichia coli	Absent			in 100mL		07/10/18 1810	07/11/18 1247	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		07/10/18 0736	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

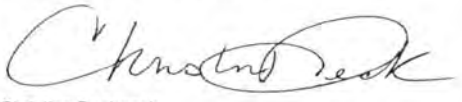
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Christine Pechacek
Environmental Operations Manager
Reported: 07/12/2018 23:56

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8G1479

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/17/2018
Reported: 07/19/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13- Mclean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J8G1479-01
Collected By: JM-Client
Collection Date: 07/17/2018 8:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/17/18 1830	07/18/18 1237	EXH
Escherichia coli	Absent			in 100mL		07/17/18 1830	07/18/18 1237	EXH

Analyses Performed by: Customer

.eld Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/17/18 0850	CUS

Client Sample ID: Cville High Way Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8G1479-02
Collected By: JM-Client
Collection Date: 07/17/2018 10:44

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/17/18 1830	07/18/18 1237	EXH
Escherichia coli	Absent			in 100mL		07/17/18 1830	07/18/18 1237	EXH

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		07/17/18 1044	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8G1479

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 07/19/2018 17:05

MICI AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 M ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.3

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland Villc

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Proje Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Red Apple Rt13/McLean Rd	7-17-18	850AM	1	DW		Na2S203	1	C10.6
	Cville High Way Garage Rt41 Polkville	7-17-18	1044AM	1	DW		Na2S203	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-17-18 1100AM	Dorothy MacNeil	7-17-18 1100am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]tin Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 13.2
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey MacLean
Sampler Signature: Jeffrey MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT	Additional Notes
	Municipal BLDG.	7-10-18	6:45AM	1	DW	Grab	Na2S2O3	1	C1 0.6
	Walden Oaks BS.	7-10-18	7:07AM	1	DW	Grab	Na2S2O3	1	C1 0.5
	Blue Creek BS	7-10-18	7:36AM	1	DW	Grab	Na2S2O3	1	C1 0.4

Cortlandville Water, Town of
J8G0750

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive
Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey MacLean	7-10-18 801AM	[signature]	7-10-18 8:01AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2018 (MM YYYY)	07/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
			80.0			.6				
1		885	75.8	4.2		.6	.3	19.9	off	8:15
2		—	75.8	—		.6	.3	19.9	off	8:30
3		—	75.8	—		.6	.3	15.2	on	7:30
4		874	72.0	3.8		.6	.3	19.7	off	6:15
5		—	72.0	—		.6	.3	15.3	on	6:15
6		807	68.3	3.7		.6	.3	19.5	off	6:45
7		—	68.3	—		.6	.3	15.1	on	6:00
8		936	63.6	4.7		.6	.3	19.4	off	915
9		—	63.6	—		.6	.3	19.5	off	915
10		—	63.6	—		.6	.3	14.8	on	7:00
11		936	59.1	4.5		.6	.3	19.2	off	715
12		—	59.1	—		.6	.3	15.0	on	700
13		753	55.4	3.7		.6	.3	19.3	off	700
14		—	55.4	—		.6	.3	14.6	on	700
15		829	51.0	4.4		.6	.3	19.1	off	8:45
16		—	51.0	—		.6	.3	19.1	off	8:45
17		—	51.0	—		.6	.3	14.5	on	8:45
18		936	46.1	4.9		.6	.3	18.9	off	6:00
19		—	46.1	—		.6	.3	15.2	on	6:15
20		713	43.0	3.1		.6	.3	18.7	off	6:30
21		—	43.0	—		.6	.3	14.0	on	6:00
22		936	38.4	4.6		.6	.3	18.6	off	8:50
23		—	38.4	—		.6	.3	18.6	off	8:00
24		—	38.4	—		.6	.3	14.0	on	7:00
25		900	34.3	4.1		.6	.3	18.4	off	7:30
26		—	34.3	—		.6	.3	13.9	on	7:00
27		772	30.5	3.8		.6	.3	18.5	off	7:30
28		—	30.5	—		.6	.3	14.0	on	6:00
29		862	26.2	4.3		.6	.3	18.2	off	850
30		—	26.2	—		.6	.3	18.3	off	830
31										
TOTAL		11136								
AVG.		371								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0030046

Signature: Peter Alteri Date: 7/2/18 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd. Munic(pal Bldg	6-13-18	1	YES NO	YES NO	0.6
Walden Oaks Booster	6-13-18	1	YES NO	YES NO	0.5
Blue Creek Booster	6-13-18	1	YES NO	YES NO	0.4
Red Apple RT 13/McLean Rd	6-19-18	1	YES NO	YES NO	0.5
Coille High Way RT 41	6-19-18	1	YES NO	YES NO	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Mcclean.

Name of NYSDOH Certified Laboratory: Microbac LABS.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2018 (MM YYYY)	07/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/Off	Time
1	Lime/Hollow well	—	107.1	—		.6	.3	31.9	off	8:05
2		645	102.9	4.2		.6	.3	31.8	off	8:30
3		583	100.0	2.9		.6	.3	31.7	off	7:30
4		—	100.0	—		.6	.3	31.7	off	6:50
5		660	95.9	4.1		.6	.3	31.6	off	7:30
6		—	95.9	—		.6	.3	31.6	off	7:00
7		541	93.2	2.7		.6	.3	31.5	off	6:10
8		—	93.2	—		.6	.3	31.4	off	900
9		702	87.7	5.5		.6	.3	31.3	off	930
10		571	85.9	1.8		.6	.3	31.2	off	7:15
11		—	85.9	—		.6	.3	31.1	off	730
12		767	80.9	5.0		.6	.3	31.0	off	730
13		—	80.9	—		.6	.3	31.0	off	730
14		632	78.0	2.9		.6	.3	30.9	off	7:30
15		—	78.0	—		.6	.3	30.9	off	8:30
16		654	74.2	3.8		.6	.3	30.7	off	8:30
17		631	71.3	2.9		.6	.3	30.6	off	8:50
18		—	71.3	—		.6	.3	30.6	off	6:10
19		718	67.1	4.2		.6	.3	30.4	off	6:30
20		—	67.1	—		.6	.3	30.4	off	6:45
21		707	63.8	3.3		.6	.3	30.3	off	6:15
22		—	63.8	—		.6	.3	30.3	off	8:50
23		599	60.3	3.5		.6	.3	30.1	off	8:40
24		556	57.8	2.5		.6	.3	30.0	off	7:00
25		—	57.8	—		.6	.3	30.0	off	7:30
26		656	53.9	3.9		.6	.3	29.8	off	8:00
27		—	53.9	—		.6	.3	29.9	off	6:00
28		593	51.2	2.7		.6	.3	29.7	off	6:15
29		—	51.2	—		.6	.3	29.6	off	910
30		738	47.0	4.2		.6	.3	29.5	off	845
31										
TOTAL		10,953								
AVG.		365								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY00330046

Signature: Peter Allen Date: 7/2/18 Operator Grade Level: 1B

Terrace Rd Well Daily Pump Record

Location	Terrace Rd Well			
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			21049.4	
6/1/2018		885	21072.1	22.7
6/2/2018		—	21072.1	—
6/3/2018		—	21072.1	—
6/4/2018		874	21094.5	22.4
6/5/2018		—	21094.5	—
6/6/2018		807	21115.2	20.7
6/7/2018		—	21115.2	15.1
6/8/2018		936	21139.2	24.0
6/9/2018		—	21139.2	—
6/10/2018		—	21139.2	—
6/11/2018		936	21163.2	24.0
6/12/2018		—	21163.2	—
6/13/2018		753	21182.5	19.3
6/14/2018		—	21182.5	—
6/15/2018		827	21206.0	23.5
6/16/2018		—	21206.0	—
6/17/2018		—	21206.0	—
6/18/2018		936	21230.0	24
6/19/2018		—	21230.0	—
6/20/2018		713	21248.3	18.3
6/21/2018		—	21248.3	—
6/22/2018		936	21272.3	24
6/23/2018		—	21272.3	—
6/24/2018		—	21272.3	—
6/25/2018		900	21295.4	23.1
6/26/2018		—	21295.4	—
6/27/2018		772	21315.2	19.8
6/28/2018		—	21315.2	—
6/29/2018		862	21337.3	22.1
6/30/2018		—	21337.3	—
Total		11,136		287.9
Average		371		
Rev 11/23/16 PA				

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		14898.0		31.9		9209.7		22.1	43587.54	
6/1/2018	—	14898.0	—	31.9	—	9209.7	—	22.2	43587.54	—
6/2/2018	645	14908.1	10.1	31.8	—	9209.7	—	22.0	43597.58	10.04
6/3/2018	—	14908.1	—	31.7	583	9216.7	7.0	21.9	43604.65	7.07
6/4/2018	—	14908.1	—	31.7	—	9216.7	—	22.0	43604.65	—
6/5/2018	660	14918.3	10.2	31.6	—	9216.7	—	22.0	43614.88	10.23
6/6/2018	—	14918.3	—	31.6	—	9216.7	—	21.8	43614.88	—
6/7/2018	—	14918.3	—	31.5	541	9223.3	6.6	21.7	43621.46	6.58
6/8/2018	—	14918.3	—	31.4	—	9223.3	—	21.6	43621.46	—
6/9/2018	702	14929.3	11.0	31.3	—	9223.3	—	21.5	43632.39	10.93
6/10/2018	—	14929.3	—	31.2	571	9230.3	7.0	21.4	43639.33	6.94
6/11/2018	—	14929.3	—	31.1	—	9230.3	—	21.3	43639.33	—
6/12/2018	767	14941.3	12.0	31.0	—	9230.3	—	21.2	43651.26	11.93
6/13/2018	—	14941.3	—	31.0	—	9230.3	—	21.2	43651.26	—
6/14/2018	—	14941.3	—	30.9	632	9238.0	7.7	21.1	43659.00	7.74
6/15/2018	—	14941.3	—	30.9	—	9238.0	—	21.1	43659.00	—
6/16/2018	654	14951.4	10.1	30.7	—	9238.0	—	20.9	43669.15	10.15
6/17/2018	—	14951.4	—	30.6	631	9245.7	7.7	20.8	43676.83	7.68
6/18/2018	—	14951.4	—	30.6	—	9245.7	—	20.9	43676.83	—
6/19/2018	718	14962.6	11.2	30.4	—	9245.7	—	20.6	43688.00	11.17
6/20/2018	—	14962.6	—	30.4	—	9245.7	—	20.6	43688.00	—
6/21/2018	—	14962.6	—	30.3	707	9254.5	8.8	20.5	43696.70	8.70
6/22/2018	—	14962.6	—	30.3	—	9254.5	—	20.5	43696.70	—
6/23/2018	599	14972.0	9.4	30.1	—	9254.5	—	20.3	43706.09	9.36
6/24/2018	—	14972.0	—	30.0	556	9261.3	6.8	20.2	43712.87	6.78
6/25/2018	—	14972.0	—	30.0	—	9261.3	—	20.2	43712.87	—
6/26/2018	656	14982.3	10.3	29.8	—	9261.3	—	20.1	43723.09	10.22
6/27/2018	—	14982.3	—	29.9	—	9261.3	—	20.1	43723.09	—
6/28/2018	—	14982.3	—	29.7	593	9268.5	7.2	19.9	43730.34	7.25
6/29/2018	—	14982.3	—	29.6	—	9268.5	—	19.9	43730.34	—
6/30/2018	738	14993.8	11.5	29.5	—	9268.5	—	19.7	43741.90	11.86
	6139		95.8		4814		158.8			154.36
AVERAGE	205				160					

Rev: 1/2015

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8F1299

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/19/2018
Reported: 06/21/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13 Mclean Road
Sample Matrix: Drinking Water
Lab Sample ID: J8F1299-01
Collected By: JM-Client
Collection Date: 06/19/2018 8:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/19/18 1831	06/20/18 1300	EDB
Escherichia coli	Absent			in 100mL		06/19/18 1831	06/20/18 1300	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/19/18 0845	CUS

Client Sample ID: C-Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8F1299-02
Collected By: JM-Client
Collection Date: 06/19/2018 9:31

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/19/18 1831	06/20/18 1300	EDB
Escherichia coli	Absent			in 100mL		06/19/18 1831	06/20/18 1300	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		06/19/18 0931	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8F0914

Client Sample ID:	Walden Oaks B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8F0914-03	**Collection Date:**	06/13/2018 9:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB
Escherichia coli	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/13/18 0920	CUS

Client Sample ID:	Blue Creek B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8F0914-04	**Collection Date:**	06/13/2018 9:51

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ethod: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB
Escherichia coli	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		06/13/18 0951	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8F0914

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/13/2018
Reported: 06/21/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Well Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J8F0914-01
Collected By: JM-Client
Collection Date: 06/13/2018 8:15

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4/EPA 200.7, Rv 4.4								
Sodium	63.7		0.100	mg/L		06/18/18 1739	06/19/18 2029	NSF

Client Sample ID: Municipal BLDG.
Sample Matrix: Drinking Water
Lab Sample ID: J8F0914-02
Collected By: JM-Client
Collection Date: 06/13/2018 8:23

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB
Escherichia coli	Absent			in 100mL		06/13/18 1730	06/14/18 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/13/18 0823	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8F1299

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Environmental Operations Manager
Reported: 06/21/2018 14:26

6 of 7

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 Nor ain Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 16.4

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSI

Town of Cortlandville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix (BACT.)	Grab/ Comp	Preservative Types **	Additional Notes
	Red Apple Rt 13 McLean Rd	6-19-18	845AM	1	DW	1	Na2S203	C10.5
	C-Ville Highway Garage Rt 41 Polkville	6-19-18	931AM	1	DW	1	Na2S203	C10.3

J8F12999

Cortlandville Water, Town of

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-19-18 952AM	Dorothy Mosher	6-19-18 9:52am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8F0914

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Environmental Operations Manager
Reported: 06/21/2018 14:34

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back
TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 12.1
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Sodium	BAET								Additional Notes
	Town of Cortlandville																
	Municipal Well Terrace Rd	6-13-18	815 AM	1	—		—	1									Raw Water
	Municipal BLDG.	6-13-18	823 AM	1					1								C10.6
	Walden Oaks B.S.	6-13-18	920 AM	1					1								C10.5
	Blue Creek B.S.	6-13-18	951 AM	1					1								C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-13-18 10:16am	Dorothy McAuliff	6-13-18 10:16am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ___ of ___

rev 12/26/2017

Page 4 of 4

J8F0914

Cortlandville Water, Town of

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05/2018 (MM YYYY)	06/04/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	133.1	—		.6	.3	17.4	ON	8:00
2		772	129.0	4.1		.6	.3	21.6	off	7:30
3		—	129.0	—		.6	.3	17.1	on	8:00
4		936	124.5	4.5		.6	.3	21.5	off	9:30
5		—	124.5	—		.6	.3	21.7	off	9:00
6		—	124.5	—		.6	.3	17.0	on	6:30
7		780	121.1	3.4		.6	.3	21.3	off	600
8		—	121.1	—		.6	.3	16.6	ON	700
9		862	116.7	4.4		.6	.3	21.0	off	700
10		—	116.7	—		.6	.3	16.3	ON	700
11		936	113.6	3.1		.6	.3	20.7	off	6:30
12		—	113.6	—		.6	.3	20.8	off	6:30
13		—	113.6	—		.6	.3	16.1	on	7:45
14		936	108.9	4.7		.6	.3	20.5	off	6:00
15		—	108.9	—		.6	.3	16.2	on	6:30
16		835	105.0	3.9		.6	.3	20.4	off	7:13
17		—	105.0	—		.6	.3	15.8	ON	600
18		725	101.5	3.5		.6	.3	20.3	off	8:20
19		—	101.5	—		.6	.3	20.6	off	9:50
20		—	101.5	—		.6	.3	15.9	ON	6:45
21		936	97.1	4.4		.6	.3	20.2	off	6:10
22		—	97.1	—		.6	.3	16.4	on	6:30
23		807	93.4	3.7		.6	.3	20.7	off	6:00
24		—	93.4	—		.6	.3	16.4	ON	600
25		936	88.5	4.9		.6	.3	20.5	off	8:00
26		—	88.5	—		.6	.3	20.5	off	10:00
27		—	88.5	—		.6	.3	15.6	ON	9:00
28		936	84.0	4.5		.6	.3	20.2	off	7:30
29		—	84.0	—		.6	.3	15.8	ON	7:00
30		799	80.0	4.0		.6	.3	20.0	off	7:30
31		—	80.0	—		.6	.3	15.6	ON	600
TOTAL		11196,000								
AVG.		361,000								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aiteri Jr- Title: W/S operator NYSDOH Operator Certification Number: NY0030046

Signature: [signature] Date: 6/4/2018 Operator Grade Level: T3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal 315 Terrace Rd	5-1-15	1	YES [NO]	YES [NO]	0.6
Walton Oaks Booster Sta	5-1-15	1	YES [NO]	YES [NO]	0.5
Blue Circle Booster	5-1-15	1	YES [NO]	YES [NO]	0.4
Red Apple Market / RT 13	5-9-15	1	YES [NO]	YES [NO]	0.6
Clyde Highway RT 41	5-9-15	1	YES [NO]	YES [NO]	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health departmer the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac LABS

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			20761.7	
5/1/2018		—	20761.7	—
5/2/2018		772	20781.5	19.8
5/3/2018		—	20781.5	—
5/4/2018		936	20805.5	24
5/5/2018		—	20805.5	—
5/6/2018		—	20805.5	—
5/7/2018		780	20825.5	20.0
5/8/2018		—	20825.5	—
5/9/2018		862	20847.6	22.1
5/10/2018		—	20847.6	—
5/11/2018		936	20871.6	24
5/12/2018		—	20871.6	—
5/13/2018		—	20871.6	—
5/14/2018		936	20895.6	24
5/15/2018		—	20895.6	—
5/16/2018		835	20917.0	21.4
5/17/2018		—	20917.6	—
5/18/2018		725	20936.2	18.6
5/19/2018		—	20936.2	—
5/20/2018		—	20936.2	—
5/21/2018		936	20960.2	24
5/22/2018		—	20960.2	—
5/23/2018		807	20980.9	20.7
5/24/2018		—	20980.9	—
5/25/2018		936	21004.9	24
5/26/2018		—	21004.9	—
5/27/2018		—	21004.9	—
5/28/2018		936	21028.9	24
5/29/2018		—	21028.9	—
5/30/2018		799	21049.4	20.5
5/31/2018		—	21049.4	—
Total		11196,000		287.7
Average		361,000		~~28~~
Rev 11/23/16 PA				

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05/2018 (MM YYYY)	06/04/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination
Public Water System ID: NY 1101755 L.H	County: Cortland	Town, Village or City: Cortlandville	

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous – Cylinder weight (lbs.)	Chlorination: Gaseous – Chlorine used per day (lbs.)	Chlorination: Liquid – Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			12.1					34.0		
1	Lime Hollow well	701	8.4	3.7		.6	.3	33.8	off	8:00
2	—	—	8.4	—		.6	.3	33.8	off	7:30
3		576	6.5	2.9		.6	.3	33.8	off	6:15
4		—	5.5	—		.6	.3	33.8	off	9:00
5		697	2.0	3.5		.6	.3	33.6	off	9:00
6		585	155.4	2.4		.6	.3	33.5	off	6:45
7		—	155.4	—		.6	.3	33.5	off	6:30
8		660	151.2	4.2		.6	.3	33.4	off	8:30
9		—	151.2	—		.6	.3	33.4	off	7:45
10		526	149.0	2.2		.6	.3	33.3	off	7:15
11		—	149.0	—		.6	.3	33.2	off	6:00
12		664	144.7	4.3		.6	.3	33.1	off	6:45
13		535	142.1	2.6		.6	.3	33.0	off	8:00
4		—	142.1	—		.6	.3	32.9	off	6:30
5		681	137.8	4.3		.6	.3	32.8	off	7:00
16		—	137.8	—		.6	.3	32.8	off	7:30
17		552	135.1	2.7		.6	.3	32.7	off	6:15
18		—	135.1	—		.6	.3	32.7	off	8:10
19		601	131.2	3.9		.6	.3	31.5	on	9:40
20		533	128.6	2.6		.6	.3	32.4	off	6:30
21		—	128.6	—		.6	.3	32.4	off	6:00
22		640	126.2	2.4		.6	.3	32.4	off	6:50
23		—	126.2	—		.6	.3	32.4	off	6:10
24		538	121.8	5.6		.6	.3	32.3	off	6:15
25		—	121.8	—		.6	.3	32.3	off	8:30
26		695	117.4	4.4		.6	.3	32.2	off	10:00
27		499	114.9	2.5		.6	.3	32.2	off	9:30
28		—	114.9	—		.6	.3	32.2	off	7:30
29		687	110.6	4.3		.6	.3	32.0	off	7:15
30		—	110.6	—		.6	.3	32.0	off	7:30
31		711	107.1	3.5		.6	.3	31.9	off	6:15
TOTAL		11,081,000								
AVG.		357								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aiken Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0030046

ure: Peter Aiken Date: 6/4/18 Operator Grade Level: IB

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		14804.5		34.0		9148.1		24.1	4343282	
5/1/2018	701	14815.3	10.8	33.8	—	9148.1	—	24.0	43443.60	10.78
5/2/2018	—	14815.3	—	33.8	—	9148.1	—	24.0	43443.60	—
5/3/2018	—	14815.3	—	33.8	576	9155.2	7.1	24.0	43456.67	7.07
5/4/2018	—	14815.3	—	33.8	—	9155.2	—	24.0	43450.67	—
5/5/2018	697	14826.2	10.9	33.6	—	9155.2	—	23.8	43461.46	10.79
5/6/2018	—	14826.2	—	33.5	585	9162.3	7.1	23.7	43468.51	7.05
5/7/2018	—	14826.2	—	33.5	—	9162.3	—	23.7	43468.51	—
5/8/2018	660	14836.4	10.2	33.4	—	9162.3		23.6	43478.71	10.20
5/9/2018	—	14836.4	—	33.4	—	9162.3	—	23.6	43478.71	—
5/10/2018	—	14836.4	—	33.3	526	9168.7	6.4	23.4	43485.08	6.37
5/11/2018	—	14836.4	—	33.2	—	9168.7	—	23.4	43485.08	—
5/12/2018	664	14846.7	10.3	33.1	—	9168.7	—	23.3	43495.35	10.27
5/13/2018	—	14846.7	—	33.0	535	9175.2	6.5	23.2	43501.83	6.48
5/14/2018	—	14846.7	—	32.9	—	9175.2	—	23.1	43501.83	—
5/15/2018	681	14857.3	10.6	32.8	—	9175.2	—	23.1	43512.42	10.59
5/16/2018	—	14857.3	—	32.8	—	9175.5	—	23.0	43512.42	—
5/17/2018	—	14857.3	—	32.7	552	9181.9	6.4	22.9	43519.11	6.69
5/18/2018	—	14859.3	—	32.7	—	9181.9	—	22.9	43619.11	—
5/19/2018	601	14866.6	9.3	31.5	—	9181.9	—	14.9	43528.56	9.45
5/20/2018	—	14866.6	—	32.4	533	9188.3	6.4	22.6	43534.87	6.31
5/21/2018	—	14866.6	—	32.4	—	9188.3	—	22.6	43534.87	—
5/22/2018	640	14876.6	10	32.4	—	9188.3	—	22.6	43544.87	10
5/23/2018	—	14876.6	—	32.4	—	9188.3	—	22.6	43644.87	—
5/24/2018	—	14876.6	—	32.3	538	9194.9	6.6	22.5	43551.41	6.54
5/25/2018	—	14876.6	—	32.3	—	9194.9	—	22.5	43551.41	—
5/26/2018	695	14887.4	10.8	32.2	—	9194.9	—	22.4	43562.17	10.76
5/27/2018	—	14887.4	—	32.2	499	9201.0	6.1	22.4	43568.24	6.07
5/28/2018	—	14887.4	—	32.2	—	9201.0	—	22.4	43568.24	—
5/29/2018	687	14898.0	10.6	32.0	—	9201.0	—	22.2	43578.85	10.61
5/30/2018	—	14898.0	—	32.0	—	9201.0	—	22.2	43578.85	—
5/31/2018	—	14898.0	—	31.9	711	9209.7	8.7	22.1	43587.54	8.69
	6026		84.5		5055		61.6			154.72
AVERAGE	194				163					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8E0669

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/09/2018
Reported: 05/11/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13 Mclean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J8E0669-01
Collected By: JM-Client
Collection Date: 05/09/2018 10:17

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/09/18 1657	05/10/18 1142	EDB
Escherichia coli	Absent			in 100mL		05/09/18 1657	05/10/18 1142	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/09/18 1017	CUS

Client Sample ID: C-ville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8E0669-02
Collected By: JM-Client
Collection Date: 05/09/2018 11:29

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/09/18 1657	05/10/18 1142	EDB
Escherichia coli	Absent			in 100mL		05/09/18 1657	05/10/18 1142	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		05/09/18 1129	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8E0669

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Environmental Operations Manager
Reported: 05/11/2018 09:18

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8E0113

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/01/2018
Reported: 05/04/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG.
Sample Matrix: Drinking Water
Lab Sample ID: J8E0113-01
Collected By: Client
Collection Date: 05/01/2018 6:13

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB
Escherichia coli	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/01/18 0613	CUS

Client Sample ID: Walden Oaks B.S.
Sample Matrix: Drinking Water
Lab Sample ID: J8E0113-02
Collected By: Client
Collection Date: 05/01/2018 6:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB
Escherichia coli	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/01/18 0653	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8E0113

Client Sample ID:	Blue Creek B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J8E0113-03	**Collection Date:**	05/01/2018 7:23

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB
Escherichia coli	Absent			in 100mL		05/01/18 1915	05/02/18 1328	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		05/01/18 0000	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

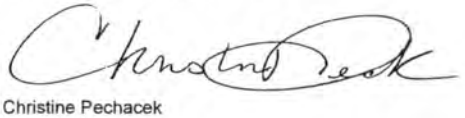
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Christine Pechacek
Operations Manager
Reported: 05/04/2018 15:37

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 No n Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECORD

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 9.9
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Town of Cortlandville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT									Additional Notes
	Red Apple Rt13/McLean Rd.	5-9-18	10:17 AM	1	DW												0106
	C-Ville Highway Garage Rt 41 Parkville	5-9-18	11:29 AM	1	DW												0103

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-9-18 11:44 AM	Dorothy Moshill	5-9-18 11:44AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 North Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 5.4
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):
Sampler Signature:
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) H

REQUESTED ANAL

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAC					Additional Notes
	Town of Cortlandville												
	Municipal BLDG.	5-1-18	613 PM	1	DW		Na2S2O3	1					c10.6
	Walden Oaks BS.	5-1-18	653 PM	1	DW		Na2S2O3	1					c10.5
	Blue Creek BS.	5-1-18	723 AM	1	DW		Na2S2O3	1					c10.4

Cortlandville Water, Town of J8E0113

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-1-18 757 PM	Dorothy Mashall	5-1-18 8:00PM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page 3 of 3

rev.12/26/2017

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 N ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECOF

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 5.4

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT):

Sampler Signature:

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BAC									Additional Notes
	Town of Cortlandville																
	Municipal BLDG.	5-1-18	613 AM	1	DW		Na2S2O3	1									C10.6
	Walden Oaks B.S.	5-1-18	653 AM	1	DW		Na2S2O3	1									C10.5
	Blue Creek B.S.	5-1-18	723 AM	1	DW		Na2S2O3	1									C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-1-18 757 AM	Dorothy Mahall	5-1-18 8:00AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8D0128

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/02/2018
Reported: 04/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J8D0128-01
Collected By: JM-Client
Collection Date: 04/02/2018 8:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB
Escherichia coli	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/02/18 0834	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8D0128-02
Collected By: JM-Client
Collection Date: 04/02/2018 8:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB
Escherichia coli	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/02/18 0856	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8D0128

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8D0128-03	**Collection Date:**	04/02/2018 9:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB
Escherichia coli	Absent			in 100mL		04/02/18 1648	04/03/18 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/02/18 0934	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 04/05/2018 11:08

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2018 (MM YYYY)	05/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		848	65.0	2.7		.6	.3	33.5	off	8:00
2		—	65.0	—		.6	.3	33.6	off	8:00
3		855	60.6	4.4		.6	.3	33.7	off	8:00
4		—	60.6	—		.6	.3	33.8	off	8:00
5		618	57.9	2.7		.6	.3	33.9	off	8:00
6		—	57.9	—		.6	.3	339	off	945
7		1026	52.7	5.2		.6	.3	33.9	off	915
8		601	50.0	2.7		.6	.3	33.9	off	715
9		—	50.0	—		.6	.3	33.9	off	715
10		1012	44.6	5.4		.6	.3	33.9	off	715
11		—	44.6	—		.6	.3	34.1	off	715
12		553	42.2	2.4		.6	.3	34.1	off	7:45
13		—	42.2	—		.6	.3	34.2	off	7:00
14		783	38.0	4.2		.6	.3	34.0	off	7:30
15		575	35.6	2.4		.6	.3	34.1	off	7:45
16		—	35.6	—		.6	.3	34.2	off	8:00
17		607	32.4	3.1		.6	.3	34.2	off	7:30
18		—	32.4	—		.6	.3	34.3	off	7:30
19		705	29.5	2.9		.6	.3	34.2	off	7:45
20		—	29.5	—		.6	.3	34.3	off	7:30
21		690	25.9	3.6		.6	.3	34.2	off	8:40
22		592	23.2	2.7		.6	.3	34.1	off	6:45
23		—	23.2	—		.6	.3	34.2	off	7:00
24		663	19.6	3.6		.6	.3	34.1	off	7:00
25		—	19.6	—		.6	.3	34.2	off	715
26		556	17.4	2.2		.6	.3	34.1	off	8:30
27		—	17.4	—		.6	.3	32.5	on	10:15
28		564	13.4	4.0		.6	.3	32.8	on	10:15
29		558	12.1	1.3		.6	.3	33.9	off	8:00
30		—	12.1	—		.6	.3	34.0	off	8:00
31										
TOTAL		11,442								
AVG.		381.4								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alter, Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 00 30046

Signature: Peter Alter Jr. Date: 5/1/2018 Operator Grade Level: IIB

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg										
4/1/2018	—	14708.9	—	33.5	848	9090.5	10.2	22.6	43279.82	7.91
4/2/2018	—	14708.9	—	33.6	—	9090.5	—	23.8	43279.82	—
4/3/2018	855	14722.1	13.2	33.7	—	9090.5	—	23.9	43293.05	13.23
4/4/2018	—	14722.1	—	33.8	—	9090.5	—	24.0	43293.05	—
4/5/2018	—	14722.1	—	33.9	618	9098.0	7.5	24.1	43300.54	7.49
4/6/2018	—	14722.1	—	33.9	—	9098.0	—	24.1	43300.54	—
4/7/2018	1026	14738.0	15.9	33.9	—	9098.0	—	24.1	43316.38	15.84
4/8/2018	—	14738.0	—	33.9	601	9105.3	7.3	24.1	43323.59	7.21
4/9/2018	—	14738.0	—	33.9	—	9105.3	—	24.1	43323.59	—
4/10/2018	1012	14753.6	15.6	33.9	—	9105.3	—	24.1	43339.18	15.59
4/11/2018	—	14753.6	—	34.1	—	9105.3	—	24.3	43339.18	—
4/12/2018	—	14753.6	—	34.1	553	9112.0	6.7	24.3	43345.87	6.69
4/13/2018	—	14753.6	—	34.2	—	9112.0	—	24.4	43345.87	—
4/14/2018	783	14765.6	12.0	34.0	—	9112.0	—	24.2	43357.83	11.96
4/15/2018	—	14765.6	—	34.1	575	9118.9	6.9	24.3	43364.74	6.91
4/16/2018	—	14765.6	—	34.2	—	9118.9	—	24.4	43364.74	—
4/17/2018	607	14774.9	9.3	34.2	—	9118.9	—	24.4	43374.07	9.33
4/18/2018	—	14774.9	—	34.3	—	9118.9	—	24.5	43374.07	—
4/19/2018	—	14774.9	—	34.2	705	9127.5	8.6	24.4	43382.66	8.59
4/20/2018	—	14774.9	—	34.3	—	9127.5	—	24.4	43382.66	—
4/21/2018	690	14785.5	10.6	34.2	—	9127.5	—	24.3	43393.29	10.63
4/22/2018	—	14785.5	—	34.1	592	9134.6	7.1	24.3	43400.41	7.12
4/23/2018	—	14785.5	—	34.2	—	9134.6	—	24.3	43400.41	—
4/24/2018	663	14795.8	10.3	34.1	—	9134.6	—	24.3	43410.65	10.24
4/25/2018	—	14795.8	—	34.2	—	9134.6	—	24.3	43410.65	—
4/26/2018	—	14795.8	—	34.1	556	9141.4	6.8	24.3	43417.38	6.73
4/27/2018	—	14795.8	—	32.5	—	9141.4	—	23.6	43417.38	—
4/28/2018	564	14804.5	8.7	32.8	—	9141.4	—	16.2	43426.08	8.70
4/29/2018	—	14804.5	—	33.9	558	9148.1	6.7	24.1	43432.82	6.74
4/30/2018	—	14804.5	—	34.0	—	9148.1	—	24.1	43432.82	—
	6200		95.6		5606		57.6			153
AVERAGE										

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2018 (MM YYYY)	05/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	101.9	—		.6	.3	23.9	off	8:00
2		705	106.7	3.2		.6	.3	23.8	off	7:30
3		—	106.7	—		.6	.3	19.3	ON	8:00
4		854	103.0	3.7		.6	.3	23.5	off	8:00
5		—	103.0	—		.6	.3	18.7	ON	8:00
6		936	98.9	4.1		.6	.3	23.6	off	930
7		—	98.9	—		.6	.3	23.4	off	930
8		—	98.9	—		.6	.3	18.8	ON	700
9		936	94.7	4.2		.6	.3	23.3	off	700
10		—	94.7	—		.6	.3	18.9	ON	700
11		741	91.3	3.4		.6	.3	23.1	off	700
12		—	91.3	—		.6	.3	18.5	on	7:30
13		796	87.8	3.5		.6	.3	22.9	off	7:15
14		—	87.8	—		.6	.3	22.7	off	7:00
15		—	87.8	—		.6	.3	18.2	on	7:30
16		826	84.9	2.9		.6	.3	23.0	off	8:00
17		—	84.9	—		.6	.3	18.5	on	7:15
18		694	82.0	2.9		.6	.3	23.0	off	7:15
19		—	82.0	—		.6	.3	18.5	on	7:30
20		780	79.2	2.8		.6	.3	22.8	off	7:40
21		—	79.2	—		.6	.3	22.9	off	8:55
22		—	79.2	—		.6	.3	19.9	on	6:55
23		936	144.8	5.2		.6	.3	22.6	off	7:10
24		—	144.8	—		.6	.3	18.3	on	7:10
25		788	141.3	3.5		.6	.3	22.3	off	700
26		—	141.3	—		.6	.3	17.7	on	8:00
27		827	137.1	4.2		.6	.3	22.2	off	1030
28		—	137.1	—		.6	.3	22.2	off	1000
29		—	137.1	—		.6	.3	17.6	ON	8:00
30		936	133.1	4.0		.6	.3	21.9	off	8:00
31										
TOTAL		10,755								
AVG.		358.5								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY0306446

Signature: Peter Alteri Date: 5/1/2018 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrac Rd	4-2-15	1	YES NO ✓	YES NO ✓	0.6
Walden Oaks Booster	4-2-15	1	YES NO ✓	YES NO ✓	0.5
Blue Creek Booster	4-2-15	1	YES NO ✓	YES NO ✓	0.5
Red Apple Mclean /RT 13	4-9-15	1	YES NO ✓	YES NO ✓	0.6
Cuylle Highlands RT 41	4-9-15	1	YES NO ✓	YES NO ✓	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean

Name of NYSDOH Certified Laboratory: Microbac.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: ___

Comments: ___

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.				
4/1/2018		—	20485.9	—
4/2/2018		705	20504.0	18.1
4/3/2018		—	20504.0	—
4/4/2018		854	20525.9	21.9
4/5/2018		—	20525.9	—
4/6/2018		936	20549.9	24.0
4/7/2018		—	20549.9	—
4/8/2018		—	20549.9	—
4/9/2018		936	20573.9	24.0
4/10/2018		—	20573.9	~~19.0~~
4/11/2018		741	20592.9	19.0
4/12/2018		—	20592.9	—
4/13/2018		796	20613.3	20.4
4/14/2018		—	20613.3	—
4/15/2018		—	20613.3	—
4/16/2018		826	20634.5	21.5
4/17/2018		—	20634.5	
4/18/2018		694	20652.3	17.8
4/19/2018		—	20652.3	—
4/20/2018		780	20672.3	20.0
4/21/2018		—	20672.3	—
4/22/2018		—	20672.3	—
4/23/2018		936	20696.3	24.0
4/24/2018		—	20696.3	—
4/25/2018		788	20776.5	20.2
4/26/2018		—	20776.5	—
4/27/2018		827	20737.7	21.2
4/28/2018		—	20737.7	—
4/29/2018		—	20737.7	—
4/30/2018		936	20761.7	24
Total		10,755		275.8
Average		358.5		
Rev 11/23/16 PA				

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8D0564

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/09/2018
Reported: 04/12/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13/ Mclean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J8D0564-01
Collected By: JM-Client
Collection Date: 04/09/2018 10:58

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB
Escherichia coli	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB

Analyses Performed by: Customer

. ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/09/18 1058	CUS

Client Sample ID: C-ville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8D0564-02
Collected By: JM-Client
Collection Date: 04/09/2018 11:58

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB
Escherichia coli	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		04/09/18 1158	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8D0564

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/09/2018
Reported: 04/12/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13/ Mclean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J8D0564-01
Collected By: JM-Client
Collection Date: 04/09/2018 10:58

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB
Escherichia coli	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB

Analyses Performed by: Customer

. ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/09/18 1058	CUS

Client Sample ID: C-ville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8D0564-02
Collected By: JM-Client
Collection Date: 04/09/2018 11:58

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB
Escherichia coli	Absent			in 100mL		04/09/18 1742	04/10/18 1209	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		04/09/18 1158	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8D0564

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 04/12/2018 13:42

MICR AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N in Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOI

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortland Ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

Temperature Upon Receipt (°C)
Therm ID 4.9
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I. MacLean
Sampler Signature: Jeffrey I. MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform										Additional Notes
	Red Apple Rt. 13/McLean Rd	4-9-18	10:58 AM	1	DW	G	Na2S2O3	1										Clo.6
	C-Ville Highway Garage Rt 41 Polkville	4-9-18	11:58 AM	1	DW	G	Na2S2O3	1										Clo3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I. MacLean	4-9-18 12:04 PM	[signature]	4-9-18 12:04
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 Nort[illegible] Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 5.4

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756 9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Municipal Bldg.	4-2-18	834 AM	1	DW		Na2S2O3		Cl 0.6
	Walden Oaks B.S.	4-2-18	856 AM	1	DW		"		Cl 0.5
	Blue Creek B.S.	4-2-18	934 AM	1	DW		"		Cl 0.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	4-2-18 952 AM	[signature]	4-2-18 9:53AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2018 (MM YYYY)	04/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			15.9			.6	.3	23.7		
1		—	15.9			.6	.3	18.7	on	7:45
2		889	12.5	3.4		.6	.3	23.7	off	9:30
3		—	12.5	—		.6	.3	23.5	off	9:45
4		—	12.5	—		.6	.3	23.5	off	7:30
5		674	9.2	3.3		.6	.3	23.4	off	8:00
6		—	9.2	—		.6	.3	18.7	on	8:00
7		683	5.8	3.4		.6	.3	23.2	off	7:15
8		—	5.8 1413	—		.6	.3	12.7	on	8:30
9		706	140.9	3.3		.6	.3	22.9	off	11:17
10		—	140.9	—		.6	.3	23.1	off	930
11		—	146.1	—		.6	.3	18.5	on	700
12		725	138.0	2.1		.6	.3	22.8	off	700
13		—	138.0	—		.6	.3	18.3	on	700
14		632	135.4	2.6		.6	.3	22.5	off	700
15		—	135.4	—		.6	.3	17.8	on	8:00
16		718	132.8	2.6		.6	.3	22.4	off	7:00
17		—	132.8	—		.6	.3	22.4	off	8:00
18		—	132.8	—		.6	.3	17.9	on	7:00
19		749	131.0	1.8		.6	.3	22.3	off	7:15
20		—	131.0	—		.6	.3	17.6	on	7:15
21		901	126.9	4.1		.6	.3	21.8	off	7:30
22		—	126.9	—		.6	.3	17.4	on	7:30
23		936	122.6	4.3		.6	.3	21.9	off	8:30
24		—	122.6	—		.6	.3	21.9	off	8:50
25		—	122.6	—		.6	.3	17.3	on	7:10
26		904	118.4	4.2		.6	.3	21.8	off	7:10
27		—	118.4	—		.6	.3	17.5	on	7:10
28		936	114.1	4.3		.6	.3	22.0	off	7:10
29		—	114.1	—		.6	.3	18.3	on	7:10
30		936	109.9	4.2		.6	.3	23.2	off	8:30
31		—	109.9	~~4.2~~		.6	.3	23.8	off	8:00
TOTAL		10,389								
AVG.		335								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S operator NYSDOH Operator Certification Number: NY. 0030046

Signature: Peter Alteri Date: 4/2/2018 Operator Grade Level: IIB

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2018 (MM YYYY)	04/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
	Limehollow Well		129.2			.6	.3	32.9		
1		608	124.6	2.6		.6	.3	33.1	off	7:30
2		—	124.6	—		.6	.3	33.2	off	9:30
3		528	120.7	3.9		.6	.3	32.1	on	8:30
4		830	118.1	2.6		.6	.3	33.2	off	8:00
5		—	118.1	—		.6	.3	33.3	off	8:00
6		555	115.3	2.8		.6	.3	33.3	off	8:00
7		—	115.3	—		.6	.3	33.4	off	8:15
8		644	112.6	2.7		.6	.3	33.4	off	8:30
9		—	112.6	—		.6	.3	33.5	off	11:30
10		618	108.8	3.8		.6	.3	32.5	on	9:00
11		528	106.9	1.9		.6	.3	33.4	off	7:15
12		—	106.9	—		.6	.3	33.4	off	7:15
13		710	103.1	3.8		.6	.3	33.4	off	7:15
14		—	103.1	—		.6	.3	33.5	off	7:15
15		636	100.5	2.6		.6	.3	33.4	off	8:25
16		—	100.5	—		.6	.3	33.4	off	7:15
17		541	96.8	3.7		.6	.3	32.4	on	8:15
18		919	93.8	3.0		.6	.3	33.2	off	6:45
19		—	93.8	—		.6	.3	33.2	off	7:45
20		780	89.5	4.3		.6	.3	33.2	off	7:30
21		—	89.5	—		.6	.3	33.2	off	8:00
22		666	86.7	2.8		.6	.3	33.1	off	7:45
23		—	86.7	—		.6	.3	33.1	off	8:30
24		812	82.1	4.6		.6	.3	32.0	on	8:40
25		786	79.1	3.0		.6	.3	32.8	off	7:00
26		—	79.1	—		.6	.3	32.9	off	7:00
27		636	75.5	3.6		.6	.3	32.9	off	7:00
28		—	75.5	—		.6	.3	33.0	off	7:00
29		645	73.0	2.5		.6	.3	33.1	off	7:00
30		—	73.0	—		.6	.3	33.5	off	9:00
31		800	67.7	5.3		.6	.3	32.3	on	8:30
TOTAL		12242								
AVG.		395								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri, Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0030046

Signature: Peter Alteri Date: 4/2/2018 Operator Grade Level: T3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	3-1-18	1	YES **NO**	YES **NO**	0.6
Walden Gates Booster STA.	3-1-18	1	YES **NO**	YES **NO**	0.5
Blue Creek Booster	3-1-18	1	YES **NO**	YES **NO**	0.5
Red Apple RT 13/McLean Rd	3-9-18	1	YES **NO**	YES **NO**	0.6
Quilt Highway RT 41	3-9-18	1	YES **NO**	YES **NO**	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean

Name of NYSDOH Certified Laboratory: MicroBac LABS

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter 14614.9	Well #2 Pump Hrs/Day	Pump 2 Well Level 32.9	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter 9004.2	Well #7 Pump Hrs/Day	Pump 7 Well Level 23.4	Chlorine Pump Electric 43100.93	Chlorine Pump Hrs/Day
Prev. Rdg										
3/1/2018	—	14614.9	—	33.1	608	9011.6	7.4	23.3	43108.32	7.39
3/2/2018	—	14614.9	—	33.2	—	9011.6	—	23.4	43108.32	—
3/3/2018	528	14623.1	8.2	32.1	—	9011.6	—	15.4	43117.02	8.70
3/4/2018	—	14623.1	—	33.2	830	9021.7	10.1	23.4	43126.53	9.51
3/5/2018	—	14623.1	—	33.3	—	9021.7	—	23.5	43126.53	—
3/6/2018	555	14631.7	8.6	33.3	—	9021.7	—	23.6	43135.15	8.62
3/7/2018	—	14631.7	—	33.4	—	9021.7	—	23.6	43135.15	—
3/8/2018	—	14631.7	—	33.4	644	9029.5	7.8	23.6	43142.96	7.81
3/9/2018	—	14631.7	—	33.5	—	9029.5	—	23.6	43142.96	—
3/10/2018	618	14641.4	9.7	32.5	—	9029.5	—	16.0	43153.04	10.08
3/11/2018	—	14641.4	—	33.4	528	9035.9	6.4	23.6	43159.00	5.96
3/12/2018	—	14641.4	—	33.4	—	9035.9	—	23.6	43159.00	—
3/13/2018	710	14652.5	11.1	33.4	—	9035.9	—	23.6	43170.05	11.05
3/14/2018	—	14652.5	—	33.5	—	9035.9	—	23.7	43170.05	—
3/15/2018	—	14652.5	—	33.4	636	9043.7	7.8	23.6	43177.76	7.71
3/16/2018	—	14652.5	—	33.4	—	9043.7	—	23.6	43177.76	—
3/17/2018	541	14661.8	9.3	32.4	—	9043.7	—	15.8	43187.06	9.3
3/18/2018	—	14661.8	—	33.2	919	9054.8	11.1	23.4	43197.29	10.23
3/19/2018	—	14661.8	—	33.2	—	9054.8	—	23.4	43197.29	—
3/20/2018	780	14674.0	12.2	33.2	—	9054.8	—	23.4	43209.39	12.10
3/21/2018	—	14674.0	—	33.2	—	9054.8	—	23.4	43209.39	—
3/22/2018	—	14674.0	—	33.1	666	9063.0	8.2	23.3	43217.77	8.38
3/23/2018	—	14674.0	—	33.1	—	9063.0	—	23.3	43217.77	—
3/24/2018	812	14686.6	12.6	32.0	—	9063.0	—	15.6	43230.74	12.99
3/25/2018	—	14686.6	—	32.8	786	9072.4	9.4	23.0	43239.59	8.85
3/26/2018	—	14686.6	—	32.9	—	9072.4	—	23.1	43239.59	—
3/27/2018	636	14696.4	9.8	32.9	—	9072.4	—	23.1	43249.39	9.80
3/28/2018	—	14696.4	—	33.0	—	9072.4	—	23.2	43249.39	—
3/29/2018	—	14696.4	—	33.1	645	9080.3	7.9	23.3	43257.22	7.83
3/30/2018	—	14696.4	—	33.1	—	9080.3	—	23.6	43257.22	—
3/31/2018	800	14708.9	12.5	32.4	—	9080.3	—	15.4	43271.91	14.69
	5980		94		6262		76.1			170.98
AVERAGE										

Rev: 1/2015

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			20219.5	
3/1/2018		—	20219.5	—
3/2/2018		889	20242.3	22.8
3/3/2018		—	20242.3	—
3/4/2018		—	20242.3	—
3/5/2018		674	20259.6	17.9
3/6/2018		—	20259.6	—
3/7/2018		683	20277.1	17.5
3/8/2018		—	20277.1	—
3/9/2018		706	20295.2	18.1
3/10/2018		—	20295.2	—
3/11/2018		—	20295.2	—
3/12/2018		725	20313.8	18.6
3/13/2018		—	20313.8	—
3/14/2018		632	20330.0	16.2
3/15/2018		—	20330.0	—
3/16/2018		718	20348.4	18.4
3/17/2018		—	20348.4	—
3/18/2018		—	20348.4	—
3/19/2018		749	20367.6	19.2
3/20/2018		—	20367.6	—
3/21/2018		901	20390.7	23.1
3/22/2018		—	20390.7	—
3/23/2018		936	20414.7	24.0
3/24/2018		—	20414.7	—
3/25/2018		—	20414.7	—
3/26/2018		904	20437.9	23.2
3/27/2018		—	20437.9	—
3/28/2018		936	20461.9	24.0
3/29/2018		—	20461.9	—
3/30/2018		936	20485.9	24.0
3/31/2018		—	20485.9	—
Total		10,389.000		266.4
Average		335,000		
Rev 11/23/16 PA				

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8C0339

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/01/2018
Reported: 03/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG.
Sample Matrix: Drinking Water
Lab Sample ID: J8C0339-01
Collected By: JM-Client
Collection Date: 03/01/2018 9:02

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB
Escherichia coli	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/01/18 0902	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J8C0339-02
Collected By: JM-Client
Collection Date: 03/01/2018 9:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB
Escherichia coli	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/01/18 0927	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8C0339

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8C0339-03	**Collection Date:**	03/01/2018 9:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB
Escherichia coli	Absent			in 100mL		03/01/18 1607	03/02/18 1114	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		03/01/18 0953	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 03/05/2018 10:22

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8C0729

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/09/2018
Reported: 03/12/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Route 13, McLean Road
Sample Matrix: Drinking Water
Lab Sample ID: J8C0729-01
Collected By: JM-Client
Collection Date: 03/09/2018 10:13

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/09/18 1832	03/10/18 1252	EDB
Escherichia coli	Absent			in 100mL		03/09/18 1832	03/10/18 1252	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/09/18 1013	CUS

Client Sample ID: C- Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8C0729-02
Collected By: JM-Client
Collection Date: 03/09/2018 11:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/09/18 1832	03/10/18 1252	EDB
Escherichia coli	Absent			in 100mL		03/09/18 1832	03/10/18 1252	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		03/09/18 1115	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8C0729

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Operations Manager
Reported: 03/12/2018 12:02

382 e
Cortlan J45
one:(607)753-3403 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microbac Laboratories, Inc.
CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # _____

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd Cortland N.Y. 13045	
Contact: Peter Alteri JR-	
Phone: 607-756-9637	
Project: Monthly Water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.: _____

Carbon Copy: Yes _____

Email Results: Yes _____

Fax Results: Yes

Analysis Requested: BACT

Receiving Info (Lab Use Only)

Ice:	(YES) NO
Cooler:	(YES) NO
Sample Temp:	11.8
Cooler Seal:	YES NO
Pickup:	YES (NO)
Dropoff:	C W
	WALKIN
Accepted?	(YES) NO

Container Material

Container Size(in Ml)

Preservative

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Red Apple Rt13/McLean Rd	3-9-18	10:13 AM	J.M.	DW GW	1	C1 0.6
2	C-ville High Way Garage Rt41 Polkville	3-9-18	11:45 AM	J.M.	DW GW	1	C1 0.3
3							
4							
5							
6							
7							
8							

	Print Name and Company	Signature	Date/Time
Sampled:	Jeff MacLean Town of Cortlandville	Jeff MacLean	3-9-18 11:55 AM
Received:	Amber Schmidt	Amber Schmidt	3-9-18 11:55
Received:			
Received:			

Comments

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory. By signing this document you are attesting that you have been informed by MNY of the intent to subcontract and are in agreement with this action.

Cortland NY 13045
Phone:(607)753-3403 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microbac Laboratories, Inc.
CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # 4-6

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd Cortland, N.Y. 13045	
Contact: Peter Alteri Jr.	
Phone: 607-756-9637	
Project: Monthly Water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.:

Carbon Copy: Yes

Email Results: Yes

Fax Results: Yes

Analysis Requested

BACT

Receiving Info (Lab Use Only)

Ice:	YES NO
Cooler:	YES NO
Sample Temp:	7.4
Cooler Seal:	YES NO
Pickup:	YES NO
Dropoff:	C W
Accepted?	YES NO

Container Material

Container Size(in Ml)

Preservative

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Municipal BLDG.	3-1-18	902 AM	J.M.		1	Cl 0.6
2	Walden Oaks BS.	3-1-18	927 AM	J.M.		1	Cl 0.5
3	Blue Creek BS	3-1-18	953 AM	J.M.		1	Cl 0.5
4							
5							
6							
7							
8							

J8C0339
Cortlandvile Water, Town of

	Print Name and Company	Signature	Date/Time	Comments
Sampled:	Jeff MacLean, Town of Cortlandville	Jeff MacLean	3-1-18 1015 AM	
Received:	Rosemary Mashell	Rosemary Mashell	3-1-18 10:15 AM	
Received:				
Received:				

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory.
By signing this document you are attesting that you have been informed by MNY of the intent to subcontract and are in agreement with this action.

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/2018 (MM YYYY)	03/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	62.2	—		.6	.3	16.6	on	8:15
2		936	57.8	4.4		.6	.3	21.6	off	11:00
3		—	57.8	—		.6	.3	21.7	off	9:00
4		—	57.8	—		.6	.3	16.9	ON	7:30
5		791	50.4	7.4		.6	.3	21.4	off	7:30
6		—	50.4	—		.6	.3	16.4	ON	7:30
7		928	47.2	3.2		.6	.3	21.1	off	7:30
8		—	47.2	—		.6	.3	16.5	on	8:00
9		729	43.7	3.5		.6	.3	21.7	off	9:45
10		—	43.7	—		.6	.3	21.3	off	9:15
11		—	43.7	—		.6	.3	21.3	off	7:00
12		690	40.7	3		.6	.3	21.0	off	7:00
13		—	40.7	—		.6	.3	16.7	ON	7:00
14		593	37.7	3.0		.6	.3	21.2	ON	7:00
15		—	37.7	—		.6	.3	17.8	on	7:05
16		690	34.7	3.0		.6	.3	21.8	off	9:20
17		—	34.7	—		.6	.3	22.0	off	8:30
18		—	34.7	—		.6	.3	18.0	on	9:00
19		655	31.2	3.5		.6	.3	22.5	off	7:00
20		—	31.2	—		.6	.3	18.1	on	7:45
21		870	27.0	4.2		.6	.3	22.9	off	7:30
22		—	27.0	—		.6	.3	18.2	on	7:00
23		916	22.9	4.1		.6	.3	23.3	off	8:30
24		—	22.9	—		.6	.3	23.8	off	9:30
25		—	22.9	—		.6	.3	23.8	off	7:10
26		702	19.7	3.2		.6	.3	23.6	off	7:05
27		—	19.7	—		.6	.3	19.0	on	7:10
28		741	15.9	3.8		.6	.3	23.7	off	7:10
29										
30										
31										
TOTAL		9241,000								
AVG.		330								

Chlorine Mix Ratio = ____ quarts/gallons of ____ % chlorine added to ____ gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY 0030046

Signature: Peter Allen Date: 3/2/2018 Operator Grade Level: WB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd.	2/1/18	1	YES NO ☑	YES NO ☑	0.5
Walden Glen Booster	2/1/18	1	YES NO ☑	YES NO ☑	0.5
Blue Creek Booster	2/1/18	1	YES NO ☑	YES NO ☑	0.6
Red Apple RT 13/McLean Rd	2/6/18	1	YES NO ☑	YES NO ☑	0.6
Cville Highway RT 41	2/6/18	1	YES NO ☑	YES NO ☑	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Mackan

Name of NYSDOH Certified Laboratory: Microbac LABS.

Did any MCL violation occur? If so, please describe: NO.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/2018 (MM YYYY)	03/02/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination
Public Water System ID	**County**	**Town, Village or City**	
NY 1101755 L.H	Cortland	Cortlandville	GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous – Cylinder weight (lbs.)	Chlorination: Gaseous – Chlorine used per day (lbs.)	Chlorination: Liquid – Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/Off	Time
1	Limehollow well	503	48.4 (lbs.) 45.9	2.5		.6	.3	31.1	off	8:30
2		—	45.9	—		.6	.3	31.2	off	11:00
3		560	41.8	4.1		.6	.3	30.4	on	9:00
4		600	39.1	2.7		.6	.3	31.3	off	8:00
5		—	39.1	—		.6	.3	31.3	off	8:00
6		560	35.4	3.7		.6	.3	31.3	off	7:30
7		—	35.4	—		.6	.3	31.4	off	7:30
8		581	32.5	2.9		.6	.3	31.3	off	7:50
9		—	32.5	—		.6	.3	31.4	off	930
10		607	27.7	4.8		.6	.3	30.2	on	900
11		777	24.5	3.2		.6	.3	31.2	off	715
12		—	24.5	—		.6	.3	31.2	off	715
13		630	20.4	4.1		.6	.3	31.2	off	715
		—	20.4	—		.6	.3	30.1	on	715
		878	15.9	4.5		.6	.3	31.3	off	7:15
16		—	15.9	—		.6	.3	31.5	off	9:00
17		571	11.0	4.9		.6	.3	30.3	on	845
18		836	7.9	3.1		.6	.3	31.5	off	8:00
19		—	142.8	—		.6	.3	31.7	off	7:20
20		503	138.8	4.0		.6	.3	31.9	off	8:00
21		—	138.8	—		.6	.3	32.1	off	7:45
22		475	136.9	1.9		.6	.3	32.2	off	6:45
23		—	136.9	—		.6	.3	32.4	off	8:45
24		526	133.1	3.8		.6	.3	31.4	off	9:15
25		771	130.7	2.4		.6	.3	32.5	off	7:00
26		—	130.7	—		.6	.3	32.7	off	7:00
27		638	127.2	3.5		.6	.3	32.8	off	7:00
28		—	127.2	—		.6	.3	32.9	off	7:00
29										
30										
31										
TOTAL		10,016								
AVG.		388								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aitel Jr. Title: W/S operator NYSDOH Operator Certification Number: NY.0030046

Signature: Peter Aitel Date: 3/2/2018 Operator Grade Level: TB

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg** 19982.5	**Hrs/Day**
Prev. Rdg.				
2/1/2018		—	19982.5	—
2/2/2018		936	20006.5	24
2/3/2018		—	20006.5	—
2/4/2018		—	20006.5	—
2/5/2018		791	20026.8	20.3
2/6/2018		—	20026.8	—
2/7/2018		928	20050.6	23.8
2/8/2018		—	20050.6	—
2/9/2018		~~729~~	20069.3	18.7
2/10/2018		~~729~~	20069.3	—
2/11/2018		—	20069.3	—
2/12/2018		690	20087.0	17.7
2/13/2018		—	20087.0	
2/14/2018		593	20102.2	15.2
2/15/2018		—	20102.2	—
2/16/2018		690	20119.9	17.7
2/17/2018		—	20119.9	—
2/18/2018		—	20119.9	—
2/19/2018		655	20136.7	16.8
2/20/2018		—	20136.7	—
2/21/2018		870	20159.0	22.3
2/22/2018		—	20159.0	—
2/23/2018		916	20182.5	23.5
2/24/2018		—	20182.5	~~23~~
2/25/2018		—	20182.5	—
2/26/2018		702	20200.5	18
2/27/2018		—	20200.5	—
2/28/2018		741	20219.5	19
Total		9,241,000		237
Average		330		
Rev 11/23/16 PA				

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter 14543.2	Well #2 Pump Hrs/Day	Pump 2 Well Level 31.2	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter 8938.3	Well #7 Pump Hrs/Day	Pump 7 Well Level 21.5	Chlorine Pump Electric 42963.68	Chlorine Pump Hrs/Day
Prev. Rdg										
2/1/2018	—	14543.2	—	31.1	503	8944.4	6.1	21.5	42969.79	6.11
2/2/2018	—	14543.2	—	31.2	—	8944.4	—	21.5	42969.79	—
2/3/2018	560	14551.9	8.7	30.4	—	8944.4	—	14.0	42979.47	9.68
2/4/2018	—	14551.9	—	31.3	600	8951.1	6.7	21.5	42985.76	6.29
2/5/2018	—	14551.9	—	31.3	—	8951.1	—	21.5	42985.76	—
2/6/2018	560	14560.7	8.8	31.3	—	8951.1	—	21.6	42994.48	8.72
2/7/2018	—	14560.7	—	31.4	—	8951.1	—	21.7	42994.48	—
2/8/2018	—	14560.7	—	31.3	581	8958.8	7.7	21.5	43000.54	7.06
2/9/2018	—	14560.7	—	31.4	—	8958.8		21.6	43001.54	—
2/10/2018	607	14570.2	10.5	30.2	—	8958.8	—	13.8	43010.60	10.14
2/11/2018	—	14570.2	—	31.2	777	8968.3	9.5	21.4	43020.42	8.82
2/12/2018	—	14570.2	—	31.2	—	8968.3	—	21.5	43020.42	—
2/13/2018	630	14580.1	9.9	31.2	—	8968.3	—	21.5	43030.27	9.85
2/14/2018	—	14580.1	—	30.1	—	8968.3	—	13.8	43030.27	—
2/15/2018	—	14580.1	—	31.3	878	8978.9	10.6	21.5	43040.93	10.66
2/16/2018	—	14580.1	—	31.5	—	8978.7	—	21.7	43040.93	—
2/17/2018	571	14589.0	8.9	30.3	—	8978.7	—	13.9	43049.83	8.90
2/18/2018	—	14589.0	—	31.5	836	8989.1	10.4	21.7	43059.96	10.13
2/19/2018	—	14589.0	—	31.7	—	8989.1	—	22.0	43059.96	—
2/20/2018	503	14596.8	7.8	31.9	—	8989.1	—	22.1	43067.79	7.83
2/21/2018	—	14596.8	—	32.1	—	8989.1	—	22.3	43067.79	—
2/22/2018	—	14596.8	—	32.2	475	8994.9	5.8	22.4	43073.53	5.74
2/23/2018	—	14596.8	—	32.4	—	8994.9	—	22.6	43073.53	—
2/24/2018	526	14604.9	8.1	31.4	—	8994.9	—	14.9	43081.66	8.13
2/25/2018	—	14604.9	—	32.5	771	9004.2	9.3	22.7	43090.99	9.33
2/26/2018	—	14604.9	—	32.7	—	9004.2	—	22.9	43090.99	—
2/27/2018	638	14614.9	10.0	32.8	—	9004.2	—	23.0	43100.93	9.94
2/28/2018	—	14614.9	—	32.9	—	9004.2	—	23.1	43100.93	—
	4595		71.7		5421		65.9			137.25
AVERAGE	164				194					

Rev: 1/2015

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8B0523

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/06/2018
Reported: 02/09/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Route 13, McLean Road
Sample Matrix: Drinking Water
Lab Sample ID: J8B0523-01
Collected By: JM-Client
Collection Date: 02/06/2018 10:26

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/06/18 1026	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/06/18 1610	02/07/18 1133	NY
Escherichia coli	Absent			in 100mL		02/06/18 1610	02/07/18 1133	NY

Client Sample ID: C- Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8B0523-02
Collected By: JM-Client
Collection Date: 02/06/2018 11:48

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		02/06/18 1148	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/06/18 1610	02/07/18 1133	NY
Escherichia coli	Absent			in 100mL		02/06/18 1610	02/07/18 1133	NY

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Laboratory

CUS: Analysis performed by customer
NY: Microbac Laboratories, Inc., New York Division

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8B0523

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 02/09/2018 17:15

382 e
Cortl J45
Phone:(607)753-3403 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microbac Laboratories, Inc.
CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # _____

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd Cortland N.Y. 13045	
Contact: Peter Alteri JR.	
Phone: 607-756-9637	
Project: Monthly Water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.: _____

Carbon Copy: Yes

Email Results: Yes

Fax Results: Yes

Analysis Requested

BACT

Receiving Info (Lab Use Only)

Ice:	YES NO
Cooler:	YES NO
Sample Temp:	10.6
Cooler Seal:	YES NO
Pickup:	YES NO
Dropoff:	C W
Accepted?	YES NO

Container Material

Container Size(in Ml)

Preservative

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Red Apple Rt13/McLean Rd	2-6-18	10:26 AM	J.M.		1	Cl 0.5
2	C-ville Highway Garage Rt41 Polkville	2-6-18	1148 AM	J.M.		1	Cl 0.3
3							
4							
5							
6							
7							
8							

	Print Name and Company	Signature	Date/Time	Comments
Sampled:	Jeff MacLean Town of Cortlandville	Jeff MacLean	2-6-18 11:58 AM	
Received:				
Received:	Dorothy Maskell		2-6-18	11:58AM
Received:				

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory.
By signing this document you are attesting that you have been informed by MNY of the [illegible]

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8B0332

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/01/2018
Reported: 02/05/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J8B0332-01
Collected By: JM-Client
Collection Date: 02/01/2018 7:10

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		02/01/18 0710	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY
Escherichia coli	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8B0332-02
Collected By: JM-Client
Collection Date: 02/01/2018 7:50

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		02/01/18 0750	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY
Escherichia coli	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8B0332

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8B0332-03	**Collection Date:**	02/01/2018 8:16

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/01/18 0816	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY
Escherichia coli	Absent			in 100mL		02/01/18 2008	02/02/18 1421	NY

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Laboratory

CUS:	Analysis performed by customer
NY:	Microbac Laboratories, Inc., New York Division

efinitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 02/05/2018 13:18

382 e
Cortl J45
Phone:(607)753-3405 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microbac Laboratories, Inc.
CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # _____

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd	
Cortland, N.Y. 13045	
Contact: Peter Alteri JR.	
Phone: 607-756-9637	
Project: Monthly Water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.:

Carbon Copy: Yes

Email Results: Yes

Fax Results: Yes

Analysis Requested

BACT								
poly 120								
Thic								

Receiving Info (Lab Use Only)

Ice:	YES NO
Cooler:	YES NO
Sample Temp:	12.0
Cooler Seal:	YES NO
Pickup:	YES NO
Dropoff:	C W
Accepted?	YES NO
Container Material	
Container Size(in Ml)	
Preservative	

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Municipal BLDG.	2-1-18	710 AM	J.M.	DW G	1	Cl 0.5
2	Walden Oaks BS	2-1-18	750 AM	J.M.	DW G	1	Cl 0.5
3	Blue Creek BS.	2-1-18	816 AM	J.M.	DW G	1	Cl 0.6
4							
5							
6							
7							
8							

Print Name and Company	Signature	Date/Time	Comments
Sampled: Jeff MacLean Town of Cortlandville	Jeff MacLean	2-1-18 834 AM	
Received:			
Received: Dorothy Marshall		2-1-18	8:34am
Received:			

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory. By signing this document you are attesting that you have been informed by MNY of the intent to subcontract and are in agreement with this action.

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2018 (MM YYYY)	02/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl	WELL Level	Pump On/OfF	Time
			121.8			.6	.3	14.6	on	
1		897	117.1	4.7		.6	.3	19.3	off	7:30
2		—	117.1	—		.6	.3	14.3	on	8:00
3		878	112.3	4.8		.6	.3	19.2	off	7:36
4		—	112.3	—		.6	.3	14.2	on	7:15
5		936	108.3	4.0		.6	.3	18.9	off	8:00
6		—	108.3	—		.6	.3	19.0	off	4:00
7		—	108.3	—		.6	.3	14.0	on	730
8		936	103.4	4.9		.6	.3	18.6	off	7:30
9		—	103.4	—		.6	.3	18.4	off	7:30
10		752	99.5	3.9		.6	.3	18.6	off	7:30
11		—	99.5	—		.6	.3	14.4	on	7:30
12		936	95.2	4.3		.6	.3	20.0	off	930
13		—	95.2	—		.6	.3	20.8	off	800
14		—	95.2	—		.6	.3	16.0	on	945
15		698	91.8	3.4		.6	.3	20.7	off	715
16		—	91.8	—		.6	.3	16.3	on	700
17		877	88.3	3.5		.6	.3	20.7	off	715
18		—	88.3	—		.6	.3	15.8	on	700
19		936	83.4	4.9		.6	.3	20.6	off	9:20
20		—	83.4	—		.6	.3	20.7	off	7:00
21		—	83.4	—		.6	.3	15.9	on	7:20
22		936	79.2	4.2		.6	.3	20.8	off	7:30
23		—	79.2	—		.6	.3	16.5	on	7:00
24		897	75.2	4.0		.6	.3	21.5	off	7:00
25		—	75.2	—		.6	.3	16.6	on	7:15
26		936	70.4	4.8		.6	.3	21.5	off	8:50
27		—	70.4	—		.6	.3	21.9	off	9:00
28		—	70.4	—		.6	.3	17.1	on	7:10
29		936	65.8	4.6		.6	.3	21.5	off	7:10
30		—	65.8	—		.6	.3	17.1	on	7:16
31		752	62.2	3.6		.6	.3	21.7	off	7:10
TOTAL		12,303								
AVG.		397								

Chlorine Mix Ratio = ____ quarts/gallons of ____ % chlorine added to ____ gallons of water in crock.

Reported by: Peter Albert Jr. Title: W/S operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Albert Date: 2/1/2018 Operator Grade Level: II

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg 3587 Track Rd.	1-2-18	1	YES NO	YES NO	0.5
Walden Wells Booster Sta.	1-2-18	1	YES NO	YES NO	0.5
Blue Creek Booster	1-2-18	1	YES NO	YES NO	0.5
Rec Apple RT13 / McLean Rd	1-5-18	1	YES NO	YES NO	0.6
Cville Highway RT41	1-8-18	1	YES NO	YES NO	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4/000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean.

Name of NYSDOH Certified Laboratory: Microbac Labs.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2018 (MM YYYY)	02/01/2018 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination
Public Water System ID: NY 1101755 Lime Hollow	County: Cortland	Town, Village or City: Cortlandville	GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous – Cylinder weight (lbs.)	Chlorination: Gaseous – Chlorine used per day (lbs.)	Chlorination: Liquid – Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
	Lime Hollow Well	892	121.2			.6	.3	29.5	off	
1		—	121.2	—		.6	.3	29.5	off	8:00
2		880	115.3	5.9		.6	.3	29.4	off	8:15
3		—	115.3	—		.6	.3	29.4	off	7:30
4		1,085	109.3	6.0		.6	.3	29.3	off	7:30
5		—	109.3	—		.6	.3	29.3	off	12:00
6		1,025	101.8	7.5		.6	.3	29.0	off	4:00
7		833	97.6	4.2		.6	.3	29.1	off	
8		—	97.6	—		.6	.3	27.1	on	7:30
9		1,063	90.6	7.0		.6	.3	28.9	off	7:30
10		—	90.6	—		.6	.3	29.0	off	7:30
11		725	86.9	3.7		.6	.3	29.0	off	7:30
12		—	86.9	—		.6	.3	29.3	off	9:45
13		534	82.5	4.4		.6	.3	28.3	on	7:45
14		844	78.9	3.6		.6	.3	29.5	off	10:00
15		—	78.9	—		.6	.3	29.6	off	7:00
16		616	74.9	4.0		.6	.3	29.7	off	7:15
17		—	74.9	—		.6	.3	29.9	off	7:00
18		506	72.3	2.6		.6	.3	29.9	off	7:15
19		—	72.3	—		.6	.3	30.0	off	9:00
20		688	67.8	4.5		.6	.3	30.0	off	6:45
21		641	64.5	3.3		.6	.3	30.0	off	9:00
22		—	64.5	—		.6	.3	30.2	off	8:00
23		575	60.9	3.6		.6	.3	30.2	off	7:45
24		—	60.9	—		.6	.3	30.4	off	8:15
25		543	58.1	2.8		.6	.3	30.5	off	7:00
26		—	58.1	—		.6	.3	30.7	off	8:40
27		552	54.2	3.9		.6	.3	29.9	on	8:40
28		548	51.6	2.6		.6	.3	30.8	off	7:00
29		—	51.6	—		.6	.3	31.0	off	7:00
30		487	48.4	3.2		.6	.3	31.0	off	7:00
31		—	48.4	—		.6	.3	31.2	off	7:00
TOTAL		13037.00								
AVG.		421								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY00300446

Signature: Peter Alteri Date: 2/1/18 Operator Grade Level: T1S

Terrace Rd Well Daily Pump Record

Location				
Date	**Totalizer**	**Gal/Day**	**Electric Rdg**	**Hrs/Day**
Prev. Rdg.			19667.0	
1/1/2018		897	19690.0	23
1/2/2018		—	19690.0	—
1/3/2018		878	19712.5	22.5
1/4/2018		—	19712.5	—
1/5/2018		936	19736.5	24
1/6/2018		—	19736.5	—
1/7/2018		—	19736.5	—
1/8/2018		936	19760.5	24
1/9/2018		—	19760,5	—
1/10/2018		752	19779.8	19.3
1/11/2018		—	19779.8	—
1/12/2018		936	19803.8	24.0
1/13/2018		—	19803.8	—
1/14/2018		—	19803.8	—
1/15/2018		698	19821.7	17.9
1/16/2018		—	19821.7	—
1/17/2018		877	19844.2	22.5
1/18/2018		—	19844.2	—
1/19/2018		936	19868.2	24.0
1/20/2018		—	19868.2	—
1/21/2018		—	19868.2	—
1/22/2018		936	19892.2	24
1/23/2018		—	19892.2	—
1/24/2018		897	19915.2	23.0
1/25/2018		—	19915.2	—
1/26/2018		936	19939.2	24.0
1/27/2018		—	19939.2	—
1/28/2018		—	19939.2	—
1/29/2018		936	19963.2	24.0
1/30/2018		—	19963.2	—
1/31/2018		752	19982.5	19.3
Total		12,303,000		
Average		397		
Rev 11/23/16 PA				

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg	—	14441.5	—	29.5	892	8867.0	11	19.8	42791.03	7.08
1/1/2018	—	14441.5	—	29.5	—	8867.0	—	19.8	42791.03	—
1/2/2018	880	14455.2	13.7	29.4	—	8867.0	—	19.7	42804.75	13.72
1/3/2018	—	14455.2	—	29.4	—	8867.0	—	19.6	42804.75	—
1/4/2018	—	14455.2	—	29.3	1,085	8881.5	14.5	19.5	42819.23	14.48
1/5/2018	—	14455.2	—	29.3	—	8881.5	—	19.5	42819.23	—
1/6/2018	1,025	14472.7	17.5	29.0	—	8881.5	—	19.3	42836.84	17.61
1/7/2018	—	14472.7	—	29.1	833	8891.8	10.3	19.3	42846.96	10.12
1/8/2018	—	14472.7	—	29.0	—	8891.8	—	19.3	42846.96	—
1/9/2018	1,063	14489.3	16.6	28.9	—	8891.8	—	19.2	42863.44	16.48
1/10/2018	—	14489.3	—	29.0	—	8891.8	—	19.2	42863.44	—
1/11/2018	~~325~~	14489.3	—	29.0	725	8900.7	8.3	19.3	42872.34	8.9
1/12/2018	—	14489.3	—	29.3	—	8900.7	—	19.6	42872.34	—
1/13/2018	534	14499.8	10.3	28.3	—	8900.7	—	19.9	42882.62	10.28
1/14/2018	~~534~~	14499.6	—	29.5	844	8911.0	10.3	19.7	42890.95	8.33
1/15/2018	—	14499.6	—	29.6	—	8911.0	—	19.9	42890.95	—
1/16/2018	616	14507.3	9.7	29.7	—	8911.0	—	19.9	42900.58	9.53
1/17/2018	—	14507.3	—	29.9	—	8911.0	—	20.1	42900.58	—
1/18/2018	—	14507.3	—	29.9	506	8917.2	6.2	20.2	42906.74	6.16
1/19/2018	—	14507.3	—	30.0	—	8917.2	—	20.2	42906.74	—
1/20/2018	688	14518.0	10.7	30.0	—	8917.2	—	20.2	42917.50	10.76
1/21/2018	—	14518.0	—	30.0	641	8925.0	7.8	20.2	42925.37	7.87
1/22/2018	—	14518.0	—	30.2	—	8925.0	—	20.4	42925.37	—
1/23/2018	575	14527.0	9	30.2	—	8925.0	—	20.5	42934.22	8.85
1/24/2018	—	14527.0	—	30.4	—	8925.0	—	20.7	42934.22	—
1/25/2018	—	14527.0	—	30.5	543	8931.6	6.6	20.7	42940.82	6.60
1/26/2018	—	14527.0	—	30.7	—	8931.6	—	20.9	42940.82	—
1/27/2018	552	14535.6	8.6	29.9	—	8931.6	—	13.5	42949.80	8.98
1/28/2018	—	14535.6	—	30.8	548	8938.3	6.7	21.1	42956.06	6.26
1/29/2018	—	14535.6	—	31.0	—	8938.3	—	21.3	42956.06	—
1/30/2018	487	14543.2	7.6	31.0	—	8938.3	—	21.3	42963.68	7.62
1/31/2018	—	14543.2	—	31.2	—	8938.3	—	21.5	42963.68	—
	6420		101.7		6617		71.3			672.65
AVERAGE	207				213					

Rev: 1/2015

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8A0658

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/08/2018
Reported: 01/09/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Route 13/McLean Road
Sample Matrix: Drinking Water
Lab Sample ID: J8A0658-01
Collected By: JM-Client
Collection Date: 01/08/2018 9:11

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/08/18 0911	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/08/18 1811	01/09/18 1223	NY
Escherichia coli	Absent			in 100mL		01/08/18 1811	01/09/18 1223	NY

Client Sample ID: C- Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J8A0658-02
Collected By: JM-Client
Collection Date: 01/08/2018 10:30

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		01/08/18 1030	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/08/18 1811	01/09/18 1223	NY
Escherichia coli	Absent			in 100mL		01/08/18 1811	01/09/18 1223	NY

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Laboratory

CUS: Analysis performed by customer
NY: Microbac Laboratories, Inc., New York Division

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8A0658

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 01/09/2018 15:35

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8A0239

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/02/2018
Reported: 01/03/2018

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J8A0239-01
Collected By: JM-Client
Collection Date: 01/02/2018 8:21

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		01/02/18 0821	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY
Escherichia coli	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J8A0239-02
Collected By: JM-Client
Collection Date: 01/02/2018 9:53

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		01/02/18 0953	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY
Escherichia coli	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J8A0239

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J8A0239-03	**Collection Date:**	01/02/2018 10:31

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		01/02/18 1031	CUS

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Lab
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY
Escherichia coli	Absent			in 100mL		01/02/18 1750	01/03/18 1211	NY

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Laboratory

CUS:	Analysis performed by customer
NY:	Microbac Laboratories, Inc., New York Division

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Brenna Murray

Brenna Murray
Project Manager
Reported: 01/03/2018 17:03

3021 Bur e
Cortland N J45
Phone:(607)753-3403 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microbac Laboratories, Inc.
CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # _____

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd Cortland, N.Y. 13045	
Contact: Peter Alteri JR.	
Phone: 607-756-9637	
Project: Monthly water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.: _____

Carbon Copy: Yes _____

Email Results: Yes _____

Fax Results: Yes

Analysis Requested

BACT

Receiving Info (Lab Use Only)	
Ice:	YES NO
Cooler:	YES NO
Sample Temp:	15 C
Cooler Seal:	YES NO
Pickup:	YES NO
Dropoff:	C W
Accepted?	YES NO
Container Material	
Container Size(in Ml)	
Preservative	

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Red Apple RT13/McLean Rd	1-8-18	9:11 AM	J.M.		1	C1 0.6
2	C-Ville Highway Garage RT41 Polkville	1-8-18	1030 AM	J.M.		1	C1 0.3
3							
4							
5							
6							
7							
8							

Print Name and Company	Signature	Date/Time	Comments
Sampled: Jeff MacLean, Town of Cortlandville	Jeff MacLean	1-8-18 1040 AM	
Received:			
Received: Dorothy Morrell		1-9-18	10:40AM
Received:			

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory. By signing this document you are attesting that you have been informed by MNY of the intent to subcontract and are in agreement with this action.

Cortlandville Water, Town of

J8A0658

382 e
Cortl J45
one:(607)753-3403 Fax:(607)753-3415
NY #10795, EPA #NY00935

Microb: Laboratories, Inc.

CHAIN OF CUSTODY

Samples must be returned on ice

MNY Workorder # _____

Client Information	Billing/Invoice:
Name: Town of Cortlandville	
Address: 3577 Terrace Rd Cortland, N.Y. 13045	
Contact: Peter Alteri JR-	
Phone: 607-756-9637	
Project: Monthly Water Samples	
Quote ID:	PO#:

Rush TAT Bus. Days: <2 2-5 5-7 7-10 Date Req.: _____

Carbon Copy: Yes _____

Email Results: Yes _____

Fax Results: Yes

Analysis Requested

BACT

Receiving Info (Lab Use Only)

Ice:	(YES) NO
Cooler:	(YES) NO
Sample Temp:	11.8
Cooler Seal:	YES (NO)
Pickup:	YES (NO)
Dropoff:	(C) W
Accepted?	(YES) NO

Container Material

Container Size(in Ml)

Preservative

Sample Information

	Description/Location	Date	Time	Initial	Matrix Type	Number of Containers for Analysis Requested	Comments/Field Data
1	Municipal BLDG.	1-2-18	821 AM	J.M.		1	Cl 0.5
2	Walden Oaks BS	1-2-18	953 AM	J.M.		1	Cl 0.5
3	Blue Creek B.S.	1-2-18	1031 AM	JM		1	Cl 0.5
4							
5							
6							
7							
8							

Print Name and Company	Signature	Date/Time	Comments
Sampled: Jeff MacLean Town of Cortlandville	Jeff MacLean	1-2-18 11:01 AM	
Received: Darrell Mashell		1-2-18	11:03
Received:			
Received:			

Microbac Laboratories (MNY) may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to another accredited laboratory.
By signing this document you are attesting that you have been informed by MNY of the intent to subcontract and are in agreement with this action.

Water Operations Reports 2019

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	12/2019 (MM YYYY)	01/02/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	111.3	—		.6	.3	12.6	ON	8:00
2		907	106.7	4.6		.6	.3	17.2	off	8:00
3		—	106.7	—		.6	.3	12.2	ON	8:00
4		839	102.4	4.3		.6	.3	17.0	off	8:00
5		—	102.4	—		.6	.3	12.3	ON	700
6		919	97.9	4.5		.6	.3	16.6	off	500
7		—	97.9			.6	.3	17.4	off	500
8		—	97.9	—		.6	.3	12.3	ON	700
9		920	93.1	4.8		.6	.3	17.3	off	700
10		—	93.1	—		.6	.3	18.7	off	700
11		731	89.7	3.4		.6	.3	18.9	off	700
12		—	89.7	—		.6	.3	14.5	on	7:45
13		925	84.7	5.0		.6	.3	19.4	off	9:00
14		—	84.7	—		.6	.3	20.3	off	9:15
15		—	84.7	—		.6	.3	15.8	on	7:30
16		933	79.9	4.8		.6	.3	20.6	off	7:40
17		—	79.9	—		.6	.3	16.4	on	7:40
18		798	76.2	3.7		.6	.3	20.7	off	7:25
19		—	76.2			.6	.3	16.2	ON	700
20		923	71.4	4.8		.6	.3	20.6	OFF	10:30
21		—	71.4	—		.6	.3	20.8	OFF	8:23
22		—	71.4	—		.6	.3	16.1	ON	7:00
23		927	66.5	4.9		.6	.3	20.0	OFF	9:30
24		—	66.5	—		.6	.3	15.6	ON	10:25
25		735	62.8	3.7		.6	.3	20.0	OFF	7:00
26		—	62.8	—		.6	.3	15.3	ON	700
27		928	58.0	4.8		.6	.3	20.1	off	8:00
28		—	58.0	—		.6	.3	20.5	off	9:15
29		—	58.0	—		.6	.3	16.1	ON	8:00
30		781	54.2	3.8		.6	.3	21.1	off	8:40
31		—	54.2	—		.6	.3	16.5	ON	8:30
TOTAL		11266								
AVG.		363								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY03046

Signature: Peter Allen Date: 1/2/2020 Operator Grade Level: IIB

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg					
12/1/2019		—	24565.0	—	12.6
12/2/2019		907	24588.8	23.8	17.2
12/3/2019		—	24588.8	~~12.4~~	12.4
12/4/2019		839	24610.9	22.1	17.0
12/5/2019		—	24610.9	—	12.3
12/6/2019		919	24634.9	24	16.6
12/7/2019		—	24634.9	—	17.4
12/8/2019		—	24634.9	—	12.3
12/9/2019		920	24658.9	24.0	17.3
12/10/2019		—	24658.9	—	18.7
12/11/2019		731	24677.9	19.0	18.9
12/12/2019		—	24677.9	—	14.5
12/13/2019		925	24701.9	24	19.4
12/14/2019		—	24701.9	—	20.3
12/15/2019		—	24701.9	—	15.8
12/16/2019		933	24725.9	24	20.6
12/17/2019		—	24725.9	—	16.4
12/18/2019		798	24746.5	20.9	20.7
12/19/2019		—	24746.5	—	16.2
12/20/2019		923	24770.5	24.0	20.6
12/21/2019		—	24770.5	—	20.8
12/22/2019		—	24770.5	—	16.1
12/23/2019		927	24794.5	24.0	20.0
12/24/2019		—	24794.5	—	15.6
12/25/2019		736	24813.6	19.1	20.0
12/26/2019		—	24813.6	—	15.3
12/27/2019		928	24837.6	24.0	20.1
12/28/2019		—	24837.6	—	20.5
12/29/2019		—	24837.6	—	16.0
12/30/2019		781	24857.9	20.3	21.1
12/31/2019		—	24857.9	~~20~~	16.6
TOTAL		11,266		292.9	
Average		363			

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17278.3		26.0		10699.7		16.2	47449.97	
12/1/2019	4 —	17278.3	—	26.1	675	10708.1	8.4	16.3	47457.91	7.94
12/2/2019	—	17278.3	—	26.1	—	10708.1	—	16.3	47457.91	—
12/3/2019	976	17293.7	15.4	26.1	—	10708.1	—	16.3	47473.20	15.29
12/4/2019	—	17293.7	—	26.2	—	10708.1	—	16.5	47473.20	—
12/5/2019	—	17293.7	—	26.2	780	10717.8	9.7	16.5	47482.92	9.72
12/6/2019	—	17293.7	—	24.4	—	10717.8	—	15.6	47482.92	—
12/7/2019	1072	17310.5	16.8	26.6	—	10717.8	—	16.2	47499.83	16.91
12/8/2019	—	17310.5	—	26.2	697	10726.4	8.6	16.4	47508.33	8.50
12/9/2019	—	17310.5	—	24.3	—	10726.4	—	15.6	47508.33	—
12/10/2019	1088	17327.5	17.0	26.5	—	10726.4	—	16.4	47525.35	17.02
12/11/2019	—	17327.5	—	26.8	—	10726.4	—	17.0	47525.35	—
12/12/2019	—	17327.5	—	27.1	872	10737.3	10.9	17.3	47536.17	10.82
12/13/2019	—	17327.5	—	27.4	—	10737.3	—	17.6	47536.17	—
12/14/2019	967	17342.7	15.2	26.6	—	10737.3	—	10.1	47552.42	16.25
12/15/2019	—	17342.7	—	27.8	741	10746.4	9.1	18.1	47560.40	7.68
12/16/2019	—	17342.7	—	28.2	—	10746.4	—	18.4	47560.40	—
12/17/2019	687	17353.5	10.8	28.3	—	10746.4	—	18.5	47571.24	10.84
12/18/2019	—	17353.5	—	28.6	—	10746.4	—	18.8	47571.24	—
12/19/2019	—	17353.5	—	28.7	470	10752.2	5.8	18.9	47577.06	5.82
12/20/2019	—	17363.5	—	28.9	—	10752.2	—	19.0	47577.06	—
12/21/2019	676	17364.2	10.7	28.0	—	10752.2	—	11.6	47588.43	11.37
12/22/2019	—	17364.2	—	28.9	682	10760.7	8.5	19.1	47596.09	7.66
12/23/2019	—	17364.2	—	29.2	—	10760.7	—	19.3	47596.09	—
12/24/2019	615	17373.8	9.6	29.2	—	10760.7	—	19.3	47605.68	9.59
12/25/2019	—	17373.8	—	29.3	—	10760.7	—	19.5	47605.68	—
12/26/2019	—	17373.8	—	29.3	532	10767.2	6.5	19.5	47612.22	6.54
12/27/2019	—	17373.8	—	29.5	—	10767.2	—	19.6	47612.22	—
12/28/2019	562	17384.0	10.2	28.5	—	10767.2	—	12.1	47623.56	11.34
12/29/2019	—	17384.0	—	29.6	559	10774.1	6.9	19.8	47629.32	5.76
12/30/2019	—	17384.0	—	28.1	—	10774.1	—	19.2	47629.32	—
12/31/2019	595	17393.4	9.4	30.1	—	10774.1	—	20.2	47638.63	9.31
	7238		115.1		6008		74.4			158.66
AVERAGE	233				194					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

ublic Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	12/2019 MM YYYY	01/02/2020 MM DD YYYY	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination
Public Water System ID: NY 1101755 L.H.	County: Cortland	Town, Village or City: Cortlandville	GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		675	43.7	3.4		.6	.3	26.1	OFF	8:00
2		—	43.7	—		.6	.3	26.1	OFF	8:30
3		976	37.3	6.4		.6	.3	26.1	OFF	8:00
4		—	37.3	—		.6	.3	26.2	OFF	8:00
5		780	32.2	5.1		.6	.3	26.2	OFF	7:15
6		—	32.2	—		.6	.3	24.4	ON	5:15
7		1072	25.9	6.3		.6	.3	26.0	OFF	5:15
8		697	22.3	3.6		.6	.3	26.2	OFF	8:00
9		—	22.3	—		.6	.3	24.3	ON	7:15
10		1088	15.0	7.3		.6	.3	26.5	OFF	8:15
11		—	15.0	—		.6	.3	26.5	OFF	8:00
12		872	10.4	4.6		.6	.3	27.1	OFF	8:00
13		—	10.4	—		.6	.3	27.4	OFF	8:45
14		967	4.8	5.6		.6	.3	26.6	ON	9:15
15		741	151.3	5.0		.6	.3	27.8	OFF	7:45
16		—	151.3	—		.6	.3	28.2	OFF	8:15
17		687	147.7	3.6		.6	.3	28.3	OFF	7:55
18		—	147.7	—		.6	.3	28.6	OFF	7:35
19		470	159.6 154.9	2.6		.6	.3	28.7	OFF	7:30
20		—	154.9	—		.6	.3	28.9	OFF	10:15
21		676	147.2	5.2		.6	.3	28.0	ON	8:30
22		682	143.9	3.3		.6	.3	28.9	OFF	7:40
23		—	143.9	—		.6	.3	29.2	OFF	9:45
24		615	140.0	3.9		.6	.3	29.2	OFF	10:15
25		—	140.0	—		.6	.3	29.3	OFF	8:00
26		532	137.2	2.8		.6	.3	29.3	off	7:30
27		—	137.2	—		.6	.3	29.5	off	7:30
28		562	132.3	4.9		.6	.3	28.5	ON	8:00
29		559	129.8	2.5		.6	.3	29.6	off	8:30
30		—	129.8	—		.6	.3	28.1	ON	8:00
31		595	126.2	3.6		.6	.3	30.1	off	8:45
TOTAL		13246								
AVG.		427								

Chlorine Mix Ratio = ——— quarts/gallons of ——— % chlorine added to ——— gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S operator NYSDOH Operator Certification Number: NY003046

ature: [signature] Date: 1/2/2020 Operator Grade Level: TIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd well Rays	12-4-19		YES ~~NO~~	YES ~~NO~~	
Municipal Bldg	12-3-19	1	YES ~~NO~~	YES ~~NO~~	.6
Walden Oaks Booster STA.	12-3-19	1	YES ~~NO~~	YES ~~NO~~	.6
Blue Creek Booster STA.	12-3-19	1	YES ~~NO~~	YES ~~NO~~	.5
Red Apple McLean / RT 13	12-9-19	1	YES ~~NO~~	YES ~~NO~~	.6
Cville Highway RT 41	12-9-19	1	YES ~~NO~~	YES ~~NO~~	.4
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 400

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Machean.

Name of NYSDOH Certified Laboratory: MICROBIC LABS.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0213

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/04/2019
Reported: 12/13/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9L0213-01	**Collection Date:**	12/04/2019 8:57

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/04/19 1545	12/05/19 1117	EDB
Escherichia coli	Absent			per 100mL		12/04/19 1545	12/05/19 1117	EDB

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	69.7		1.02	mg/L		12/09/19 0907	12/09/19 1259	JDF

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0213

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Customer Relationship Coordinator

Reported: 12/13/2019 16:40

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0149

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/03/2019
Reported: 12/05/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9L0149-01
Collected By: JM-Client
Collection Date: 12/03/2019 7:44

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB
Escherichia coli	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/03/19 0744	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9L0149-02
Collected By: JM-Client
Collection Date: 12/03/2019 8:05

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB
Escherichia coli	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/03/19 0805	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0149

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9L0149-03	**Collection Date:**	12/03/2019 8:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB
Escherichia coli	Absent			per 100mL		12/03/19 1556	12/04/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		12/03/19 0834	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/05/2019 11:01

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0544

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/09/2019
Reported: 12/12/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9L0544-01
Collected By: JM-Client
Collection Date: 12/09/2019 9:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/09/19 1551	12/10/19 1112	EDB
Escherichia coli	Absent			per 100mL		12/09/19 1551	12/10/19 1112	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		12/09/19 0952	CUS

Client Sample ID: C-Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9L0544-02
Collected By: JM-Client
Collection Date: 12/09/2019 10:55

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		12/09/19 1551	12/10/19 1112	EDB
Escherichia coli	Absent			per 100mL		12/09/19 1551	12/10/19 1112	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		12/09/19 1055	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9L0544

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/12/2019 14:09

MI AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162 ain Avenue
Scr PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time 8 | 6
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BHC	Additional Notes
	Red Apple Rt13/McLean Rd	12-9-19	952AM	1	DW	1	Na2S2O3	1	C10.6
	C-ville Highway Garage Rt 41 Polkville	12-9-19	1055AM	1	DW	1	Na2S2O3	1	C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-9-19 1125 AM		12/9/19 1125
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MI[illegible]AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

3+4

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time 8.6
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BHCT										Additional Notes
	Red Apple Rt 13/McLean Rd	12-9-19	952 AM	1	DW	1	Na2S203	1										C106
	C-Ville Highway Garage RT 41 Polkville	12-9-19	1055 AM	1	DW	1	Na2S203	1										C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-9-19 1125 AM	[signature]	12/9/19 1125
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ____ of ____

J9L0544
Cortlandville Water, Town of

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number 35

Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 9.8
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BMcT	Additional Notes
	Municipal BLDG.	12/3/19	744 AM	1	DW	1	Na2S2O3	1	c10.6
	Walden Oaks BS.	12/3/19	805 AM	1	DW	1	Na2S2O3	1	c10.6
	Blue Creek BS.	12/3/19	834 AM	1	DW	1	Na2S2O3	1	c10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12/3/19 907 AM	[signature]	12/3/19 907
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

Page 3 of 3

J9L0149

Cortlandville Water, Town of

M AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

16 ain Avenue
Sc , PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RE

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.7
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	(Grab) / Comp	Preservative Types **	Raw Water	Sodium								Additional Notes
	Terrace Rd well	12/4/19	857 AM	2	DW	2	~~H2SO4~~ HNO3	1	1								Raw Water / 60 HP

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12/4/19 920 AM	[signature]	12/4/19 9:20
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

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CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.8

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types**	BACT.									Additional Notes
	Municipal BLDG.	12/3/19	744 AM	1	DW	1	Na2S2O3	1									c10.6
	Walden Oaks BS.	12/3/19	805 AM	1	DW	1	Na2S2O3	1									c10-6
	Blue Creek BS.	12/3/19	834 AM	1	DW	1	Na2S2O3	1									c10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12/3/19 907 AM	[illegible]	12/3/19 9:07
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result:

ublic Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	11/2019 (MM Y Y Y Y)	12/02/2019 (MM DD Y Y Y Y)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous – Cylinder weight (lbs.)	Chlorination: Gaseous – Chlorine used per day (lbs.)	Chlorination: Liquid – Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			138.1			.6	.3	23.2		
1		—	138.1	—	—	.6	.3	23.8	off	6:30
2		666	133.6	4.5		.6	.3	23.9	off	5:30
3		566	130.6	3.0		.6	.3	24.2	off	7:45
4		—	130.6	—		.6	.3	24.5	off	5:30
5		749	125.5	5.1		.6	.3	24.6	off	7:45
6		—	125.2	—		.6	.3	24.9	off	7:45
7		691	121.2	4		.6	.3	25.0	off	715
8		—	121.2	—		.6	.3	25.2	off	600
9		1013	118.8	6.4		.6	.3	24.9	off	600
10		822	110.1	3.7		.6	.3	25.1	off	545
11		—	110.1	—		.6	.3	25.5	off	745
12		995	103.4	6.7		.6	.3	25.2	off	730
13		460	101.0	2.4		.6	.3	25.2	off	730
14		784	96.8	4.2		.6	.3	25.4	off	7:20
15		—	96.8	—		.6	.3	25.4	off	8:15
16		961	89.8	7.0		.6	.3	25.4	off	7:20
17		801	86.1	3.7		.6	.3	25.5	off	8:00
18		—	86.1	—		.6	.3	25.7	off	8:20
19		968	79.6	6.5		.6	.3	25.6	off	8:10
20		—	79.6	—		.6	.3	25.7	off	8:10
21		975	74.5	5.1		.6	.3	25.8	off	7:30
22		—	74.5	—		.6	.3	25.8	Off	8:20
23		956	67.9	6.6		.6	.3	25.8	off	10:10
24		722	64.4	3.5		.6	.3	25.8	off	7:45
25		—	64.4	—		.6	.3	25.9	off	8:00
26		942	58.1	6.3		.6	.3	25.8	off	7:20
27		—	58.1	—		.6	.3	25.9	off	8:45
28		855	53.6	4.5		.6	.3	26.0	off	9:30
29		—	53.6	—		.6	.3	26.1	off	8:00
30		942	47.1	6.5		.6	.3	26.0	off	7:30
31										
TOTAL		14,865,000								
AVG.		496								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S operator NYSDOH Operator Certification Number: NY0030046

ature: Peter Alteri Date: 12/2/19 Operator Grade Level: III

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal bldg Terrace Rd	11-4-19	1	YES NO	YES NO	.96
Walden Oaks Booster STA.	11-4-19	1	YES NO	YES NO	.95
Blue Creek Booster STA.	11-4-19	1	YES NO	YES NO	0.3
Rte Apple Hudson Rd/RT 13	11-13-19	1	YES NO	YES NO	0.6
Castle Highway RT 6/11	11-13-19	1	YES NO	YES NO	0.4
Terrace Rd well	11-13-19		YES NO	YES NO	∅
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4/060

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Kff McClean

Name of NYSDOH Certified Laboratory: Microbac LABS.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: ___

Comments: ___

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17149.6		23.2		10616.6		13.4	47238.11	
11/1/2019	—	17149.6	—	23.8	—	10616.6	—	14.0	47238.11	
11/2/2019	666	17160.1	10.5	23.9	—	10616.6	—	14.1	47248.64	10.53
11/3/2019	—	17160.1	—	24.2	566	10623.7	7.1	14.5	47255.70	7.06
11/4/2019	—	17160.1	—	24.5	—	10623.7	—	14.8	47255.70	—
11/5/2019	749	17172.0	11.9	24.6	—	10623.7	—	14.8	47267.54	11.84
11/6/2019	—	17172.0	—	24.9	—	10623.7	—	15.1	47267.54	—
11/7/2019	—	17172.0	—	25.0	691	10632.3	8.6	15.2	47276.19	8.65
11/8/2019	—	17172.0	—	25.2	—	10632.3	—	15.5	47276.19	—
11/9/2019	1013	17187.8	15.8	24.9	—	10632.3	—	15.1	47293.47	17.28
11/10/2019	—	17187.8	—	25.1	822	10642.6	10.3	15.3	47302.19	8.72
11/11/2019	—	17187.8	—	25.5	—	10642.6	—	15.7	47302.19	—
11/12/2019	995	17203.4	15.6	25.2	—	10642.6	—	15.5	47317.75	15.66
11/13/2019	—	17203.4	—	25.2	460	10648.3	5.7	15.4	47323.49	5.74
11/14/2019	—	17203.4	—	25.4	784	10657.9	9.6	15.6	47333.11	9.62
11/15/2019	—	17203.4	—	25.4	—	10657.9	—	15.6	47333.11	—
11/16/2019	961	17218.5	15.1	25.4	—	10657.9	—	15.7	47349.27	16.16
11/17/2019	—	17218.5	—	25.5	801	10667.9	10.0	15.8	47358.14	8.87
11/18/2019	—	17218.5	—	25.7	—	10667.9	—	15.9	47358.14	—
11/19/2019	968	17233.7	15.2	25.6	—	10667.9	—	15.9	47373.30	15.16
11/20/2019	—	17233.7	—	25.7	—	10667.9	—	16.0	47373.30	—
11/21/2019	—	17233.7	—	25.8	975	10680.0	12.1	16.0	47385.40	12.10
11/22/2019	—	17233.7	—	25.8	—	10680.0	—	16.0	47385.40	—
11/23/2019	956	17248.7	15.0	25.8	—	10680.0	—	16.0	47401.14	15.74
11/24/2019	—	17248.7	—	25.8	722	10689.0	9.0	16.0	47409.34	8.20
11/25/2019	—	17248.7	—	25.9	—	10689.0	—	16.1	47409.34	—
11/26/2019	942	17263.5	14.8	25.8	—	10689.0	—	16.0	47424.11	14.77
11/27/2019	—	17263.5	—	25.9	—	10689.0	—	16.2	47424.11	—
11/28/2019	—	17263.5	—	26.0	855	10699.7	10.7	16.2	47434.76	10.65
11/29/2019	—	17263.5	—	26.1	—	10699.7	—	16.3	47434.76	—
11/30/2019	942	17278.3	14.8	26.0	—	10699.7	—	16.2	47449.97	15.21
	8192		128.7		6676		83.1			211.86
AVERAGE	273				223					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9K0320

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/04/2019
Reported: 11/06/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9K0320-01
Collected By: JM-Client
Collection Date: 11/04/2019 7:39

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB
Escherichia coli	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB

Analyses Performed by: Customer

ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		11/04/19 0739	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9K0320-02
Collected By: JM-Client
Collection Date: 11/04/2019 8:29

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB
Escherichia coli	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		11/04/19 0829	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9K0320

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9K0320-03	**Collection Date:**	11/04/2019 8:57

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB
Escherichia coli	Absent			in 100mL		11/04/19 1845	11/05/19 1312	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		11/04/19 0857	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 11/06/2019 13:57

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9K0806

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/13/2019
Reported: 11/15/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9K0806-01
Collected By: JM-Client
Collection Date: 11/13/2019 9:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB
Escherichia coli	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB

Analyses Performed by: Customer

ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		11/13/19 0930	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9K0806-02
Collected By: JM-Client
Collection Date: 11/13/2019 10:51

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB
Escherichia coli	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		11/13/19 1051	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9K0806

Client Sample ID:	Terrace Rd Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9K0806-03	**Collection Date:**	11/13/2019 9:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB
Escherichia coli	Absent			per 100mL		11/13/19 1629	11/14/19 1128	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 11/15/2019 14:23

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	11/2019 (MM YYYY)	12/02/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terraca Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl	WELL Level	Pump On/OfF	Time
			16.5			.6	.3			
1		869	122	4.3		.6	.3	17.4	off	6:45
2		—	12.2	—		.6	.3	18.2	off	5:30
3		—	12.2	—		.6	.3	12.9	ON	7:45
4		917	7.5	4.7		.6	.3	17.4	off	5:45
5		—	7.5	—		.6	.3	13.0	ON	7:30
6		686	4.0	3.5		.6	.3	17.3	off	7:30
7		—	4.0 150	—		.6	.3	12.2	ON	700
8		896	147.1+1	4.9		.6	.3	16.9	off	545
9		—	147.1	—		.6	.3	17.3	off	615
10		—	147.1	—		.6	.3	12.3	ON	530
11		905	142.6	5.5		.6	.3	16.7	off	700
12		—	142.6	—		.6	.3	12.2	ON	760
13		729	138.5	4.1		.6	.3	16.8	off	700
14		—	138.5	—		.6	.3	12.3	on	7:15
15		781	134.9	3.6		.6	.3	16.7	off	8:05
16		—	134.9	—		.6	.3	17.1	off	7:35
17		—	134.9	—		.6	.3	12.6	on	7:56
18		809	130.7	4.2		.6	.3	17.0	off	8:00
19		—	130.7	—		.6	.3	13.1	on	7:35
20		737	126.9	3.8		.6	.3	16.9	off	7:58
21		—	126.9	—		.6	.3	12.5	ON	7:00
22		838	122.9	4.0		.6	.3	16.9	Off	8:35
23		—	122.9	—		.6	.3	17.2	Off	10:00
24		—	122.9	—		.6	.3	12.4	ON	7:30
25		873	118.4	4.5		.6	.3	16.8	Off	7:45
26		—	118.4	—		.6	.3	12.4	ON	7:10
27		701	114.9	3.5		.6	.3	16.9	Off	8:55
28		—	114.9	—		.6	.3	12.5	ON	9:25
29		749	111.3	3.6		.6	.3	16.9	off	8:00
30		—	111.3	—		.6	.3	12.3	off	8:00
31										
TOTAL		10490,000								
AVG.		350								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aker, Jr. Title: W/S operator NYSDOH Operator Certification Number: NY 003a416

Signature: Peter Aker Date: 12/2/19 Operator Grade Level: ~~1-B~~

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			24290.0		
11/1/2019		869	24313.0	23	17.3
11/2/2019		—	24313.0	—	18.1
11/3/2019		—	24313.0	—	12.9
11/4/2019		917	24337.0	24	17.5
11/5/2019		—	24337.0	—	13.0
11/6/2019		686	24355.0	18	17.2
11/7/2019		—	24355.0	—	12.2
11/8/2019		896	24378.6	23.6	16.9
11/9/2019		—	24378.6	—	17.3
11/10/2019		—	24378.6	—	12.3
11/11/2019		905	24402.5	23.9	16.7
11/12/2019		—	24402.5	—	12.2
11/13/2019		729	24421.6	19.1	16.8
11/14/2019		—	24421.6	—	12.3
11/15/2019		781	24442.1	20.5	16.7
11/16/2019		—	24442.1	—	17.1
11/17/2019		—	24442.1	—	12.6
11/18/2019		809	24463.3	21.2	17.0
11/19/2019		—	24463.3	—	13.1
11/20/2019		737	24482.6	19.3	16.9
11/21/2019		—	24482.6	—	12.5
11/22/2019		838	24504.1	21.5	16.9
11/23/2019		—	24504.1	—	17.2
11/24/2019		—	24504.1	—	12.4
11/25/2019		873	24527.0	22.9	16.8
11/26/2019		—	24527.0	—	12.4
11/27/2019		701	24545.4	18.4	16.9
11/28/2019		—	24545.4	—	12.5
11/29/2019		749	24565.0	19.6	16.9
11/30/2019		—	24565.0	—	12.4
TOTAL		10,490,000		275	
Average		350			

Rev: 1/2019 PA

MI AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162 ain Avenue
Scr..., PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RE(

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time 10 d
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No (N/A)

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Red Apple Rt 13/McLean Rd	11-13-19	930 AM	1	DW	1	Na2S203	1	C10.6
	Cortlandville Highway Garage Rt 41 Polkville	11-13-19	1057 AM	1	DW	1	Na2S203	1	C10.4
	Terrace Rd well	11-13-19	9:12 AM	1	DW	1	Na2S203	1	RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-13-19 1124 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			11/13/19 1124
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

8-10

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N ain Avenue, Scranton, PA 18508, 570.346.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.0
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT									Additional Notes
	Municipal BLDG.	11-4-19	739 AM	1	DW	G	Na2S2O3	1									C10.6
	Walden Oaks BS.	11-4-19	8:29 AM	1	DW	G	Na2S2O3	1									C10.5
	Blue Creek BS.	11-4-19	857 AM	1	DW	G	Na2S2O3	1									C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-4-19 921 AM	[signature]	11/4/19 9:21
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Page 3 of 3

J9K0320

Cortlandville Water, Town of

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

ublic Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	10/2019 (MM YYYY)	11/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 71.1	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .6	Other Treatments / Readings: End of System Cl .3	WELL Level 13.8	Pump On/OfF	Time
1		—	71.1	—		.6	.3	9.4	ON	7:00
2		748	67.0	4.1		.6	.3	13.7	OFF	7:15
3		—	67.0	—		.6	.3	9.6	on	7:45
4		900	62.8	4.2		.6	.3	14.0	off	8:00
5		—	62.8	—		.6	.3	14.3	off	6:30
6		—	62.8	—		.6	.3	9.6	ON	8:00
7		936	57.9	4.9		.6	.3	14.1	off	7:30
8		—	57.9	—		.6	.3	9.6	ON	7:30
9		694	54.5	3.4		.6	.3	13.8	off	7:30
10		—	54.5	—		.6	.3	9.3	ON	7:00
11		838	50.3	4.2		.6	.3	13.7	off	820
12		—	50.3	—		.6	.3	14.0	off	810
13		—	50.3	—		.6	.3	9.0	ON	845
14		936	45.8	4.5		.6	.3	13.2	off	700
15		—	45.8	—		.6	.3	8.9	ON	715
16		710	42.0	3.8		.6	.3	13.6	off	8:30
17		—	42.0	—		.6	.3	9.5	on	8:00
18		846	37.8	4.2		.6	.3	14.0	off	8:15
19		—	37.8	—		.6	.3	14.6	off	7:50
20		—	37.8	—		.6	.3	9.6	on	8:00
21		888	32.9	4.9		.6	.3	13.9	off	7:20
22		—	32.9	—		.6	.3	10.1	on	7:25
23		697	29.5	3.4		.6	.3	14.0	off	7:35
24		—	29.5	—		.6	.3	9.4	ON	8:30
25		813	25.1	4.4		.6	.3	13.8	OFF	8:30
26		—	25.1	—		.6	.3	14.4	OFF	8:25
27		—	25.1	—		.6	.3	9.6	ON	7:35
28		900	20.3	4.8		.6	.3	13.8	OFF	7:00
29		—	20.3	—		.6	.3	9.9	ON	7:05
30		718	16.5	3.8		.6	.3	13.8	OFF	7:15
31		—	16.5	—		.6	.3	11.5	on	8:35
TOTAL		10,624								
AVG.		343								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock

Reported by: Peter Aitken Jr. Title: W/S operator NYSDOH Operator Certification Number: NY00300416

Signature: [signature] Date: 11/1/19 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Office Terrace Rd.	10-1-19	1	YES ~~NO~~	YES ~~NO~~	0.6
Walden OAKS Booster STA.	10-1-19	1	YES ~~NO~~	YES ~~NO~~	0.4
Blue Creek Booster	10-1-19	1	YES ~~NO~~	YES ~~NO~~	0.4
Kuk Fill McLan Rd / RT 13	10-7-19	1	YES ~~NO~~	YES ~~NO~~	0.6
Highway Garage Rakville.	10-7-19	1	YES ~~NO~~	YES ~~NO~~	0.4
Terrace Rd well RAW	10-7-19		YES ~~NO~~	YES ~~NO~~	∅
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4/000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" a copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): J Bragg Canajoharie

Name of NYSDOH Certified Laboratory: MicroBAC.

Did any MCL violation occur? If so, please describe: NO.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments:

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			24011.5		
10/1/2019	—	—	24011.5	—	9.4
10/2/2019		748	24030.7	19.2	13.7
10/3/2019		—	24030.7	—	9.6
10/4/2019		900	24053.8	23.1	14.0
10/5/2019		—	24053.8	—	14.3
10/6/2019		—	24053.8	—	9.6
10/7/2019		936	24077.8	24	13.9
10/8/2019		—	24077.8	—	9.9
10/9/2019		694	24095.6	17.8	13.7
10/10/2019		—	24095.6	—	9.3
10/11/2019		838	24117.1	21.5	13.7
10/12/2019		—	24117.1	—	14.0
10/13/2019		—	24117.1	—	9.0
10/14/2019		936	24141.1	24.0	13.2
10/15/2019		—	24141.1	—	8.9
10/16/2019		710	24160.1	19	13.6
10/17/2019		—	24160.1	—	9.5
10/18/2019		846	24182.7	22.6	14.0
10/19/2019		—	24182.7	—	14.6
10/20/2019		—	24182.7	—	9.6
10/21/2019		888	24206.5	23.8	13.9
10/22/2019		—	24206.5	—	10.1
10/23/2019		697	24225.0	18.5	14.0
10/24/2019		—	24225.0	—	9.4
10/25/2019		813	24246.8	21.8	13.8
10/26/2019		—	24246.8	—	14.4
10/27/2019		—	24246.8	—	9.6
10/28/2019		900	24270.8	24.0	13.8
10/29/2019		—	24270.8	—	9.9
10/30/2019		718	24290.0	19.2	13.8
10/31/2019		—	24290.0		
TOTAL		10,624		278.5	
Average		343			

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR

Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	10/2019 (MM YYYY)	11/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
			57.2			.6		24.0		
1		743	53.2	4.0		.6	.3	23.8	OFF	7:20
2		—	53.2	—		.6	.3	23.8	OFF	7:30
3		675	50.4	2.8		.6	.3	23.7	off	8:00
4		—	50.4	—		.6	.3	23.8	off	8:15
5		628	47.2	3.2		.6	.3	23.6	off	6:30
6		526	45.0	2.2		.6	.3	23.6	off	11:10
7		—	45.0	—		.6	.3	23.6	off	7:00
8		733	41.0	4.0		.6	.3	23.4	off	7:30
9		—	41.0	—		.6	.3	23.5	off	7:45
10		719	38.0	3.0		.6	.3	23.3	OFF	7:10
11		—	38.0	—		.6	.3	23.3	off	8:10
12		758	33.9	4.1		.6	.3	23.1	off	8:30
13		579	31.4	2.5		.6	.3	23.1	off	9:00
14		—	31.4	—		.6	.3	23.1	off	7:50
15		735	27.4	4.0		.6	.3	22.8	off	7:30
16		—	27.4	—		.6	.3	22.9	off	8:35
17		733	24.5	2.9		.6	.3	22.9	off	8:10
18		—	24.5	—		.6	.3	23.1	off	8:00
19		674	20.7	3.8		.6	.3	22.9	off	7:40
20		568	18.4	2.3		.6	.3	22.9	off	8:10
21		—	18.4	—		.6	.3	23.1	off	7:40
22		745	14.2	4.2		.6	.3	22.9	off	7:40
23		—	14.2	—		.6	.3	23.0	off	8:00
24		739	11.1	3.1		.6	.3	22.9	off	8:45
25		—	11.1	—		.6	.3	23.1	off	8:20
26		706	150.4	4.7		.6	.3	22.9	off	8:10
27		654	146.6	3.5		.6	.3	22.8	OFF	7:55
28		—	146.6	—		.6	.3	23.0	OFF	7:15
29		782	141.7	4.9		.6	.3	22.8	OFF	7:50
30		—	141.7	—		.6	.3	22.9	OFF	7:45
31		686	138.1	3.6		.6	.3	23.2	off	8:45
TOTAL		12383								
AVG.		399								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Attard Jr. Title: W/S operator NYSDOH Operator Certification Number: 2140030416

Signature: Peter Attard Date: 11/1/19 Operator Grade Level: T-2

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17046.4		24.0		10542.6		14.3	47061.32	
10/1/2019	743	17058.1	11.7	23.8	—	10542.6	—	14.0	47073.06	11.74
10/2/2019	—	17058.1	—	23.8	—	10542.6	—	14.0	47073.06	—
10/3/2019	—	17058.1	—	23.7	675	10551.2	8.6	14.0	47081.55	8.49
10/4/2019	—	17058.1	—	23.8	—	10551.2	—	14.1	47081.55	—
10/5/2019	628	17068.1	10	23.6	—	10551.2	—	13.8	47091.49	9.94
10/6/2019	—	17068.1	—	23.6	526	10557.7	6.5	13.8	47098.05	6.56
10/7/2019	—	17068.1	—	23.6	—	10557.7	—	13.9	47098.05	—
10/8/2019	733	17079.7	11.6	23.4	—	10557.7	—	13.7	47109.65	11.6
10/9/2019	—	17079.7	—	23.5	—	10557.7	—	13.7	47109.65	—
10/10/2019	—	17079.7	—	23.3	719	10566.8	9.1	13.6	47118.70	9.05
10/11/2019	—	17079.7	—	23.3	—	10566.8	—	13.5	47118.70	—
10/12/2019	758	17091.8	12.1	23.1	—	10566.8	—	13.4	47130.74	12.04
10/13/2019	—	17091.8	—	23.1	579	10574.1	7.3	13.3	47137.98	7.24
10/14/2019	—	17091.8	—	23.1	—	10574.1	—	13.4	47137.98	—
10/15/2019	735	17103.4	11.6	22.8	—	10574.1	—	13.1	47149.62	11.64
10/16/2019	—	17103.4	—	22.9	—	10574.1	—	13.2	47149.62	—
10/17/2019	—	17103.4	—	22.9	733	10583.3	9.2	13.2	47158.82	9.2
10/18/2019	—	17103.4	—	23.1	—	10583.3	—	13.4	47158.82	—
10/19/2019	674	17114.1	11.3	22.9	—	10583.3	—	13.2	47169.49	10.67
10/20/2019	—	17114.1	—	22.9	568	10590.4	7.1	13.2	47176.60	7.11
10/21/2019	—	17114.1	—	23.1	—	10590.4	—	13.4	47176.60	—
10/22/2019	745	17125.9	11.8	22.9	—	10590.4	—	13.1	47188.35	11.75
10/23/2019	—	17125.9	—	23.0	—	10590.4	—	13.3	47188.35	—
10/24/2019	—	17125.9	—	22.9	739	10599.7	9.3	13.2	47197.65	9.3
10/25/2019	—	17125.9	—	23.1	—	10599.7	—	13.3	47197.65	—
10/26/2019	706	17137.1	11.2	22.9	—	10599.7	—	13.1	47208.85	11.2
10/27/2019	—	17137.1	—	22.8	654	10607.9	8.2	13.1	47217.01	8.16
10/28/2019	—	17137.1	—	23.0	—	10607.9	—	13.2	47217.01	—
10/29/2019	782	17149.6	12.5	22.8	—	10607.9	—	13.1	47229.44	12.43
10/30/2019	—	17149.6	—	22.9	—	10607.9	—	13.2	47229.44	—
10/31/2019	—	17149.6	—	23.2	686	10616.6	8.7	13.4	47238.11	8.67
	6504		103.2		5879		74			176.79
AVERAGE	210				190					

Rev: 1/2015

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9J0162

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/01/2019
Reported: 10/07/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Garage
Sample Matrix: Drinking Water
Lab Sample ID: J9J0162-01
Collected By: BC-Client
Collection Date: 10/01/2019 7:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB
Escherichia coli	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/01/19 0740	CUS

Client Sample ID: Walden Oaks Booster Station
Sample Matrix: Drinking Water
Lab Sample ID: J9J0162-02
Collected By: BC-Client
Collection Date: 10/01/2019 8:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB
Escherichia coli	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/01/19 0830	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9J0162

Client Sample ID:	Blue Creek Booster Station		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J9J0162-03	**Collection Date:**	10/01/2019 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB
Escherichia coli	Absent			in 100mL		10/01/19 1521	10/02/19 1049	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/01/19 0900	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Quality Assurance Officer
Reported: 10/07/2019 12:17

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9J0571

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/07/2019
Reported: 10/09/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 60hp Terrace Rd Well Raw Water
Sample Matrix: Drinking Water
Lab Sample ID: J9J0571-01
Collected By: BC-Client
Collection Date: 10/07/2019 8:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB
Escherichia coli	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.00	4.00 MCL		mg/L	Y1		10/07/19 0830	CUS

Client Sample ID: Kiwk Fill / Red Apple McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9J0571-02
Collected By: BC-Client
Collection Date: 10/07/2019 8:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB
Escherichia coli	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/07/19 0845	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9J0571

Client Sample ID:	Highway Garage Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J9J0571-03	**Collection Date:**	10/07/2019 9:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB
Escherichia coli	Absent			in 100mL		10/07/19 1603	10/08/19 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		10/07/19 0945	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 10/09/2019 14:24

MI[illegible]BAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1[illegible]rth Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY R[illegible]RD

Number
Instructions on back

Lab Report Address

Client Name: Town of Cortlandville Water Dept.
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Brian R. Congdon
Telephone No.: 591-2770

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Pat Alfieri
Telephone No.: 756-9637

Turnaround Time

[ ] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[ ]Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.2
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [ ] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [ ] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Bacterial
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon
Sampler Signature: B.R. Cgdn
Sampler Phone No.:

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	Bacterial										Additional Notes
1	Municipal Garage	10-1-19	7:40 AM	1		G	THIO	1										.6 Chlorine
2	Walden Oaks Booster Station	10-1-19	8:30 AM	1		G	THIO	1										.4 Chlorine
3	Blue Creek Booster Station	10-1-19	9:00 AM	1		G	THIO	1										.4 Chlorine

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R. Cgdn	10-1-19 10:00 AM	[illegible]	10/1/19 9:59
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162 [illegible]th Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number _____
Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 591-2770

Invoice Address

Client Name:
Address:
City, State, Zip:
Contact:
Telephone No.:

Turnaround Time

[ ] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[ ]Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time 8.3
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No (N/A)

Send Report via: [ ] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [ ] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon
Sampler Signature: B. R. Congdon
Sampler Phone No.:

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteriological	Additional Notes
1	60th Terrace Rd Well Raw Water	10-7-19	8:30 AM	1		G	THIO	1	Chlorine 0.0
2	Kwik Fill / Red Apple McLean Rd	10-7-19	8:45 AM	1		G	THIO	1	Chlorine .60
3	Highway Garage Poolkville	10-7-19	9:45 AM	1		G	THIO	1	Chlorine .70

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. R. Congdon	7-10-19 10:24 AM	[signature]	7/10/19 1028
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	09/2019 (MM YYYY)	10/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl 3	WELL Level 16.4	Pump On/Off	Time
1		—	126.1	—		.6	.3	11.7	ON	9:00
2		690	122.5	3.6		.6	.3	16.2	"	7:00
3		—	122.5	—		.6	.3	16.3	OFF	7:00
4		674	118.9	3.6		.6	.3	15.9	OFF	7:00
5		—	118.9	—		.6	.3	11.5	ON	7:00
6		873	114.5	4.4		.6	.3	15.7	off	6:45
7		—	114.5	—		.6	.3	15.7	off	2:30
8		—	114.5	—		.6	.3	10.9	ON	7:30
9		936	109.1	5.4		.6	.3	15.4	off	7:30
10		—	109.1	—		.6	.3	11.3	ON	7:00
11		702	105.2	3.9		.6	.3	15.3	OFF	7:15
12		—	105.2	—		.6	.3	11.1	ON	6:00
13		787	101.3	3.9		.6	.3	15.1	OFF	9:50
14		—	101.3	—		.6	.3	15.3	OFF	8:00
15		—	101.3	—		.6	.3	10.6	on	6:30
16		944	96.5	4.8		.6	.3	14.8	off	7:30
17		—	96.5	—		.6	.3	10.4	on	7:00
18		753	92.6	3.9		.6	.3	14.6	off	7:00
19		—	92.6	—		.6	.3	10.3	on	7:00
20		850	88.3	4.3		.6	.3	14.3	off	8:20
21		—	88.3	—		.6	.3	14.8	off	8:15
22		—	88.3	—		.6	.3	9.9	on	7:30
23		936	83.4	4.9		.6	.3	14.4	"	7:00
24		—	83.4	—		.6	.3	10.2	on	7:00
25		733	79.8	3.6		.6	.3	14.2	"	8:00
26		—	79.8	—		.6	.3	9.8	ON	6:00
27		780	75.9	3.9		.6	.3	14.1	off	9:20
28		—	75.9	—		.6	.3	14.4	off	9:15
29		—	75.9	—		.6	.3	9.4	ON	7:20
30		936	71.1	4.8		.6	.3	13.8	OFF	7:15
31										
TOTAL		10,594								
AVG.		353								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Peter Alfeo Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY003011L

Signature: Peter Alfeo Date: 10/1/2019 Operator Grade Level: WS

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	9-4-19	1	YES [NO X]	YES [NO X]	0.6
Walden Gdns Booster STA.	9-4-19	1	YES [NO X]	YES [NO X]	0.3
Blue Creek Booster STA.	9-4-19	1	YES [NO X]	YES [NO X]	0.3
Terrace Rd Well 12AW	9-4-19		[YES X] NO	YES [NO X]	0
Rte Apple McLean Rd/RT 13	9-10-19	1	YES [NO X]	YES [NO X]	0.5
Coville Highway RT 41	9-10-19	1	YES [NO X]	YES [NO X]	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Matt MacLean

Name of NYSDOH Certified Laboratory: MicroBAC Labs

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments: _____

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	09/2019 (MM YYYY)	10/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl 1.3	WELL Level	Pump On/Off	Time
			112.4			.6	.3	27.0		
1		534	110.2	2.2		.6	.3	26.9	OFF	9:10
2		—	110.2	—		.6	.3	26.8	off	7:15
3		792	106.1	4.1		.6	.3	26.6	OFF	7:10
4		←	106.1	—		.6	.3	26.6	OFF	7:20
5		744	103.0	3.1		.6	.3	26.5	OFF	7:15
6		—	103.0	—		.6	.3	26.5	off	6:30
7		615	98.3	4.7		.6	.3	26.0	off	2:45
8		419	97.9	.4		.6	.3	26.2	off	7:45
9		—	97.9	—		.6	.3	26.2	off	7:45
10		698	94.2	3.7		.6	.3	26.0	off	7:30
11		—	94.2	—		.6	.3	25.9	off	7:30
12		669	91.4	2.8		.6	.3	25.8	OFF	6:20
13		—	91.4	—		.6	.3	25.8	OFF	9:40
14		726	87.5	3.9		.6	.3	25.5	OFF	7:50
15		564	85.2	2.3		.6	.3	25.4	off	6:45
16		—	85.2	—		.6	.3	25.5	off	800
17		701	81.4	3.8		.6	.3	25.2	off	730
18		—	81.4	—		.6	.3	25.1	off	730
19		826	78.0	3.4		.6	.3	25.0	off	730
20		—	78.0	—		.6	.3	24.9	off	8:00
21		771	74.0	4.0		.6	.3	24.8	off	8:00
22		583	71.5	2.5		.6	.3	24.7	off	8:15
23		—	71.5	—		.6	.3	24.7	off	7:30
24		780	66.8	4.7		.6	.3	24.5	off	7:15
25		—	66.8	—		.6	.3	24.5	off	8:10
26		775	63.8	3.0		.6	.3	24.3	off	6:30
27		—	63.8	—		.6	.3	24.3	off	9:30
28		808	59.5	4.3		.6	.3	24.1	off	9:30
29		574	57.2	2.3		.6	.3	24.0	OFF	7:30
30		—	57.2	—		.6	.3	24.0	OFF	7:30
31										
TOTAL		11579								
AVG.		386								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alter Jr. Title: W/S operator NYSDOH Operator Certification Number: N.Y. 0030046

Signature: Peter Alter Date: 10/1/19 Operator Grade Level: IIB

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16953.2		27.0		10471.3		17.2	46897.18	
9/1/2019	—	16953.2	—	26.9	534	10478.0	6.7	17.1	46903.80	6.62
9/2/2019	—	16953.2	—	26.8	—	10478.0	—	17.1	46903.80	—
9/3/2019	792	16965.7	12.5	26.6	—	10478.0	—	16.8	46916.27	12.47
9/4/2019	—	16965.7	—	26.6	—	10478.0	—	16.8	46916.27	—
9/5/2019	—	16965.7	—	26.5	749	10487.3	9.3	16.7	46925.56	9.29
9/6/2019	—	16965.7	—	26.5	—	10487.3	—	16.7	46925.56	—
9/7/2019	615	16975.5	9.8	26.0	—	10487.8	—	16.2	46935.70	10.14
9/8/2019	—	16975.5	—	26.2	419	10492.7	4.9	16.4	46940.71	5.01
9/9/2019	—	16975.5	—	26.2	—	10492.7	—	16.4	46940.71	—
9/10/2019	698	16986.5	11	26.0	—	10492.7	—	16.2	46951.72	11.01
9/11/2019	—	16986.5	—	25.9	—	10492.7	—	16.2	46951.72	—
9/12/2019	—	16986.5	—	25.8	669	10501.1	8.4	16.0	46960.10	8.38
9/13/2019	—	16986.5	—	25.8	—	10501.1	—	16.0	46960.10	—
9/14/2019	726	16997.9	11.4	26.6	—	10501.1	—	16.8	46971.51	11.41
9/15/2019	—	16997.9	—	25.4	564	10508.1	7.0	15.7	46978.51	7.0
9/16/2019	—	16997.9	—	25.5	—	10508.1	—	15.7	46978.51	—
9/17/2019	701	17009.0	11.1	25.2	—	10508.1	—	15.4	46989.53	11.02
9/18/2019	—	17009.0	—	25.1	—	10508.1	—	15.4	46989.53	—
9/19/2019	—	17009.0	—	25.0	826	10518.4	10.3	15.3	46999.84	10.31
9/20/2019	—	17009.0	—	24.9	—	10518.4	—	15.2	46999.84	—
9/21/2019	771	17021.2	12.2	24.8	—	10518.4	—	15.0	47012.04	12.2
9/22/2019	—	17021.2	—	24.7	583	10525.7	7.3	14.9	47019.31	7.3
9/23/2019	—	17021.2	—	24.7	—	10525.7	—	14.9	47019.31	—
9/24/2019	780	17033.6	12.4	24.5	—	10525.7	—	14.7	47031.65	12.34
9/25/2019	—	17033.6	—	24.5	—	10525.7	—	14.7	47031.65	—
9/26/2019	—	17033.6	—	24.3	775	10535.5	9.8	14.5	47041.37	9.72
9/27/2019	—	17033.6	—	24.3	—	10535.5	—	14.5	47041.37	—
9/28/2019	808	17046.4	12.8	24.1	—	10535.5	—	14.1	47054.17	12.80
9/29/2019	—	17046.4	—	24.0	574	10542.6	7.1	14.2	47061.32	7.15
9/30/2019	—	17046.4	—	24.0	—	10542.6	—	14.3	47061.32	—
	5891		93.2		5688		71.3			164
AVERAGE	196				190					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			23736.0		
9/1/2019	—	—	23736.0	—	11.7
9/2/2019		690	23753.7	17.7	16.2
9/3/2019		—	23753.7	—	16.3
9/4/2019		674	23771.0	17.3	15.9
9/5/2019		—	23771.0	—	11.5
9/6/2019		873	23793.4	22.4	15.7
9/7/2019		—	23793.4	—	15.7
9/8/2019		—	23793.4	—	10.9
9/9/2019		936	23821.2	24	15.4
9/10/2019		—	23821.2	—	11.3
9/11/2019		702	23839.2	18	15.3
9/12/2019		—	23839.2	—	11.1
9/13/2019		787	23859.4	20.2	15.1
9/14/2019		—	23859.4	—	15.3
9/15/2019		—	23859.4	—	10.6
9/16/2019		944	23883.6	24.2	14.8
9/17/2019		—	23883.6	—	10.4
9/18/2019		753	23902.9	19.3	14.6
9/19/2019		—	23902.9	—	10.3
9/20/2019		850	23924.7	21.8	14.3
9/21/2019		—	23924.7	—	14.8
9/22/2019		—	23924.7	—	9.9
9/23/2019		936	23948.7	24.0	14.4
9/24/2019		—	23948.7	—	10.2
9/25/2019		733	23967.5	18.8	14.2
9/26/2019		—	23967.5	—	9.8
9/27/2019		780	23987.5	20.0	14.1
9/28/2019		—	23987.5	—	14.4
9/29/2019		—	23987.5	—	9.4
9/30/2019		936	24011.5	24	13.8
TOTAL		10,594		275.5	
Average		353			

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9I0406

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/04/2019
Reported: 09/06/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9I0406-01
Collected By: JM-Client
Collection Date: 09/04/2019 6:26

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB
Escherichia coli	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		09/04/19 0626	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9I0406-02
Collected By: JM-Client
Collection Date: 09/04/2019 7:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB
Escherichia coli	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		09/04/19 0712	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9I0406

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9I0406-03	**Collection Date:**	09/04/2019 7:46

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB
Escherichia coli	Absent			in 100mL		09/04/19 1420	09/05/19 1428	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		09/04/19 0746	CUS

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9I0406-04	**Collection Date:**	09/04/2019 8:06

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		09/04/19 1420	09/05/19 1816	EDB
Escherichia coli	Absent			in 100mL		09/04/19 1420	09/05/19 1816	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Quality Assurance Officer
Reported: 09/06/2019 14:32

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9I0729

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/10/2019
Reported: 09/13/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J9I0729-01
Collected By: JM-Client
Collection Date: 09/10/2019 10:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/10/19 1910	09/11/19 1334	EDB
Escherichia coli	Absent			in 100mL		09/10/19 1910	09/11/19 1334	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		09/10/19 1040	CUS

Client Sample ID: Cortlandville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9I0729-02
Collected By: JM-Client
Collection Date: 09/10/2019 12:06

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		09/10/19 1910	09/11/19 1334	EDB
Escherichia coli	Absent			in 100mL		09/10/19 1910	09/11/19 1334	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		09/10/19 1206	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9I0729

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

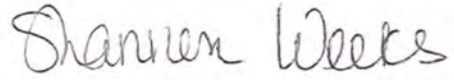
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Shannon Weeks
Customer Relationship Coordinator
Reported: 09/13/2019 11:56

MI(.AC^

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162 ain Avenue
Scr ,rA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RI

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID 12.8
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT.	Additional Notes
	Red Apple C-Ville Highway Garage Rt 41 Polkville	9-10-19	10:40 AM	1	DW		Na2S2O3	1	C10.5
		9-10-19	1206 PM	1	DW		Na2S2O3	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-10-19 1217 PM		9/10/19 1217
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1 [illegible] ain Avenue, S [illegible] n, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY F)

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C): 9.9
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey MacLean
Sampler Signature: Jeffrey L MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT	Additional Notes
	Municipal BLDG.	9-4-19	626 AM	1	DW	1	Na2S2O3	1	Cl 0.6
	Walden Oaks BS	9-4-19	712 AM	1	DW	1	Na2S2O3	1	Cl 0.3
	Blue Creek BS	9-4-19	746 AM	1	DW	1	Na2S2O3	1	Cl 0.3
	Terrace Rd well	9-4-19	806 AM	1	DW	1	Na2S2O3	1	Raw water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey L MacLean	9-4-19 837 AM	[illegible]	9/4 837
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	08/2019 (MM Y Y Y Y)	09/03/2019 (MM DD Y Y Y Y)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd.

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl	WELL Level	Pump On/OfF	Time
			48.6			.6	1.3			
1		936	43.7	4.9		.6	.3	13	ON	6:00
2		1,096	38.0	5.7		.6	.3	12.9	ON	9:30
3		862	33.4	4.7		.6	.3	16.9	Off	7:36
4		—	33.4	—		.6	.3	13.0	on	6:30
5		936	28.4	5.0		.6	.3	17.4	off	7:30
6		—	28.4	—		.6	.3	13.4	ON	7:00
7		721	24.6	3.8		.6	.3	17.4	OFF	7:00
8		—	24.6	—		.6	.3	13.0	OFF	7:10
9		904	19.9	4.7		.6	.3	17.3	off	8:00
10		—	19.9	—		.6	.3	17.6	off	9:00
11		—	19.9	—		.6	.3	12.9	ON	7:00
12		869	15.2	4.7		.6	.3	17.2	off	7:30
13		—	15.7	—		.6	.3	13.3	ON	2:50
14		705	11.4	3.8		.6	.3	17.0	off	7:30
15		—	11.4	—		.6	.3	12.7	ON	6:00
16		936	6.3	5.1		.6	.3	16.9	off	6:50
17		—	6.3	—		.6	.3	17.3	off	7:50
18		—	6.3	—		.6	.3	12.6	on	6:45
19		936	2.5	3.8		.6	.3	16.8	off	7:20
20		—	147.9	—		.6	.3	12.9	ON	7:00
21		694	144.5	3.4		.6	.3	16.5	off	7:00
22		—	144.5	—		.6	.3	12.0	ON	7:00
23		846	140.6	3.9		.6	.3	16.6	off	9:30
24		—	140.6	—		.6	.3	16.7	off	9:00
25		—	140.6	—		.6	.3	12.0	on	8:00
26		924	136.0	4.6		.6	.3	16.3	off	7:37
27		—	136.0	—		.6	.3	11.7	on	7:15
28		796	131.9	4.1		.6	.3	16.4	off	7:00
29		—	131.9	—		.6	.3	11.8	ON	6:15
30		936	126.1	5.8		.6	.3	16.1	OFF	8:10
31		—	126.1	—		.6	.3	16.4	OFF	10:00
TOTAL		13077								
AVG.		422								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock

Reported by: Brian R. Congdon Title: Water Operator NYSDOH Operator Certification Number: NY0056255

Signature: B. R. Congdon Date: 9-3-19 Operator Grade Level: IIB, C

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	8-2-19	1	YES [NO]	YES [NO]	.60
Walden Oaks BS.	8-2-19	1	YES [NO]	YES [NO]	.50
Blue Creek BS	8-2-19	1	YES [NO]	YES [NO]	.30
Terrace Rd well Raw	8-14-19		YES [NO]	YES [NO]	zero
Red Apple Gas Station RT13 / Maclean Rd	8-6-19	1	YES [NO]	YES [NO]	.60
Cuttle Highway RT41	8-6-19	1	YES [NO]	YES [NO]	.30
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean

Name of NYSDOH Certified Laboratory: Microvac

Did any MCL violation occur? If so, please describe: no

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR

Microbiological Sample Result

ublic Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	08/2019 (MM YYYY)	09/03/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			158.4			.6	.3	29.6		
1		—	158.4	—		.6	.3	29.8	off	6:45
2		—	158.4	—		.6	.3	29.8	off	9:15
3		—	158.4	—		.6	.3	29.7	off	7:45
4		457	156.4	2.0		.6	.3	29.6	off	6:45
5		—	156.4	—		.6	.3	29.5	off	7:40
6		700	153.2	3.2		.6	.3	29.3	off	7:10
7		—	153.2	—		.6	.3	29.4	OFF	7:20
8		590	150.5	2.7		.6	.3	29.2	OFF	7:20
9		—	150.5	—		.6	.3	29.2	off	8:15
10		601	147.5	3.0		.6	.3	29.0	off	8:00
11		525	145.3	2.2		.6	.3	28.9	off	8:00
12		—	145.3	—		.6	.3	28.9	off	8:00
13		675	141.8	3.5		.6	.3	28.9	off	7:45
14		—	141.8	—		.6	.3	28.7	off	7:45
15		585	139.3	2.5		.6	.3	28.5	off	6:30
16		—	139.3	—		.6	.3	28.5	off	8:00
17		582	136.3	3.0		.6	.3	28.4	off	8:00
18		568	133.9	2.4		.6	.3	28.3	off	7:00
19		—	133.9	—		.6	.3	28.3	off	8:30
20		657	130.6	3.3		.6	.3	28.0	off	7:30
21		—	130.6	—		.6	.3	28.1	off	7:45
22		633	127.8	2.8		.6	.3	27.9	off	7:30
23		—	127.8	—		.6	.3	27.9	off	9:20
24		638	124.6	3.2		.6	.3	27.7	off	8:50
25		574	122.2	2.4		.6	.3	27.5	off	8:10
26		—	122.2	—		.6	.3	27.5	off	8:15
27		627	118.6	3.6		.6	.3	27.4	off	7:30
28		—	118.6	—		.6	.3	27.4	off	7:10
29		573	116.2	2.4		.6	.3	27.2	off	6:30
30		—	116.2	—		.6	.3	27.2	OFF	7:55
31		738	112.4	3.8		.6	.3	27.0	OFF	9:45
TOTAL		9723,00								
AVG.		314								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Brian R. Congdon Title: Water Operator NYSDOH Operator Certification Number: NY0036757

Signature: B. R. Congdon Date: 9-3-19 Operator Grade Level: II B, C

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	8-2-19	1	YES [NO]	YES [NO]	.60
Walden Cocks BS.	8-2-19	1	YES [NO]	YES [NO]	.50
Blue Creek BS	8-2-19	1	YES [NO]	YES [NO]	.30
Terrace Rd well flow	8-14-19		YES [NO]	YES [NO]	2.20
Red Apple Gas Station RT 13 / Mclean Rd	8-6-19	1	YES [NO]	YES [NO]	.60
Cuttle Highway RT 41	8-6-19	1	YES [NO]	YES [NO]	.30
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	
			YES [NO]	YES [NO]	

Population Served: 4220

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean

Name of NYSDOH Certified Laboratory: Microbac

Did any MCL violation occur? If so, please describe: no

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			23400.6		
8/1/2019	936		23424.6	24	13.6
8/2/2019	1,076		23452.2	27.6	12.9
8/3/2019	862		23474.3	22.1	16.9
8/4/2019	—		23474.3	—	13.0
8/5/2019	936		23498.3	24.0	17.4
8/6/2019	—		23498.3	—	13.4
8/7/2019	721		23516.8	18.5	17.4
8/8/2019	—		23516.8	—	13.0
8/9/2019	904		23540.0	23.2	17.3
8/10/2019	—		23540.0	—	12.6
8/11/2019	—		23540.0	—	12.9
8/12/2019	869		23562.3	22.3	17.2
8/13/2019	—		23562.3	—	13.4
8/14/2019	705		23580.4	18.1	17.0
8/15/2019	—		23580.4	—	12.8
8/16/2019	936		23604.4	24.0	16.9
8/17/2019	—		23604.4	—	17.3
8/18/2019	—		23604.4	—	12.6
8/19/2019	936		23628.4	24.0	16.8
8/20/2019	—		23628.4	—	12.9
8/21/2019	694		23646.2	17.8	16.5
8/22/2019	—		23646.2	—	12.0
8/23/2019	846		23667.9	21.7	16.6
8/24/2019	—		23667.9	—	16.7
8/25/2019	—		23667.9	—	12.0
8/26/2019	924		23691.6	23.7	16.3
8/27/2019	—		23691.6	—	11.7
8/28/2019	796		23712.0	20.4	16.4
8/29/2019	—		23712.0	—	11.8
8/30/2019	936		23736.0	24.0	16.1
8/31/2019	—		23736.0	—	16.4
TOTAL		13077		335.4	
Average		422		10.82	

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16871.4		29.6		10415.5		19.7	46759.78	
8/1/2019	—	16871.4	—	29.8	—	10415.5	—	20.0	46759.78	—
8/2/2019	—	16871.4	—	29.8	—	10415.5	—	20.0	46759.78	
8/3/2019	—	16871.4	—	29.7	—	10415.5	—	19.9	46759.78	—
8/4/2019	—	16871.4	—	29.6	457	10421.1	5.6	19.8	46765.45	5.67
8/5/2019	—	16871.4	—	29.5	—	10421.1	—	19.9	46765.45	—
8/6/2019	700	16882.4	11.0	29.3	—	10421.1	—	19.6	46776.41	10.96
8/7/2019	—	16882.4	—	29.4	—	10421.1	—	19.5	46776.41	—
8/8/2019	—	16882.4	—	29.2	590	10428.5	7.4	19.4	46783.72	7.31
8/9/2019	—	16882.4	—	29.2	—	10428.5	—	19.4	46783.72	—
8/10/2019	601	16891.8	9.4	29.0	—	10428.5	—	19.2	46793.14	9.42
8/11/2019	—	16891.8	—	28.9	525	10434.9	6.4	19.1	46799.62	6.48
8/12/2019	—	16891.8	—	28.9	—	10434.9	—	19.1	46799.62	—
8/13/2019	675	16902.3	10.5	28.7	—	10434.9	—	18.9	46810.14	10.52
8/14/2019	—	16902.3	—	28.7	—	10434.9	—	18.9	46810.14	—
8/15/2019	—	16902.3	—	28.5	585	10442.2	7.3	18.8	46817.42	7.28
8/16/2019	—	16902.3	—	28.5	—	10442.2	—	18.8	46817.42	—
8/17/2019	582	16911.4	9.1	28.4	—	10442.2	—	18.6	46826.49	9.07
8/18/2019	—	16911.4	—	28.3	568	10449.3	7.1	18.5	46833.51	7.02
8/19/2019	—	16911.4	—	28.3	—	10449.3	—	18.5	46833.51	—
8/20/2019	657	16921.7	10.3	28.0	—	10449.3	—	18.2	46843.77	10.26
8/21/2019	—	16921.7	—	28.1	—	10449.3	—	18.3	46843.77	—
8/22/2019	—	16921.7	—	27.9	633	10457.1	7.8	18.1	46851.61	7.84
8/23/2019	—	16921.7	—	27.9	—	10457.1		18.1	46851.61	—
8/24/2019	638	16931.7	10.0	27.7	—	10457.1	—	17.9	46861.57	10.84
8/25/2019	—	16931.7	—	27.5	574	10464.2	7.1	17.7	46868.66	7.09
8/26/2019	—	16931.7	—	27.5	—	10464.2	—	17.8	46868.66	—
8/27/2019	627	16941.5	9.8	27.4	—	10464.2	—	17.6	46878.48	9.82
8/28/2019	—	16941.5	—	27.4	—	10464.2	—	17.6	46878.48	—
8/29/2019	—	16941.5	—	27.2	573	10471.3	7.1	17.5	46885.56	7.08
8/30/2019	—	16941.5	—	27.2	—	10471.3	—	17.4	46885.56	—
8/31/2019	738	16953.2	11.7	27.0	—	10471.3	—	17.2	46897.18	11.62
	5218		81.8		4505		55.8	5		137.4
AVERAGE	168				145					

Rev: 1/2015

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9H1247

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/14/2019
Reported: 08/21/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 60 Hp Well Raw Water Tap
Sample Matrix: Drinking Water
Lab Sample ID: J9H1247-01
Collected By: BC-Client
Collection Date: 08/14/2019 7:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/14/19 1823	08/15/19 1253	EDB
Escherichia coli	Absent			in 100mL		08/14/19 1823	08/15/19 1253	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	2.20	4.00 MCL		mg/L	Y1		08/14/19 0730	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit
Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Chris Long
Director
Reported: 08/21/2019 18:16

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9H0577

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/06/2019
Reported: 08/09/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rte 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9H0577-01
Collected By: JM-Client
Collection Date: 08/06/2019 8:48

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/06/19 1919	08/07/19 1342	EDB
Escherichia coli	Absent			in 100mL		08/06/19 1919	08/07/19 1342	EDB

Analyses Performed by: Customer

ield Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/06/19 0848	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9H0577-02
Collected By: JM-Client
Collection Date: 08/06/2019 10:42

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/06/19 1919	08/07/19 1342	EDB
Escherichia coli	Absent			in 100mL		08/06/19 1919	08/07/19 1342	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		08/06/19 1042	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9H0577

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 08/09/2019 11:45

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9H0167

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/01/2019
Reported: 08/07/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J9H0167-01
Collected By: JM-Client
Collection Date: 08/01/2019 6:48

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB
Escherichia coli	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/01/19 0648	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J9H0167-02
Collected By: JM-Client
Collection Date: 08/01/2019 7:14

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB
Escherichia coli	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		08/01/19 0714	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9H0167

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9H0167-03	**Collection Date:**	08/01/2019 7:41

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB
Escherichia coli	Absent			in 100mL		08/01/19 2005	08/02/19 1427	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		08/01/19 0741	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 08/07/2019 14:23

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

8

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C): 7.4°
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon
Sampler Signature: B. R. Congdon
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria									Additional Notes
1	60 Hp Well Raw Water Tap	8-14-19	7:30 AM	1		G	7H10	1									Chlorine Zero

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. R. Congdon	8-14-19 8:30 AM	[signature]	8/14/19 8:33
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

Page 2 of 2

J9H1247

Cortlandville Water, Town of

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 Main Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 7.4°
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon

Sampler Signature: B. R. Congdon

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria										Additional Notes
1	60 Ft Well Raw Water Tap	8-14-19	7:30 AM	1		G	7H10	1										Chlorine 2820

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B. R. Congdon	8-17-19 8:50 am	[illegible]	8/14/19 8:33
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

MI AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
16[illegible] ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RI

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID 12.2
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No (N/A)

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BHET										Additional Notes
	Red Apple Rt13/Jeffers Rd	8-6-19	8:48 AM	1	DW		Na2S2O3	1										C10.6
	Cortlandville Highway Garage Rt41 Polkville	8-6-19	10:42 AM	1	DW		Na2S2O3	1										C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-6-19 1051 AM		8/6/19 1057
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
[illegible] ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.4
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform										Additional Notes
	Municipal BLDG	8-1-19	6:48 AM	1	DW	1	Na2S2O3	1										C10.6
	Walden Oaks BS	8-1-19	7:14 AM	1	DW	1	Na2S2O3	1										C10.5
	Blue Creek BS	8-1-19	7:41 AM	1		1	Na2S2O3	1										C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-1-19 805 AM	Amber Lett	8/1/19 805
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2019 (MM YYYY)	08/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 106.2	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .6	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		783	102.0	4.2		.6	.3	19.5	off	7:00
2		—	102.0	—		.6	.3	15.8	on	7:00
3		679	98.3	3.7		.6	.3	19.3	off	10:15
4		—	98.3	—		.6	.3	14.8	ON	600
5		900	93.3	5.0		.6	.3	18.9	off	9:15
6		—	93.3	—		.6	.3	19.3	off	7:45
7		—	93.3	—		.6	.3	14.6	on	7:00
8		955	88.4	4.9		.6	.3	15.3	on	7:00
9		214	87.2	1.2		.6	.3	18.9	off	7:10
10		559	84.2	3.0		.6	.3	18.8	off	7:10
11		—	84.2	—		.6	.3	14.6	ON	7:10
12		861	79.7	4.5		.6	.3	18.6	off	8:30
13		—	79.7	—		.6	.3	18.8	off	9:00
14		—	79.7	—		.6	.3	14.1	on	8:00
15		900	74.9	4.8		.6	.3	18.5	off	7:30
16		—	74.9	—		.6	.3	15.3	on	7:15
17		690	71.2	3.7		.6	.3	19.0	off	7:15
18		—	71.2	—		.6	.3	14.5	ON	6:00
19		893	66.4	4.8		.6	.3	18.7	off	830
20		—	66.4	—		.6	.3	19.0	off	8:40
21		—	66.4	—		.6	.3	14.2	on	7:00
22		647	63.1	3.3		.6	.3	18.9	off	700
23		—	63.1	—		.6	.3	14.4	ON	700
24		928	58.3	4.8		.6	.3	18.4	off	700
25		—	58.3	—		.6	.3	14.0	on	700
26		839	53.7	4.6		.6	.3	18.3	off	9:00
27		—	53.7	—		.6	.3	18.3	off	8:00
28		—	53.7	—		.6	.3	13.8	on	7:20
29		905	48.6	5.1		.6	.3	17.9	off	7:15
30		—	48.6	—		.6	.3	18.4	off	7:16
31		—	48.6	—		.6	.3	14.4	on	7:00
TOTAL		10,751								
AVG.		346.8								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S operator NYSDOH Operator Certification Number: NY0003046

Signature: Peter Alteri Date: 8/1/19 Operator Grade Level: IIB

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			23124.9		
7/1/2019		783	23145.0	20.1	19.5
7/2/2019		—	23145.0	—	15.8
7/3/2019		679	23162.4	17.4	19.3
7/4/2019		—	23162.4	—	14.8
7/5/2019		900	23185.5	23.1	18.9
7/6/2019		—	23185.5	—	19.3
7/7/2019		—	23185.5	—	14.6
7/8/2019		955	23210.0	24.5	15.3
7/9/2019		214	23215.5	5.5	18.9
7/10/2019		557	23229.8	14.3	18.8
7/11/2019		—	23229.8	—	14.6
7/12/2019		861	23251.9	22.1	18.6
7/13/2019		—	23251.9	~~18.8~~	18.8
7/14/2019		—	23251.9	—	14.1
7/15/2019		900	23275.0	23.1	18.5
7/16/2019		—	23275.0	~~15.3~~	15.3
7/17/2019		690	23292.7	17.7	19.0
7/18/2019		—	23292.7	—	14.5
7/19/2019		893	23315.6	22.9	18.7
7/20/2019		—	23315.6	—	19.0
7/21/2019		—	23315.6	—	14.3
7/22/2019		647	23332.2	16.6	18.9
7/23/2019		—	23332.2	—	14.4
7/24/2019		928	23356.6	23.8	18.4
7/25/2019		—	23356.6	—	14.0
7/26/2019		839	23377.5	21.5	18.3
7/27/2019		—	23377.5	—	18.7
7/28/2019		—	23377.5	—	13.8
7/29/2019		905	23400.6	23.2	17.9
7/30/2019		—	23400.6	—	18.4
7/31/2019		—	23400.6	—	14.4
TOTAL		10,751			
Average		346.8			

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16772.1		31.9		10344.5		22.1	46590.01	
7/1/2019	—	16772.1	—	32.0	—	10344.5	—	22.1	46590.01	—
7/2/2019	672	16782.7	10.6	31.8	—	10344.5	—	22.0	46600.52	10.51
7/3/2019	—	16782.7	—	31.8	—	10344.5	—	22.0	46600.52	—
7/4/2019	—	16782.7	—	31.7	621	10352.2	7.7	21.9	46608.17	7.65
7/5/2019	—	16782.7	—	31.8	—	10352.2	—	21.9	46608.17	—
7/6/2019	602	16792.6	9.3	31.6	—	10352.2	—	21.8	46617.51	9.34
7/7/2019	—	16792.0	—	31.5	554	10359.0	6.8	21.7	46624.28	6.77
7/8/2019	194	16795.0	3.0	29.9	—	10359.0	—	21.0	46627.52	3.24
7/9/2019	544	16803.7	8.7	31.4	—	10359.0	—	21.5	46635.92	8.40
7/10/2019	—	16803.7	—	31.3	—	10359.0	—	21.5	46635.92	—
7/11/2019	—	16803.7	—	31.2	761	10368.4	9.4	21.4	46646.32	9.4
7/12/2019	—	16803.7	—	31.2	—	10368.4	—	21.4	46645.32	—
7/13/2019	832	16816.7	13.0	31.1	—	10368.4	—	21.2	46658.30	12.98
7/14/2019	—	16816.7	—	31.0	594	10375.7	7.3	21.1	46665.56	7.26
7/15/2019	—	16816.7	—	31.0	—	10375.7	—	21.1	46665.56	—
7/16/2019	739	16828.3	11.6	30.8	—	10375.7	—	21.0	46677.07	11.51
7/17/2019	—	16828.3	—	30.9	—	10375.7	—	21.1	46677.07	—
7/18/2019	—	16828.3	—	30.8	620	10383.4	7.7	20.9	46684.74	7.67
7/19/2019	—	16828.3	—	30.8	—	10383.4	/	21.0	46684.74	—
7/20/2019	736	16839.8	11.5	30.6	—	10383.4	—	20.8	46696.22	11.48
7/21/2019	—	16839.8	—	30.6	561	10390.3	6.9	20.7	46703.10	6.88
7/22/2019	—	16839.8	—	29.0	—	10390.3	—	20.1	46703.10	—
7/23/2019	683	16850.4	10.6	30.5	—	10390.3	—	20.7	46713.73	10.63
7/24/2019	—	16850.4	—	30.6	—	10390.3	—	20.7	46713.73	—
7/25/2019	—	16850.4	—	30.4	605	10397.7	7.4	20.5	46721.14	7.41
7/26/2019	—	16850.4	—	30.4	—	10397.7	—	20.5	46721.14	—
7/27/2019	718	16861.7	11.3	30.2	—	10397.7	—	20.4	46732.38	11.24
7/28/2019	—	16861.7	—	30.1	537	10404.3	6.6	20.3	46738.98	6.6
7/29/2019	—	16861.7	—	30.1	—	10404.3	—	20.3	46738.98	—
7/30/2019	620	16871.4	9.7	29.9	—	10404.3	—	20.1	46748.65	9.67
7/31/2019	—	16871.4	—	29.6	905	10415.5	11.2	19.7	46759.78	11.13
	6340		99.3		5758		71			169.77
AVERAGE	205				186					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2019 (MM YYYY)	08/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			54.3			.6	.3	31.9		
1		—	54.3	—		.6	.3	32.0	off	7:20
2		672	50.8	3.5		.6	.3	31.8	off	7:10
3		—	50.8	—		.6	.3	31.8	off	10:00
4		621	48.3	2.5		.6	.3	31.7	off	6:30
5		—	48.3	—		.6	.3	31.8	off	9:00
6		602	45.1	3.2		.6	.3	31.6	off	7:30
7		554	42.9	2.2		.6	.3	31.5	off	7:10
8		194	41.7	1.2		.6	.3	29.9	on	7:10
9		544	39.0	2.7		.6	.3	31.4	off	7:25
10		—	39.0	—		.6	.3	31.3	off	7:20
11		761	35.8	3.2		.6	.3	31.2	off	7:20
12		—	35.8	—		.6	.3	31.2	off	8:45
13		832	31.4	4.4		.6	.3	31.1	off	9:50
14		594	29.2	2.2		.6	.3	31.0	off	8:00
15		—	29.2	—		.6	.3	31.0	off	7:30
16		739	25.2	4.0		.6	.3	30.8	off	7:30
17		—	25.2	—		.6	.3	30.9	off	7:30
18		620	22.6	2.8		.6	.3	30.8	off	6:10
19		—	22.6	—		.6	.3	30.8	off	8:45
20		736	18.8	3.8		.6	.3	30.6	off	8:25
21		561	16.6	2.2		.6	.3	30.6	off	7:00
22		—	16.6	—		.6	.3	29.0	on	7:15
23		683	13.0	3.6		.6	.3	30.5	off	7:50
24		—	13.0	—		.6	.3	30.6	off	7:30
25		605	10.5	2.5		.6	.3	30.4	off	7:15
26		—	10.5	—		.6	.3	30.4	off	8:45
27		718	6.7	3.8		.6	.3	30.2	off	8:00
28		537	4.5	2.2		.6	.3	30.1	off	7:30
29		—	4.5	—		.6	.3	30.1	off	7:40
30		620	1.1	3.4		.6	.3	29.9	off	7:30
31		905	150.7	4.6		.6	.3	29.6	off	7:15
TOTAL		12098								
AVG.		390								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Peter Allen Jr. Title: W/S operator NYSDOH Operator Certification Number: NY. 0030046

Signature: Peter Allen Date: 8/1/19 Operator Grade Level: T3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	7-2-19	1	YES ~~NO~~	YES ~~NO~~	0.6
Waldon OHKS Booster.	7-2-19	1	YES ~~NO~~	YES ~~NO~~	0.5
Blue Creek Booster	7-2-19	1	YES ~~NO~~	YES ~~NO~~	0.3
Terrace Rd Well RAN	7-3-19		YES ~~NO~~	YES ~~NO~~	Ø
Red Apple RT 13/McLean Rd	7-9-19	1	YES ~~NO~~	YES ~~NO~~	0.6
Cville Highway RT 41	7-9-19	1	YES ~~NO~~	YES ~~NO~~	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0579

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/09/2019
Reported: 07/12/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9G0579-01
Collected By: JM-Client
Collection Date: 07/09/2019 8:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/09/19 1540	07/10/19 1052	EDB
Escherichia coli	Absent			in 100mL		07/09/19 1540	07/10/19 1052	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/09/19 0820	CUS

Client Sample ID: C-Ville Highway Garage Rt41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9G0579-02
Collected By: JM-Client
Collection Date: 07/09/2019 9:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/09/19 1540	07/10/19 1052	EDB
Escherichia coli	Absent			in 100mL		07/09/19 1540	07/10/19 1052	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		07/09/19 0956	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0579

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

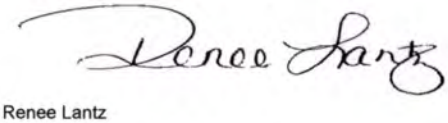
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Renee Lantz
Customer Relationship Specialist
Reported: 07/12/2019 12:15

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0441

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/03/2019
Reported: 07/08/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9G0441-01	**Collection Date:**	07/03/2019 7:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/03/19 1616	07/04/19 1041	EDB
Escherichia coli	Absent			in 100mL		07/03/19 1616	07/04/19 1041	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/08/2019 10:48

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0364

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/02/2019
Reported: 07/05/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municiple Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9G0364-01
Collected By: JM-Client
Collection Date: 07/02/2019 8:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB
Escherichia coli	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/02/19 0800	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J9G0364-02
Collected By: JM-Client
Collection Date: 07/02/2019 8:13

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB
Escherichia coli	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/02/19 0813	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9G0364

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9G0364-03	**Collection Date:**	07/02/2019 8:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB
Escherichia coli	Absent			in 100mL		07/02/19 1902	07/03/19 1319	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		07/02/19 0845	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/05/2019 15:03

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID 15.1
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No (N/A)

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform										Additional Notes
	Red Apple Rt13 / McLean Rd	7-9-19	8:20 AM	1	DW	1	Na2S2O3	1										C10.6
	Cortville Highway Garage Rt11 Polkville	7-9-19	9:56 AM	1	DW	1	Na2S2O3	1										C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-9-19 10:13 PM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			7/9/19 1014
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1[illegible] ain Avenue, S[illegible], PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY F[illegible]

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.6
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform										Additional Notes
	Terrace Rd Well	7-3-19	7:35	1	DW	1	Na2S2O3	1										Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-3-19	[signature]	7/3/19 7:46
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number _____
Instructions on back

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Client Name: Townof Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID 13.4
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No (N/A)

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	Coliform										Additional Notes
	Municipal BLD G.	7-2-19	8:00 AM	1	DW	1	Na2S2O3	1										Cl-0.6
	WaldenOaks BS.	7-2-19	8:13 AM	1	DW	1	"	1										Cl-0.5
	BlueCreek BS	7-2-19	8:45 AM	1	DW	1	"	1										Cl-0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-2-19 9:13 AM	[signature]	7/2/19 913
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR

Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2019 (MM YYYY)	07/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrac Rd well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			12.5			.6	.3			
1		—	12.5	—		.6	.3	21.3	off	8:00
2		—	12.5	—		.6	.3	16.7	on	7:00
3		784	8.5	4.0		.6	.3	20.8	off	7:00
4		—	8.5	—		.6	.3	16.4	on	7:05
5		737	4.6	3.9		.6	.3	20.8	off	7:00
6		—	4.6	—		.6	.3	16.3	on	6:00
7		939	146.0	5.2		.6	.3	20.5	off	8:30
8		—	146.0	—		.6	.3	20.6	off	9:15
9		—	146.0	—		.6	.3	16.1	on	6:20
10		717	142.4	3.6		.6	.3	20.4	off	7:00
11		—	142.4	—		.6	.3	20.6	off	7:00
12		655	139.0	3.4		.6	.3	20.3	off	7:00
13		—	139.0	—		.6	.3	16.0	on	7:00
14		783	133.8	5.2		.6	.3	20.1	off	6:30
15		—	133.8	—		.6	.3	20.2	off	7:30
16		—	133.8	—		.6	.3	16.1	on	7:30
17		815	129.5	4.3		.6	.3	20.2	off	7:30
18		—	129.5	—		.6	.3	15.8	on	7:00
19		783	125.1	4.4		.6	.3	20.0	off	7:15
20		—	125.1	—		.6	.3	16.2	on	600
21		936	120.2	4.9		.6	.3	20.5	off	745
22		—	120.2	—		.6	.3	20.7	off	815
23		—	120.2	—		.6	.3	15.8	on	6:30
24		757	116.1	4.1		.6	.3	20.3	off	700
25		—	116.1	—		.6	.3	15.8	on	715
26		854	111.4	4.7		.6	.3	20.1	off	700
27		—	111.4	—		.6	.3	15.6	on	715
28		936	106.2	5.2		.6	.3	19.8	off	9:15
29		—	106.2	—		.6	.3	19.9	off	8:45
30		—	106.2	—		.6	.3	15.3	on	7:15
31										
TOTAL										
AVG.										

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Alteg. Jr. Title: W/S operator NYSDOH Operator Certification Number: NY003046

Signature: Peter Alteg Date: 07/01/2019 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Blue Creek Booster Station	6/4/19	1	YES [X] NO	YES [X] NO	0.5
Municipal Bldg Terrace Rd	6/4/19	1	YES [X] NO	YES [X] NO	0.6
Walden Oaks Booster Station	6/4/19	1	YES [X] NO	YES [X] NO	0.5
Terrace Rd. well	6/5/19		YES [X] NO	YES [X] NO	RAW.
Red Apple RT 13/McLean Rd.	6/11/19	1	YES [X] NO	YES [X] NO	0.5
Quille Highway RT 41	6/11/19	1	YES [X] NO	YES [X] NO	0.3
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	
			YES [ ] NO	YES [ ] NO	

Population Served: <1000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System", a copy of this form shall be sent to your local health department no later than the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Machean

Name of NYSDOH Certified Laboratory: MICROBAC.

Did any MCL violation occur? If so, please describe: ND

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: ND.

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2019 (MM YYYY)	07/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			105.7			.6	.3	33.6		
1		668	102.2	3.5		.6	.3	33.5	off	7:45
2		516	100.0	2.2		.6	.3	33.4	off	7:25
3		—	100.0	—		.6	.3	33.4	off	7:15
4		635	96.9	3.1		.6	.3	33.3	off	7:35
5		—	96.4	—		.6	.3	33.3	off	7:10
6		704	93.9	2.5		.6	.3	33.3	off	6:30
7		—	93.9	—		.6	.3	33.3	off	8:10
8		624	90.7	3.2		.6	.3	33.2	off	9:00
9		586	89.3	1.4		.6	.3	33.1	off	6:30
10		—	89.3	—		.6	.3	33.1	off	7:30
11		804	83.9	5.4		.6	.3	33.0	off	7:15
12		—	83.9	—		.6	.3	32.9	off	7:15
13		710	81.0	2.9		.6	.3	32.8	off	7:15
14		—	81.0	—		.6	.3	32.8	off	6:30
15		560	78.2	2.9		.6	.3	32.6	off	7:30
16		520	76.1	2.1		.6	.3	32.6	off	7:30
17		—	76.1	—		.6	.3	32.6	off	7:30
18		587	73.1	3.0		.6	.3	32.5	off	7:15
19		—	73.1	—		.6	.3	32.5	off	7:15
20		453	70.1	3.0		.6	.3	32.5	off	6:30
21		—	70.1	—		.6	.3	32.4	off	7:50
22		667	67.7	2.4		.6	.3	32.3	off	7:50
23		530	65.4	2.3		.6	.3	32.3	off	6:45
24		—	65.4	—		.6	.3	32.2	off	7:30
25		652	62.1	3.3		.6	.3	32.2	off	7:45
26		—	62.1	—		.6	.3	32.2	off	7:30
27		555	59.8	2.3		.6	.3	32.1	off	7:30
28		—	59.8	—		.6	.3	32.1	off	9:00
29		601	56.5	3.3		.6	.3	32.0	off	8:30
30		540	54.3	2.2		.6	.3	31.9	off	7:30
31										
TOTAL		10,912								
AVG.		364								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Allen Jr - Title: W/S operator NYSDOH Operator Certification Number: NY 30046

Signature: Peter Allen Date: 7/1/2019 Operator Grade Level: IIB

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16681.9		33.6		10281.9		23.7	46437.40	—
6/1/2019	668	16692.2	10.3	33.5	—	10281.9	—	23.6	46447.71	10.31
6/2/2019	—	16692.2	—	33.4	516	10288.2	6.3	23.5	46453.98	6.27
6/3/2019	—	16692.2	—	33.4	—	10288.2	—	23.6	46453.98	—
6/4/2019	635	16702.0	9.8	33.3	—	10288.2	—	23.5	46463.79	9.81
6/5/2019	—	16702.0	—	33.3	—	10288.2	—	23.5	46463.79	—
6/6/2019	—	16702.0	—	33.3	704	10296.8	8.6	23.4	46472.43	8.64
6/7/2019	—	16702.0	—	33.3	—	10296.8	—	23.4	46472.43	—
6/8/2019	629	16711.8	9.8	33.2	—	10296.8	—	23.3	46482.12	9.69
6/9/2019	—	16711.8	—	33.1	586	10304.0	7.2	23.3	46489.27	7.15
6/10/2019	—	16711.8	—	33.1	—	10304.0	—	23.2	46489.27	—
6/11/2019	804	16724.3	12.5	33.0	—	10304.0	—	23.1	46501.80	12.53
6/12/2019	—	16724.3	—	32.9	—	10304.0	—	23.1	46501.80	—
6/13/2019	—	16724.3	—	32.8	710	10312.7	8.7	23.0	46510.60	8.70
6/14/2019	—	16724.3	—	32.8	—	10312.7	—	22.9	46510.50	—
6/15/2019	560	16733.0	8.7	32.6	—	10312.7	—	22.8	46519.17	8.67
6/16/2019	—	16733.0	—	32.6	520	10319.1	6.4	22.7	46525.53	6.36
6/17/2019	—	16733.0	—	32.6	—	10319.1	—	22.8	46525.53	—
6/18/2019	587	16742.1	9.1	32.5	—	10319.1	—	22.6	46534.65	9.12
6/19/2019	—	16742.1	—	32.5	—	10319.1	—	22.7	46534.65	—
6/20/2019	—	16742.1	—	32.5	453	10324.6	5.5	22.6	46540.19	5.54
6/21/2019	—	16742.1	—	32.4	—	10324.6	—	22.6	46540.19	—
6/22/2019	667	16752.6	10.5	32.3	—	10324.6	—	22.4	46550.60	10.41
6/23/2019	—	16752.6	—	32.3	530	10331.1	6.5	22.4	46557.07	6.47
6/24/2019	—	16752.6	—	32.2	—	10331.1	—	22.4	46557.07	—
6/25/2019	652	16762.7	10.1	32.2	—	10331.1	—	22.3	46567.21	10.14
6/26/2019	—	16762.7	—	32.2	—	10331.1	—	22.3	46567.21	—
6/27/2019	—	16762.7	—	32.1	585	10337.9	6.8	22.2	46573.99	6.78
6/28/2019	—	16762.7	—	32.1	—	10337.9	—	22.3	46573.99	—
6/29/2019	601	16772.1	9.4	32.0	—	10337.9	—	22.2	46583.41	9.42
6/30/2019	—	16772.1	—	31.9	540	10344.5	6.6	22.1	46590.01	6.60
	5798		90.2		5114		82.6			152.61
AVERAGE					170					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			22876.2		
6/1/2019		—	22876.2	—	21.3
6/2/2019		—	22876.2	—	16.7
6/3/2019		784	22896.3	20.1	20.8
6/4/2019		—	22896.3	—	16.4
6/5/2019		737	22915.2	18.9	20.8
6/6/2019		—	22915.2	—	16.3
6/7/2019		939	22939.3	24.1	20.5
6/8/2019		—	22939.3	—	20.6
6/9/2019		—	22939.3	—	16.1
6/10/2019		717	22957.7	18.4	20.4
6/11/2019		—	22957.7	—	20.6
6/12/2019		655	22974.6	16.8	20.3
6/13/2019		—	22974.5	—	16.0
6/14/2019		783	22994.6	20.1	20.1
6/15/2019		—	22994.6	—	20.2
6/16/2019		—	22994.6	—	16.1
6/17/2019		815	23015.5	20.9	20.2
6/18/2019		—	23015.5	—	15.8
6/19/2019		783	23035.6	20.1	20.0
6/20/2019		—	23035.6	—	16.2
6/21/2019		936	23059.6	24	20.5
6/22/2019		—	23059.6	—	20.7
6/23/2019		—	23059.6	—	15.8
6/24/2019		757	23079.0	20.4	19.4
6/25/2019		—	23079.0	—	15.8
6/26/2019		854	23100.9	21.9	20.1
6/27/2019		—	23100.9	—	15.6
6/28/2019		936	23124.9	24	19.8
6/29/2019		—	23124.9	—	19.9
6/30/2019		—	23124.9	—	15.3
TOTAL		9696		248.7	
Average		323		8.29	

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0771

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/11/2019
Reported: 06/13/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13 McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0771-01
Collected By: JM-Client
Collection Date: 06/11/2019 13:38

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/11/19 1818	06/12/19 1242	EDB
Escherichia coli	Absent			in 100mL		06/11/19 1818	06/12/19 1242	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/11/19 1338	CUS

Client Sample ID: C-Ville Highway Garage Rt. 49 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9F0771-02
Collected By: JM-Client
Collection Date: 06/11/2019 15:22

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/11/19 1818	06/12/19 1242	EDB
Escherichia coli	Absent			in 100mL		06/11/19 1818	06/12/19 1242	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		06/11/19 1522	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0771

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/13/2019 11:18

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0424

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/05/2019
Reported: 06/10/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9F0424-01	**Collection Date:**	06/05/2019 6:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/05/19 1629	06/06/19 1058	EDB
Escherichia coli	Absent			in 100mL		06/05/19 1629	06/06/19 1058	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/10/2019 12:02

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0346

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/04/2019
Reported: 06/06/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0346-01
Collected By: JM-Client
Collection Date: 06/04/2019 6:33

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB
Escherichia coli	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/04/19 0633	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9F0346-02
Collected By: JM-Client
Collection Date: 06/04/2019 6:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB
Escherichia coli	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/04/19 0652	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9F0346

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9F0346-03	**Collection Date:**	06/04/2019 7:17

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB
Escherichia coli	Absent			in 100mL		06/04/19 1546	06/05/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		06/04/19 0717	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/06/2019 14:30

15+16

MICRO BAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.2
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Col. form							Additional Notes
	Red Apple Rt13/McLean Rd	6-11-19	138 PM	1	DW	1	Na2S2O3	1							Clo. 5
	C-Ville Highway Garage Rt41 Polkville	6-11-19	322 PM	1	DW	1	"	1							Clo. 3

J9F0771
Cortlandville Water, Town of

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-11-19 331 PM	[signature]	6-11-19 15:31
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
16 [illegible] ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number _____
Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 4.8
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	Col-form										Additional Notes
	Red Apple RT13/McLean Rd	6-11-19	138 PM	1	DW	1	Na2S2O3	1										C10-5
	C-Ville Highway Garage RT41 pelkville	6-11-19	322 PM	1	DW	1	"	1										C10-3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-11-19 331 PM		6-11-19 15:31
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECC

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 7.3
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Terrace Rd well	6-5-19	640 AM	1	DW	(G)	Na2S2O3		RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-5-19 932 AM	Dorothy Marshall	6-5-19 9:33am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.2
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [X] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform	Additional Notes
	Municipal BLDG.	6-4-19	6:33 AM	1	DW	1	Na2S2O3	-	c10.6
	Walden Oak BS.	6-4-19	6:52 AM	1	DW	1	Na2S2O3	-	c10.5
	Blue Creek BS	6-4-19	7:17 AM	1	DW	1	Na2S2O3	-	c10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature): Jeff MacLean — Date/Time: 6-4-19 851 PM
Relinquished By (signature) — Date/Time
Relinquished By (signature) — Date/Time

Received By (signature): Dorothy Marshall — Date/Time: 6-4-19 8:51am
Received By (signature) — Date/Time
Received By (signature) — Date/Time

Page ____ of ____

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05/2019 (MM YYYY)	06/03/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
1		741	73.5 / 69.9	4.1		.6	.3	21.4	off	700
2		—	69.4	—		.6	.3	17.1	ON	700
3		885	64.8	4.6		.6	.3	21.4	off	9:15
4		—	64.8	—		.6	.3	21.6	off	9:00
5		—	64.8	—		.6	.3	16.9	on	7:30
6		936	59.9	4.9		.6	.3	21.2	off	615
7		—	59.9	—		.6	.3	16.9	on	7:05
8		745	56.3	3.6		.6	.3	21.1	off	7:06
9		—	56.3			.6	.3	16.7	ON	600
10		842	51.9	4.4		.6	.3	21.3	off	9:10
11		—	51.9	—		.6	.3	21.5	off	10:00
12		—	51.9	—		.6	.3	17.1	on	6:15
13		885	47.6	4.3		.6	.3	22.2	off	7:00
14		—	47.6	—		.6	.3	18.0	ON	7:00
15		936	43.0	4.6		.6	.3	22.5	off	7:00
16		—	43.0	—		.6	.3	18.0	ON	7:00
17		861	38.5	4.5		.6	.3	22.4	off	8:20
18		—	38.5	—		.6	.3	22.6	off	8130
19		—	38.5	—		.6	.3	17.9	ON	7:00
20		963	33.6	4.9		.6	.3	22.2	off	7:30
21		—	33.6	—		.6	.3	18.1	ON	7:30
22		217	29.8	3.8		.6	.3	22.0	off	7:30
23		—	29.8	—		.6	.3	17.5	ON	600
24		710	26.3	3.5		.6	.3	21.7	off	630
25		—	26.3	—		.6	.3	22.0	off	800
26		—	26.3	—		.6	.3	17.0	ON	715
27		936	21.2	5.1		.6	.3	21.5	off	6:06
28		—	21.2	—		.6	.3	17.4	ON	700
29		784	17.2	4.0		.6	.3	17.4	off	700
30		—	17.2	—		.6	.3	16.9	ON	700
31		885	12.5	4.7		.6	.3	21.2	off	9:30
TOTAL		11,826								
AVG.		381								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY-a30046

Signature: Peter Alteri Date: 6/3/2019 Operator Grade Level: T3

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			22573.5		
5/1/2019		741	22592.5	19.0	21.6
5/2/2019		—	22592.5	—	17.1
5/3/2019		885	22615.2	22.7	21.4
5/4/2019		—	22615.2	—	21.6
5/5/2019		—	22615.2	—	16.9
5/6/2019		936	22639.2	24.0	21.2
5/7/2019		—	22639.2	—	16.9
5/8/2019		745	22658.3	19.1	21.1
5/9/2019		—	22658.3	—	16.7
5/10/2019		842	22679.9	21.6	21.3
5/11/2019		—	22679.9		21.5
5/12/2019		—	22679.9	—	17.1
5/13/2019		885	22702.0	22.1	22.2
5/14/2019		—	22702.0	—	18.0
5/15/2019		936	22726.0	24	22.5
5/16/2019		—	22726.0	—	18.0
5/17/2019		861	22748.1	22.1	22.4
5/18/2019		—	22748.1	—	22.4
5/19/2019		—	22748.1	[illegible]	12.9
5/20/2019		963	22772.8	24.7	22.2
5/21/2019		—	22772.8	—	18.1
5/22/2019		717	22791.2	18.4	22.0
5/23/2019		—	22791.2	—	17.5
5/24/2019		710	22809.4	18.2	21.7
5/25/2019		—	22809.4	—	22.0
5/26/2019		—	22809.4	—	17.0
5/27/2019		936	22833.4	24	21.5
5/28/2019		—	22833.4		17.4
5/29/2019		784	22853.5	20.1	21.1
5/30/2019		—	22853.5	—	16.9
5/31/2019		885	22876.2	22.7	22.2
TOTAL		11826		302.7	
Average		381			

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05/2019 (MM Y Y Y Y)	06/03/2019 (MM DD Y Y Y Y)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 LH	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
			38.3			.6		32.7		
1		—	38.3	—		.6	.3	32.8	off	7:15
2		584	35.7	2.6		.6	.3	32.7	off	7:15
3		—	35.7	—		.6	.3	32.8	off	9:00
4		675	32.1	3.6		.6	.3	32.7	off	8:40
5		490	29.9	2.2		.6	.3	32.7	off	7:45
6		—	29.9	—		.6	.3	32.8	off	6:30
7		697	25.8	4.1		.6	.3	32.7	off	7:15
8		—	25.8	—		.6	.3	32.7	off	7:15
9		633	23.0	2.8		.6	.3	32.7	off	6:15
10		—	23.0	—		.6	.3	32.8	off	8:00
11		657	19.2	3.8		.6	.3	31.9	on	9:50
12		502	17.0	2.2		.6	.3	32.8	off	6:30
13		—	17.0	—		.6	.3	33.1	off	7:15
14		588	13.7	3.3		.6	.3	33.2	off	7:15
15		—	13.7	—		.6	.3	33.4	off	7:15
16		547	11.1	2.6		.6	.3	33.4	off	7:15
17		—	11.1	—		.6	.3	33.5	off	8:30
18		641	7.4	3.7		.6	.3	33.5	off	8:00
19		589	6/3 122.9	2.4		.6	.3	33.5	off	2:00
20		—	122.9	—		.6	.3	33.6	off	2:30
21		646	119.5	3.4		.6	.3	33.5	off	2:30
22		—	119.5	—		.6	.3	33.6	off	2:30
23		623	117.0	2.5		.6	.3	33.6	off	6:15
24		—	117.0	—		.6	.3	33.7	off	6:45
25		655	113.6	3.4		.6	.3	32.8	on	8:15
26		554	111.4	2.2		.6	.3	33.6	off	7:30
27		—	111.4	—		.6	.3	33.6	off	6:15
28		617	108.2	3.2		.6	.3	33.6	off	7:15
29		—	108.2	—		.6	.3	33.7	off	7:15
30		611	105.7	2.4		.6	.3	33.6	off	7:15
31		—	105.7	—		.6	.3	33.6	off	9:15
TOTAL		10,329								
AVG.		333								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock

Reported by: Peter Aiten, Jr. Title: W/S operator NYSDOH Operator Certification Number: NY-030046

Signature: Peter Aiten Date: 6/3/2019 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	5-1-19	1	YES ☒	YES ☒	0.6
Terrace Rd Well	5-1-19		YES ☒	YES ☒	RAW
Walden Acres Booster Sta.	5-1-19	1	YES ☒	YES ☒	0.5
Blue Creek Booster	5-1-19	1	YES ☒	YES ☒	0.5
Red Apple Kitchen Rt / RT 13	5-7-19	1	YES ☒	YES ☒	0.5
Quilt Highway RT 41	5-7-19	1	YES ☒	YES ☒	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16600.9		32.7		10218.5		22.8	46293.36	
5/1/2019	—	16600.9	—	32.8	—	10218.5	—	22.9	46293.36	—
5/2/2019	—	16600.9	—	32.7	584	10225.7	7.2	22.9	46300.49	7.13
5/3/2019	—	16600.9	—	32.8	—	10225.7	—	23.0	46300.49	—
5/4/2019	645	16610.9	10	32.7	—	10225.7	—	22.9	46310.49	10
5/5/2019	—	16610.9	—	32.7	490	10231.6	5.9	22.9	46316.46	5.97
5/6/2019	—	16610.9	—	32.8	—	10231.6	—	22.9	46316.46	—
5/7/2019	697	16621.8	10.9	32.7	—	10231.6	—	22.8	46327.30	10.84
5/8/2019	—	16621.8	—	32.7	—	10231.6	—	22.9	46327.30	—
5/9/2019	—	16621.8	—	32.7	633	10239.4	7.8	22.8	46335.08	7.78
5/10/2019	—	16621.8	—	32.8	—	10239.4	—	23.0	46335.08	—
5/11/2019	657	16632.0	10.2	31.9	—	10239.4	—	15.4	46345.38	10.30
5/12/2019	—	16632.0	—	32.8	502	10245.6	6.2	23.0	46351.36	5.98
5/13/2019	—	16632.0	—	33.1	—	10245.6	—	23.2	46351.36	—
5/14/2019	588	16641.1	9.1	33.2	—	10245.6	—	23.3	46360.48	9.12
5/15/2019	—	16641.1	—	33.4	—	10245.6	—	23.5	46360.48	—
5/16/2019	—	16641.1	—	33.4	597	10252.9	7.3	23.5	46367.72	7.24
5/17/2019	—	16641.1	—	33.4	—	10252.9	—	23.6	46367.72	—
5/18/2019	641	16651.0	9.9	33.4	—	10252.9	—	23.6	46377.62	9.9
5/19/2019	—	16651.0	—	33.5	589	10260.0	7.1	23.6	46384.79	7.17
5/20/2019	—	16651.0	—	33.6	—	10260.0	—	23.7	46384.79	—
5/21/2019	646	16662.1	11.1	33.5	—	10260.0	—	23.6	46395.89	11.1
5/22/2019	—	16662.1	—	33.6	—	10260.0	—	23.7	46395.89	—
5/23/2019	—	16662.1	—	33.6	623	10267.7	7.7	23.7	46403.52	7.63
5/24/2019	—	16662.1	—	33.7	—	10267.7	—	23.8	46403.52	—
5/25/2019	655	16672.3	10.2	32.8	—	10267.7	—	16.2	46413.82	10.30
5/26/2019	—	16672.3	—	33.6	554	10274.4	6.7	23.7	46420.39	6.57
5/27/2019	—	16672.3	—	33.6	—	10274.4	—	23.8	46420.39	—
5/28/2019	617	16681.9	9.6	33.6	—	10274.4	—	23.7	46429.97	9.58
5/29/2019	—	16681.9	—	33.7	—	10274.4	—	23.8	46429.97	—
5/30/2019	—	16681.9	—	33.6	611	10281.9	7.5	23.7	46437.40	7.43
5/31/2019	—	16681.9	—	33.6	—	10281.9	—	23.7	46437.40	—
	5146		81		5183		63.4			144
AVERAGE	166				167					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9E0601

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/07/2019
Reported: 05/09/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13 - McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J9E0601-01
Collected By: JM-Client
Collection Date: 05/07/2019 7:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/07/19 1900	05/08/19 1327	EDB
Escherichia coli	Absent			in 100mL		05/07/19 1900	05/08/19 1327	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/07/19 0752	CUS

Client Sample ID: C-Ville Highway Garage Rt 41
Sample Matrix: Drinking Water
Lab Sample ID: J9E0601-02
Collected By: JM-Client
Collection Date: 05/07/2019 9:19

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/07/19 1900	05/08/19 1327	EDB
Escherichia coli	Absent			in 100mL		05/07/19 1900	05/08/19 1327	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		05/07/19 0919	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9E0601

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 05/09/2019 14:53

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9E0241

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/01/2019
Reported: 05/03/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Building
Sample Matrix: Drinking Water
Lab Sample ID: J9E0241-01
Collected By: JM-Client
Collection Date: 05/01/2019 8:05

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB
Escherichia coli	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/01/19 0805	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J9E0241-02
Collected By: JM-Client
Collection Date: 05/01/2019 8:16

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB
Escherichia coli	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9E0241

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9E0241-03	**Collection Date:**	05/01/2019 8:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB
Escherichia coli	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/01/19 0834	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9E0241-04	**Collection Date:**	05/01/2019 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
lethod: SM9223 B-1997								
Total Coliform	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB
Escherichia coli	Absent			in 100mL		05/01/19 1825	05/02/19 1244	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/01/19 0900	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9E0241

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 05/03/2019 14:34

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]n Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.6
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I. MacLean
Sampler Signature: Jeffrey I. MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Red Apple Rt13/McLean Rd	5-7-19	7:52 AM	1	DW	1	Na2S2O3	1	C10.5
	C-Ville Highway Garage Rt41	5-7-19	9:19 AM	1	DW	1	Na2S2O3	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I MacLean	5-7-19		5-7-19 9:31am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number 23-26

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[M] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[M] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

Temperature Upon Receipt (°C) 12.0
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [M] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [M] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I. MacLean
Sampler Signature: Jeffrey I. MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Total Coliform	Additional Notes
	Municipal BLDG.	5-1-19	8:05 AM	1	DW	1	Na2S2O3	+	Cl 0.6
	Terrace Rd well	5-1-19	8:16 AM	1	DW	1	"	X	Raw Water
	Walden Oaks BS	5-1-19	8:34 AM	1	DW	1	"	X	Cl 0.5
	Blue Creek BS.	5-1-19	9:00 AM	1	DW	1	"	X	Cl 0.5

Cortlandville Water, Town of

J9E0241

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I. MacLean	5-1-19 9:17 AM	Dorothy MacNeil	5-1-19 9:18am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2019 (MM YYYY)	05/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
			127.1			.6		21.7		
1		616	124.4	2.7		.6	.3	21.4	off	700
2		42	134.0	.4		.6	.3	17.4	on	700
3		667	121.0	3.0		.6	.3	21.3	off	700
4		—	121.0	—		.6	.3	16.8	on	7:30
5		846	116.9	4.1		.6	.3	21.3	off	9:20
6		—	116.9	—		.6	.3	21.3	off	7:00
7		—	116.9	—		.6	.3	16.8	on	7:30
8		936	112.0	4.9		.6	.3	21.3	off	7:00
9		—	112.0	—		.6	.3	16.9	on	7:30
10		753	108.6	3.4		.6	.3	21.0	off	7:20
11		269	107.3	1.3		.6	.3	16.5	ON	700
12		666	103.9	3.4		.6	.3	20.8	off	8:50
13		—	103.9	—		.6	.3	21.1	off	8:00
14		—	103.9	—		.6	.3	16.8	ON	700
15		741	100.3	3.6		.6	.3	21.5	off	7:00
16		—	100.3	—		.6	.3	16.8	on	7:00
17		936	95.4	4.9		.6	.3	21.4	off	7:45
18		—	95.4	—		.6	.3	16.9	on	7:00
19		936	90.6	4.8		.6	.3	21.8	off	8:00
20		—	90.6	—		.6	.3	22.2	off	8:50
21		—	90.6	—		.6	.3	17.6	ON	8:00
22		932	85.8	4.8		.6	.3	21.9	off	7:30
23		—	85.8	—		.6	.3	17.6	ON	7:15
24		752	82.1	3.7		.6	.3	21.7	off	7:15
25		—	82.1	—		.6	.3	17.4	ON	700
26		737	78.2	3.9		.6	.3	22.0	off	7:15
27		—	78.2	—		.6	.3	22.1	off	7:45
28		—	78.2	—		.6	.3	17.5	ON	7:05
29		952	73.5	4.7		.6	.3	21.7	off	700
30		—	73.5	—		.6	.3	17.3	ON	700
31										
TOTAL		10,781								
AVG.		359								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in cro

Reported by: Peter Alteri, JR Title: W/S Operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Alteri Date: 5/1/19 Operator Grade Level: IIB

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR

Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2019 (MM YYYY)	05/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
1		237	93.4	1.4		.6	.3	32.3	off	715
2		675	89.6	3.8		.6	.3	32.3	off	730
3		127	89.1	.5		.6	.3	32.3	off	715
4		608	86.3	1.8		.6	.3	32.3	off	7:45
5		←	86.3	—		.6	.3	32.4	off	9:15
6		706	82.3	4.0		.6	.3	32.3	off	9:00
7		616	79.6	2.7		.6	.3	32.3	off	7:45
8		—	79.6	—		.6	.3	32.4	off	7:15
9		738	75.5	4.1		.6	.3	32.2	off	7:45
10		—	75.5	—		.6	.3	32.3	off	7:30
11		653	72.5	3.0		.6	.3	32.2	off	730
12		—	72.5	—		.6	.3	32.3	off	8:30
13		609	69.1	3.4		.6	.3	32.2	off	8:30
14		525	66.8	2.3		.6	.3	32.2	off	715
15		—	66.8	—		.6	.3	32.3	off	7:15
16		642	63.1	3.7		.6	.3	32.3	off	7:30
17		—	63.1	—		.6	.3	32.4	off	8:00
18		620	60.3	2.8		.6	.3	32.3	off	7:30
19		—	60.3	—		.6	.3	32.4	off	7:45
20		756	56.1	4.2		.6	.3	32.5	off	8:40
21		490	54.0	2.1		.6	.3	32.5	off	8:00
22		—	54.0	—		.6	.3	32.6	off	7:30
23		616	50.8	3.2		.6	.3	32.6	off	7:30
24		—	50.8	—		.6	.3	32.6	off	7:30
25		560	47.7	3.1		.6	.3	32.6	off	715
26		—	47.7	—		.6	.3	32.7	off	7:30
27		576	44.6	3.1		.6	.3	32.7	off	800
28		539	42.2	2.4		.6	.3	32.7	off	7:00
29		—	42.2	—		.6	.3	32.7	off	715
30		675	38.3	3.9		.6	.3	32.7	off	715
31										
TOTAL		10,962								
AVG.		365								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in croc

Reported by: Peter Alteri Jr Title: W/S Operator NYSDOH Operator Certification Number: N4003004

Signature: Peter Alteri Jr Date: 5/1/19 Operator Grade Level: ~~H~~B

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd Well	4/10/19	RAW	YES [NO]	YES [NO]	Ø
Municipal Bldg	4/1/19	1	YES [NO]	YES [NO]	0.6
Walden Oaks B.S.	4/1/19	1	YES [NO]	YES [NO]	0.6
Blue Creek B.S.	4/1/19	1	YES [NO]	YES [NO]	0.6
Red Apple Machean / RT 13	4/11/19	1	YES [NO]	YES [NO]	0.5
Coville Highway RT 41	4/11/19	1	YES [NO]	YES [NO]	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Machean.

Name of NYSDOH Certified Laboratory: Microbac. LABS.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: No.

Comments:

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			22297.4		21.7
4/1/2019		616	22313.2	15.8	21.4
4/2/2019		42	22314.2	1.0	17.4
4/3/2019		667	22331.3	17.1	21.3
4/4/2019		—	22331.3	—	16.8
4/5/2019		846	22353.0	21.7	21.3
4/6/2019		—	22353.0	—	21.3
4/7/2019		—	22353.0	—	16.8
4/8/2019		936	22377.0	24	21.3
4/9/2019		—	22377.0	—	16.9
4/10/2019		753	22396.3	19.3	21.0
4/11/2019		269	22403.2	6.9	16.5
4/12/2019		666	22420.3	17.1	20.9
4/13/2019		—	22420.3	—	21.1
4/14/2019		—	22420.3	—	16.8
4/15/2019		741	22439.3	19.0	21.6
4/16/2019		—	22439.3	—	16.8
4/17/2019		936	22463.3	24.0	21.4
4/18/2019		—	22463.3	[illegible]	16.9
4/19/2019		936	22487.3	24.0	21.8
4/20/2019		—	22487.3	—	22.2
4/21/2019		—	22487.3	—	17.6
4/22/2019		932	22511.2	23.9	19.2
4/23/2019		—	22511.2	—	17.7
4/24/2019		752	22530.5	19.3	19.3
4/25/2019		—	22530.5	—	17.4
4/26/2019		737	22549.4	18.9	22.0
4/27/2019		—	22549.4	—	22.1
4/28/2019		—	22549.4	—	22.1
4/29/2019		952	22573.5	24.4	21.7
4/30/2019			22573.5	—	17.3
TOTAL		10,781		274.	
Average		359			

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16504.1				10159.6			46137.98	
4/1/2019	237	16507.9	3.8	32.3	—	10159.6	—	22.5	46141.70	3.72
4/2/2019	675	16518.3	10.4	32.3	—	10159.6	—	22.5	46152.13	10.43
4/3/2019	—	16518.3	—	32.3	127	10161.2	1.6	22.5	46153.78	1.65
4/4/2019	—	16518.3	—	32.3	608	10168.6	7.4	22.5	46161.14	7.36
4/5/2019	—	16518.3	—	32.4	—	10168.6	—	22.6	46161.14	—
4/6/2019	706	16529.3	11	32.3	—	10168.6	—	22.4	46172.07	10.93
4/7/2019	—	16529.3	—	32.3	614	10176.1	7.2	22.5	46179.57	7.5
4/8/2019	—	16529.3	—	32.4	—	10176.1	—	22.5	46179.57	—
4/9/2019	737	16540.7	11.4	32.2	—	10176.1	—	22.4	46191.02	11.45
4/10/2019	—	16540.7	—	32.3	—	10176.1	—	22.4	46191.02	—
4/11/2019	—	16540.7	—	32.2	653	10184.2	8.1	24.4	46199.07	8.05
4/12/2019	—	16540.7	—	32.3	—	10184.2	—	22.5	46199.07	—
4/13/2019	609	16550.2	9.5	32.2	—	10184.2	—	22.4	46208.50	9.43
4/14/2019	—	16550.2	—	32.2	525	10190.6	6.4	22.4	46214.90	6.40
4/15/2019	—	16550.2	—	32.3	—	10190.6	—	22.5	46214.90	—
4/16/2019	642	16560.2	10	32.3	—	10190.6	—	22.4	46224.87	9.97
4/17/2019	—	16560.2	—	32.4	—	10190.6	—	22.5	46224.87	—
4/18/2019	—	16560.2	—	32.3	620	10198.2	7.6	22.5	46232.55	7.68
4/19/2019	—	16560.2	—	32.4	—	10198.2	—	22.6	46232.55	—
4/20/2019	756	16572.0	11.8	32.5	—	10198.2	—	22.6	46244.26	11.71
4/21/2019	—	16572.0	—	32.5	490	10204.2	6.0	22.7	46250.25	5.99
4/22/2019	—	16572.0	—	32.6	—	10204.2	—	22.8	46250.25	—
4/23/2019	616	16581.5	9.5	32.6	—	10204.2	—	22.7	46259.76	9.5
4/24/2019	—	16581.5	—	32.6	—	10204.2	—	22.8	46259.76	—
4/25/2019	—	16581.5	—	32.6	560	10211.9	7.7	22.8	46267.45	7.69
4/26/2019	—	16581.5	—	32.7	—	10211.9	—	22.9	46267.45	—
4/27/2019	570	16590.4	8.9	32.8	—	10211.9	—	22.8	46276.29	8.84
4/28/2019	—	16590.4	—	32.7	539	10218.5	6.6	22.8	46282.84	6.55
4/29/2019	—	16590.4	—	32.7	—	10218.5	—	22.9	46282.84	—
4/30/2019	675	16600.9	10.5	32.7	—	10218.5		22.8	46293.36	10.52
	6,123		96.8		4738		58.9			155.38
AVERAGE	207				158					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0836

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/10/2019
Reported: 04/11/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9D0836-01	**Collection Date:**	04/10/2019 14:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/10/19 1600	04/11/19 1100	EDB
Escherichia coli	Absent			in 100mL		04/10/19 1600	04/11/19 1100	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/11/2019 15:28

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0167

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/01/2019
Reported: 04/03/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9D0167-01
Collected By: JM-Client
Collection Date: 04/01/2019 9:19

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB
Escherichia coli	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/01/19 0919	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9D0167-02
Collected By: JM-Client
Collection Date: 04/01/2019 9:51

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB
Escherichia coli	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/01/19 0951	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0167

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9D0167-03	**Collection Date:**	04/01/2019 10:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB
Escherichia coli	Absent			in 100mL		04/01/19 1543	04/02/19 1050	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/01/19 1020	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/03/2019 11:12

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0887

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/11/2019
Reported: 04/15/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13/McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J9D0887-01
Collected By: JM-Client
Collection Date: 04/11/2019 9:28

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/11/19 1539	04/12/19 1051	EDB
Escherichia coli	Absent			in 100mL		04/11/19 1539	04/12/19 1051	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/11/19 0928	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J9D0887-02
Collected By: JM-Client
Collection Date: 04/11/2019 10:43

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		04/11/19 1539	04/12/19 1051	EDB
Escherichia coli	Absent			in 100mL		04/11/19 1539	04/12/19 1051	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		04/11/19 1043	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9D0887

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Quality Assurance Officer
Reported: 04/15/2019 09:51

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nor[illegible]in Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number 142

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 7.9
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I. MacLean

Sampler Signature: Jeffrey I. MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types **	BAC-T	Additional Notes
	Red Apple Rt13/McLean Rd	4-11-19	9:28 AM	1	DW	G	Na2S2O3	1	Cl 0.5
	Cortlandville Highway Garage	4-11-19	10:43 AM	1	DW	G	"	1	Cl 0.3

Cortlandville Water, Town of

J 9 D 0 8 8 7

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I. MacLean	4-11-19 11:18 AM		4-11-19 11:19am
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

MICRO...

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 Nor... Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 11.2
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortland ville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly water Sample

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey L. MacLean

Sampler Signature: Jeffrey L. MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Terrace Rd well	4-10-19	2:57PM	1	DW	1	Na2S2O3	1									Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey L. MacLean	4-10-19 14:57		4-10-19 14:57
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

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1620 Nor[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

11-13

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortland ville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 5.4
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey L MacLean

Sampler Signature: Jeffrey L MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Town of Cortland ville

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Municipal BLDG	4-1-19	9:19 AM	1	DW	G	Na2S2O3	C10.6
	Walden Oaks BS.	4-1-19	9:51 AM	1	DW	G	"	C10.6
	Blue Creek BS.	4-1-19	10:20 AM	1	DW	G	"	C10.6

Cortlandville Water, Town of

J 9 D 0 1 6 7

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey L MacLean	4-1-19 1043 AM		4-1-19 10:46am.
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page 3 of 3

Page ___ of ___

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
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570.888.0169

16[illegible] Main Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECORD

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 3.4

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey T MacLean

Sampler Signature: Jeffrey T MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

Lab ID	Client Sample ID (Town of Cortland ville)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	REQUESTED ANALYSIS	Additional Notes
	Municipal BLDG	4-1-19	9:19 AM	1	DW	G	Na2S2O3		Cl0.6
	Walden Oaks BS	4-1-19	9:51 AM	1	DW	G	"		Cl0.6
	Blue Creek BS	4-1-19	10:20 AM	1	DW	G	"		Cl0.6

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey A MacLean	4-1-19 1043 AM		4-1-19 10:46am.
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2019 (MM YYYY)	04/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		902	54.2	4.4		.6	.3	31.9		
2		674	49.8	3.1		.6	.3	31.6	ON	600
3		855	46.9	3.8		.6	.3	33.4	off	615
4		613	43.1	3.1		.6	.3	31.4	ON	715
5		697	40.0	3.1		.6	.3	31.5	ON	700
6		814	36.9	3.2		.6	.3	32.2	ON	715
7		791	33.7	2.7		.6	.3	32.1	ON	715
8		850	31.0	4.3		.6	.3	33.0	off	7:30
9		619	26.7	4.0		.6	.3	31.1	on	9:00
10		848	22.7	2.3		.6	.3	31.7	on	8:23
11		712	20.5	3.4		.6	.3	32.8	off	7:30
12		488	17.1	4.3		.6	.3	31.0	on	7:45
13		1,060	12.8	2.1		.6	.5	31.4	on	7:45
14		597	10.7	3.8		.6	.3	32.5	off	7:45
15		1086	6.9	3.9		.6	.3	30.6	on	8:00
16		508	3.9/155.5	2.8		.6	.3	32.4	off	8:30
17		641	152.7	2.8		.6	.3	32.6	off	8:00
18		1029	149.9	5.9		.6	.3	32.6	off	7:05
19		547	144.0	3.1		.6	.3	30.5	on	7:30
20		971	140.9	4.3		.6	.3	32.5	off	7:40
21		505	136.6	2.5		.6	.3	32.2	off	7:45
22		1,019	134.1	5.7		.6	.3	30.8	on	730
23		480	128.4	2.6		.6	.3	32.1	off	9:15
24		511	125.8	4.0		.6	.3	32.5	off	8:45
25		1,147	121.8	4.9		.6	.3	30.5	on	7:45
26		525	116.9	3.3		.6	.3	30.4	on	7:45
27		940	113.6	4.3		.6	.3	32.4	off	7:30
28		461	109.3	2.1		.6	.3	31.2	on	7:30
29		469	107.2	5.5		.6	.3	32.4	off	715
30		673	101.7	3.7		.6	.3	30.4	on	700
31		664	98.0	3.2		.6	.3	32.3	off	800
TOTAL		23,196	94.8					30.4	on	715
AVG.		748								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr Title: W/S Operator NYSDOH Operator Certification Number: N.Y. 0030046

Signature: Peter Alteri Date: 4/1/19 Operator Grade Level: TD

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Rec Apts MacLean Rd/RT13	3/11/19	1	YES NO ✓	YES NO ✓	0.5
Cville Highway RT41	3/11/19	1	YES NO ✓	YES NO ✓	0.3
Municipal Bldg Terrace Rd	3/6/19	1	YES NO ✓	YES NO ✓	0.6
Weldon Dr. Booster	3/6/19	1	YES NO ✓	YES NO ✓	0.5
Blue Circle Booster	3/6/19	1	YES NO ✓	YES NO ✓	0.5
			YES NO	YES NO	
Terrace Rd well Surveillance	3/13/19		YES ✓ NO	YES ✓ NO	0
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac.

Did any MCL violation occur? If so, please describe: No.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: No.

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2019 (MM YYYY)	04/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd well

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.3	WELL Level	Pump On/OfF	Time
1		—	127.1	—		.6	.3	22.1		
2		—	127.1	—		.6	.3	22.1	off	550
3		—	127.1	—		.6	.3	22.1	off	630
4		—	127.1	—		.6	.3	22.0	off	700
5		—	127.1	—		.6	.3	21.6	off	715
6		—	127.1	—		.6	.3	21.6	off	700
7		—	127.1	—		.6	.3	21.3	off	700
8		—	127.1	—		.6	.3	21.3	off	7:30
9		—	127.1	—		.6	.3	21.3	"	9:15
10		—	127.1	—		.6	.3	21.2	off	9:00
11		—	127.1	—		.6	.3	21.4	off	7:15
12		—	127.1	—		.6	.3	21.4	off	7:00
13		—	127.1	—		.6	.3	21.1	off	7:30
14		—	127.1	—		.6	.3	21.3	"	7:30
15		—	127.1	—		.6	.3	21.6	"	7:50
16		—	127.1	—		.6	.3	21.7	off	8:45
17		—	127.1	—		.6	.3	22.0	off	8:15
18		—	127.1	—		.6	.3	22.0	off	7:45
19		—	127.1	—		.6	.3	21.9	off	8:30
20		—	127.1	—		.6	.3	21.9	off	7:30
21		—	127.1	—		.6	.3	21.6	off	7:00
22		—	127.1	—		.6	.3	21.9	off	715
23		—	127.1	—		.6	.3	22.0	off	9:00
24		—	127.1	—		.6	.3	22.2	off	9:30
25		—	127.1	—		.6	.3	21.9	off	7:15
26		—	127.1	—		.6	.3	21.8	off	7:30
27		—	127.1	—		.6	.3	21.8	off	7:30
28		—	127.1	—		.6	.3	22.0	off	7:00
29		—	127.1	—		.6	.3	22.0	off	700
30		—	127.1	—		.6	.3	22.0	off	710
31		—	127.1	—		.6	.3	22.0	off	825
TOTAL		0						21.7	off	700
AVG.										

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alteri Jr Title: W/S Operator NYSDOH Operator Certification Number: NY0003046

Signature: Peter Alteri Date: 4/1/19 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: _____

Number of microbiological monitoring samples required: _____

Number of microbiological monitoring samples taken: _____

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): _____

Name of NYSDOH Certified Laboratory: _____

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: _____

Comments: _____

MICRO

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 Nor. Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECOR

Number
Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.1
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortland Ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I MacLean
Sampler Signature: Jeffrey I MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT	Sodium	Additional Notes
	Terrace Rd well	3-13-19	1:15 PM	1	DW	I	Na2S2O3	1		Raw water
	Sodium	3-13-19	1:16 PM	1	DW	I	U		1	Raw water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I MacLean	3/13/19 1:38 PM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			3/13/19 15:39
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0425

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/06/2019
Reported: 03/08/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9C0425-01
Collected By: JM-Client
Collection Date: 03/06/2019 7:55

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB
Escherichia coli	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/06/19 0755	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J9C0425-02
Collected By: JM-Client
Collection Date: 03/06/2019 8:16

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB
Escherichia coli	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/06/19 0816	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0425

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9C0425-03	**Collection Date:**	03/06/2019 8:42

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB
Escherichia coli	Absent			in 100mL		03/06/19 1555	03/07/19 1045	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/06/19 0842	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/08/2019 14:27

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0689

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/11/2019
Reported: 03/12/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt. 13 McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J9C0689-01
Collected By: JM-Client
Collection Date: 03/11/2019 9:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/11/19 1535	03/12/19 1056	EDB
Escherichia coli	Absent			in 100mL		03/11/19 1535	03/12/19 1056	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/11/19 0915	CUS

Client Sample ID: C-Ville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9C0689-02
Collected By: JM-Client
Collection Date: 03/11/2019 10:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		03/11/19 1535	03/12/19 1056	EDB
Escherichia coli	Absent			in 100mL		03/11/19 1535	03/12/19 1056	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		03/11/19 1050	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0841

Town of Cortlandville Water

Hayne Smith
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Sample

Project / PO Number: N/A
Received: 03/13/2019
Reported: 03/22/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Road Well
Sample Matrix: Drinking Water
Lab Sample ID: J9C0841-01
Collected By: JM-Client
Collection Date: 03/13/2019 13:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		03/13/19 1532	03/14/19 1052	EDB
Escherichia coli	Absent			in 100mL		03/13/19 1532	03/14/19 1052	EDB

Client Sample ID: Sodium
Sample Matrix: Drinking Water
Lab Sample ID: J9C0841-02
Collected By: JM-Client
Collection Date: 03/13/2019 13:16

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals, Total	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4								
Sodium	61.4		1.02	mg/L		03/18/19 0853	03/18/19 1625	BRC

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9C0689

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Christine Pechacek
Director
Reported: 03/12/2019 17:12

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg		—	22296.8		22.1
3/1/2019		—	22296.8		22.1
3/2/2019		—	22296.8		22.1
3/3/2019		—	22296.8		22.0
3/4/2019		—	22296.8		21.6
3/5/2019		—	22296.8		21.6
3/6/2019		—	22296.8		21.3
3/7/2019		—	22296.8		21.3
3/8/2019		—	22296.8		21.3
3/9/2019		—	22296.8		21.2
3/10/2019		—	22296.8		21.4
3/11/2019		—	22296.8		21.4
3/12/2019		—	22296.8		21.1
3/13/2019		—	22296.8		21.3
3/14/2019		—	22296.8		21.6
3/15/2019	flushed for sample	—	22297.4		21.7
3/16/2019		—	22297.4		22.0
3/17/2019		—	22297.4		22.0
3/18/2019		—	22297.4		21.9
3/19/2019		—	22297.4		21.9
3/20/2019		—	22297.4		21.6
3/21/2019		—	22297.4		21.9
3/22/2019		—	22297.4		22.0
3/23/2019		—	22297.4		22.2
3/24/2019		—	22297.4		21.9
3/25/2019		—	22297.4		21.8
3/26/2019		—	22297.4		21.8
3/27/2019		—	22297.4		22.0
3/28/2019		—	22297.4		22.0
3/29/2019		—	22297.4		22.0
3/30/2019		—	22297.4		22.0
3/31/2019		—	22297.4		21.7
TOTAL		∅		∅	
Average					

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16286.9		31.9		10046.6		23.0	45808.45	
3/1/2019	902	16300.8	13.9	31.6	—	10046.6	—	22.0	45822.43	13.98
3/2/2019	674	16311.3	10.5	33.4	—	10046.6	—	23.6	45832.82	10.39
3/3/2019	357	16316.9	5.6	31.4	498	10052.6	6.0	22.6	45844.35	11.53
3/4/2019	613	16326.3	9.4	31.5	—	10052.6	—	20.6	45853.84	9.49
3/5/2019	699	16335.2	8.9	32.2	126	10054.2	1.6	15.6	45864.21	10.37
3/6/2019	—	16335.2	—	32.1	814	10064.0	9.8	15.4	45874.02	9.81
3/7/2019	—	16335.2	—	33.0	791	10073.5	9.5	23.1	45883.53	9.51
3/8/2019	850	16348.4	13.2	31.1	—	10073.5	—	22.2	45894.70	8.17
3/9/2019	619	16357.9	9.5	31.7	—	10073.5	—	15.6	45908.10	12.4
3/10/2019	—	16357.9	—	32.8	848	10083.9	10.4	22.9	45916.53	7.43
3/11/2019	712	16368.9	11	31.0	—	10083.9	—	22.1	45927.57	11.04
3/12/2019	498	16376.5	7.6	31.4	—	10083.9	—	15.1	45940.89	13.32
3/13/2019	—	16376.5	—	32.5	1,060	10096.8	12.9	22.7	45948.02	7.13
3/14/2019	—	16376.5	—	30.6	597	10104.1	7.3	21.8	45959.72	11.7
3/15/2019	1086	16393.4	16.9	32.4	—	10104.1	—	22.6	45972.12	12.4
3/16/2019	508	16401.2	7.8	32.6	—	10104.1	—	22.7	45979.98	7.86
3/17/2019	—	16401.2	—	32.6	641	10111.9	7.8	22.7	45987.80	7.82
3/18/2019	1029	16417.3	16.1	30.5	—	10111.9	—	21.6	46003.75	15.95
3/19/2019	547	16425.8	8.5	32.5	—	10111.9	—	22.6	46012.22	8.47
3/20/2019	—	16425.8	—	32.2	971	10123.8	11.9	22.4	46024.06	11.84
3/21/2019	35	16426.4	.6	30.8	470	10129.5	5.7	22.0	46030.36	6.30
3/22/2019	1,019	16442.2	15.8	32.1	—	10129.5	—	22.2	46046.15	15.79
3/23/2019	480	16449.7	7.5	32.5	—	10129.5	—	22.6	46053.61	7.46
3/24/2019	—	16449.7	—	30.5	511	10135.8	6.3	21.7	46064.39	10.78
3/25/2019	1,147	16467.5	17.8	30.3	—	10135.8	—	21.6	46077.62	13.23
3/26/2019	525	16476.6	9.1	32.4	—	10135.8	—	22.5	46086.73	9.11
3/27/2019	—	16476.6	—	31.2	940	10147.3	11.5	15.0	46098.24	11.51
3/28/2019	—	16476.6	—	32.4	461	10153.3	6.0	22.6	46103.90	5.66
3/29/2019	969	16491.7	15.1	30.4	—	10153.3	—	21.5	46118.93	15.03
3/30/2019	618	16501.2	9.5	32.4	55	10153.7	.4	22.5	46129.19	10.26
3/31/2019	183	16504.1	2.9	30.4	481	10159.6	5.9	21.6	46137.98	8.79
	14,058		217.2		9264		113			329.13
AVERAGE	453				299					

Rev: 1/2015

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162[illegible]]in Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortland ville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 4.9
Therm ID
Holding Time
Samples Received on Ice? ~~Yes~~ No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I MacLean
Sampler Signature: Jeffrey I MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAET										Additional Notes
	Red Apple Rt 13/McLean Rd	3-11-19	9:15 AM	1	DW	1	Na2S2O3	1										C10.5
	C-Ville Highway Garage Rt 41 Polkville	3/-11/19	10:50 AM	1	DW	1	"	1										C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I MacLean	3/11/19 11:00 AM	[signature]	3/11/19 11:01 AM
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

27-29

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 Nor[illegible]ain Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY RECOR

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 5.1

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland ville

Address: 3579 Terrace Rd

City, State, Zip: Cortland NY 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland Ny. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeffrey I MacLean

Sampler Signature: Jeffrey I MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Coliform							Additional Notes
	Municipal BLDG.	3-6-19	755 AM	1	DW	1	Na2S2O3	1							c10.6
	Walden Oaks BS	3-6-19	816 AM	1	DW	1	Na2S2O3	1							c10.5
	Blue Creek BS	3-6-19	842 AM	1	DW	1	Na2S2O3	1							c10.5

Cortlandville Water, Town of J 9 C 0 4 2 5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeffrey I MacLean	3-6-19 1106 AM		3/6/19 11:07am.
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page 3 of 3

rev 12/26/2017

Page ___ of ___

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/2019 (MM YYYY)	03/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
	Lime Hollow		144.9					32.2		
1		955	140.3	4.6		.6	.3	31.9	ON	7:45
2		678	137.3	3.0		.6	.3	33.5	off	8:00
3		505	136.1	2.2		.6	.3	32.0	ON	7:10
4		1024	130.4	4.7		.6	.3	33.3	off	7:15
5		546	127.8	2.6		.6	.3	33.7	off	7:00
6		883	124.2	3.6		.6	.3	32.7	ON	7:00
7		475	122.5	1.7		.6	.3	34.1	off	8:00
8		965	118.1	4.4		.6	.3	34.1	off	8:45
9		446	115.7	2.4		.6	.3	34.4	off	7:40
10		504	112.3	3.4		.6	.3	32.5	on	7:38
11		561	108.4	3.9		.6	.3	34.1	off	7:15
12		525	105.9	2.5		.6	.3	34.5	off	8:30
13		889	102.8	3.1		.6	.3	34.3	off	8:20
14		474	100.8	2.0		.6	.3	32.9	off	7:15
15		1,114	95.8	5.0		.6	.3	34.2	off	11:00
16		449	93.4	2.4		.6	.3	33.5	on	10:30
17		526	89.9	3.5		.6	.3	32.4	on	9:50
18		1,066	86.5	3.4		.6	.3	33.9	off	7:40
19		521	84.0	2.5		.6	.3	34.2	off	7:15
20		893	80.5	3.5		.6	.3	33.0	on	7:10
21		605	78.4	2.1		.6	.3	34.1	off	6:45
22		1,014	73.3	5.1		.6	.3	32.1	on	9:00
23		528	69.8	4.5		.6	.3	33.8	off	9:00
24		946	67.0	2.8		.6	.3	32.0	on	8:00
25		1,077	62.4	4.6		.6	.3	33.5	off	8:00
26		537	59.6	2.8		.6	.3	33.7	off	7:30
27		889	56.4	3.2		.6	.3	33.4	off	8:00
28		512	54.2	2.2		.6	.3	31.9	ON	7:30
29										
30										
31										
TOTAL		20,107								
AVG.		718								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Alteri Date: 3/1/19 Operator Grade Level: II

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		16093.5		32.3		9946.9		23.3	45515.90	
2/1/2019	955	16108.3	14.8	31.9	—	9946.9	—	23.0	45530.63	14.73
2/2/2019	504	16116.1	7.8	33.7	174	9949.3	2.4	23.8	45540.61	9.98
2/3/2019	57	16117.0	.9	32.0	446	9955.1	5.8	23.1	45547.49	6.88
2/4/2019	1024	16132.8	15.8	33.3	—	9955.1	—	23.5	45563.37	15.88
2/5/2019	546	16141.3	8.5	33.7	—	9955.1	—	23.9	45571.72	8.35
2/6/2019	—	16141.3	—	32.5	883	9965.8	10.7	16.7	45582.39	10.67
2/7/2019	—	16141.3	—	34.1	475	9971.5	5.7	24.3	45588.11	5.72
2/8/2019	965	16156.2	14.9	34.1	—	9971.5	—	24.2	45603.04	14.93
2/9/2019	446	16163.7	7.5	34.4	—	9971.5	—	24.5	45610.48	7.44
2/10/2019	—	16163.7	—	32.5	504	9977.6	6.1	23.6	45620.85	10.37
2/11/2019	561	16180.9	17.2	34.1	—	9977.6	—	24.2	45633.80	12.95
2/12/2019	525	16189.0	8.1	34.5	—	9977.6	—	24.7	45641.89	8.09
2/13/2019	—	16189.0	—	34.3	889	9988.4	10.8	24.5	45652.65	10.76
2/14/2019	—	16189.0	—	32.9	474	9994.1	5.7	24.0	45658.60	5.95
2/15/2019	1,114	16206.2	17.2	34.2	—	9994.1	—	24.4	46675.53	16.93
2/16/2019	499	16213.2	7.0	33.5	—	9994.1	—	17.0	45683.29	7.76
2/17/2019	—	16213.2	—	32.4	526	10000.5	6.4	23.5	45694.46	11.17
2/18/2019	1,066	16229.7	16.5	33.9	—	10000.5	—	24.1	45705.33	10.87
2/19/2019	521	16237.7	8.0	34.2	—	10000.5	—	24.3	45713.35	8.02
2/20/2019	—	16237.7	—	33.0	893	10011.3	10.8	16.6	45724.11	10.76
2/21/2019	—	16237.7	—	34.1	605	10018.6	7.3	24.2	45731.40	7.29
2/22/2019	1,014	16253.4	15.7	32.1	—	10018.6	—	23.2	45747.01	15.61
2/23/2019	528	16261.5	8.1	33.8	—	10018.6	—	24.0	45760.00	12.99
2/24/2019	—	16261.5	—	32.1	946	10030.0	11.4	23.1	45768.42	8.42
2/25/2019	1,077	16278.1	16.5	33.5	—	10030.0	—	23.7	45783.17	14.75
2/26/2019	537	16286.5	8.4	33.7	—	10030.0	—	23.9	45791.47	8.33
2/27/2019	—	16286.5	—	33.4	889	10040.8	10.8	23.6	45802.20	10.73
2/28/2019	26	16286.9	.4	31.9	496	10046.6	5.8	23.0	45808.45	6.25
	11,915		193.4		8240		99.7			292.55
AVERAGE	426				294					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/20/19 (MM Y Y Y Y)	03/01/2019 (MM DD Y Y Y Y)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		—	127.1	~		.6	.3	22.9	off	740
2		—	127.1	~		.6	.3	22.7	off	815
3		—	127.1	—		.6	.3	22.9	off	700
4		—	127.1	~		.6	.3	23.3	off	700
5		—	127.1	—		.6	.3	23.6	off	715
6		—	127.1	—		.6	.3	24.1	off	715
7		—	127.1	—		.6	.3	24.4	off	7:45
8		—	127.1	—		.6	.3	24.4	off	9:00
9		—	127.1	—		.6	.3	24.6	off	7:30
10		—	127.1	—		.6	.3	24.3	off	7:25
11		—	127.1	—		.6	.3	24.1	off	7:10
12		—	127.1	—		.6	.3	24.1	off	8:15
13		—	127.1	—		.6	.3	23.8	off	7:45
14		—	127.1	—		.6	.3	23.9	Off	7:05
15		—	127.1	—		.6	.3	23.7	off	11:10
16		—	127.1	—		.6	.3	23.3	off	10:50
17		—	127.1	—		.6	.3	23.4	Off	9:40
18		—	127.1	—		.6	.3	23.1	Off	7.30
19		—	127.1	—		.6	.3	23.0	off	700
20		—	127.1	—		.6	.3	22.9	Off	7:00
21		—	127.1	—		.6	.3	22.6	Off	6:56
22		—	127.1	—		.6	.3	22.4	off	8:45
23		—	127.1	—		.6	.3	22.6	off	9:00
24		—	127.1	—		.6	.3	22.6	off	7:35
25		—	127.1	—		.6	.3	22.4	off	7:35
26		—	127.1	—		.6	.3	22.4	off	7:35
27		—	127.1	—		.6	.3	22.0	off	7:35
28		—	127.1	—		.6	.3	22.1	off	7:15
29										
30										
31										
TOTAL		Ø								
AVG.										

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in croc

Reported by: Peter Allen, Jr Title: W/S Operator NYSDOH Operator Certification Number: NY4003046

Signature: Peter Allen Date: 3/1/19 Operator Grade Level: II B

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Bluedeck Booster	2-4-19	1	YES NO ✓	YES NO ✓	0.6
Municipal Bldg	2-4-19	1	YES NO ✓	YES NO ✓	0.6
Walden Oaks Booster	2-4-19	1	YES NO ✗	YES NO ✗	0.6
Terrace Rd Well	2-4-19		YES NO ✗	YES NO ✗	Ø RAW
Red Apple RT 13 / McLean Rd	2-11-19	1	YES NO ✗	YES NO ✗	0.7
Quilla Highway RT 41	2-11-19	1	YES NO ✗	YES NO ✗	0.3
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System,' copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): _____

Name of NYSDOH Certified Laboratory: _____

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: _____

Comments: _____

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			22296.0		23.1
2/1/2019		—	22296.0	—	22.9
2/2/2019		—	22296.0	—	22.7
2/3/2019		—	22296.0	—	22.9
2/4/2019		—	22296.0	—	23.3
2/5/2019		—	22296.8	.8	23.6
2/6/2019		—	22296.8	—	24.1
2/7/2019		—	22296.8	—	24.4
2/8/2019		—	22296.8	—	24.4
2/9/2019		—	22296.8	—	24.6
2/10/2019		—	22296.8	—	24.3
2/11/2019		—	22296.8	—	24.1
2/12/2019		—	22296.8	—	24.1
2/13/2019		—	22296.8	—	23.8
2/14/2019		—	22296.8	—	23.9
2/15/2019		—	22296.8	—	23.7
2/16/2019		—	22296.8	—	23.3
2/17/2019		—	22296.8	—	23.4
2/18/2019		—	22296.8	—	23.1
2/19/2019		—	22296.8	—	23.0
2/20/2019		—	22296.8	—	22.9
2/21/2019		—	22296.8	—	22.6
2/22/2019		—	22296.8	—	22.4
2/23/2019		—	22296.8	—	22.6
2/24/2019		—	22296.8	—	22.6
2/25/2019		—	22296.8	—	22.4
2/26/2019		—	22296.8	—	22.4
2/27/2019		—	22296.8	—	22.0
2/28/2019		—	22296.8	—	22.1
TOTAL		ϕ			
Average					

Rev: 1/2019 PA

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9B0230

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9B0230-03	**Collection Date:**	02/04/2019 13:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB
Escherichia coli	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		02/04/19 1356	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/06/2019 13:48

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9B0230

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/04/2019
Reported: 02/06/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9B0230-01
Collected By: JM-Client
Collection Date: 02/04/2019 13:04

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB
Escherichia coli	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/04/19 1304	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J9B0230-02
Collected By: JM-Client
Collection Date: 02/04/2019 13:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB
Escherichia coli	Absent			in 100mL		02/04/19 1633	02/05/19 1101	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/04/19 1320	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9B0287

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/05/2019
Reported: 02/06/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9B0287-01	**Collection Date:**	02/05/2019 14:19

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/05/19 1530	02/06/19 1017	EDB
Escherichia coli	Absent			in 100mL		02/05/19 1530	02/06/19 1017	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/06/2019 14:33

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9B0620

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/11/2019
Reported: 02/12/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13 McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J9B0620-01
Collected By: JJ-CLIENT
Collection Date: 02/11/2019 9:34

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/11/19 1558	02/12/19 1057	EDB
Escherichia coli	Absent			in 100mL		02/11/19 1558	02/12/19 1057	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.70	4.00 MCL		mg/L	Y1		02/11/19 0934	CUS

Client Sample ID: Cortlandville Highway Garage Rt 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9B0620-02
Collected By: JM-Client
Collection Date: 02/11/2019 10:42

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		02/11/19 1558	02/12/19 1057	EDB
Escherichia coli	Absent			in 100mL		02/11/19 1558	02/12/19 1057	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		02/11/19 1042	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9B0620

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

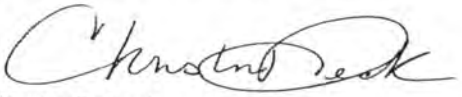
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Christine Pechacek
Director
Reported: 02/12/2019 16:18

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 [illegible]ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 2.2

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Coliform									Additional Notes
	Townof Cortlandville																
	Red Apple Rt13/McLean Rd.	2-11-19	934AM	1	DW	1	Na2S203										C10.7
	Cortlandville Highway Garage Rt41 Poke ville	2-11-19	1042AM	1	DW	1	"										C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-11-19 1113 AM	[signature]	2/11/19 11:13am.
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162(ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE(

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.1
Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAeT										Additional Notes
	Town of Cortlandville																	
	Terrace Rd well	2-5-19	2:19PM	1	DW	G	Na2S2O3	1										RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-5-19 2:39PM	[illegible]	2/5/19 14:39
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 [illegible]in Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.4

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortland Ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3579 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BTEX										Additional Notes
	Municipal BLDG.	2-4-19	104 PM	1	DW	G	Na2S2O3	1										C10.6
	Walden Oaks BS	2-4-19	120 PM	1	DW	G	"	1										C10.6
	Blue Creek BS	2-4-19	156 PM	1	DW	G	"	1										C10.6

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-4-19 228 PM	[signature]	2/4/19 14:27
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2019 (MM YYYY)	02/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace R2	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl	WELL Level	Pump On/Off	Time
			127.1			.6	1.3	24.2		
1		—	127.1	—		.6	.3	24.0	off	7:50
2		—	127.1	—		.6	.3	24.2	off	7:00
3		—	127.1	—		.6	.3	24.1	off	700
4		—	127.1	—		.6	.3	24.0	off	930
5		—	127.1	—		.6	.3	24.1	off	830
6		—	127.1	—		.6	.3	23.7	off	700
7		—	127.1	—		.6	.3	23.9	off	700
8		—	127.1	—		.6	.3	24.2	off	700
9		—	127.1	—		.6	.3	24.0	off	700
10		—	127.1	—		.6	.3	23.9	off	7:30
11		—	127.1	—		.6	.3	24.1	off	8:45
12		—	127.1	—		.6	.3	24.0	off	8:45
13		—	127.1	—		.6	.3	23.9	off	7:15
14		—	127.1	—		.6	.3	23.8	off	7:30
15		—	127.1	—		.6	.3	23.8	off	7:00
16		—	127.1	—		.6	.3	23.4	off	7:30
17		—	127.1	—		.6	.3	23.4	off	700
18		—	127.1	—		.6	.3	23.3	off	9:30
19		—	127.1	—		.6	.3	23.3	off	12:45
20		—	127.1	—		.6	.3	23.0	off	10:00
21		—	127.1	—		.6	.3	22.9	off	715
22		—	127.1	—		.6	.3	22.9	off	7:00
23		—	127.1	—		.6	.3	23.2	off	8:15
24		—	127.1	—		.6	.3	23.6	off	7:00
25		—	127.1	—		.6	.3	23.7	off	7:41
26		—	127.1	—		.6	.3	23.8	off	9:00
27		—	127.1	—		.6	.3	23.4	off	7:30
28		—	127.1	—		.6	.3	23.7	off	7:30
29		—	127.1	—		.6	.3	23.4	off	7:30
30		—	127.1	—		.6	.3	23.4	off	7:30
31		—	127.1	—		.6	.3	23.1	off	700
TOTAL										
AVG.										

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to _____ gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY. CO030046

Signature: Peter Alteri Date: 2/1/19 Operator Grade Level: IIB

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level	
Prev. Rdg	—		22295.3			
1/1/2019	—	—	22295.3	—	24.0	
1/2/2019	—	—	22295.3	—	24.2	
1/3/2019	—	—	22295.3	—	24.1	
1/4/2019	—	—	22295.3	—	24.0	
1/5/2019	—	—	22295.3	—	24.1	
1/6/2019	—	—	22295.3	—	23.7	
1/7/2019	—	—	22295.3	—	23.9	
1/8/2019	—	—	22295.3	—	24.2	
1/9/2019	—	—	22295.3	—	24.0	
1/10/2019	—	—	22296.0	7	23.9	run for storm
1/11/2019		—	22296.0	—	24.1	
1/12/2019		—	22296.0	—	24.0	
1/13/2019		—	22296.0	—	23.9	
1/14/2019		—	22296.0	—	23.8	
1/15/2019		—	22296.0	—	23.8	
1/16/2019		—	22296.0	—	23.4	
1/17/2019		—	22296.0	—	23.4	
1/18/2019		—	22296.0	—	23.3	
1/19/2019		—	22296.0	—	23.3	
1/20/2019		—	22296.0	—	23.0	
1/21/2019		—	22296.0	—	22.9	
1/22/2019		—	22296.0	—	22.9	
1/23/2019		—	22296.0	—	23.2	
1/24/2019		—	22296.0	—	23.6	
1/25/2019		—	22296.0	—	23.7	
1/26/2019		—	22296.0	—	23.8	
1/27/2019		—	22296.0	—	23.5	
1/28/2019		—	22296.0	—	23.7	
1/29/2019		—	22296.0	—	23.4	
1/30/2019		—	22296.0		23.4	
1/31/2019		—	22296.6		23.1	
TOTAL		0		7		
Average						

Rev: 1/2019 PA

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2019 (MM YYYY)	02/01/2019 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl2	WELL Level	Pump On/OfF	Time
			99.8 lbs.			.6	.6	34.4		
1		420	97.2	2.6		.6	.3	34.5	off	8:10
2		870	93.3	3.9		.6	.3	33.4	on	7:05
3		482	91.1	2.2		.6	.3	34.6	off	715
4		848	86.3	4.8		.6	.3	32.7	ON	9:15
5		641	82.9	3.4		.6	.3	34.5	off	815
6		458	80.9	2.0		.6	.3	34.5	off	715
7		897	75.7	5.2		.6	.3	32.5	ON	715
8		517	72.7	3.0		.6	.3	34.4	off	715
9		753	69.4	3.3		.6	.3	33.4	ON	730
10		562	66.9	2.5		.6	.3	34.5	off	8:00
11		725	62.7	4.2		.6	.3	32.6	on	8:30
12		373	59.2	3.5		.6	.3	34.4	off	9:00
13		769	57.1	2.1		.6	.3	34.5	off	7:30
4		962	51.4	5.7		.6	.3	32.5	on	8:30
15		478	48.3	3.1		.6	.3	33.4	on	7:15
16		481	44.4	3.9		.6	.3	34.2	off	8:00
17		580	41.8	2.6		.6	.3	32.5	ON	730
18		863	36.8	5.0		.6	.3	34.1	off	9:15
19		458	33.0	3.8		.6	.3	33.1	on	12:30
20		440	30.0	3.0		.6	.3	32.2	on	10:15
21		613	26.4	4.4		.6	.3	33.9	off	730
22		488	23.6	2.8		.6	.3	34.0	off	7:10
23		984	19.2	4.4		.6	.3	33.8	off	8:00
24		497	17.1	2.1		.6	.3	34.0	off	6:40
25		988	11.3	5.8		.6	.3	32.0	ON	7:30
26		590	7.4	3.9		.6	.3	34.0	off	9:15
27		564	3.8	3.6		.6	.3	32.0	ON	7:30
28		1,152	-.6	4.4		.6	.3	33.7	off	7:45
29		500	150.0	2.4		.6	.3	33.9	off	7:45
30		869	147.0	3.0		.6	.3	33.7	off	8:00
31		480	144.9	2.1		.6	.3	32.2	ON	715
TOTAL		21,778								
AVG.										

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Alter Jr Title: W/S operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Alter Date: 2/1/19 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	1-2-19	1	YES NO	YES NO	0.6
Walden Oaks Booster STA.	1-2-19	1	YES NO	YES NO	0.6
Blue Creek Booster STA.	1-2-19	1	YES NO	YES NO	0.6
Red Apple Machem Rd/RT13	1-8-19	1	YES NO	YES NO	0.7
Gville Hgwy. RT41	1-8-19	1	YES NO	YES NO	0.3
			YES NO	YES NO	
Terrace Rd Well Raw Water.	1-8-19		YES NO	YES NO	0
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☑

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☑

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Machem.

Name of NYSDOH Certified Laboratory: MICROBAC.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		15909.8	15.1	34.4	—	9833.6	—	24.6	45219.31	9.80
1/1/2019	420	15916.7	6.9	34.5	—	9833.6	—	24.7	45226.26	6.95
1/2/2019	—	15916.7	—	33.4	870	9844.1	10.5	17.4	45236.74	10.48
1/3/2019	—	15916.7	—	34.6	482	9849.9	5.8	24.7	45242.56	5.82
1/4/2019	848	15929.8	13.1	32.7	—	9849.9	—	23.8	45255.62	13.06
1/5/2019	420	15936.3	6.5	34.5	221	9852.6	2.7	24.6	45264.85	9.23
1/6/2019	—	15936.3	—	34.5	458	9858.1	5.5	24.6	45270.36	5.51
1/7/2019	897	15950.2	13.9	32.5	—	9858.1	—	23.6	45284.24	13.88
1/8/2019	617	15958.2	8.0	34.4	—	9858.1	—	24.6	45292.22	7.98
1/9/2019	—	15958.2	—	33.4	753	9867.2	9.1	16.3	45301.28	9.06
1/10/2019	—	15958.2	—	34.5	562	9874.0	6.8	24.7	45308.06	6.78
1/11/2019	725	15969.9	11.7	32.6	—	9874.0	—	23.8	45319.31	11.25
1/12/2019	373	15975.3	5.4	34.4	—	9874.0	—	24.5	45325.79	9.48
1/13/2019	—	15975.3	—	34.5	769	9883.3	9.3	24.6	45334.30	5.57
1/14/2019	962	15990.0	14.7	32.5	—	9883.3	—	23.6	45349.06	14.70
1/15/2019	478	15997.5	7.5	33.4	—	9883.3	—	16.8	45357.84	8.78
1/16/2019	—	15997.5	—	34.2	981	9895.2	11.9	24.4	45368.40	10.56
1/17/2019	132	15999.6	2.1	32.5	448	9900.6	5.4	23.6	45375.91	7.51
1/18/2019	863	16012.9	13.3	34.1	—	9900.6	—	24.2	45389.19	13.28
1/19/2019	458	16020.0	7.1	33.1	—	9900.6	—	16.4	45399.49	10.30
1/20/2019	—	16020.0	—	32.2	440	9905.9	5.3	23.3	45407.52	8.03
1/21/2019	613	16035.7	15.7	33.9	—	9905.9	—	24.6	45417.27	9.75
1/22/2019	488	16043.3	7.6	34.0	—	9905.9	—	24.2	45424.82	7.55
1/23/2019	—	16043.3	—	33.8	989	9917.6	11.9	24.0	45436.76	11.94
1/24/2019	—	16043.3	—	34.0	497	9923.5	6.0	24.2	45442.72	5.96
1/25/2019	988	16058.6	15.3	32.0	—	9923.8	—	23.2	45457.99	15.27
1/26/2019	590	16067.7	9.1	34.0	—	9923.8	—	14.1	45468.67	10.68
1/27/2019	—	16067.7	—	32.0	564	9930.7	6.9	13.7	45478.31	9.64
1/28/2019	1,152	16085.5	17.8	33.7	—	9930.7	—	23.9	45491.77	13.46
1/29/2019	500	16093.3	7.8	33.9	—	9930.7	—	24.1	45499.50	7.73
1/30/2019	—	16093.3	—	33.7	869	9941.2	10.5	23.9	45510.01	10.51
1/31/2019	11	16093.5	.2	32.3	469	9946.9	5.7	23.3	45515.96	4.89
	12406		183.7		9372		113.3			296.59
AVERAGE	400				302					

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9A0129

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/02/2019
Reported: 01/04/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J9A0129-01
Collected By: JM-Client
Collection Date: 01/02/2019 10:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB
Escherichia coli	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/02/19 1053	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J9A0129-02
Collected By: JM-Client
Collection Date: 01/02/2019 11:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB
Escherichia coli	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/02/19 1112	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9A0129

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9A0129-03	**Collection Date:**	01/02/2019 11:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB
Escherichia coli	Absent			in 100mL		01/02/19 1544	01/03/19 1052	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/02/19 1145	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

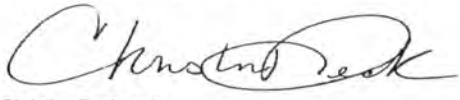
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:



Christine Pechacek
Environmental Operations Manager
Reported: 01/04/2019 15:18

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9A0525

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/08/2019
Reported: 01/10/2019

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13/McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J9A0525-01
Collected By: JM-Client
Collection Date: 01/08/2019 11:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/08/19 1559	01/09/19 1042	EDB
Escherichia coli	Absent			in 100mL		01/08/19 1559	01/09/19 1042	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.70	4.00 MCL		mg/L	Y1		01/08/19 1125	CUS

Client Sample ID: Cortlandville Highway Garage - Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J9A0525-02
Collected By: JM-Client
Collection Date: 01/08/2019 12:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			in 100mL		01/08/19 1559	01/09/19 1042	EDB
Escherichia coli	Absent			in 100mL		01/08/19 1559	01/09/19 1042	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		01/08/19 1230	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J9A0525

Client Sample ID:	Terrace Rd. 60 HP Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J9A0525-03	**Collection Date:**	01/08/2019 14:04

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			in 100mL		01/08/19 1559	01/09/19 1042	EDB
Escherichia coli	Absent			in 100mL		01/08/19 1559	01/09/19 1042	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with theTotal Coliform Rule as established under the Safe Drinking Water Act.

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 01/10/2019 15:08

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 [illegible]in Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortland ville

Address: 3577 Terrace Rd

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 9.6

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types **	BAC										Additional Notes
	Town of Cortland ville																	
	Red Apple Rt13/McLean Rd	1-8-19	11:25 AM	1	DW	1	Na2S2O3	1										C10.7
	Cortland ville Highway Garage Rt41 Polkville	1-8-19	1230 PM	1	DW	1	"	1										C10.3
	Terrace Rd 60HP Well	1-8-19	204 PM	1	DW	1	"	1										RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-8-19 14:21		1/8/19 14:21
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N ...in Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC(

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortland ville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3579 Terrace Rd
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 1.8
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Additional Notes
	Municipal BLDG	1-2-19	1053 AM	1	DW	1	Na2S203	C10.6
	Walden Oaks BS	1-2-19	1112 AM	1	DW	1	"	C10.6
	Bike Creek BS	1-2-19	1145 AM	1	DW	1	"	C10.6

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-2-19 1202 PM		1/2/19 12:02
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Water Operations Reports 2020

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Dec-20	1/4/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump	Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON OFF	
Prev Rdg.		108.7						
1	711,413	105	3.7	0.6	0.3	18.3	☐ ☑	7:40
2	0	105	0	0.6	0.3	18.6	☐ ☑	7:30
3	713,252	101.2	3.8	0.6	0.3	18.6	☐ ☑	7:38
4	0	101.2	0	0.6	0.3	18.9	☐ ☑	8:34
5	624,898	97.8	3.4	0.6	0.3	19	☐ ☑	8:38
6	546,430	94.9	2.9	0.6	0.3	19	☐ ☑	7:17
7	0	94.9	0	0.6	0.3	19	☐ ☑	7:33
8	702,243	91.1	3.8	0.6	0.3	19	☐ ☑	7:49
9	0	91.1	0	0.6	0.3	19.4	☐ ☑	8:33
10	675,472	87.5	3.6	0.6	0.3	19.3	☐ ☑	7:35
11	0	87.5	0	0.6	0.3	19.5	☐ ☑	9:41
12	683,309	83.8	3.7	0.6	0.3	19.5	☐ ☑	9:46
13	598,895	80.6	3.2	0.6	0.3	19.4	☐ ☑	7:34
14	0	80.6	0	0.6	0.3	19.6	☐ ☑	7:49
15	671,980	77	3.6	0.6	0.3	19.5	☐ ☑	7:17
16	0	77	0	0.6	0.3	19.7	☐ ☑	9:09
17	674,652	73.4	3.6	0.6	0.3	19.6	☐ ☑	7:28
18	0	73.4	0	0.6	0.3	19.8	☐ ☑	8:00
19	696,264	69.6	4	0.6	0.3	19.7	☐ ☑	8:30
20	518,391	66.7	3	0.6	0.3	19.7	☐ ☑	7:00
21	0	66.7	0	0.6	0.3	19.9	☐ ☑	7:30
22	644,380	63.4	3	0.6	0.3	19.8	☐ ☑	8:00
23	0	63.4	0	0.6	0.3	19.9	☐ ☑	7:00
24	652,194	59.9	4	0.6	0.3	20.2	☐ ☑	6:00
25	0	59.9	0	0.6	0.3	21.7	☐ ☑	9:15
26	525,075	57	3	0.6	0.3	22.4	☐ ☑	7:45
27	550,543	54.1	3	0.6	0.3	23	☐ ☑	7:40
28	0	54.1	0	0.6	0.3	23.7	☐ ☑	7:40
29	578,803	51.1	3	0.6	0.3	24	☐ ☑	7:30
30	0	51.1	0	0.6	0.3	24.6	☐ ☑	7:32
31	668,852	47.5	4	0.6	0.3	24.8	☐ ☑	8:05
Total	11,437,046		62.3					
AVG.	368,937		2.009677419					

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr. NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)

Population Served: ____

Number of microbiological monitoring samples required: ____

Number of microbiological monitoring samples taken: ____

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): _____

Name of NYSDOH Certified Laboratory: _____

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

Comments: _____

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		18973				11457			49882			
1	711,413	18,985	12	18	0	11,457	0	9	49,893	11	0.50	0.50
2	0	18,985	0	19	0	11,457	0	9	49,893	0	0.00	0.00
3	713,252	18,996	11	19	0	11,457	0	9	49,905	12	0.00	0.00
4	0	18,996	0	19	0	11,457	0	9	49,905	0	0.00	0.00
5	624,898	19,006	10	19	0	11,457	0	9	49,915	10	0.00	0.50
6	546,430	19,015	9	19	0	11,457	0	9	49,924	9	0.00	0.25
7	0	19,015	0	19	0	11,457	0	9	49,924	0	0.00	0.10
8	702,243	19,027	12	19	0	11,457	0	10	49,935	11	0.00	0.10
9	0	19,027	0	19	0	11,457	0	10	49,935	0	0.00	1.50
10	675,472	19,038	11	19	0	11,457	0	10	49,946	11	0.00	0.00
11	0	19,038	0	20	0	11,457	0	10	49,946	0	0.00	0.00
12	683,309	19,049	11	20	0	11,457	0	10	49,957	11	Yes	0.00
13	598,895	19,058	9	19	0	11,457	0	10	49,967	10	yes	0.00
14	0	19,058	0	20	0	11,457	0	10	49,967	0	0.00	0.20
15	671,980	19,069	11	20	0	11,457	0	10	49,978	11	0.00	0.10
16	0	19,069	0	20	0	11,457	0	10	49,978	0	0.00	11.00
17	674,652	19,080	11	20	0	11,457	0	10	49,989	11	0.00	0.00
18	0	19,080	0	20	0	11,457	0	10	49,989	0	0.00	0.00
19	696,264	19,091	11	20	0	11,457	0	10	50,000	11	0.00	0.40
20	518,391	19,100	8	20	0	11,457	0	10	50,008	8	0.00	2.00
21	0	19,100	0	20	0	11,457	0	10	50,008	0	0.10	0.20
22	644,380	19,110	10	20	0	11,457	0	10	50,019	11	0.10	0.10
23	0	19,110	0	20	0	11,457	0	10	50,019	0	0.00	0.00
24	652,194	19,121	11	20	0	11,457	0	11	50,029	10	1.50	0.00
25	0	19,121	0	22	0	11,457	0	12	50,029	0	0.00	0.50
26	525,075	19,129	8	22	0	11,457	0	13	50,038	0	0.00	0.00
27	550,543	19,138	9	23	0	11,457	0	13	50,047	9	0.00	0.25
28	0	19,138	0	24	0	11,457	0	14	50,047	0	0.00	0.25
29	578,803	19,147	9	24	0	11,457	0	14	50,056	9	0.00	0.00
30	0	19,147	0	25	0	11,457	0	15	50,056	0	0.00	0.00
31	668,852	19,158	11	25	0	11,457	0	15	50,066	11	0.00	0.00
Total	11,437,046		184		0		0			176	2.20	17.95
Average	368,937		6		0		0			6		

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Dec-20	1/4/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		16.8							
1	0	16.8	0	0.6	0.3	7.9	☑	☐	7:20
2	621,870	13.6	3.2	0.6	0.3	12.1	☐	☑	7:15
3	0	13.6	0	0.6	0.3	8	☑	☐	7:25
4	624,500	10	3.6	0.6	0.3	12.2	☐	☑	8:47
5	0	10	0	0.6	0.3	12.5	☐	☑	8:44
6	0	10	0	0.6	0.3	7.9	☑	☐	7:08
7	730,837	6.2	3.8	0.6	0.3	12.1	☐	☑	7:09
8	0	6.2	0	0.6	0.3	8.3	☑	☐	7:35
9	608,588	2.8	3.4	0.6	0.3	12.2	☐	☑	8:16
10	0	2.8	0	0.6	0.3	8.1	☑	☐	7:05
11	639,358	-2.3	5.1	0.6	0.3	12.4	☐	☑	9:30
12	0	-2.3	0	0.6	0.3	12.7	☐	☑	10:00
13	0	-2.3	0	0.6	0.3	8	☑	☐	7:06
14	714,853	-6.3	4	0.6	0.3	12.3	☐	☑	7:40
15	0	-6.3/150.3	0	0.6	0.3	8.3	☑	☐	7:00
16	620,127	-8.7/150.1	2.6	0.6	0.3	12.4	☐	☑	8:58
17	0	150.1	0	0.6	0.3	8.2	☑	☐	7:10
18	633,925	147.6	2.5	0.6	0.3	12.4	☐	☑	8:15
19	0	147.6	0	0.6	0.3	12.8	☐	☑	9:00
20	0	147.6	0	0.6	0.3	7.9	☑	☐	7:00
21	789,193	143.2	4.4	0.6	0.3	12.5	☐	☑	7:30
22	0	143.2	0	0.6	0.3	8.1	☑	☐	7:30
23	646,317	139.9	3.3	0.6	0.3	12.6	☐	☑	7:00
24	0	139.9	0	0.6	0.3	15.8	☐	☑	
25	397,994	138.2	1.7	0.6	0.3	19.4	☐	☑	9:30
26	0	138.2	0	0.6	0.3	20	☐	☑	7:30
27	0	138.2	0	0.6	0.3	14.8	☑	☐	7:30
28	846,708	134.2	4	0.6	0.3	19.8	☐	☑	7:10
29	0	134.2	0	0.6	0.3	15.5	☑	☐	7:00
30	681,916	130.8	3.4	0.6	0.3	19.8	☐	☑	7:25
31	0	130.8	0	0.6	0.3	15.4	☑	☐	7:45
Total	8,556,186		45						
AVG.	276,006		1.451612903						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr. NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd Well	12/2/2020	**Raw**	No	No	0
Municipal Bldg Terrace Rd	12/2/2020	**1**	No	No	0.6
Waldon Oaks Booster Sta.	12/2/2020	**1**	No	No	0.5
Blue Creek Booster Sta.	12/2/2020	**1**	No	No	0.4
Red Apple Rt13/McLean Rd	12/7/2020	**1**	No	No	0.6
Cville Highway	12/7/2020	**1**	No	No	0.3

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac Labs

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			27,750		
1		0	27,750	0	8
2		621,870	27,768	18	12
3		0	27,768	0	8
4		624,500	27,786	18	12
5		0	27,786	0	13
6		0	27,786	0	8
7		730,837	27,807	21	12
8		0	27,807	0	8
9		608,588	27,824	17	12
10		0	27,824	0	8
11		639,358	27,843	19	12
12		0	27,843	0	13
13		0	27,843	0	8
14		714,853	27,863	20	12
15		0	27,863	0	8
16		620,127	27,881	18	12
17		0	27,881	0	8
18		633,925	27,899	18	12
19		0	27,899	0	13
20		0	27,899	0	8
21		789,193	27,922	23	13
22		0	27,922	0	8
23		646,317	27,941	21	13
24		0	27,941	0	16
25		397,994	27,952	11	19
26		0	27,952	0	20
27		0	27,952	0	15
28		846,708	27,975	23	20
29		0	27,975	0	16
30		681,916	27,994	19	20
31		0	27,994	0	15
Total		8,556,186		246	
Average		276,006		8	

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0L0210

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/02/2020
Reported: 12/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0L0210-01
Collected By: JM-Client
Collection Date: 12/02/2020 10:04

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

lient Sample ID: Terrace Rd Well
ɔample Matrix: Drinking Water
Lab Sample ID: J0L0210-02
Collected By: JM-Client
Collection Date: 12/02/2020 10:06

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	75.2		1.02	mg/L		12/07/20 1235	12/07/20 1559	JDF

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J0L0210-03
Collected By: JM-Client
Collection Date: 12/02/2020 10:14

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
orine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/02/20 1014	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0L0210

Client Sample ID:	Walden Oaks BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0L0210-04	**Collection Date:**	12/02/2020 10:32

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		12/02/20 1032	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0L0210-05	**Collection Date:**	12/02/2020 10:55

obiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ıod: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB
Escherichia coli	Absent			per 100mL		12/02/20 1849	12/03/20 1315	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		12/02/20 1055	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0L0573

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/07/2020
Reported: 12/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt 13, McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J0L0573-01
Collected By: JM-Client
Collection Date: 12/07/2020 8:21

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/07/20 1925	12/08/20 1340	EDB
Escherichia coli	Absent			per 100mL		12/07/20 1925	12/08/20 1340	EDB

Analyses Performed by: Customer

I Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		12/07/20 0821	CUS

Client Sample ID: C-Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J0L0573-02
Collected By: JM-Client
Collection Date: 12/07/2020 9:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		12/07/20 1925	12/08/20 1340	EDB
Escherichia coli	Absent			per 100mL		12/07/20 1925	12/08/20 1340	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		12/07/20 0945	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0L0573

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

he data and information on this, and other accompanying documents, represents only the ample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/10/2020 21:35

CERTIFICATE OF ANALYSIS

J0L0210

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/10/2020 21:37

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 No[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

5t6

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 4.1

Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Note
	Red Apple Rt13 / McDonald	12-7-2020	8:21AM	1	DW	1	Na2S203	1	c10.6
	C-ville Highway Garage Rt41-Polkville	12-7-2020	9:45AM	1	DW	1	Na2S203	1	c10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-7-2020 2:58PM	Jennifer Walker	12/7/2020 1045
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

J0L0573

Cortlandville Water, Town of
PM: Shannon Weeks

rev.12/2(

Page ____ of ____

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

9-17

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.3

Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Sodium	BACTc	Additional Notes
	Terrace Rd well	12-2-2020	10:04 AM	1	DW	1			1	Raw Water
	Terrace Rd well	12-2-2020	10:06 AM	1	DW	1	Nitric acid	1		Raw Water
	Municipal BLDG	12-2-2020	10:14 AM	1	DW	1	Na2S2O3		1	C10.6
	Walden Oaks BS.	12-2-2020	10:32 AM	1	DW	1	Na2S2O3		1	C10.5
	Blue Creek BS.	12-2-2020	10:55 AM	1	DW	1	Na2S2O3		1	C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-2-2020 11:21 AM		12/2/2020 17:23
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

ARS

JOL0210

Cortlandville Water, Town of

PM: Shannon Weeks

rev.12/2[illegible]

Page ____ of ____

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Nov-20	12/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		-9.2							
1	470,688	-11.9	2.7	0.6	0.3	18.2	☐	☑	7:30
2	0	11.9	0	0.6	0.3	18.5	☐	☑	5:55
3	545,232	-14.8	2.9	0.6	0.3	18.3	☐	☑	7:35
4	0	-14.8	0	0.6	0.3	18.2	☐	☑	7:10
5	767,869	-14.8	4.6	0.6	0.3	18.2	☐	☑	7:46
6	0	-14.8	0	0.6	0.3	18.2	☐	☑	4:57
7	947,265	-24.6	9.8	0.6	0.3	16	☑	☐	8:34
8	487,828	156.4	2.8	0.6	0.3	17.9	☐	☑	7:58
9	0	156.4	0	0.6	0.3	18	☐	☑	7:46
10	689,569	152.9	3.6	0.6	0.3	17.9	☐	☑	7:13
11	0	152.9	0	0.6	0.3	18.1	☐	☑	7:56
12	537,551	149.9	3	0.6	0.3	18	☐	☑	8:10
13	0	149.9	0	0.6	0.3	16.7	☑	☐	9:52
14	854,554	145.3	4.6	0.6	0.3	15.9	☑	☐	9:29
15	78,176	144.9	0.4	0.6	0.3	17.3	☑	☐	7:46
16	747,303	140.7	4.2	0.6	0.3	16	☑	☐	7:17
17	857,105	136.2	4.5	0.6	0.3	15.7	☑	☐	7:10
18	234,856	135	1.2	0.6	0.3	17.8	☐	☑	7:47
19	610,748	131.8	3.2	0.6	0.3	17.8	☐	☑	8:05
20	0	131.8	0	0.6	0.3	17.6	☐	☑	5:00
21	675,250	124.8	7	0.6	0.3	17.3	☑	☐	5:30
22	423,336	123.2	1.6	0.6	0.3	17.9	☐	☑	7:30
23	0	123.2	0	0.6	0.3	17.9	☐	☑	7:45
24	763,928	119	4.2	0.6	0.3	17.8	☐	☑	7:00
25	0	119	0	0.6	0.3	17.8	☐	☑	5:30
26	683,311	115.2	3.8	0.6	0.3	17.8	☐	☑	5:30
27	0	115.2	0	0.6	0.3	18.1	☐	☑	3:30
28	622,099	111.9	3.3	0.6	0.3	18.1	☐	☑	5:45
29	579,586	108.7	3.2	0.6	0.3	18.1	☐	☑	8:00
30	0	108.7	0	0.6	0.3	18.3	☐	☑	7:30
31							☐	☐	
Total	11,576,254		70.6						
AVG.	385,875		2.353333333						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: _____ Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd Well	11/2/2020		No	No	Raw
Municipal Bldg Terrace Rd	11/2/2020	1	No	No	0.6
Walden Oaks Booster	11/2/2020	1	No	No	0.5
Blue Creek Booster	11/2/2020	1	No	No	0.4
Red Apple Rt13/McLean Rd	11/9/2020	1	No	No	0.6
Cvill Highway Rt 41	11/9/2020	1	No	No	0.3

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac Labs

Did any MCL violation occur? If so, please describe:

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		18774				11457			49683			
1	470,688	18,781	7	18	0	11,457	0	9	49,690	7	0.20	2.00
2	0	18,781	0	19	0	11,457	0	9	49,690	0	0.00	0.00
3	545,232	18,790	9	18	0	11,457	0	9	49,699	9	0.00	0.00
4	0	18,790	0	18	0	11,457	0	9	49,699	0	0.00	0.00
5	767,869	18,802	12	18	0	11,457	0	9	49,712	13	0.00	0.00
6	0	18,802	0	18	0	11,457	0	9	49,712	0	0.00	0.00
7	947,265	18,818	16	16	0	11,457	0	7	49,727	15	0.00	0.00
8	487,828	18,826	8	18	0	11,457	0	8	49,735	8	0.00	0.00
9	0	18,826	0	18	0	11,457	0	8	49,735	0	0.00	0.00
10	689,569	18,837	11	18	0	11,457	0	8	49,746	11	0.00	0.00
11	0	18,837	0	18	0	11,457	0	8	49,746	0	0.50	0.00
12	537,551	18,846	9	18	0	11,457	0	8	49,755	9	0.00	0.00
13	0	18,846	0	17	0	11,457	0	8	49,755	0	0.00	0.00
14	854,554	18,860	14	16	0	11,457	0	7	49,769	14	0.00	0.00
15	78,176	18,861	1	17	0	11,457	0	8	49,770	1	rain	0.00
16	747,303	18,873	12	16	0	11,457	0	7	49,782	12	0.00	0.00
17	857,105	18,887	14	16	0	11,457	0	7	49,796	14	0.00	1.00
18	234,856	18,891	4	18	0	11,457	0	8	49,800	4	0.00	1.00
19	610,748	18,901	10	18	0	11,457	0	8	49,810	10	0.00	0.00
20	0	18,901	0	18	0	11,457	0	8	49,810	0	0.00	0.00
21	675,250	18,921	20	17	0	11,457	0	8	49,830	20	0.00	0.00
22	425,336	18,930	9	18	0	11,457	0	8	49,839	9	0.30	0.00
23	0	18,930	0	18	0	11,457	0	8	49,839	0	0.00	0.20
24	763,928	18,942	12	18	0	11,457	0	8	49,851	12	0.00	0.00
25	0	18,942	0	18	0	11,457	0	8	49,851	0	0.20	0.00
26	683,311	18,953	11	18	0	11,457	0	8	49,862	11	0.20	0.00
27	0	18,953	0	18	0	11,457	0	8	49,862	0	0.00	0.00
28	622,099	18,964	11	18	0	11,457	0	8	49,872	10	0.00	0.00
29	579,586	18,973	9	18	0	11,457	0	8	49,882	10	0.00	0.00
30	0	18,973	0	18	0	11,457	0	9	49,882	0	0.50	0.00
31												
Total	11,578,254		199		0		0			198	1.90	4.20
Average	385,942		7		0		0			7		

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Nov-20	12/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP	Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON / OFF	
Prev Rdg		78.6						
1	0	78.6	0	0.6	0.3	6.6	ON	7:10
2	805,815	73.5	5.1	0.6	0.3	11	OFF	5:45
3	0	73.5	0	0.6	0.3	6.4	ON	6:50
4	828,780	68.5	5	0.6	0.3	10.9	OFF	7:00
5	0	68.5	0	0.6	0.3	6.2	ON	7:24
6	776,181	63.7	4.9	0.6	0.3	10.7	OFF	5:05
7	0	63.7	0	0.6	0.3	11	OFF	8:46
8	0	63.7	0	0.6	0.3	6.2	ON	7:39
9	823,189	58.9	4.8	0.6	0.3	10.6	OFF	7:33
10	0	58.9	0	0.6	0.3	5.9	ON	7:23
11	821,427	52.6	6.3	0.6	0.3	11.1	OFF	7:35
12	0	52.6	0	0.6	0.3	6.4	ON	7:45
13	646,184	45.6	7	0.6	0.3	11.2	OFF	10:00
14	0	45.6	0	0.6	0.3	11.4	OFF	9:20
15	0	45.6	0	0.6	0.3	7.2	ON	8:13
16	308,481	40.6	5	0.6	0.3	11.3	OFF	7:37
17	0	40.6	0	0.6	0.3	11.4	OFF	7:18
18	389,720	37.2	3.4	0.6	0.3	11.1	OFF	7:39
19	0	37.2	0	0.6	0.3	6.8	ON	7:51
20	614,839	32.8	4.4	0.6	0.3	10.9	OFF	5:15
21	0	32.8	0	0.6	0.3	10.9	OFF	5:30
22	0	32.8	0	0.6	0.3	6.4	ON	7:15
23	948,554	26.8	6	0.6	0.3	10.8	OFF	7:30
24	0	26.8	0	0.6	0.3	10.9	OFF	7:00
25	578,797	23.6	3.2	0.6	0.3	10.9	OFF	6:00
26	0	23.6	0	0.6	0.3	10.9	OFF	5:45
27	608,062	20.3	3.3	0.6	0.3	11.4	OFF	3:45
28	0	20.3	0	0.6	0.3	11.9	OFF	5:30
29	0	20.3	0	0.6	0.3	7.3	ON	7:20
30	681,916	16.8	3.5	0.6	0.3	11.9	OFF	7:10
31							OFF	
Total	8,831,945		61.9					
AVG.	294,398		2.063333333					

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr

NYS DOH Operator Certification Number: NY0030046

Signature:

Operator Grade Level IIB

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			27,487		
1		0	27,487	0	7
2		805,815	27,511	24	11
3		0	27,511	0	6
4		828,780	27,535	24	11
5		0	27,535	0	6
6		776,181	27,558	23	11
7		0	27,558	0	11
8		0	27,558	0	6
9		823,189	27,582	24	11
10		0	27,582	0	6
11		821,427	27,606	24	11
12		0	27,606	0	6
13		646,184	27,630	24	11
14		0	27,630	0	11
15		0	27,630	0	7
16		308,481	27,639	9	11
17		0	27,639	0	11
18		389,720	27,650	11	11
19		0	27,650	0	7
20		614,839	27,668	18	11
21		0	27,668	0	11
22		0	27,668	0	6
23		948,554	27,696	28	11
24		0	27,696	0	11
25		578,797	27,713	17	11
26		0	27,713	0	11
27		608,062	27,730	17	11
28		0	27,730	0	12
29		0	27,730	0	7
30		681,916	27,750	20	12
31					
Total		8,831,945		262	
Average		294,398		9	

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0K0680

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/09/2020
Reported: 11/12/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/Mclean Road
Sample Matrix: Drinking Water
Lab Sample ID: J0K0680-01
Collected By: JM-Client
Collection Date: 11/09/2020 10:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/09/20 1702	11/10/20 1136	EDB
Escherichia coli	Absent			per 100mL		11/09/20 1702	11/10/20 1136	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		11/09/20 1030	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J0K0680-02
Collected By: JM-Client
Collection Date: 11/09/2020 12:07

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/09/20 1702	11/10/20 1136	EDB
Escherichia coli	Absent			per 100mL		11/09/20 1702	11/10/20 1136	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		11/09/20 1207	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0K0680

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 11/12/2020 20:37

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0K0202

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/02/2020
Reported: 11/04/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0K0202-01
Collected By: JM-Client
Collection Date: 11/02/2020 13:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB
Escherichia coli	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB

lient Sample ID: Municipal BLDG
ample Matrix: Drinking Water
Lab Sample ID: J0K0202-02
Collected By: JM-Client
Collection Date: 11/02/2020 13:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB
Escherichia coli	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		11/02/20 1340	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0K0202

Client Sample ID:	Walden Oak BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0K0202-03	**Collection Date:**	11/02/2020 14:05

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB
Escherichia coli	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		11/02/20 1405	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0K0202-04	**Collection Date:**	11/02/2020 14:30

obiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
iod: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB
Escherichia coli	Absent			per 100mL		11/02/20 1951	11/03/20 1413	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		11/02/20 1430	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0K0202

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 11/04/2020 18:40

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 N ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

12+13

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.4
Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BHET	Additional Notes
	Red Apple Rt 13 / McLean Rd.	11-9-2020	10:30 AM	1	DW	1	Na2S2O3	1	C10.6
	Cortlandville Highway Garage Rt 41 Palkville	11-9-2020	12:07 PM	1	DW	1	Na2S2O3	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-9-2020 12:16 PM	Jennifer Walter	11/9/2020 17:35
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

J0K0680

Cortlandville Water, Town of

PM: Shannon Weeks

Page 3 of 3

rev.12/26/2017

Page of

4-7

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 14.3

Therm ID 044

Holding Time

Samples Received on Ice? Yes No

Custody Seals Intact? Yes No N/

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland NY. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT	Additional No
	Terrace Rd Well	11-2-2020	152 PM	1	DW	1	Na2S2O3	1	Raw Water
	Municipal BLDG.	11-2-2020	140 PM	1	DW	1	Na2S2O3	1	C10.6
	Walden Oak BS.	11-2-2020	205 PM	1	DW	1	Na2S2O3	1	C10.5
	Blue Creek BS	11-2-2020	230 PM	1	DW	1	Na2S2O3	1	C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-2-2020 244 PM	Jennifer Walker	11/3/2020 1546
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J0K0202

Cortlandville Water, Town of

PM: Shannon Weeks

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Oct-20	11/2/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		69.2							
1	745,474	65.1	4.1	0.6	0.3	20.2	☐	☑	6:35
2	0	65.1	0	0.6	0.3	20.2	☐	☑	8:15
3	906,399	60.1	5	0.6	0.3	20	☐	☑	6:30
4	686,572	56.3	3.8	0.6	0.3	19.9	☐	☑	7:25
5	0	56.3	0	0.6	0.3	19.9	☐	☑	8:08
6	887,758	51.4	4.9	0.6	0.3	19.7	☐	☑	7:24
7	0	51.4	0	0.6	0.3	19.7	☐	☑	7:12
8	731,353	46.8	4.6	0.6	0.3	19.6	☐	☑	8:05
9	0	46.8	0	0.6	0.3	19.6	☐	☑	7:45
10	654,271	41.9	4.9	0.6	0.3	19.4	☐	☑	7.45
11	658,098	38.2	3.7	0.6	0.3	19.3	☐	☑	7:50
12	0	38.2	0	0.6	0.3	19.2	☐	☑	7:30
13	854,155	33.5	4.7	0.6	0.3	19.2	☐	☑	7:45
14	0	33.5	0	0.6	0.3	19.2	☐	☑	7:41
15	784,950	29.2	4.3	0.6	0.3	19.1	☐	☑	8:42
16	0	29.2	0	0.6	0.3	19	☐	☑	7:47
17	886,151	24.3	4.9	0.6	0.3	18.9	☐	☑	8:57
18	682,833	20.4	3.9	0.6	0.3	18.8	☐	☑	7:43
19	0	20.4	0	0.6	0.3	18.8	☐	☑	7:47
20	849,902	15.7	4.7	0.6	0.3	18.7	☐	☑	8:09
21	0	15.7	0	0.6	0.3	18.7	☐	☑	8:39
22	823,895	11.1	4.6	0.6	0.3	18.7	☐	☑	7:46
23	0	11.1	0	0.6	0.3	18.7	☐	☑	6:30
24	778,900	6.7	4.4	0.6	0.3	16.6	☑	☐	6:30
25	655,790	3.1	3.6	0.6	0.3	18.4	☐	☑	7:30
26	0	3.1	0	0.6	0.3	18.5	☐	☑	7:30
27	723,936	-0.9	4	0.6	0.3	18.4	☐	☑	7:45
28	0	-0.9	0	0.6	0.3	18.6	☐	☑	9:00
29	599,162	-4.2	3.3	0.6	0.3	18.4	☐	☑	7:31
30	0	-4.2	0	0.6	0.3	18.6	☐	☑	7:30
31	888,000	-9.2	5	0.6	0.3	16.3	☑	☐	8:00
Total	13,797,599		78.4						
AVG.	445,084		2.529032258						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: _____ Operator Grade Level IIB

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Oct-20	11/2/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		133.5							
1	0	133.5	0	0.6	0.3	7.9	☑	☐	6:05
2	635,618	130.1	3.4	0.6	0.3	11.7	☐	☑	8:00
3	0	130.1	0	0.6	0.3	11.9	☐	☑	6:50
4	0	130.1	0	0.6	0.3	8	☑	☐	7:15
5	592,525	126.2	3.9	0.6	0.3	11.5	☐	☑	8:00
6	0	126.2	0	0.6	0.3	11.6	☐	☑	7:07
7	603,756	122.6	3.6	0.6	0.3	11.4	☐	☑	7:02
8	0	122.6	0	0.6	0.3	11.3	☐	☑	7:35
9	639,200	118.7	3.9	0.6	0.3	11.3	☐	☑	7:25
10	0	118.7	0	0.6	0.3	11.5	☐	☑	8:05
11	0	118.7	0	0.6	0.3	7.1	☑	☐	8:05
12	598,920	115.3	3.4	0.6	0.3	11.1	☐	☑	7:16
13	0	115.3	0	0.6	0.3	6.5	☑	☐	7:30
14	822,899	107.5	7.8	0.6	0.3	10.9	☐	☑	7:30
15	0	107.5	0	0.6	0.3	6.8	☑	☐	8:17
16	587,244	104.4	3.1	0.6	0.3	11.1	☐	☑	7:32
17	0	104.4	0	0.6	0.3	11.3	☐	☑	9:08
18	0	104.4	0	0.6	0.3	7.2	☑	☐	6:59
19	600,298	100.4	4	0.6	0.3	11	☐	☑	7:33
20	0	100.4	0	0.6	0.3	11.3	☐	☑	7:55
21	608,801	96.8	3.6	0.6	0.3	11.1	☐	☑	7:17
22	0	96.8	0	0.6	0.3	6.4	☑	☐	7:27
23	745,936	92.3	4.5	0.6	0.3	10.9	☐	☑	6:45
24	0	92.3	0	0.6	0.3	11.2	☐	☑	7:00
25	0	92.3	0	0.6	0.3	8.3	☑	☐	7:30
26	650,580	88.4	3.9	0.6	0.3	11	☐	☑	7:30
27	0	88.4	0	0.6	0.3	6.4	☑	☐	7:45
28	788,359	83.6	4.8	0.6	0.3	10.9	☐	☑	7:30
29	0	83.6	0	0.6	0.3	6.4	☑	☐	7:05
30	826,250	78.6	7.7	0.6	0.3	11.1	☐	☑	7:15
31	0	78.6	0	0.6	0.3	11.4	☐	☑	7:45
Total	8,700,386		57.6						
AVG.	280,658		1.858064516						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: Operator Grade Level IIB

11	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			27,236		
1		0	27,236	0	8
2		635,618	27,254	18	12
3		0	27,254	0	12
4		0	27,254	0	8
5		592,525	27,271	17	12
6		0	27,271	0	12
7		603,756	27,288	17	11
8		0	27,288	0	11
9		639,200	27,307	19	11
10		0	27,307	0	12
11		0	27,307	0	7
12		598,920	27,324	17	11
13		0	27,324	0	7
14		822,899	27,348	24	11
15		0	27,348	0	7
16		587,244	27,365	17	11
17		0	27,365	0	11
18		0	27,365	0	7
19		600,298	27,382	17	11
20		0	27,382	0	11
21		608,801	27,400	18	11
22		0	27,400	0	6
23		745,936	27,422	22	11
24		0	27,422	0	11
25		0	27,422	0	8
26		650,580	27,440	22	11
27		0	27,440	0	7
28		788,359	27,463	23	11
29		0	27,463	0	6
30		826,250	27,487	24	11
31		0	27,487	0	11
Total		8,700,386		255	

11	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Average		280,658		8	

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	10/1/2020	1	No	No	0.6
Waldon Okas Booster	10/1/2020	1	No	No	0.5
Blue Creek Booster	10/1/2020	1	No	No	0.6
1040 McLean Rd Redapple	10/7/2020	1	No	No	0.6
Terrace Rd Well	10/7/2020		Yes	No	Raw

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean, Brian Congdon

Name of NYSDOH Certified Laboratory: MicroBac Labs

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

Comments:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0J0344

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J0J0344-03	**Collection Date:**	10/01/2020 8:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB
Escherichia coli	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/01/20 0825	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Renee Lantz
Customer Relationship Specialist
Reported: 10/04/2020 17:24

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0J0344

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/01/2020
Reported: 10/04/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0J0344-01
Collected By: Jeff MacLean
Collection Date: 10/01/2020 6:21

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB
Escherichia coli	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/01/20 0621	CUS

Client Sample ID: Walden Oaks B.S.
Sample Matrix: Drinking Water
Lab Sample ID: J0J0344-02
Collected By: JM-Client
Collection Date: 10/01/2020 7:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB
Escherichia coli	Absent			per 100mL		10/01/20 1705	10/02/20 1148	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		10/01/20 0756	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0J0838

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Water Analysis

Project / PO Number: N/A
Received: 10/07/2020
Reported: 10/12/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well Raw Tap Water
Sample Matrix: Drinking Water
Lab Sample ID: J0J0838-01
Collected By: Client
Collection Date: 10/07/2020 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	**Present**			per 100mL		10/07/20 1835	10/08/20 1300	EDB
Escherichia coli	Absent			per 100mL		10/07/20 1835	10/08/20 1300	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.00	4.00 MCL		mg/L	**Y1**		10/07/20 0900	CUS

Client Sample ID: 1040 McLean Rd. Coffee Stand Sink
Sample Matrix: Drinking Water
Lab Sample ID: J0J0838-02
Collected By: Client
Collection Date: 10/07/2020 8:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		10/07/20 1835	10/08/20 1300	EDB
Escherichia coli	Absent			per 100mL		10/07/20 1835	10/08/20 1300	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		10/07/20 0820	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0J0838

Client Sample ID:	4765 Rt. 41 Highway Garage Kitchen Sink		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J0J0838-03	**Collection Date:**	10/07/2020 9:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		10/07/20 1835	10/08/20 1300	EDB
Escherichia coli	Absent			per 100mL		10/07/20 1835	10/08/20 1300	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		10/07/20 0950	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 10/12/2020 09:36

MICROBAC

3821 Buck Dr.	2369 Elmira St., Suite C	428 Route 315 Hwy	4359 Linglestown Rd.	3719 Garrett Rd.
Cortland, NY 13045	Sayre, PA 18840	Pittston, PA 18640	Harrisburg, PA 17112	Drexel Hill, PA 19026
607.753.3403	570.888.0169	570.348.0775	717.651.9700	484.461.9722

CHAIN OF CUSTODY RECORD

23-25

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact: Brian R. Congdon
Telephone No.: 541-2330

Invoice Address

Client Name: Town of Cortlandville Water Dept
Address: 3577 Terrace Rd
City, State, Zip: Cortland NY. 13045
Contact:
Telephone No.:

Turnaround Time

[ ] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[ ] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C)
Therm ID 89

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [ ] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [ ] Mail [ ] Fax [ ] e-mail (address)

Project: Location: Water Dist. PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon

Sampler Signature: B R. Congdon

Sampler Phone No.:

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID (Location of sample taken. Ex: Kitchen sink, bathroom sink etc.)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types	Bacterial	Additional Notes
1	Terrace Rd Wall Raw Water Tap	10-7-20	9:00 AM	1		G		1	Chlorine 0
2	1040 McLean Rd Coffee Station Sink	10-7-20	8:20 AM	1		G	THIO	1	Chlorine .60
3	4965 RT41 Highway Garage Kitchen Sink	10-7-20	9:50 AM	1		G	THIO	1	Chlorine .30

J0J0838

Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

PLEASE RETURN SAMPLES ON ICE.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B R. Congdon	10-7-20 10:00 AM	KMC	10/7/2020 1115
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 7/16/18

Page of

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

11-13.

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 4.6
Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No (N/A)

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Note
	Municipal BLDG.	10-1-2020	6:21 AM	1	DW	1	Na2S2O3	1	Clo.6
	Walden Oaks BS.	10-1-2020	7:56 AM	1	DW	1	Na2S2O3	1	Clo.5
	Blue Creek BS.	10-1-2020	8:25 AM	1	DW	1	Na2S2O3	1	Clo.6

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-1-2020 853 AM	KMC	10/1/2020 1155
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ____ of ____

rev.12/26/2017

J0J0344

Cortlandville Water, Town of

PM: Shannon Weeks

Page 3 of 3

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Sep-20	10/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		30.5							
1	878,000	26	4.5	0.6	0.3	23.1	☐	☑	7:55
2	0	26	0	0.6	0.3	23.1	☐	☑	7:30
3	809,741	22.5	4	0.6	0.3	23	☐	☑	6:20
4	0	22.5	0	0.6	0.3	22.9	☐	☑	8:30
5	816,111	18.1	4.4	0.6	0.3	22.8	☐	☑	9:30
6	588,855	15.5	3	0.6	0.3	22.7	☐	☑	8:40
7	0	15.5	0	0.6	0.3	22.7	☐	☑	7:30
8	847,761	11	4.5	0.6	0.3	22.4	☐	☑	7:55
9	0	11	0	0.6	0.3	22.3	☐	☑	8:15
10	936,869	8.6	2.4	0.6	0.3	22.2	☐	☑	7:50
11	0	124.1	0	0.6	0.3	22.2	☐	☑	8:30
12	864,812	115.7	8.4	0.6	0.3	22	☐	☑	7:53
13	655,818	112.2	3.5	0.6	0.3	22	☐	☑	7:30
14	0	112.2	0	0.6	0.3	21.9	☐	☑	8:00
15	879,336	107.3	5	0.6	0.3	21.7	☐	☑	7:20
16	0	107.3	0	0.6	0.3	21.6	☐	☑	7:53
17	911,944	102.5	4.8	0.6	0.3	21.5	☐	☑	6:21
18	0	102.5	0	0.6	0.3	21.4	☐	☑	7:54
19	917,485	97.4	5.1	0.6	0.3	21.3	☐	☑	8:38
20	657,811	93.7	3.7	0.6	0.3	21.2	☐	☑	6:45
21	0	93.7	0	0.6	0.3	21.1	☐	☑	7:18
22	923,340	88.7	5	0.6	0.3	21	☐	☑	7:13
23	0	88.7	0	0.6	0.3	20.8	☐	☑	7:20
24	935,232	83.7	5	0.6	0.3	20.8	☐	☑	7:33
25	0	83.7	0	0.6	0.3	20.7	☐	☑	8:00
26	923,500	78.1	5.6	0.6	0.3	20.6	☐	☑	8:30
27	740,823	74.1	4	0.6	0.3	20.4	☐	☑	8:00
28	0	74.1	0	0.6	0.3	20.2	☐	☑	7:45
29	910,536	69.2	4.9	0.6	0.3	20.3	☐	☑	7:30
30	0	69.2	0	0.6	0.3	20.5	☐	☑	7:45
31							☐	☐	
Total	14,197,974		77.8						
AVG.	473,266		2.593333333						

Chlorine Mix N/A quarts/gallons of **N/A** % chlorine added to N/A gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: **NY0030046**

Signature: Peter Alteri Operator Grade Level **IIB**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inces of:	
Date	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		18338				11440			49231			
1	878,000	18,352	14	23	0	11,440	0	13	49,245	14	0.00	0.00
2	0	18,352	0	23	0	11,440	0	13	49,245	0	0.10	0.00
3	0	18,352	0	23	809,741	11,450	10	13	49,255	10	0.00	0.00
4	0	18,352	0	23	0	11,450	0	13	49,255	0	0.00	0.00
5	816,111	18,365	13	23	0	11,450	0	13	49,268	13	0.10	0.00
6	0	18,365	0	23	588,855	11,457	7	13	49,275	7	0.00	0.00
7	0	18,365	0	23	0	11,457	0	13	49,275	0	0.00	0.00
8	847,761	18,379	14	22	0	11,457	0	13	49,289	14	0.00	0.00
9	0	18,379	0	22	0	11,457	0	13	49,289	0	0.00	0.00
10	936,869	18,394	15	22	0	11,457	0	13	49,304	15	0.00	0.00
11	0	18,394	0	22	0	11,457	0	12	49,304	0	0.00	0.00
12	864,812	18,408	14	22	0	11,457	0	12	49,318	14	0.00	0.00
13	655,818	18,418	10	22	0	11,457	0	12	49,328	10	0.30	0.00
14	0	18,418	0	22	0	11,457	0	12	49,328	0	0.00	0.00
15	879,336	18,432	14	22	0	11,457	0	12	49,342	14	0.00	0.00
16	0	18,432	0	22	0	11,457	0	12	49,342	0	0.00	0.00
17	911,944	18,447	15	22	0	11,457	0	12	49,357	15	0.00	0.00
18	0	18,447	0	21	0	11,457	0	12	49,357	0	0.00	0.00
19	917,485	18,462	15	21	0	11,457	0	12	49,372	15	0.00	0.00
20	657,811	18,472	11	21	0	11,457	0	11	49,382	11	0.00	0.00
21	0	18,472	0	21	0	11,457	0	11	49,382	0	0.00	0.00
22	923,340	18,487	15	21	0	11,457	0	11	49,397	15	0.00	0.00
23	0	18,487	0	21	0	11,457	0	11	49,397	0	0.00	0.00
24	935,232	18,502	15	21	0	11,457	0	11	49,412	15	0.00	0.00
25	0	18,502	0	21	0	11,457	0	11	49,412	0	0.00	0.00
26	923,500	18,518	16	21	0	11,457	0	11	49,428	16	0.00	0.00
27	740,823	18,530	12	20	0	11,457	0	11	49,440	12	0.00	0.00
28	0	18,530	0	20	0	11,457	0	11	49,440	0	0.00	0.00
29	910,536	18,545	15	20	0	11,457	0	11	49,455	15	1.30	0.00
30	0	18,545	0	21	0	11,457	0	11	49,455	0	0.00	0.00
31												
Total	12,799,378		207		1,398,596		17			224	1.80	0.00
Average	426,646		7		46,620		1			7		

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	September 2020	10/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		37.4							
1	0	37.4		0.6	0.3	13.8	☐	☑	6:54
2	590,728	34	3.4	0.6	0.3	14.1	☐	☑	7:30
3	0	34	0	0.6	0.3	9.9	☑	☐	6:00
4	669,658	30.4	4.4	0.6	0.3	13.9	☐	☑	8:10
5	0	30.4	0	0.6	0.3	14	☐	☑	9:10
6	0	30.4	0	0.6	0.3	9.4	☑	☐	8:15
7	714,055	26.5	3.9	0.6	0.3	13.6	☐	☑	7:00
8	0	26.5	0	0.6	0.3	13.7	☐	☑	7:20
9	596,706	22.9	3.6	0.6	0.3	13.4	☐	☑	7:30
10	0	22.9	0	0.6	0.3	13.4	☐	☑	7:20
11	635,890	19.5	3.4	0.6	0.3	13.3	☐	☑	8:47
12	0	19.5	0	0.6	0.3	13.4	☐	☑	8:15
13	0	19.5	0	0.6	0.3	13.5	☐	☑	7:00
14	592,047	16	3.5	0.6	0.3	12.5	☐	☑	7:15
15	0	16	0	0.6	0.3	12.7	☐	☑	7:10
16	601,092	12.8	3.2	0.6	0.3	12.5	☐	☑	7:30
17	0	12.8	0	0.6	0.3	12.4	☐	☑	6:04
18	650,779	9.5	3.3	0.6	0.3	12.4	☐	☑	7:41
19	0	9.5	0	0.6	0.3	12.6	☐	☑	8:26
20	0	9.5	0	0.6	0.3	12.6	☐	☑	6:35
21	589,315	6	3.5	0.6	0.3	12.2	☐	☑	7:08
22	0	148.4	0	0.6	0.3	12.1	☐	☑	7:02
23	634,185	145.7	2.7	0.6	0.3	12.1	☐	☑	7:04
24	0	145.7	0	0.6	0.3	12	☐	☑	6:20
25	625,036	141.9	3.8	0.6	0.3	11.9	☐	☑	8:00
26	0	141.9	0	0.6	0.3	12.1	☐	☑	8:15
27	0	141.9	0	0.6	0.3	7.9	☑	☐	7:45
28	582,015	138.6	3.3	0.6	0.3	11.7	☐	☑	7:30
29	0	138.6	0	0.6	0.3	7.5	☑	☐	7:30
30	827,921	133.5	5.1	0.6	0.3	11.9	☐	☑	
31							☐	☐	
Total	8,309,427		47.1						
AVG.	276,981		1.624137931						

Chlorine Mix N/A quarts/gallons of N/A % chlorine added to N/A gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Date	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			26,999		
1		0	26,999	0	14
2		590,728	27,016	17	14
3		0	27,016	0	10
4		669,658	27,034	18	14
5		0	27,034	0	14
6		0	27,034	0	9
7		714,055	27,055	21	14
8		0	27,055	0	14
9		596,706	27,072	17	13
10		0	27,072	0	13
11		635,890	27,090	18	13
12		0	27,090	0	13
13		0	27,090	0	14
14		592,047	27,106	17	13
15		0	27,106	0	13
16		601,092	27,124	18	13
17		0	27,124	0	12
18		650,779	27,142	19	12
19		0	27,142	0	13
20		0	27,142	0	13
21		589,315	27,159	18	12
22		0	27,159	0	12
23		634,185	27,177	18	12
24		0	27,177	0	12
25		625,036	27,195	18	12
26		0	27,195	0	12
27		0	27,195	0	8
28		582,015	27,212	17	12
29		0	27,212	0	8
30		827,921	27,236	24	12
31					
Total		8,309,427		239	
Average		276,981		8	

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
3587 Terrace Rd	9/2/2020	1	0	0	0.6
Waldon Okas Booster Sta	9/2/2020	1	0	0	0.5
Blue Creek Booster Sta.	9/2/2020	1	0	0	0.4
Red Apple Rt 13/ McLean Rd	9/9/2020	1	0	0	0.6
Cville Highway Rt 41	9/9/2020	1	0	0	0.3
Terrace Rd Well	9/9/2020	Raw	0	0	0

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Micro Bac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

Comments:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I0108

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/01/2020
Reported: 09/08/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J0I0108-01
Collected By: JM-Client
Collection Date: 09/01/2020 7:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB
Escherichia coli	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		09/01/20 0750	CUS

Client Sample ID: Walken Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J0I0108-02
Collected By: JM-Client
Collection Date: 09/01/2020 8:05

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB
Escherichia coli	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		09/01/20 0805	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I0108

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0I0108-03	**Collection Date:**	09/01/2020 8:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB
Escherichia coli	Absent			per 100mL		09/01/20 1805	09/02/20 1218	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		09/01/20 0825	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Chris Long
Director
Reported: 09/08/2020 19:19

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I0745

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/09/2020
Reported: 09/15/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J0I0745-01
Collected By: JM-Client
Collection Date: 09/09/2020 9:28

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB
Escherichia coli	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	69.0		1.02	mg/L		09/11/20 1032	09/11/20 1702	JDF

Client Sample ID: Red Apple Rt13 McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J0I0745-02
Collected By: JM-Client
Collection Date: 09/09/2020 9:58

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB
Escherichia coli	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		09/09/20 0958	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0I0745

Client Sample ID:	C-Ville Highway Garage Rt41 Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0I0745-03	**Collection Date:**	09/09/2020 11:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB
Escherichia coli	Absent			per 100mL		09/09/20 1822	09/10/20 1246	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		09/09/20 1140	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 09/15/2020 19:47

6-8

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.1
Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No (N/A)

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT	Additional I
	Municipal BLDG	9-1-2020	7:58 AM	1	DW	1	Na2S2O3	1	Cl 0.6
	Walden Oaks B.S.	9-1-2020	8:05 AM	1	DW	1	"	1	Cl 0.5
	Blue Creek B.S.	9-1-2020	8:25 AM	1	DW	1	"	1	Cl 0.4

J0101108

Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-1-2020 10:06 AM	KMC	9/1/2020 1030
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

9-11

MICI... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N... ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back
TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

Temperature Upon Receipt (°C) 18.2
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Montly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Sodium								Additional Notes
	Terrace Rd Well	9-9-2020	9:28 AM	1	DW	1	Na2S2O3	1									Raw Water
	Red Apple Rt 13 / McLean Rd	9-9-2020	9:58 AM	1	DW	1	Na2S2O3	1									Clo.6
	C-Ville Highway Garage Rt 41 Polkville	9-9-2020	1140 AM	1	DW	1	Na2S2O3	1									Clo.3
	Terrace Rd Well	9-9-2020	9:28 AM	1	DW	1	Na2S2O3	1	1								Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-9-2020 11:57 AM	KMC	9/9/2020 1215

J0I0745
Cortlandville Water, Town of
PM: Shannon Weeks

rev.12/26/2017

Page ___ of ___

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Aug-20	9/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump On/Off	Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)					
Prev Rdg.		94.5						
1	797,000	90.3	4.2	0.6	0.3	26.5	off	7:30
2	568,000	87.9	2.4	0.6	0.3	26.4	off	7:30
3	0	87.9	0	0.6	0.3	26.4	off	7:15
4	687,000	83.7	4.2	0.6	0.3	26.2	off	7:30
5	0	83.7	0	0.6	0.3	26.3	off	6:50
6	702,000	80.9	2.8	0.6	0.3	26.1	off	6:45
7	0	80.9	0	0.6	0.3	26	off	9:00
8	799,000	76.8	4.1	0.6	0.3	25.8	off	7:45
9	595,000	74.4	2.4	0.6	0.3	25.7	off	7:15
10	0	74.4	0	0.6	0.3	25.8	off	7:30
11	708,000	70.6	3.8	0.6	0.3	25.5	off	7:30
12	0	70.6	0	0.6	0.3	25.5	off	7:30
13	787,000	67.3	3.3	0.6	0.3	25.3	off	7:15
14	0	67.3	0	0.6	0.3	25.3	off	8:50
15	793,000	63	4.3	0.6	0.3	25.1	off	7:00
16	657,000	60.3	2.7	0.6	0.3	25	off	7:30
17	0	60.3	0	0.6	0.3	25	off	8:00
18	798,000	55.6	4.7	0.6	0.3	24.7	off	7:10
19	0	55.6	0	0.6	0.3	24.7	off	8:00
20	817,000	52.4	3.2	0.6	0.3	24.5	off	6:20
21	0	52.4	0	0.6	0.3	24.5	off	7:45
22	904,000	47.6	4.8	0.6	0.3	24.2	off	8:18
23	638,000	45	2.6	0.6	0.3	24.1	off	6:15
24	0	45	0	0.6	0.3	24	off	7:28
25	870,000	40.1	4.9	0.6	0.3	23.9	off	7:16
26	0	40.1	0	0.6	0.3	23.9	Off	8:22
27	754,061	37.2	2.9	0.6	0.3	23.7	Off	7:21
28	0	37.2	0	0.6	0.3	23.7	off	8:30
29	820,723	32.8	4.3	0.6	0.3	23.5	off	8:15
30	574,067	30.5	2.4	0.6	0.3	23.4	off	7:30
31	0	30.5	0	0.6	0.3	23.3	off	7:30
Total	13,268,851		64					
AVG.	428,027		2.064516129					

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr. Water/Sewer Operator NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion inches of:	
Date	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		18223.5				11362.8			49039.57			
1	797,000	18,236	13	27	0	11,363	0	17	49,040	13		
2	0	18,236	0	26	568,000	11,370	7	17	49,059	7		
3	0	18,236	0	26	0	11,370	0	17	0	0	0.1	
4	687,000	18,247	11	26	0	11,370	0	16	49,070	11	1	
5	0	18,247	0	26	0	11,370	0	16	49,070	0		
6	0	18,247	0	26	702,000	11,379	9	16	49,079	9		
7	0	18,247	0	26	0	11,379	0	16	49,079	0		
8	799,000	18,260	14	26	0	11,379	0	16	49,092	13		
9	0	18,260	0	26	295,000	11,386	7	16	49,099	7		
10	0	18,260	0	26	0	11,386	0	16	49,099	0	0.50	
11	708,000	18,271	11	26	0	11,386	0	16	49,111	11	0.60	
12	0	18,271	0	26	0	11,386	0	16	49,111	0		
13	0	18,271	0	25	787,000	11,396	10	16	49,120	10		
14	0	18,271	0	25	0	11,396	0	16	49,120	0		
15	793,000	18,284	13	25	0	11,396	0	15	49,133	13		
16	0	18,284	0	25	657,000	11,404	8	15	49,141	8		
17	0	18,284	0	25	0	11,404	0	15	49,141	0	0.20	
18	798,000	18,297	13	25	0	11,404	0	15	49,154	13		
19	0	18,297	0	25	0	11,404	0	15	49,154	0		
20	0	18,297	0	25	817,000	11,415	10	15	49,164	10		
21	0	18,297	0	25	0	11,415	0	15	49,164	0		
22	904,000	18,311	14	24	0	11,415	0	14	49,179	15		
23	0	18,311	0	24	638,000	11,423	8	14	49,187	8		
24	0	18,311	0	24	0	11,423	0	14	49,187	0	0.40	
25	870,000	18,325	14	24	0	11,423	0	14	49,201	14	0.20	
26	0	18,325	0	24	0	11,423	0	14	49,201	0	0.30	
27	0	18,325	0	24	754,061	11,432	10	14	49,210	10	0.20	
28	0	18,325	0	24	0	11,432	0	14	49,210	0	0.00	
29	820,723	18,338	13	24	0	11,432	0	14	49,224	13	0.00	
30	0	18,338	0	23	574,067	11,440	7	14	49,231	7	0.00	
31	0	18,338	0	23	0	11,440	0	14	49,231	0	0.00	
Total	7,176,723		116		5,792,128		76			190	3.50	0.00
Average	231,507		4		186,843		2			6		

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Aug-20	9/1/2020	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump On/Off	Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)					
Prev Rdg		86.9						
1	0	86.9	0	0.6	0.3	16.4	Off	7:45
2	0	86.9	0	0.6	0.3	12.1	On	7:00
3	712,000	82.8	4.1	0.6	0.3	16.1	Off	7:15
4	0	82.8	0	0.6	0.3	16.6	Off	7:30
5	584,000	79.6	3.2	0.6	0.3	16.4	Off	6:35
6	0	79.6	0	0.6	0.3	11.8	On	6:00
7	734,000	75.4	4.2	0.6	0.3	16.1	Off	8:45
8	0	75.4	0	0.6	0.3	16.1	Off	8:00
9	0	75.4	0	0.6	0.3	11.9	On	6:00
10	737,000	71	4.4	0.6	0.3	15.8	Off	7:00
11	0	71	0	0.6	0.3	12	On	7:15
12	619,000	67.6	3.4	0.6	0.3	15.7	Off	7:00
13	0	67.6	0	0.6	0.3	11.4	Off	7:00
14	698,000	63.6	4	0.6	0.3	15.4	Off	9:00
15	0	63.6	0	0.6	0.3	15.6	Off	9:05
16	0	63.6	0	0.6	0.3	11	On	7:15
17	707,000	59.6	4	0.6	0.3	15.2	Off	7:35
18	0	59.6	0	0.6	0.3	15.3	Off	7:00
19	596,000	56.5	3.1	0.6	0.3	15	Off	7:31
20	0	56.5	0	0.6	0.3	10.2	On	6:00
21	713,000	52.5	4	0.6	0.3	14.8	Off	7:32
22	0	52.5	0	0.6	0.3	15	Off	8:00
23	0	52.5	0	0.6	0.3	10.6	On	6:10
24	755,000	47.9	4.6	0.6	0.3	14.6	Off	7:20
25	0	47.9	0	0.6	0.3	14.9	Off	7:05
26	597,179	44.7	3.2	0.6	0.3	14.6	Off	8:04
27	0	44.7	0	0.6	0.3	10.1	On	7:01
28	691,647	40.8	3.9	0.6	0.3	14.4	off	8:30
29	0	40.8	0	0.6	0.3	14.4	off	8:00
30	0	40.8	0	0.6	0.3	10.2	on	7:30
31	659,337	37.4	3.4	0.6	0.3	13.6	off	7:30
Total	8,803,163		49.5					
AVG.	283,973		1.596774194					

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr / Water Sewer operator NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	8/4/2020	1	NO	NO	0.6
Waldon Okas Booster Station	8/4/2020	1	No	No	0.5
Blue Creek Booster Station	8/4/2020	1	No	NO	0.4
Red Apple Rt 13/McLean Rd	8/12/2020	1	No	No	0.6
Cville Highway Rt 41	8/12/2020	1	No	No	0.3
Terrace Rd Well Raw	8/12/2020	Raw	No	No	No

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MICROBAC

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Date	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg					
1		0	26,753	0	16
2		0	26,753	0	12
3		712,000	26,772	20	16
4		0	26,772	0	17
5		584,000	26,788	16	16
6		0	26,788	0	12
7		734,000	26,809	21	16
8		0	26,809	0	16
9		0	26,809	0	12
10		737,000	26,829	21	16
11		0	26,829	0	12
12		619,000	26,847	17	16
13		0	26,847	0	11
14		698,000	26,866	20	16
15		0	26,866	0	16
16		0	26,866	0	11
17		707,000	26,886	20	15
18		0	26,886	0	15
19		596,000	26,903	17	15
20		0	26,903	0	10
21		713,000	26,923	20	15
22		0	26,923	0	15
23		0	26,923	0	11
24		755,000	26,944	21	15
25		0	26,944	0	15
26		597,179	26,961	17	15
27		0	26,961	0	10
28		691,647	26,980	19	14
29		0	26,980	0	14
30		0	26,980	0	10
31		659,337	~~269,988~~ 26,999	19	14
Total		8,803,163		246	
Average		283,973		8	

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0H1108

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/12/2020
Reported: 08/18/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Road Well
Sample Matrix: Drinking Water
Lab Sample ID: J0H1108-01
Collected By: JM-Client
Collection Date: 08/12/2020 9:13

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB
Escherichia coli	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB

Client Sample ID: Red Apple - Rt. 13/Mclean Road
Sample Matrix: Drinking Water
Lab Sample ID: J0H1108-02
Collected By: JM-Client
Collection Date: 08/12/2020 9:26

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB
Escherichia coli	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/12/20 0926	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0H1108

Client Sample ID:	C-Ville Highway Garage - Rt 41, Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0H1108-03	**Collection Date:**	08/12/2020 9:26

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB
Escherichia coli	Absent			per 100mL		08/12/20 1832	08/13/20 1307	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		08/12/20 0926	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 08/18/2020 18:38

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0H0549

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/04/2020
Reported: 08/07/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0H0549-01
Collected By: Jeff MacLean
Collection Date: 08/04/2020 6:44

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB
Escherichia coli	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/04/20 0644	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J0H0549-02
Collected By: Jeff MacLean
Collection Date: 08/04/2020 7:07

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB
Escherichia coli	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		08/04/20 0707	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0H0549

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J0H0549-03	**Collection Date:**	08/04/2020 7:35

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB
Escherichia coli	Absent			per 100mL		08/04/20 1920	08/05/20 1338	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		08/04/20 0735	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Chris Long
Director
Reported: 08/07/2020 17:56

6-8

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.9
Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No (N/A)

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAC	Additional Notes
	Terrace Rd Well	8-12-2020	9:13 AM	1	DW	1	Na2S2O3	1	RAW Water
	Red Apple Rt13/McLean Rd	8-12-2020	9:26 AM	1	DW	1	"	1	C10-6
	C-ville Highway Garage Rt41 Polkville	8-12-2020	11:16 AM	1	DW	1	"	1	C10-3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-12-2020 11:34 AM	KCut.	8.12.2020 1130
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Page 3 of 3

JOH1108
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 N[illegible] ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

1-3

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 15.0

Therm ID

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? Yes No (N/A)

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Municipal BLDG.	8-4-2020	6:44 AM	1	DW	1	Na2S2O3	C1 0.6
	Walden Oaks BS.	8-4-2020	7:07 AM	1	DW	1	Na2S2O3	C1 0.5
	Blue Creek BS	8-4-2020	7:35 AM	1	DW	1	Na2S2O3	C1 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-4-2020 810 AM	KCarter	8-4-2020 938
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Cortlandville Water, Town of

PM: Shannon Weeks

J O H 0 5 4 9

Page 3 of 3

rev.12/26/2017

Page ___ of ___

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2020 (MM YYYY)	08/03/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 142.8	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .6	Other Treatments / Readings: End of System Cl 1.3	WELL Level	Pump On/OfF	Time
1		629	139.5	3.3		.6	.3	18.3	OFF	7:40
2		—	139.5	—		.6	.3	14.1	ON	8:35
3		761	135.1	4.4		.6	.3	18.1	OFF	8:40
4		—	135.1	—		.6	.3	18.2	OFF	8:05
5		—	135.1	—		.6	.3	13.5	ON	8:00
6		796	130.8	4.3		.6	.3	17.9	off	6:00
7		—	130.8	—		.6	.3	13.4	ON	7:00
8		903	125.8	5.0		.6	.3	17.6	off	7:30
9		—	125.8	—		.6	.3	13.2	ON	600
10		808	121.0	5.2		.6	.3	17.5	off	840
11		—	121.0	—		.6	.3	18.3	off	845
12		—	121.0	—		.6	.3	14.5	ON	7:30
13		736	117.2	3.8		.6	.3	18.0	off	7:30
14		—	117.2	—		.6	.3	14.3	ON	700
15		633	113.7	3.5		.6	.3	17.7	off	715
16		—	113.7			.6	.3	13.2	ON	700
17		716	109.7	4.0		.6	.3	17.4	off	9:10
18		—	109.7	—		.6	.3	17.5	off	6:00
19		—	109.7	—		.6	.3	13.1	on	6:30
20		752	105.2	4.5		.6	.3	17.2	off	8:19
21		—	105.2	—		.6	.3	17.3	off	7:15
22		596	101.8	3.4		.6	.3	17.0	off	7:18
23		—	101.8	—		.6	.3	12.8	ON	6:00
24		683	98.0	3.8		.6	.3	16.8	OFF	9:40
25		—	98.0	—		.6	.3	16.9	OFF	9:07
26		—	98.0	—		.6	.3	12.3	on	7:40
27		770	93.8	4.2		.6	.3	16.6	OFF	7:04
28		—	93.8	—		.6	.3	16.7	OFF	6:58
29		591	90.6	3.2		.6	.3	16.5	OFF	7:06
30		—	90.6	—		.6	.3	12.3	ON	7:02
31		676	86.9	3.7		.6	.3	16.3	off	8:00
TOTAL		10,050								
AVG.		324								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alter Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY.0030446

Signature: Peter Alter Jr. Date: 8/3/2020 Operator Grade Level: TB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd.	7-1-20	1	YES NO	YES NO	.5
Walden Oaks BS.	7-1-20	1	YES NO	YES NO	.5
Blue Creek BS.	7-1-20	1	YES NO	YES NO	.5
Terrace Rd Well #2 RAW	7-1-20	RAW	YES NO	YES NO	0
Red Apple RT 13 Archer Rd	7-7-20	1	YES NO	YES NO	.4
Quill Highway RT 41	7-8-20	1	YES NO	YES NO	.2
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System, copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac.

Did any MCL violation occur? If so, please describe: NO.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	07/2020 (MM YYYY)	08/03/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L. H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 154	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .6	Other Treatments / Readings: End of System Cl .3	WELL Level	Pump On/OfF	Time
1		—	154.0	—		.6	.3	29.9	OFF	7:50
2		803	151.0	3		.6	.3	29.7	OFF	8:45
3		—	151.0	—		.6	.3	29.7	OFF	8:50
4		761	147.2	3.8		.6	.3	29.5	OFF	8:15
5		631	144.7	2.5		.6	.3	29.4	off	8:00
6		—	144.7	—		.6	.3	29.1	off	6:00
7		967	139.7	5.0		.6	.3	29.1	off	7:00
8		—	139.7	—		.6	.3	29.1	off	7:30
9		743	136.6	3.1		.6	.3	28.9	off	630
10		—	136.6	—		.6	.3	28.9	off	830
11		623	133.4	3.2		.6	.3	28.8	off	900
12		537	131.3	2.1		.6	.3	28.7	off	7:00
13		—	131.3	—		.6	.3	28.8	off	730
14		753	126.9	4.4		.6	.3	28.5	off	815
15		—	126.9	—		.6	.3	28.5	off	800
16		869	123.5	3.4		.6	.3	28.4	off	715
17		—	123.5	—		.6	.3	28.3	off	9:00
18		820	118.9	4.6		.6	.3	28.1	off	5:45
19		618	116.5	2.4		.6	.3	28.1	off	6:45
20		—	116.5	—		.6	.3	28.0	off	8:40
21		860	112.0	4.5		.6	.3	27.8	off	7:20
22		—	112.0	—		.6	.3	27.8	off	7:30
23		746	108.8	3.2		.6	.3	27.6	OFF	6:10
24		—	108.8	—		.6	.3	27.6	OFF	9:30
25		801	104.5	4.3		.6	.3	27.4	OFF	9:30
26		605	102.0	2.5		.6	.3	27.3	off	7:50
27		—	102.0	—		.6	.3	27.2	OFF	7:10
28		847	97.7	4.3		.6	.3	27.0	OFF	7:07
29		—	97.7	—		.6	.3	27.0	OFF	7:20
30		762	94.5	3.2		.6	.3	26.8	OFF	7:28
31		—	94.5	—		.6	.3	26.7	off	8:30
TOTAL		12746								
AVG.		411								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr Title: W/S Operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Allen Date: 8/3/20 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served:_____

Number of microbiological monitoring samples required:____

Number of microbiological monitoring samples taken: _____

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): _____

Name of NYSDOH Certified Laboratory: _____

Did any MCL violation occur? If so, please describe: _____

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: _____

Comments: _____

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		18121.9				11284.0			48859.60	
7/1/2020	—	18121.9	—	29.9	—	11284.0	—	20.0	48859.60	—
7/2/2020	—	18121.9	—	29.7	803	11294.0	10	19.9	48869.57	9.97
7/3/2020	—	18121.9	—	29.7	—	11294.0	—	19.8	48869.57	—
7/4/2020	751	18133.7	11.8	29.5	—	11294.0	—	19.6	48881.36	11.79
7/5/2020	—	18133.7	—	29.4	631	11301.8	7.8	19.5	48889.15	7.79
7/6/2020	—	18133.7	—	29.1	—	11301.8	—	19.3	48889.15	—
7/7/2020	967	18148.9	15.2	29.1	—	11301.8	—	19.2	48904.23	15.08
7/8/2020	—	18148.9	—	29.1	—	11301.8	—	19.3	48904.23	—
7/9/2020	—	18148.9	—	28.9	743	11311.0	9.2	19.1	48913.41	9.18
7/10/2020	—	18148.9	—	28.9	—	11311.0	—	19.1	48913.41	—
7/11/2020	623	18158.9	9.8	28.8	—	11311.0	—	19.0	48923.19	9.78
7/12/2020	—	18158.9	—	28.7	537	11317.6	6.6	18.9	48929.85	6.66
7/13/2020	—	18158.9	—	28.8	—	11317.6	—	18.9	48929.85	—
7/14/2020	763	18170.5	11.6	28.5	—	11317.6	—	18.7	48941.63	11.78
7/15/2020	—	18170.5	—	28.5	—	11317.6	—	18.6	48941.63	—
7/16/2020	—	18170.5	—	28.4	869	11328.6	11.0	18.5	48952.80	11.17
7/17/2020	—	18170.5	—	28.3	—	11328.6	—	18.5	48952.80	—
7/18/2020	820	18183.7	13.2	28.1	—	11328.6	—	18.3	48965.85	13.05
7/19/2020	—	18183.7	—	28.1	618	11336.3	7.7	18.2	48973.43	7.58
7/20/2020	—	18183.7	—	28.0	—	11336.3	—	18.2	48973.43	—
7/21/2020	860	18197.3	13.6	27.8	—	11336.3	—	18.0	48987.01	13.58
7/22/2020	—	18197.3	—	27.8	—	11336.3	—	18.0	48987.01	—
7/23/2020	—	18197.3	—	27.6	746	11345.7	9.4	17.8	48996.35	9.34
7/24/2020	—	18197.3	—	27.6	—	11345.7	—	17.8	48996.35	—
7/25/2020	801	18210.1	12.8	27.4	—	11345.7	—	17.6	49009.07	12.72
7/26/2020	—	18210.1	—	27.3	605	11353.2	7.5	17.5	49016.58	7.51
7/27/2020	—	18210.1	—	27.2	—	11353.2	—	17.4	49016.58	—
7/28/2020	847	18223.5	13.4	27.0	—	11353.2	—	17.1	49030.02	13.44
7/29/2020	—	18223.5	—	27.0	—	11353.2	—	17.1	49030.02	—
7/30/2020	—	18223.5	—	26.8	762	11362.8	9.6	17.0	49039.57	9.55
7/31/2020	—	18223.5	—	26.7	—	11362.8	—	16.9	49039.57	—
TOTAL	6,422		101.6		6314		75.8			179.97
AVERAGE	207				204					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			26480.5		
7/1/2020		629	26497.0	16.5	18.3
7/2/2020		—	26497.0	—	14.1
7/3/2020		761	26517.0	20	18.1
7/4/2020		—	26517.0	—	18.2
7/5/2020		—	26517.0	—	13.5
7/6/2020		796	26537.9	20.9	17.9
7/7/2020		—	26537.9	—	13.4
7/8/2020		903	26561.9	24	17.6
7/9/2020		—	26561.9	—	13.2
7/10/2020		808	26583.2	21.3	17.5
7/11/2020		—	26583.2	—	18.3
7/12/2020		—	26583.2	—	14.3
7/13/2020		736	26602.6	19.4	18.0
7/14/2020		—	26602.6	—	14.3
7/15/2020		633	26619.7	17.1	17.7
7/16/2020		—	26619.7	—	13.2
7/17/2020		716	26639.4	19.7	17.4
7/18/2020		—	26639.4	—	17.5
7/19/2020		—	26639.4	—	13.1
7/20/2020		752	26660.2	20.8	17.2
7/21/2020		—	26660.2	—	17.3
7/22/2020		596	26676.7	16.5	17.0
7/23/2020		—	26676.7	—	12.8
7/24/2020		683	26695.6	18.9	16.8
7/25/2020		—	26695.6	—	16.9
7/26/2020		—	26695.6	—	12.3
7/27/2020		770	26717.0	21.4	16.6
7/28/2020		—	26717.0	—	16.7
7/29/2020		591	26733.4	16.4	16.5
7/30/2020		—	26733.4	—	12.3
7/31/2020		676	26752.5	19.1	16.3
TOTAL		10,050			
Average		324			

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0127

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/01/2020
Reported: 07/06/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG.
Sample Matrix: Drinking Water
Lab Sample ID: J0G0127-01
Collected By: Jeff MacLean
Collection Date: 07/01/2020 6:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB
Escherichia coli	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/01/20 0610	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J0G0127-02
Collected By: Jeff MacLean
Collection Date: 07/01/2020 7:26

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB
Escherichia coli	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/01/20 0726	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0127

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J0G0127-03	**Collection Date:**	07/01/2020 7:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB
Escherichia coli	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/01/20 0756	CUS

Client Sample ID:	Terrace Rd Well		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J0G0127-04	**Collection Date:**	07/01/2020 8:20

obiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
iod: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB
Escherichia coli	Absent			per 100mL		07/01/20 1710	07/02/20 1155	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/06/2020 16:54

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0629

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/07/2020
Reported: 07/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Red Apple - Rt 13, McLean Rd		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J0G0629-01	**Collection Date:**	07/07/2020 14:33

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/07/20 2022	07/08/20 1451	EDB
Escherichia coli	Absent			per 100mL		07/07/20 2022	07/08/20 1451	EDB

Analyses Performed by: Customer

. ..d Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		07/07/20 1433	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/10/2020 14:25

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0G0574

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/08/2020
Reported: 07/16/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	C-Ville Highway Garage, Rt 41 Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0G0574-01	**Collection Date:**	07/08/2020 8:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/08/20 1800	07/09/20 1245	EDB
Escherichia coli	Absent			per 100mL		07/08/20 1800	07/09/20 1245	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.20	4.00 MCL		mg/L	**Y1**		07/08/20 0856	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/16/2020 16:13

67

MICRO BAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 [illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back
TO BE COMPLETED BY MICROBAC

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C)
Therm ID
Holding Time 15.4
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Red Apple Rt13/McLean Rd	7-7-2020	2:33 PM	1	DW	1	Na2S203	1									Clo.4
	~~C-Ville Highway Garage Rt41 Polk Ville~~	~~7-7-2020~~		~~1~~	~~DW~~	~~1~~	~~Na2S203~~	~~1~~									~~Clo~~

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-7-2020 4:10 PM	[signature]	7/7/2020 1642
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page of

J0G0629
Cortlandville Water, Town of
PM: Shannon Weeks

27

MICR AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 14.3
Therm ID 377
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	C-Ville Highway Garage Rt 41 Polkville	7-8-2020	8:56 AM	1	DW		Na2S203	1									Clo.2

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-8-2020 905 Am	Amber Schu	7/8/2020 9:24
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J0G0574
Cortlandville Water, Town of
PM: Shannon Weeks

MICBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 16.1
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	BACT	Additional Notes
	Municipal BLDG.	7-1-2020	610 AM	1	DW		Na2S2O3	1	Cl 0.5
	Walden Oaks BS.	7-1-2020	726 AM	1	DW		"	1	Cl 0.5
	Blue Creek BS.	7-1-2020	756 AM	1	DW		"	1	Cl 0.5
	Terrace Rd well	7-1-2020	820 AM	1	DW		"	1	RAW Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-1-2020 837 AM		7/1/2020 8:40
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2020 (MM YYYY)	07/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		—	79.9	—		.6	.3	33.0	OFF	7:20
2		937	74.8	5.1		.6	.3	32.9	OFF	7:15
3		—	74.8	—		.6	.3	32.8	OFF	7:20
4		1026	70.4	4.4		.6	.3	32.7	OFF	7:20
5		—	70.4	—		.6	.3	32.5	off	7:5
6		1008	64.6	5.8		.6	.3	32.5	off	7:45
7		836	61.6	3		.6	.3	32.4	off	7:30
8		—	61.6	—		.6	.3	32.3	off	7:30
9		1019	56.2	5.4		.6	.3	32.2	off	7:15
10		—	56.2	—		.6	.3	32.2	off	7:30
11		886	52.5	3.7		.6	.3	32.0	off	6:20
12		—	52.5	—		.6	.3	31.9	off	845
13		959	47.0	5.5		.6	.3	31.7	off	8:30
14		796	44.0	3.0		.6	.3	31.6	off	7:20
15		—	44.0	—		.6	.3	31.4	off	745
16		1008	38.5	5.5		.6	.3	31.4	off	7:30
17		—	38.5	—		.6	.3	31.3	off	7:30
18		1038	34.2	4.3		.6	.3	31.2	off	730
19		—	34.2	—		.6	.3	31.0	off	9:00
20		1057	28.4	5.8		.6	.3	30.9	off	8:00
21		864	25.3	3.1		.6	.3	30.8	off	8:50
22		—	25.3	—		.6	.3	28.8	off	6:20
23		1022	19.9	5.4		.6	.3	30.6	off	7:20
24		—	19.9	—		.6	.3	30.5	off	7:15
25		758	16.6	3.3		.6	.3	30.5	OFF	6:10
26		—	16.6	—		.6	.3	30.4	off	7:10
27		791	12.4	4.2		.6	.3	30.3	off	7:00
28		884	8.6	3.8		.6	.3	29.6	off	7:20
29		—	4.6/156.8	—		.6	.3	30.1	off	6:45
30		1019	7.1/154.0	4.3		.6	.3	29.4	OFF	7:05
31										
TOTAL		15908								
AVG.		530								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr. Title: W/S Operator NYSDOH Operator Certification Number: N400 30046

Signature: Peter Allen Date: 7/1/2020 Operator Grade Level: T-3

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17985.3				11196.2			48639.45	
6/1/2020	—	17985.3	—	33.0	—	11196.2	—	23.1	48639.45	—
6/2/2020	937	17999.8	14.5	32.9	—	11196.2	—	23.0	48653.95	14.50
6/3/2020	—	17999.8	—	32.8	—	11196.2	—	22.9	48653.95	—
6/4/2020	—	17999.8	—	32.7	1026	11209.2	13	22.9	48666.91	12.96
6/5/2020	—	17999.8	—	32.5	—	11209.2	—	22.6	48666.91	—
6/6/2020	1008	18015.4	15.6	32.5		11209.2	—	22.6	48684.10	17.19
6/7/2020	—	18015.4	—	32.4	836	11219.4	10.2	22.5	48692.71	8.61
6/8/2020	—	18015.4	—	32.3	—	11219.4	—	22.4	48692.71	—
6/9/2020	1019	18031.2	15.8	32.2	—	11219.4	—	22.3	48708.46	15.75
6/10/2020	—	18031.2	—	32.2	—	11219.4	—	22.3	48708.46	—
6/11/2020	—	18031.2	—	32.0	886	11230.3	10.9	22.2	48719.31	10.85
6/12/2020	—	18031.2	—	31.9	—	11230.3	—	22.0	48719.31	—
6/13/2020	959	18046.1	14.9	31.7	—	11230.3	—	21.8	48735.34	16.03
6/14/2020	—	18046.1	—	31.6	796	11240.1	9.8	21.7	48743.91	8.57
6/15/2020	—	18046.1	—	31.6	—	11240.1	—	21.5	48743.91	—
6/16/2020	1008	18061.7	15.6	31.4	—	11240.1	—	21.5	48759.51	15.60
6/17/2020	—	18061.7	—	31.3	—	11240.1	—	21.4	48759.51	—
6/18/2020	—	18061.7	—	31.2	1038	11252.8	12.7	21.3	48772.24	12.73
6/19/2020	—	18061.7	—	31.0	—	11252.8	—	21.1	48772.24	—
6/20/2020	1057	18077.3	15.6	30.9	—	11252.8	—	21.1	48789.38	17.14
6/21/2020	—	18077.3	—	30.8	864	11263.5	10.7	21.0	48798.48	9.10
6/22/2020	—	18077.3	—	28.8	—	11263.5	—	20.0	48798.48	—
6/23/2020	1022	18093.2	15.9	30.6	—	11263.5	—	20.8	48814.35	15.87
6/24/2020	—	18093.2	—	30.5	—	11263.5	—	20.7	48814.35	—
6/25/2020	—	18093.2	—	30.5	758	11272.9	9.4	20.6	48823.74	9.39
6/26/2020	—	18093.2	—	30.4	—	11272.9	—	20.5	48823.74	—
6/27/2020	791	18105.7	12.5	30.3	—	11272.9	—	20.4	48836.16	12.42
6/28/2020	—	18105.7	—	29.6	884	11284.0	11.1	19.8	48847.66	11.5
6/29/2020	—	18105.7	—	30.1	—	11284.0	—	20.2	48847.66	—
6/30/2020	1019	18121.9	16.2	29.9	—	11284.0	—	20.0	48859.60	11.94
TOTAL	8,820,000		136.6		7088		87.8			226.11
AVERAGE	294				236					

Rev: 1/2015

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	06/2020 (MM YYYY)	07/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.) 508	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l) .6	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		826	46.6	4.2		.6	.3	20.1	OFF	7:15
2		—	46.6	—		.6	.3	20.0	OFF	7:05
3		726	42.5	4.1		.6	.3	20.0	OFF	7:00
4		—	42.5	—		.6	.3	16.4	ON	7:03
5		739	37.9	4.6		.6	.3	20.2	off	7:00
6		—	37.9	—		.6	.3	20.3	off	7:30
7		—	37.9	—		.6	.3	15.9	on	7:15
8		808	33.5	4.4		.6	.3	19.9	off	7:00
9		—	33.5	—		.6	.3	15.2	on	7:00
10		921	27.8	5.7		.6	.3	19.6	off	7:30
11		—	27.8	—		.6	.3	15.1	ON	600
12		892	23.1	4.7		.6	.3	19.4	off	900
13		—	23.1	—		.6	.3	19.5	off	845
14		—	23.1	—		.6	.3	15.1	on	7:00
15		804	18.5	4.6		.6	.3	19.2	off	730
16		—	18.5	—		.6	.3	18.7	off	700
17		736	13.8	4.7		.6	.3	19.0	off	700
18		—	13.8	—		.6	.3	15.1	on	700
19		764	9.1	4.7		.6	.3	18.9	off	8:45
20		—	9.1	—		.6	.3	19.0	off	8:15
21		—	9.1	—		.6	.3	14.6	on	7:45
22		743	4.5	4.6		.6	.3	18.7	off	6:35
23		—	4.5	—		.6	.3	14.2	on	7:10
24		918	0	4.5		.6	.3	18.5	off	6:50
25		—	150	—		.6	.3	14.5	ON	6:00
26		778	146	4.0		.6	.3	18.4	off	7:30
27		—	146	—		.6	.3	18.7	off	7:15
28		—	146	—		.6	.3	14.1	on	7:10
29		913	142.8	3.2		.6	.3	18.4	off	6:35
30		—	142.8	—		.6	.3	18.5	OFF	6:55
31										
TOTAL		10,568								
AVG.		352								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allegri Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY4003044

Signature: [signature] Date: 7/1/2020 Operator Grade Level: T3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	6-3-20	1	YES ☒ NO	YES ☒ NO	.6
Walton Oaks Booster	6-3-20	1	YES ☒ NO	YES ☒ NO	.5
Blue Creek Booster	6-3-20	1	YES ☒ NO	YES ☒ NO	.5
Terrace Rd Well RAW	6-3-20		YES ☒ NO	YES ☒ NO	RAW
Red Apple RT 13/McLean Rd	6-9-20	1	YES ☒ NO	YES ☒ NO	.5
Quile Highway RT 41	6-9-20	1	YES ☒ NO	YES ☒ NO	.4
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean.

Name of NYSDOH Certified Laboratory: MicroBAC Labs.

Did any MCL violation occur? If so, please describe: NO.

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments:

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			26206.0		
6/1/2020		826	26227.2	21.2	20.1
6/2/2020		—	26227.2	—	20.0
6/3/2020		726	26246.1	18.9	20.0
6/4/2020		—	26246.1	—	16.4
6/5/2020		739	26265.1	19	20.2
6/6/2020		—	26265.1	—	20.3
6/7/2020		—	26265.1	—	15.9
6/8/2020		808	26285.9	20.8	15.8
6/9/2020		—	26285.9	—	15.2
6/10/2020		921	26309.9	24	19.6
6/11/2020		—	26309.9	—	15.1
6/12/2020		892	26333.1	23.2	19.4
6/13/2020		—	26333.1	—	19.5
6/14/2020		—	26333.1	—	15.1
6/15/2020		804	26353.9	20.8	19.2
6/16/2020		—	26353.9	—	18.7
6/17/2020		736	26373.1	19.2	19.0
6/18/2020		—	26373.1	—	15.1
6/19/2020		764	26392.9	19.8	18.9
6/20/2020		—	26392.9	—	19.0
6/21/2020		—	26392.9	—	14.6
6/22/2020		743	26412.2	19.3	18.7
6/23/2020		—	26412.2	—	14.2
6/24/2020		918	26436.2	24.0	18.5
6/25/2020		—	26436.2	—	14.5
6/26/2020		778	26456.9	20.7	18.4
6/27/2020		—	26456.9	—	18.7
6/28/2020		—	26456.9	—	14.2
6/29/2020		913	26480.5	23.6	18.4
6/30/2020		—	26480.5	—	18.5
TOTAL		10,568		274.5	
Average		352			

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0678

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/09/2020
Reported: 06/17/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt 13/ Mclean Road
Sample Matrix: Drinking Water
Lab Sample ID: J0F0678-01
Collected By: JM-Client
Collection Date: 06/09/2020 13:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/09/20 1654	06/10/20 1156	EDB
Escherichia coli	Absent			per 100mL		06/09/20 1654	06/10/20 1156	EDB

Analyses Performed by: Customer

Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		06/09/20 1310	CUS

Client Sample ID: C-Ville Highway Garage, Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J0F0678-02
Collected By: JM-Client
Collection Date: 06/09/2020 14:57

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/09/20 1654	06/10/20 1156	EDB
Escherichia coli	Absent			per 100mL		06/09/20 1654	06/10/20 1156	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		06/09/20 1457	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0678

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

e data and information on this, and other accompanying documents, represents only the mple(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/17/2020 09:02

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0272

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/03/2020
Reported: 06/16/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municiple Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J0F0272-01
Collected By: JM-Client
Collection Date: 06/03/2020 6:28

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/03/20 0628	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J0F0272-02
Collected By: JM-Client
Collection Date: 06/03/2020 6:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/03/20 0653	CUS

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0272

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-03	**Collection Date:**	06/03/2020 7:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/03/20 0725	CUS

Client Sample ID:	Terrace Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-04	**Collection Date:**	06/03/2020 6:17

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

...etals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	64.1		1.02	mg/L		06/10/20 1415	06/10/20 1439	JDF

Client Sample ID:	Terrace Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0F0272-05	**Collection Date:**	06/03/2020 6:18

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB
Escherichia coli	Absent			per 100mL		06/03/20 1923	06/04/20 1343	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0F0272

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 06/16/2020 09:26

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2359 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

12-15

Instructions on back

Lab Report Address

Client Name: Townof Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC*

Temperature Upon Receipt (°C): 12.6°
Therm ID:
Holding Time:
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Sodium	Raw water			Additional Notes
	Municipal BLDG	6-3-2020	6:28 AM	1	DW	1	Na2S2O3	1					Clo x 6
	Walden Oaks BS	6-3-2020	653 AM	1	DW	1	"	1					Clo 5
	Bilhe Creek BS	6-3-2020	725 AM	1	DW	1	"	1					Clo 5
	Terrace Rd Well	6-3-2020	617 AM	1	DW	1	Nitric acid		1				Raw Water
	Terrace Rd Well	6-3-2020	618 PM	1	DW	1	Na2S2O3			1			Raw Water

J0F0272
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-3-2020 752 AM	Jennifer Walle	6/3/2020 7:5[illegible]
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ____ of ____

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back
TO BE COMPLETED BY MICROBAC

13+14

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Temperature Upon Receipt (°C) 14.7
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Red Apple RH3 / McLean Rd	6-9-2020	110 PM	1	DW	1	Na2S2O3	1									Clo.5
	O-Ville Highway Garage Rt 41 Polkville	6-9-2020	257 PM	1	DW	1	"	1									Clo.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-9-2020 319 PM	Jennifer Walker	6/9/2020 1525
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J O F 0 6 7 8
Cortlandville Water, Town of
PM: Shannon Weeks

R. . AC* 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 162 ain Avenue, Scranton, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 12.6°

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Sodium	Raw Water								Additional Notes
	Municipal BLDG	6-3-2020	6:28 AM	1	DW	1	Na2S2O3	1										Clo. 6
	Walden Oaks BS	6-3-2020	653 AM	1	DW	1	"	1										Clo 5
	Blue Creek BS	6-3-2020	725 AM	1	DW	1	"	1										Clo. 5
	Terrace Rd Well	6-3-2020	617 AM	1	DW	1	Nitric acid		1									Raw Water
	Terrace Rd Well	6-3-2020	618 AM	1	DW	1	Na2S2O3			1								Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-3-2020 752 AM	Jennifer Walle	6/3/2020 7:54

rev.12/26/2017

Page ___ of ___

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05 / 2020 (MM YYYY)	06/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd Well	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		776	106.7 111.3	4.6		.6	.3	22.6	OFF	1:15 am
2		—	106.7	—		.6	.3	23.1	OFF	8:20
3		—	106.7	—		.6	.3	18.5	ON	8:00
4		838	101.5	5.2		.6	.3	22.8	off	8:00
5		—	101.5	—		.6	.3	22.8	off	7:50
6		693	97.4	4.1		.6	.3	22.5	off	7:50
7		—	97.4	—		.6	.3	17.8	ON	7:00
8		806	93.0	4.4		.6	.3	22.2	off	8:15
9		—	93.0	—		.6	.3	22.2	off	7:15
10		—	93.0	—		.6	.3	17.6	ON	8:00
11		824	88.1	4.9		.6	.3	21.7	off	7:15
12		—	88.1	—		.6	.3	17.6	ON	7:15
13		644	84.3	3.8		.6	.3	21.4	off	7:30
14		—	84.3	—		.6	.3	17.1	ON	8:00
15		784	79.5	4.6		.6	.3	21.4	off	9:15
16		—	79.5	—		.6	.3	21.5	off	8:50
17		—	79.5	—		.6	.3	17.1	on	6:50
18		819	73.2	6.3		.6	.3	21.1	off	7:00
19		—	73.2	—		.6	.3	21.1	off	715
20		675	68.2	5.0		.6	.3	20.9	off	700
21		—	68.2	—		.6	.3	16.7	ON	700
22		788	63.6	4.6		.6	.3	20.8	off	9:15
23		—	63.6	—		.6	.3	20.9	off	9:10
24		—	63.6	—		.6	.3	16.4	on	8:30
25		760	59.0	4.9		.6	.3	21.0	off	7:56
26		—	59.0	—		.6	.3	16.4	on	7:10
27		929	55.8	3.2		.6	.3	20.6	off	7:26
28		—	55.8	—		.6	.3	16.3	ON	800
29		884	50.8	5.0		.6	.3	20.9	OFF	9:00
30		—	50.8	—		.6	.3	21.0	OFF	8:30
31		—	50.8	—		.6	.3	16.7	on	6:20
TOTAL		10,220								
AVG.		330								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Alteri Jr Title: W/S operator NYSDOH Operator Certification Number: NY003046

Signature: Peter Alteri Date: 6/1/2020 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Walden Oaks Booster	5-4-20	1	YES NO	YES NO	0.5
Blue Creek Booster	5-4-20	1	YES NO	YES NO	0.5
Municipal Bldg Terrace Rd	5-4-20	1	YES NO	YES NO	0.6
Terrace Rd Well RAW	5-4-20		YES NO	YES NO	
Red Apple RT13/McLean Rd	5-11-20	1	YES NO	YES NO	0.6
Cville Highway RT41	5-11-20	1	YES NO	YES NO	0.4
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: ____

Number of microbiological monitoring samples taken: ____

Did an M&R violation occur? Yes☐ No☐

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☐

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): B. Congdon

Name of NYSDOH Certified Laboratory: Microbac

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: ____

Comments: ____

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	05/2020 (MM YYYY)	06/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	153.1 (153.1)	—		.6	.3	33.0	ON	1:00am
2		984	148.2	4.9		.6	.3	33.4	OFF	8:30
3		757	145.7	2.5		.6	.3	33.5	off	8:00
4		—	145.7	—		.6	.3	33.6	off	7:50
5		896	141.3	4.4		.6	.3	33.7	off	7:00
6		—	141.3	—		.6	.3	33.8	off	7:00
7		882	137.9	3.4		.6	.3	33.8	off	7:00
8		—	137.9	—		.6	.3	33.8	off	8:00
9		882	133.4	4.5		.6	.3	33.8	off	7:00
10		799	130.6	2.8		.6	.3	33.8	off	7:30
11		—	130.6	—		.6	.3	33.9	off	7:45
12		884	125.8	4.8		.6	.3	33.8	off	8:00
13		—	125.8	—		.6	.5	33.8	off	8:00
14		927	122.4	3.4		.6	.3	33.8	off	8:00
15		—	122.4	—		.6	.3	33.8	off	9:00
16		928	117.7	4.7		.6	.3	33.8	off	8:30
17		733	115.0	2.7		.6	.3	33.8	off	6:55
18		—	115.0	—		.6	.3	33.7	off	7:20
19		1020	110.0	5.0		.6	.3	33.7	off	7:30
20		—	110.0	—		.6	.3	33.6	off	7:15
21		1030	105.8	4.2		.6	.3	33.6	off	7:30
22		—	105.8	—		.6	.3	33.5	off	9:00
23		1046	99.8	6.0		.6	.3	33.5	off	9:00
24		856	96.9	2.9		.6	.3	33.5	off	8:20
25		—	96.9	—		.6	.3	33.4	off	8:20
26		989	91.6	5.3		.6	.3	33.3	off	7:20
27		—	91.6	—		.6	.3	33.4	off	7:30
28		896	87.8	3.8		.6	.3	33.3	off	7:00
29		—	87.8	—		.6	.3	33.3	OFF	9:10
30		932	82.5	5.3		.6	.3	33.2	OFF	8:45
31		707	79.9	2.6		.6	.3	33.1	off	6:30
TOTAL		16,148								
AVG.		521								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alter IV Title: W/S operator NYSDOH Operator Certification Number: NY 0030646

Signature: Peter Alter Date: 6/1/2020 Operator Grade Level: IIB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E0342

Client Sample ID:	Walden Oaks B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J0E0342-03	**Collection Date:**	05/04/2020 9:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB
Escherichia coli	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/04/20 0930	CUS

Client Sample ID:	Blue Creek B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J0E0342-04	**Collection Date:**	05/04/2020 9:45

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ıthod: SM 9223 B (Colilert)-1997								
ıotal Coliform	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB
Escherichia coli	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.45	4.00 MCL		mg/L	Y1		05/04/20 0945	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E0342

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/04/2020
Reported: 05/06/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0E0342-01
Collected By: BC-Client
Collection Date: 05/04/2020 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB
Escherichia coli	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/04/20 0900	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J0E0342-02
Collected By: BC-Client
Collection Date: 05/04/2020 9:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB
Escherichia coli	Absent			per 100mL		05/04/20 1604	05/05/20 1134	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E0703

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/11/2020
Reported: 05/14/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - 1040 McLean Rd. - Sink
Sample Matrix: Drinking Water
Lab Sample ID: J0E0703-01
Collected By: BC-Client
Collection Date: 05/11/2020 9:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/11/20 1620	05/12/20 1127	EDB
Escherichia coli	Absent			per 100mL		05/11/20 1620	05/12/20 1127	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		05/11/20 0930	CUS

Client Sample ID: 4765 Rt 11 Cortlandville Highway
Sample Matrix: Drinking Water
Lab Sample ID: J0E0703-02
Collected By: BC-Client
Collection Date: 05/11/2020 11:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/11/20 1620	05/12/20 1127	EDB
Escherichia coli	Absent			per 100mL		05/11/20 1620	05/12/20 1127	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		05/11/20 1100	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0E0703

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

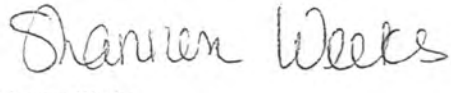
Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:



Shannon Weeks
Customer Relationship Coordinator
Reported: 05/14/2020 07:58

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			25944.2		
5/1/2020		776	25963.9	19.7	22.6
5/2/2020		—	25963.9	←	23.1
5/3/2020		—	25963.9	—	18.5
5/4/2020		838	25985.2	21.3	22.8
5/5/2020		—	25985.2	—	22.8
5/6/2020		693	26002.9	17.7	22.5
5/7/2020		—	26002.9	—	17.8
5/8/2020		806	26023.5	20.6	22.2
5/9/2020		—	26023.5	—	22.2
5/10/2020		—	26023.5	—	17.7
5/11/2020		824	26044.6	21.1	21.7
5/12/2020		—	26044.6	~~17.6~~	17.6
5/13/2020		641	26061.1	16.5	21.4
5/14/2020		—	26061.1	—	17.1
5/15/2020		784	26081.2	20.1	21.4
5/16/2020		—	26081.2	—	21.5
5/17/2020		—	26081.2	—	17.1
5/18/2020		819	26102.2	21.0	21.1
5/19/2020		—	26102.2	—	21.1
5/20/2020		675	26119.5	17.3	20.9
5/21/2020		—	26119.5	—	16.7
5/22/2020		788	26139.7	20.2	20.8
5/23/2020		—	26139.7	~~20.9~~	20.9
5/24/2020		—	26139.7	—	16.4
5/25/2020		760	26159.2	19.5	21.0
5/26/2020		—	26159.2	—	16.4
5/27/2020		929	26183.3	24.1	20.6
5/28/2020		—	26183.3	—	16.3
5/29/2020		884	26206.0	22.7	20.9
5/30/2020		—	26206.0	—	21.0
5/31/2020		—	26206.0	—	16.7
TOTAL		10,220		261.8	
Average		330			

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17852.6				11103.5			48415.25	
5/1/2020	—	17852.6	—	33.0	—	11103.5	—	22.9	48415.25	—
5/2/2020	984	17868.6	16	33.4	—	11103.5	—	23.5	48431.46	16.21
5/3/2020	—	17868.6	—	33.5	757	11112.7	9.2	23.6	48439.67	8.21
5/4/2020	—	17868.6	—	33.6	—	11112.7	—	23.7	48439.67	—
5/5/2020	896	17882.5	13.9	33.7	—	11112.7	—	23.7	48453.52	13.85
5/6/2020	—	17882.5	—	33.8	—	11112.7	—	23.8	48453.52	—
5/7/2020	—	17882.5	—	33.8	882	11123.5	10.8	23.9	48464.30	10.78
5/8/2020	—	17882.5	—	33.8	—	11123.5	—	23.9	48464.30	—
5/9/2020	882	17896.2	13.7	33.8	—	11123.5	—	23.9	48478.72	14.42
5/10/2020	—	17896.2	—	33.8	799	11133.2	9.7	23.9	48487.64	8.92
5/11/2020	—	17896.2	—	33.9	—	11133.2	—	24.0	48487.64	—
5/12/2020	884	17909.9	13.7	33.8	—	11133.2	—	23.9	48501.33	13.69
5/13/2020	—	17909.9	—	33.8	—	11133.2	—	23.9	48501.33	—
5/14/2020	—	17909.9	—	33.8	927	11144.6	11.4	23.9	48512.63	11.03
5/15/2020	—	17909.9	—	33.8	—	11144.6	—	23.9	48512.63	—
5/16/2020	928	17924.3	14.4	33.8	—	11144.6	—	23.9	48527.48	14.85
5/17/2020	—	17924.3	—	33.8	733	11153.5	8.9	23.8	48535.88	8.40
5/18/2020	—	17924.3	—	33.7	—	11153.5	—	23.8	48535.88	—
5/19/2020	1020	17940.1	15.8	33.7	—	11153.5	—	23.7	48551.66	15.78
5/20/2020	—	17940.1	—	33.6	—	11153.5	—	23.7	48551.66	—
5/21/2020	—	17940.1	—	33.6	1030	11166.1	12.6	23.7	48564.22	12.56
5/22/2020	—	17940.1	—	33.5	—	11166.1	—	23.6	48564.22	—
5/23/2020	1046	17955.6	15.5	33.5	—	11166.1	—	23.6	48581.55	17.33
5/24/2020	—	17955.6	—	33.5	856	11176.6	10.5	23.6	48590.12	8.57
5/25/2020	—	17955.6	—	33.4	—	11176.6	—	23.5	48590.12	—
5/26/2020	989	17970.8	15.2	33.3	—	11176.6	—	23.4	48605.40	15.28
5/27/2020	—	17970.8	—	33.4	—	11176.6	—	23.5	48605.40	—
5/28/2020	—	17970.8	—	33.3	896	11187.5	10.9	23.4	48616.35	10.95
5/29/2020	—	17970.8	—	33.3	—	11187.5	—	23.3	48616.35	—
5/30/2020	932	17985.3	14.5	33.2	—	11187.5	—	23.3	48631.62	15.27
5/31/2020	—	17985.3	—	33.1	707	11196.2	8.7	23.2	48639.45	7.83
TOTAL	8561		132.7		7587		92.7			224.2
AVERAGE	276				245					

Rev: 1/2015

6+7

M... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time 7 3
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon
Sampler Signature: B.R. Cyler
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacterial							Additional Notes
#1	Redapple sink 1040 McLean Rd	5-11-20	9:30 AM	1		G	TH10	1							.60 Chlorine
#2	4765 Route 41 Cortlandville Highway	5-11-20	11:00 AM	1		G	TH10	1							.40 Chlorine

J O E 0 7 0 3
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R. Cyler	5-11-20 11:10 AM	[signature]	5/11/2020 1139
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

13-14

MICROBAC | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID: 01

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon

Sampler Signature: B.R. Gn

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria						Additional Notes
1	Municipal Bldg	5-4-20	9:00 AM	1		G	THIO	1						Chlorine .60
2	Terrace Rd Well	5-4-20	9:15 AM	1		G	THIO	1						Chlorine None Raw Water
3	Waldon Oaks BS.	5-4-20	9:30 AM	1		G	THIO	1						Chlorine .50
4	Blue Creek B.S.	5-4-20	9:45 AM	1		G	THIO	1						Chlorine .45

J 0 E 0 3 4 2

Cortlandville Water, Town of

PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R. Gn	5-4-20 10:15 AM	[illegible]	5/4/20 1040
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Result

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2020 (MM YYYY)	05/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		696	26.5	3.6		.6	.3	21.3	off	8:00 AM
2		—	26.5	—		.6	.3	17.0	ON	8:00 A
3		770	22.2	4.3		.6	.3	21.2	OFF	9:00am
4		—	22.2	—		.6	.3	21.3	OFF	8:45am
5		—	22.2	—		.6	.3	16.8	ON	7:30
6		832	17.6	4.6		.6	.3	20.9	off	7:30
7		—	17.6	—		.6	.3	21.1	off	7:30
8		697	13.8	3.8		.6	.3	21.0	off	7:15
9		—	13.8	—		.6	.3	17.1	ON	7:00
10		825	9.5	4.3		.6	.3	20.8	off	8:15
11		—	9.5	—		.6	.3	20.9	off	7:30
12		—	9.5	—		.6	.3	16.5	ON	8:00
13		834	5.4	4.1		.6	.3	20.7	off	7:45
14		—	5.4	—		.6	.3	20.8	off	7:15
15		634	140/138.6	2.4		.6	.3	20.6	off	7:45
16		—	138.6	—		.6	.3	16.4	ON	7:15
17		767	133.9	4.7		.6	.3	20.5	off	930
18		—	133.9	—		.6	.3	20.7	off	745
19		—	133.9	—		.6	.3	16.3	ON	7:00
20		840	128.9	5.0		.6	.3	20.5	off	7:30
21		—	128.9	—		.6	.3	16.2	ON	7:00
22		676	126.2	2.7		.6	.3	20.3	off	7:30
23		—	126.2	—		.6	.3	16.2	ON	7:30
24		783	121.3	4.9		.6	.3	20.2	off	10:05
25		—	121.3	—		.6	.3	20.4	off	8:35
26		—	121.3	—		.6	.3	16.6	ON	7:15
27		924	115.6	5.7		.6	.3	21.0	off	7:00
28		—	115.6	—		.6	.3	21.3	off	7:15
29		678	111.3	4.3		.6	.3	21.1	off	7:00
30		—	111.3	—		.6	.3	18.1	ON	7:30
31										
TOTAL		9,951								
AVG.		332								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Allen Jr- Title: W/S operator NYSDOH Operator Certification Number: NY 02346

Signature: Peter Allen Jr Date: 5/1/2020 Operator Grade Level: 1D3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd Well	4-1-20		~~YES~~ NO	YES ~~NO~~	RAW.
Municipal Bldg Terrace Rd.	4-1-20	1	YES ~~NO~~	YES ~~NO~~	.6
Waldon Oaks Booster STA.	4-1-20	1	YES ~~NO~~	YES ~~NO~~	.5
Blue Creek Booster	4-1-20	1	YES ~~NO~~	YES ~~NO~~	.5
1040 McLean Rd.	4-6-20	1	YES ~~NO~~	YES ~~NO~~	.6
4765 RT 41	4-6-20	1	YES ~~NO~~	YES ~~NO~~	.2
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Brian Congdon

Name of NYSDOH Certified Laboratory: Microbac.

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	04/2020 (MM YYYY)	05/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	66.4 66.4	—		.6	.3	33.4	off	8:15
2		1,057	62.2	4.2		.6	.3	33.3	off	7:45
3		—	62.2	—		.6	.3	33.3	OFF	9:15
4		935	57.2	5		.6	.3	33.2	OFF	8:55
5		812	54.6	2.6		.6	.3	33.2	off	7:00
6		—	54.6	—		.6	.3	33.2	off	7:00
7		933	50.0	4.6		.6	.3	33.2	off	7:00
8		—	50.0	—		.6	.3	33.2	off	7:00
9		864	46.7	3.3		.6	.3	33.2	off	7:20
10		—	46.7	—		.6	.3	33.1	off	8:00
11		862	42.3	4.4		.6	.3	33.0	off	7:30
12		585	40.0	2.3		.6	.3	33.1	off	8:00
13		—	40.0	—		.6	.3	33.0	off	7:30
14		949	35.4	4.6		.6	.3	32.9	off	7:00
15		—	35.4	—		.6	.3	32.9	off	7:30
16		907	31.8	3.6		.6	.3	32.9	off	7:00
17		—	32.9	—		.6	.3	32.9	off	9:40
18		822	27.7	5.2		.6	.3	32.8	off	8:00
19		616	25.4	2.3		.6	.3	32.8	off	7:30
20		—	25.4	—		.6	.3	32.8	off	7:00
21		839	21.4	4.0		.6	.3	32.7	off	7:30
22		—	21.4	—		.6	.3	32.7	off	7:00
23		852	18.1	3.3		.6	.3	32.6	off	7:00
24		—	18.1	—		.6	.3	32.6	off	9:50
25		896	13.4	4.7		.6	.3	32.5	off	8:25
26		703	10.9	2.5		.6	.3	32.5	off	7:00
27		—	10.9	—		.6	.3	32.6	off	7:00
28		908	6.4	4.5		.6	.3	32.6	off	7:00
29		—	6.4	—		.6	.3	32.7	off	7:30
30		943	5.7 / 153.1	3.8		.6	.3	33.0	off	7:30
31										
TOTAL		14,483								
AVG.		483								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Aitken Jr Title: W/S Operator NYSDOH Operator Certification Number: NY00346

Signature: Peter Aitken Date: 5-1-20 Operator Grade Level: TP3

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			25686.3		
4/1/2020		696	25704.1	17.8	21.3
4/2/2020		—	25704.1	—	17.0
4/3/2020		770	25723.9	19.8	21.2
4/4/2020		—	25723.9	—	21.3
4/5/2020		—	25723.9	—	16.8
4/6/2020		832	25745.2	21.3	20.9
4/7/2020		—	25745.2	—	21.1
4/8/2020		692	25763.0	17.8	21.0
4/9/2020		—	25763.0	[illegible]	16.3
4/10/2020		825	25784.2	21.2	20.8
4/11/2020		—	25784.2	—	20.9
4/12/2020		—	25784.2	—	16.5
4/13/2020		834	25805.7	21.5	20.7
4/14/2020		—	25807.6	—	20.8
4/15/2020		634	25823.9	16.3	20.6
4/16/2020		—	25823.9	—	16.4
4/17/2020		767	25843.7	19.8	20.5
4/18/2020		—	25843.7	—	20.7
4/19/2020		—	25843.7	—	16.3
4/20/2020		840	25865.3	21.6	20.5
4/21/2020		—	25865.3	—	16.2
4/22/2020		676	25882.7	20.3	17.4
4/23/2020		—	25882.7	—	16.2
4/24/2020		783	25902.9	20.2	20.2
4/25/2020		—	25902.9	—	20.4
4/26/2020		—	25902.9	—	16.7
4/27/2020		924	25926.8	23.9	21.0
4/28/2020		—	25926.8	—	21.3
4/29/2020		678	25944.2	17.4	21.1
4/30/2020		—	25944.2	[illegible]	18.2
TOTAL		9951		257.9	
Average		332			

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17741.0				11012.7			48213.21	
4/1/2020	—	17741.0	—	33.4	—	11012.7	—	23.5	48213.21	—
4/2/2020	—	17741.0	—	33.3	1,057	11025.7	13	23.5	48226.25	13.04
4/3/2020	—	17741.0	—	33.3	—	11025.7	—	23.4	48226.25	—
4/4/2020	935	17755.6	14.6	33.2	—	11025.7	—	23.3	48242.31	16.06
4/5/2020	—	17755.6	—	33.2	812	11035.8	10.1	23.3	48250.83	8.52
4/6/2020	—	17755.6	—	33.2	—	11035.8	—	23.3	48250.83	—
4/7/2020	933	17770.1	14.5	33.2	—	11035.8	—	23.3	48265.35	14.52
4/8/2020	—	17770.1	—	33.2	—	11035.8	—	23.3	48265.35	—
4/9/2020	—	17770.1	—	33.2	864	11046.5	10.7	23.3	48276.06	10.71
4/10/2020	—	17770.1	—	33.1	—	11046.5	—	23.3	48276.06	—
4/11/2020	862	17783.6	13.5	33.0	—	11046.5	—	23.1	48289.59	13.53
4/12/2020	—	17783.6	—	33.1	585	11053.8	7.3	23.2	48296.81	7.22
4/13/2020	—	17783.6	—	33.0	—	11053.8	—	23.2	48296.81	—
4/14/2020	949	17798.4	14.8	~~32.8~~	—	11053.8	—	23.0	48311.58	14.77
4/15/2020	—	17798.4	—	32.9	—	11053.8	—	23.0	48311.58	—
4/16/2020	—	17798.4	—	32.9	907	11065.1	11.3	23.0	48322.82	11.24
4/17/2020	—	17798.4	—	32.9	—	11065.1	—	23.1	48322.82	—
4/18/2020	822	17811.3		32.8	—	11065.1	—	22.9	48335.69	12.87
4/19/2020	—	17811.3	—	32.8	616	11072.7	7.6	22.9	48343.28	7.59
4/20/2020	—	17811.3	—	32.8	—	11072.7	—	23.0	48343.28	—
4/21/2020	839	17824.5	13.2	32.7	—	11072.7	—	22.8	48356.40	13.12
4/22/2020	—	17824.5	—	32.7	—	11072.7	—	22.8	48356.40	—
4/23/2020	—	17824.5	—	32.6	852	11083.2	10.5	22.7	48366.96	10.56
4/24/2020	—	17824.5	—	32.6	—	11083.2	—	22.7	48366.96	—
4/25/2020	896	17838.5	14.0	32.5	—	11083.2	—	22.6	48381.35	14.39
4/26/2020	—	17838.5	—	32.5	703	11091.9	8.7	22.7	48389.60	8.25
4/27/2020	—	17838.5	—	32.6	—	11091.9	—	22.7	48389.60	—
4/28/2020	908	17852.6	14.1	32.6	—	11091.9	—	22.7	48403.71	14.11
4/29/2020	—	17852.6	—	32.7	—	11091.9	—	22.8	48403.71	—
4/30/2020	—	17852.6	—	33.0	943	11103.5	11.6	23.1	48415.25	11.54
TOTAL	7144		111.6		7359		90.8			202.01
AVERAGE	238									

Rev: 1/2015

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0D0199

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/01/2020
Reported: 04/03/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 3587 Terrace Rd. Municipal Bldg. Mop Room
Sample Matrix: Drinking Water
Lab Sample ID: J0D0199-01
Collected By: BC-Client
Collection Date: 04/01/2020 8:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB
Escherichia coli	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/01/20 0820	CUS

Client Sample ID: 60 HP Raw Water Tap
Sample Matrix: Drinking Water
Lab Sample ID: J0D0199-02
Collected By: BC-Client
Collection Date: 04/01/2020 8:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			per 100mL		04/01/20 1549	04/02/20 1343	EDB
Escherichia coli	Absent			per 100mL		04/01/20 1549	04/02/20 1343	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0D0199

Client Sample ID:	Walden Oaks Booster Station		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J0D0199-03	**Collection Date:**	04/01/2020 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB
Escherichia coli	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/01/20 0900	CUS

Client Sample ID:	Blue Creek Booster Station		
Sample Matrix:	Drinking Water	**Collected By:**	BC-Client
Lab Sample ID:	J0D0199-04	**Collection Date:**	04/01/2020 8:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ethod: SM9223 B-1997								
otal Coliform	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB
Escherichia coli	Absent			per 100mL		04/01/20 1549	04/02/20 1116	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/01/20 0850	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0D0467

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/06/2020
Reported: 04/08/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: 1040 McLean Rd
Sample Matrix: Drinking Water
Lab Sample ID: J0D0467-01
Collected By: BC-Client
Collection Date: 04/06/2020 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		04/06/20 1628	04/07/20 1133	EDB
Escherichia coli	Absent			per 100mL		04/06/20 1628	04/07/20 1133	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		04/06/20 0900	CUS

Client Sample ID: 4765 Rt 11
Sample Matrix: Drinking Water
Lab Sample ID: J0D0467-02
Collected By: BC-Client
Collection Date: 04/06/2020 10:15

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		04/06/20 1628	04/07/20 1133	EDB
Escherichia coli	Absent			per 100mL		04/06/20 1628	04/07/20 1133	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.20	4.00 MCL		mg/L	**Y1**		04/06/20 1015	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0D0467

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division

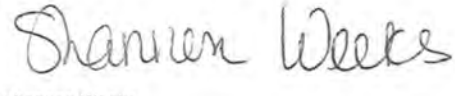
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:



Shannon Weeks

Customer Relationship Coordinator

Reported: 04/08/2020 12:01

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162 Main Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number 11412

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C) 10.0°C
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Location: PO No.: Compliance Monitoring? [ ] Yes [ ] No ( ) Agency/Program

Sampled by (PRINT): Brian L. Congdon Sampler Signature: B.L.C. Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacteria					Additional Notes
1	1040 McLean Rd	4-6-20	9:40 AM	1		G	THIO	1					Chlorine, 60
2	4765 RT 11	4-6-20	10:15	1		G	THIO	1					Chlorine, 20

Cortlandville Water, Town of
PM: Shannon Weeks
J O D 0 4 6 7

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.L.C.	4-6-20 10:20 AM	Jennifer Walker	4/6/2020 10:20
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0D0199

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/03/2020 17:05

8-11

MICROBAC 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 162(ain Avenue, Scranton, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 8.9°C

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project:

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Brian R. Congdon

Sampler Signature: B.R. [signature]

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Bacterial						Additional Notes
1	3587 Terrace Rd Municipal Bldg Map Room	4-1-20	8:20 AM	1		G	TH10	1						.60 Chlorine
2	60 HP Raw Water Tap	4-1-20	8:30 AM	1		G	TH10	1						Raw Water
3	Walden Oaks Booster Station	4-1-20	9:00 AM	1		G	TH10	1						.50 Chlorine
4	Blue Creek Booster Station	4-1-20	8:50	1		G	TH10	1						.50 Chlorine

J0D0199
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
B.R. [signature]		Jennifer M Walker	4/1/2020 9:44
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
	4-1-20 9:30 am		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

ublic Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2020 (MM YYYY)	04/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Lime Hollow	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
			133.2			.6				
1		738	130.4	2.8		.6	.3	32.3	off	7:10
2		—	130.4	—		.6	.3	32.4	off	7:45
3		878	126.2	4.2		.6	.3	32.5	off	7:35
4		—	126.2	—		.6	.3	32.8	off	7:45
5		926	122.5	3.7		.6	.3	32.9	OFF	7:31
6		—	122.5	—		.6	.3	33.0	OFF	8:00
7		876	116.1	6.4		.6	.3	29.9	ON x2	8:30
8		1388	114.0	2.1		.6	.3	33.0	OFF	8:00
9		—	114.0	—		.6	.3	33.1	OFF	7:25
10		910	109.4	4.6		.6	.3	33.2	OFF	7:05
11		—	109.4	—		.6	.3	33.3	OFF	7:26
12		816	106.3	3.1		.6	.3	33.4	off	800
13		—	106.3	—		.6	.3	33.4	off	8:00
14		823	102.1	4.2		.6	.3	33.4	off	8:00
15		613	99.6	2.5		.6	.3	33.4	off	7:30
16		—	99.6	—		.6	.3	33.5	off	7:45
17		821	95.5	4.1		.6	.3	33.4	off	8:15
18		—	95.5	—		.6	.3	33.5	off	8:00
19		860	92.1	3.4		.6	.3	33.5	off	8:00
20		—	92.1	—		.6	.3	33.5	off	845
21		852	88.0	4.1		.6	.3	33.3	off	900
22		622	85.4	2.6		.6	.3	33.4	off	8:00
23		—	85.4	—		.6	.3	33.4	off	8:15
24		823	81.3	4.1		.6	.3	33.3	off	8:45
25		—	81.3	—		.6	.3	33.4	off	8:15
26		829	78.1	3.2		.6	.3	33.3	off	7:45
27		—	78.1	—		.6	.3	33.3	off	9:10
28		954	73.0	5.1		.6	.3	33.2	off	8:40
29		742	70.5	2.5		.6	.3	33.3	off	8:15
30		—	70.5	—		.6	.3	33.4	off	7:30
31		827	66.4	4.1		.6	.3	33.4	off	7:30
TOTAL		15298								
AVG.		493								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Atteri Jr Title: W/S operator NYSDOH Operator Certification Number: NY0030046

ature: [signature] Date: 4/1/2020 Operator Grade Level: IT3

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	3-3-20	1	YES NO	YES NO	.6
Walden Oaks Booster	3-3-20	1	YES NO	YES NO	.5
Blue Creek Booster	3-3-20	1	YES NO	YES NO	.41
Rt 2 Apple Rt 13 / Nichols Rd	3-9-20	1	YES NO	YES NO	.6
Ouilie Highway Rt 41	3-9-20	1	YES NO	YES NO	.41
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System." copy of this form shall be sent to your local health departmen the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	03/2020 (MM YYYY)	04/01/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 Terrace Rd	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		—	84.3	—		.6	.3	17.7	on	7:05
2		775	79.3	5.0		.6	.3	22.1	off	7:32
3		—	79.3	—		.6	.3	18.5	on	7:20
4		689	77.0	2.3		.6	.3	22.6	off	7:37
5		—	77.0	—		.6	.3	18.4	ON	7:03
6		766	73.2	3.8		.6	.3	22.6	OFF	7:51
7		—	73.2	—		.6	.3	22.6	OFF	8:17
8		155	70.7	2.6		.6	.3	17.9	ON	7:00
9		946	66.8	3.9		.6	.3	22.6	OFF	7:15
10		—	66.8	—		.6	.3	22.6	OFF	6:58
11		702	63.3	3.5		.6	.3	22.5	OFF	7:06
12		—	63.3	—		.6	.3	17.9	ON	745
13		781	59.0	4.3		.6	.3	22.2	off	8:15
14		—	59.0	—		.6	.3	22.3	off	8:00
15		—	59.0	—		.6	.3	17.4	ON	7:30
16		843	54.5	4.5		.6	.3	21.8	off	7:30
17		—	54.5	—		.6	.3	17.5	ON	8:00
18		665	50.9	3.6		.6	.3	21.6	off	8:00
19		—	50.9	—		.6	.3	17.6	ON	8:00
20		763	46.8	4.1		.6	.3	21.4	off	830
21		—	46.8	—		.6	.3	21.4	off	920
22		—	46.8	—		.6	.3	16.8	ON	8:00
23		831	42.3	4.5		.6	.3	21.0	off	8:00
24		—	42.3	—		.6	.3	17.3	ON	8:00
25		638	38.9	3.4		.6	.3	21.0	off	8:00
26		—	38.9	—		.6	.3	16.6	ON	8:00
27		821	34.3	4.6		.6	.3	20.9	off	8:58
28		—	34.3	—		.6	.3	21.3	off	9:00
29		—	34.3	—		.6	.3	17.0	ON	8:00
30		756	30.1	4.2		.6	.3	21.3	off	8:00
31		—	30.1	—		.6	.3	21.3	off	8:00
TOTAL		10,131								
AVG.		327								

Chlorine Mix Ratio = — quarts/gallons of — % chlorine added to — gallons of water in crock.

Reported by: Peter Alfeti Jr. Title: W/S operator NYSDOH Operator Certification Number: NY 0030046

Signature: Peter Alfeti Date: 4/1/2020 Operator Grade Level: TB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0316

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/03/2020
Reported: 03/05/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0C0316-01
Collected By: JM-Client
Collection Date: 03/03/2020 7:53

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB
Escherichia coli	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB

Analyses Performed by: Customer

eld Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/03/20 0753	CUS

Client Sample ID: Walden Oaks BS
Sample Matrix: Drinking Water
Lab Sample ID: J0C0316-02
Collected By: JM-Client
Collection Date: 03/03/2020 8:18

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB
Escherichia coli	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/03/20 0818	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0316

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0C0316-03	**Collection Date:**	03/03/2020 8:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB
Escherichia coli	Absent			per 100mL		03/03/20 1624	03/04/20 1120	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		03/03/20 0856	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/05/2020 17:28

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0640

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/09/2020
Reported: 03/11/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J0C0640-01
Collected By: JM-Client
Collection Date: 03/09/2020 9:20

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		03/09/20 1600	03/10/20 1150	EDB
Escherichia coli	Absent			per 100mL		03/09/20 1600	03/10/20 1150	EDB

Analyses Performed by: Customer

Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/09/20 0920	CUS

Client Sample ID: C-Ville Highway Garage Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J0C0640-02
Collected By: JM-Client
Collection Date: 03/09/2020 10:55

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		03/09/20 1600	03/10/20 1150	EDB
Escherichia coli	Absent			per 100mL		03/09/20 1600	03/10/20 1150	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		03/09/20 1055	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17615.5				10923.5			48003.64	
3/1/2020	—	17615.5	—	32.3	738	10932.5	9.0	22.4	48012.60	8.96
3/2/2020	—	17615.5	—	32.4	—	10932.5	—	22.5	48012.60	—
3/3/2020	878	17629.2	13.7	32.5	—	10932.5	—	22.7	48026.30	13.7
3/4/2020	—	17629.2	—	32.8	—	10932.5	—	22.9	48026.30	—
3/5/2020	—	17629.2	—	32.9	926	10944.0	11.5	23.0	48037.75	11.45
3/6/2020	—	17629.2	—	33.0	—	10944.0	—	23.1	48037.75	—
3/7/2020	876	17647.2	18.0	29.9	—	10944.0	—	15.2	48057.00	19.25
3/8/2020	384	17647.2	Inadvertent	33.0	1004	10956.6	12.6	23.1	48064.05	7.05
3/9/2020	—	17647.2	—	33.1	—	10956.6	—	23.2	48064.05	—
3/10/2020	910	17661.4	14.2	33.2	—	10956.6	—	23.3	48078.24	14.19
3/11/2020	—	17661.4	—	33.3	—	10956.6	—	23.4	48078.24	—
3/12/2020	—	17661.4	—	33.4	816	10966.8	10.2	23.5	48088.35	10.11
3/13/2020	—	17661.4	—	33.4	—	10966.8	—	23.5	48088.35	—
3/14/2020	823	17674.3	12.9	33.4	—	10966.8	—	23.5	48101.23	12.88
3/15/2020	—	17674.3	—	33.4	613	10974.3	7.5	23.5	48108.78	7.55
3/16/2020	—	17674.3	—	33.5	—	10974.3	—	23.6	48108.78	—
3/17/2020	821	17687.1	12.8	33.4	—	10974.3	—	23.5	48121.60	12.82
3/18/2020	—	17687.1	—	33.5	—	10974.3	—	23.6	48121.60	—
3/19/2020	—	17687.1	—	33.5	860	10985.0	10.7	23.6	48132.27	10.67
3/20/2020	—	17687.1	—	33.5	—	10985.0	—	23.6	48132.27	—
3/21/2020	852	17700.5	13.4	33.3	—	10985.0	—	23.5	48145.68	13.41
3/22/2020	—	17700.5	—	33.4	622	10992.7	7.7	23.5	48153.26	7.58
3/23/2020	—	17700.5	—	33.4	—	10992.7	—	23.5	48153.26	—
3/24/2020	823	17713.2	12.7	33.3	—	10992.7	—	23.4	48165.96	12.7
3/25/2020	—	17713.2	—	33.4	—	10992.7	—	23.5	48165.96	—
3/26/2020	—	17713.2	—	33.3	829	11003.0	10.3	23.4	48176.24	10.28
3/27/2020	—	17713.2	—	33.3	—	11003.0	—	23.4	48176.24	—
3/28/2020	954	17728.1	14.9	33.2	—	11003.0	—	23.4	48192.36	16.12
3/29/2020	—	17728.1	—	33.3	742	11012.7	9.7	23.4	48200.29	7.93
3/30/2020	—	17728.1	—	33.4	—	11012.7	—	23.5	48200.29	—
3/31/2020	827	17741.0	12.9	33.4	—	11012.7	—	23.5	48213.21	12.92
TOTAL	8148		125.5		7150		89.2			210
AVERAGE	263				231					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			25427.1		
3/1/2020		—	25427.1	—	17.7
3/2/2020		775	25446.9	19.8	22.1
3/3/2020		—	25446.9	—	18.5
3/4/2020		689	25464.4	17.5	22.6
3/5/2020		—	25464.4	—	18.4
3/6/2020		766	25483.9	19.5	22.6
3/7/2020		—	25483.9	—	22.6
3/8/2020		155.0	25488.0	4.1	17.9
3/9/2020		946	25512.0	24	22.6
3/10/2020		—	25512.0	—	22.6
3/11/2020		702	25529.9	17.9	22.5
3/12/2020		—	25529.9	—	17.9
3/13/2020		781	25549.9	20.0	22.2
3/14/2020		—	25549.9	—	22.3
3/15/2020		—	25549.9	—	17.4
3/16/2020		843	25571.5	21.6	21.8
3/17/2020		—	25571.5	—	17.5
3/18/2020		665	25588.5	17	21.6
3/19/2020		—	25588.5	—	17.3
3/20/2020		763	25608.1	19.6	21.4
3/21/2020		—	25608.1	—	21.4
3/22/2020		—	25608.1	—	16.8
3/23/2020		831	25629.5	21.4	21.0
3/24/2020		—	25629.5	—	16.9
3/25/2020		638	25645.9	16.4	21.0
3/26/2020		—	25645.9	—	16.6
3/27/2020		821	25666.9	21.0	20.9
3/28/2020		—	25666.9	—	21.3
3/29/2020		—	25666.9	—	17.0
3/30/2020		756	25686.3	19.4	21.3
3/31/2020		—	25686.3	—	21.3
TOTAL		10,131		259.2	
Average		327			

MI AC*

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

162 ain Avenue
Scranton, PA 18508
570.343.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BTEX										Additional Notes
	Red Apple Rt13/McLean Rd	3-9-2020	9:20 AM	1	DW	1	Na2S2O3	1										C10.6
	C-Ville High Way Garage Rt41 Polkville	3-9-2020	10:55 AM	1	DW	1	Na2S2O3	1										C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-9-2020 1104 AM		3/9/2020 1104
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0C0640

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/11/2020 10:02

M AC* 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 16 ain Avenue, S 1, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RI

Number

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (°C): 3.2
Therm ID:
Holding Time:
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Municipal BLDG	3-3-2020	7:53 AM	1	DW	1	Na2S2O3	1	C10.6
	Walden Oaks BS	3-3-2020	8:18 AM	1	DW	1	Na2S2O3	1	C10.5
	Blue Creek BS.	3-3-2020	8:56 AM	1	DW	1	Na2S2O3	1	C16.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-3-2020 9:21 AM	[illegible]	3/3/2020 9:21
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPOR
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/2020 (MM YYYY)	03/02/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
			51.0			.6				
1		955	45.0	6.0		.6	.3	31.9	off	7:10
2		731	42.4	3.6		.6	.3	31.9	off	7:40
3		—	42.4	—		.6	.3	32.0	off	10:00
4		656	39.6	2.8		.6	.3	31.9	off	7:00
5		—	39.6	—		.6	.3	32.0	off	9:00
6		665	37.0	2.6		.6	.3	32.1	off	7:45
7		—	37.0	—		.6	.3	32.1	OFF	9:05
8		607	33.3	3.7		.6	.3	31.0	ON/OFF	9:50
9		667	30.7	2.6		.6	.3	32.1	OFF	7:15
10		—	30.7	—		.6	.3	32.2	OFF	7:20
11		653	27.3	3.4		.6	.3	32.1	OFF	7:25
12		—	27.3	—		.6	.3	32.2	OFF	7:25
13		708	24.7	2.6		.6	.3	32.1	off	7:40
14		—	24.7	—		.6	.3	32.2	off	8:30
15		711	21.2	3.5		.6	.3	32.1	off	7:00
16		632	18.7	2.5		.6	.3	32.1	off	8:30
17		—	18.7	—		.6	.3	32.1	off	8:00
18		778	14.8	3.9		.6	.3	32.0	off	8:00
19		—	14.8	—		.6	.3	32.0	off	7:30
20		863	11.3	3.6		.6	.3	32.0	OFF	8:00
21		—	11.3	—		.6	.3	32.0	off	10:15
22		934	6.5	4.8		.6	.3	31.9	off	8:50
23		744	4.9 1461	3.2		.6	.3	31.9	off	7:40
24		—	145.3 1453	—		.6	.3	31.9	off	7:30
25		914	140.8	4.5		.6	.3	31.8	off	8:00
26		—	140.8	—		.6	.3	32.0	off	7:45
27		820	137.4	3.4		.6	.3	32.2	off	8:00
28		—	137.4	—		.6	.3	32.3	off	6:35
29		869	133.2	4.2		.6	.3	32.3	off	8:20
30										
31										
TOTAL		12,967								
AVG.		447								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Ted A Tesi Jr Title: W/S operator NYSDOH Operator Certification Number: NY. 0030046

Signature: _____ Date: 3/2/2020 Operator Grade Level: TTB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg. Terrace Rd	2-5-20	1	YES NO	YES NO	.6
Terrace Rd Well	2-5-20		YES NO	YES NO	RAW
Walton Oaks Boosters	2-5-20	1	YES NO	YES NO	.5
Blue Creek Boosters	2-5-20	1	YES NO	YES NO	
Red Apple 13/McLean Rd	2-11-20	1	YES NO	YES NO	.5
Chile Hgts. RT 41	2-11-20	1	YES NO	YES NO	.4
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System" a copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain: NO.

Comments:

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	02/2020 (MM YYYY)	03/02/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl. 3	WELL Level	Pump On/OfF	Time
1		—	110.3	—		.6	.3	21.8	off	7:25
2		—	110.3	—		.6	.3	17.0	on	7:25
3		931	105.3	5.0		.6	.3	21.5	off	7:17
4		—	105.3	—		.6	.3	17.1	on	7:10
5		748	101.1	4.2		.6	.3	21.4	off	8:30
6		—	101.1	—		.6	.3	16.9	on	7:15
7		880	97.1	4.0		.6	.3	21.6	OFF	9:00
8		—	97.1	—		.6	.3	21.9	OFF	9:40
9		—	97.1	—		.6	.3	17.3	ON	7:05
10		913	92.2	4.9		.6	.3	21.9	OFF	7:00
11		—	92.2	—		.6	.3	17.5	ON	7:00
12		778	88.4	3.8		.6	.3	21.8	OFF	7:15
13		—	88.7	—		.6	.3	17.2	ON	700
14		932	25.3	2.4		.6	.3	21.6	off	8:45
15		—	25.3	—		.6	.3	21.7	off	7:30
16		—	25.3	—		.6	.3	17.0	on	8:45
17		933	19.6	5.7		.6	.3	21.3	off	8:00
18		—	19.6	—		.6	.3	17.0	on	8:00
19		721	15.9	3.7		.6	.3	21.1	off	7:30
20		—	15.9	—		.6	.3	16.8	ON	7:45
21		747	11.9	4.0		.6	.3	21.0	off	10:10
22		—	11.9	—		.6	.3	21.0	off	10:10
23		—	11.9	—		.6	.3	16.6	on	7:10
24		791	6.5	5.4		.6	.3	20.9	off	700
25		—	6.5	—		.6	.3	21.1	off	700
26		688	3.1	3.4		.6	.3	21.5	off	700
27		—	3.1	—		.6	.3	17.5	on	8:00
28		777	84.3	3.6		.6	.3	22.0	off	6.51
29		—	84.3	—		.6	.3	22.2	off	8:40
30										
31										
TOTAL		9839								
AVG.		339								

Chlorine Mix Ratio = _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock.

Reported by: Peter Atteridge Jr. Title: W/S Operator NYSDOH Operator Certification Number: NY0030046

Signature: Peter Atteridge Date: 3/2/2020 Operator Grade Level: TB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0B0382

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/05/2020
Reported: 02/10/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0B0382-01
Collected By: JM-Client
Collection Date: 02/05/2020 7:38

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB
Escherichia coli	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/05/20 0738	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J0B0382-02
Collected By: JM-Client
Collection Date: 02/05/2020 8:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB
Escherichia coli	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0B0382

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0B0382-03	**Collection Date:**	02/05/2020 8:27

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB
Escherichia coli	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		02/05/20 0827	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0B0382-04	**Collection Date:**	02/05/2020 8:57

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
ethod: SM9223 B-1997								
otal Coliform	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB
Escherichia coli	Absent			per 100mL		02/05/20 1720	02/06/20 1149	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Renee Lantz

Renee Lantz
Customer Relationship Specialist
Reported: 02/10/2020 17:29

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0B0636

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/11/2020
Reported: 02/18/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J0B0636-01
Collected By: JM-Client
Collection Date: 02/11/2020 8:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		02/11/20 1657	02/12/20 1131	EDB
Escherichia coli	Absent			per 100mL		02/11/20 1657	02/12/20 1131	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		02/11/20 0800	CUS

Client Sample ID: C-ville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J0B0636-02
Collected By: JM-Client
Collection Date: 02/11/2020 9:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		02/11/20 1657	02/12/20 1131	EDB
Escherichia coli	Absent			per 100mL		02/11/20 1657	02/12/20 1131	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		02/11/20 0952	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0B0636

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/18/2020 10:12

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17496.5				10856.3			47823.50	
2/1/2020	955	17511.6	15.1	31.9	—	10856.3	—	22.1	47838.57	15.07
2/2/2020	—	17511.6	—	31.9	731	10865.5	9.2	22.1	47845.11	6.54
2/3/2020	—	17511.6	—	32.0	—	10865.5	—	22.2	47845.11	—
2/4/2020	656	17522.0	10.4	31.9	—	10865.5	—	22.1	47852.47	7.36
2/5/2020	—	17522.0	—	32.0	—	10865.5	—	22.2	47852.47	—
2/6/2020	—	17522.0	—	32.1	665	10873.8	8.3	22.2	47860.78	8.31
2/7/2020	—	17522.0	—	32.1	—	10873.8	—	22.2	47860.78	—
2/8/2020	607	17531.5	9.5	31.0	—	10873.8	—	14.4	47872.24	11.46
2/9/2020	505	17539.4	7.9	32.1	161	10876.0	2.2	22.2	47880.19	7.95
2/10/2020	—	17539.4	—	32.2	—	10876.0	—	22.3	47880.19	—
2/11/2020	653	17549.6	10.2	32.1	—	10876.0	—	22.2	47891.03	10.84
2/12/2020	—	17549.6	—	32.2	—	10876.0	—	22.4	47891.03	—
2/13/2020	—	17549.6	—	32.1	708	10884.8	8.8	22.3	47899.20	8.17
2/14/2020	—	17549.6	—	32.2	—	10884.8	—	22.3	47899.20	—
2/15/2020	711	17560.8	11.2	32.1	—	10884.8	—	22.2	47910.36	11.16
2/16/2020	—	17560.8	—	32.1	637	10892.6	7.8	22.2	47918.13	7.77
2/17/2020	—	17560.8	—	32.1	—	10892.6	—	22.2	47918.13	—
2/18/2020	778	17573.0	12.2	32.0	—	10892.6	—	22.2	47930.32	12.19
2/19/2020	—	17573.0	—	32.0	—	10892.6	—	22.1	47930.32	—
2/20/2020	—	17573.0	—	32.0	863	10903.3	10.7	22.1	47941.03	10.71
2/21/2020	—	17573.0	—	32.0	—	10903.3	—	22.1	47941.03	—
2/22/2020	934	17587.6	14.6	31.9	—	10903.3	—	22.0	47956.31	15.28
2/23/2020	—	17587.6	—	31.9	744	10912.5	9.2	22.0	47964.77	8.46
2/24/2020	—	17587.6	—	31.9	—	10912.5	—	22.0	47964.77	—
2/25/2020	914	17601.9	14.3	31.8	—	10912.5	—	22.0	47979.02	14.25
2/26/2020	—	17601.9	—	32.0	—	10912.5	—	22.1	47979.02	—
2/27/2020	—	17601.9	—	32.2	880	10923.5	11.0	22.3	47989.92	10.9
2/28/2020	—	17601.9	—	32.3	—	10923.5	—	22.4	47989.92	—
2/29/2020	869	17615.5	13.6	32.3	—	10923.5	—	22.4	48003.64	14.0
TOTAL	7582		119		5389		67.2			180.14
AVERAGE	261				186					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			25173.7		
2/1/2020		—	25173.7	—	21.8
2/2/2020		—	25173.7	—	17.0
2/3/2020		931	25197.7	24.0	21.5
2/4/2020		—	25197.7	—	17.1
2/5/2020		748	25216.9	19.2	21.4
2/6/2020		—	25216.9	—	16.9
2/7/2020		880	25239.7	22.8	21.6
2/8/2020		—	25239.7	—	21.9
2/9/2020		—	25239.7	—	17.3
2/10/2020		913	25263.3	23.6	21.9
2/11/2020		[illegible]	25263.3	—	17.5
2/12/2020		778	25283.4	20.1	21.8
2/13/2020		—	25283.4	—	17.2
2/14/2020		932	25307.4	24	21.6
2/15/2020		—	25307.4	—	21.7
2/16/2020		—	25307.4	—	17.0
2/17/2020		933	25331.5	24	21.3
2/18/2020		—	25331.5	—	17.0
2/19/2020		721	25350.0	18.5	21.1
2/20/2020		—	25350.0	—	16.8
2/21/2020		747	25369.2	19.2	21.0
2/22/2020		—	25369.2	—	21.0
2/23/2020		—	25369.2	—	16.6
2/24/2020		791	25389.5	20.3	20.9
2/25/2020		—	25389.5	—	21.1
2/26/2020		688	25407.2	17.7	21.5
2/27/2020		—	25407.2	—	17.6
2/28/2020		777	25427.1	19.9	22.0
2/29/2020		—	25427.1	22.2	—
TOTAL		9839		253	
Average		339			

MI(AC*

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 ain Avenue
Scra , -A 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Townof Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ]Level 1 [ ]Level 2 [ ]Level3 [ ]Level 4 [ ]EDD

*TO BE COMPLETED BY MICROBAC**

Temperature Upon Receipt (°C)
Therm ID
Holding Time 8.4
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types**	Additional Notes
	Red Apple RTE 13/Dean Rd	2-11-2020	800 AM	1	DW	1	Na2S2O3	c10.5
	C-Ville Highway Garage	2-11-2020	952 AM	1	DW	1	Na2S2O3	c10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-11-2020 10:04 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			2/11/2020 1004
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

M AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
16 ain Avenue, Sc rA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.2
Therm ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? (Yes) No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types**	BAeT.	Additional Notes
	Municipal BLDG.	2-5-2020	7:38 AM	1	DW	1	Na2S2O3	1	Clo.6
	Terrace Rd well	2-5-2020	8:12 AM	1	DW	1	"	1	Raw Water
	Walden Oaks BS	2-5-2020	827 AM	1	DW	1	"	1	Clo.5
	Blue Creek BS	2-5-2020		1	DW	1	"	1	Clo.

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-5-2020 918 AM	DWells	2/5/2020 9:18
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2020 (MM YYYY)	02/03/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755 L.H.	Cortland	Cortlandville

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		—	126.2	—		.6	.3	29.1	ON	8:15
2		965	120.9	5.3		.6	.3	30.2	off	7:15
3		—	120.9	—		.6	.3	30.4	off	9:30
4		898	115.2	5.7		.6	.3	29.6	on	7:30
5		870	111.1	4.1		.6	.3	30.5	off	7:50
6		—	111.1	—		.6	.3	30.7	off	8:05
7		735	106.5	4.6		.6	.3	30.7	off	7:55
8		—	106.5	—		.6	.3	30.7	off	7:30
9		858	102.7	3.8		.6	.3	30.8	off	2:30
10		—	102.7	—		.6	.3	30.9	OFF	9:00
11		1,073	95.0	6.3		.6	.3	30.0	ON	10:15
12		663	92.1	2.9		.6	.3	31.1	OFF	7:50
13		—	92.1	—		.6	.3	29.2	ON	7:15
14		884	86.6	5.5		.6	.3	31.2	OFF	7:45
15		—	86.6	—		.6	.3	31.4	OFF	7:45
16		798	82.6	4.0		.6	.3	31.4	off	9:00
17		—	82.6	—		.6	.3	31.5	off	11:00
18		984	76.4	6.2		.6	.3	31.5	off	8:00
19		587	73.5	2.9		.6	.3	31.5	off	8:30
20		—	73.5	—		.6	.3	31.6	off	10:30
21		598	69.7	3.8		.6	.3	31.6	off	7:30
22		—	69.7	—		.6	.3	31.7	off	2:30
23		675	66.3	3.4		.6	.3	31.6	off	7:15
24		—	66.3	—		.6	.3	31.7	off	9:30
25		671	62.1	4.2		.6	.3	31.8	off	7:10
26		536	59.5	2.6		.6	.3	31.8	off	7:15
27		—	59.5	—		.6	.3	31.9	off	7:15
28		754	54.7	4.8		.6	.3	31.9	off	7:15
29		—	54.7	—		.6	.3	31.9	off	7:15
30		737	51.0	3.7		.6	.3	31.9	off	7:15
31		—	51.0	—		.6	.3	31.9	off	9:30
TOTAL		13286								
AVG.		429								

Chlorine Mix Ratio = ——— quarts/gallons of ——— % chlorine added to ——— gallons of water in crock.

Reported by: Peter Alteri Jr. Title: W/S operator NYSDOH Operator Certification Number: NY.30046

Signature: Peter Alteri Date: 2/3/2020 Operator Grade Level: IIB

New York State Department of Health
Bureau of Water Supply Protection

WATER SYSTEM OPERATION REPORT
Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type (s)
Cortlandville Town Water	01/2020 (MM YYYY)	02/03/2020 (MM DD YYYY)	☐ Surface ☒ Ground ☐ GWUDI ☐ Purchase with subsequent chlorination ☐ Purchase w/out subsequent chlorination

Public Water System ID	County	Town, Village or City
NY 1101755	Cortland	Cortlandville

Terrace Rd.

GWR – NOT MET

DATE	Source(s) in use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Other Treatments / Readings: End of System Cl.	WELL Level	Pump On/OfF	Time
1		674	50.9	3.3		.6	.3	21.4	off	8:00
2		—	50.9	—		.6	.3	17.3	ON	700
3		714	47.2	3.7		.6	.3	21.6	off	7:56
4		—	47.2	—		.6	.3	22.0	off	7:35
5		—	47.2	—		.6	.3	17.0	on	7:25
6		933	41.9	5.3		.6	.3	21.8	off	7:47
7		—	41.9	—		.6	.3	17.5	on	7:20
8		895	37.6	4.3		.6	.3	21.5	off	7:20
9		—	37.6	—		.6	.3	16.7	ON	715
10		834	32.5	5.1		.6	.3	21.8	OFF	9:15
11		—	32.5	—		.6	.3	22.2	OFF	10:00
12		—	32.5	—		.6	.3	17.5	ON	7:00
13		945	24.4	8.1		.6	.3	21.9	OFF	7:00
14		—	24.4/147.6	—		.6	.3	17.3	ON	7:30
15		1056	142.5	5.1		.6	.3	21.8	OFF	7:00
16		—	142.5	—		.6	.3	17.4	ON	700
17		940	137.8	4.7		.6	.3	21.9	off	11:00
18		—	137.8	—		.6	.3	21.9	off	8:00
19		—	137.8	—		.6	.3	17.0	on	8:00
20		937	132.9	4.9		.6	.3	21.4	off	8:00
21		—	132.9	—		.6	.3	16.8	ON	7:30
22		901	128.3	4.6		.6	.3	21.2	off	7:30
23		—	128.3	—		.6	.3	16.9	ON	700
24		897	123.3	5.0		.6	.3	21.1	off	945
25		—	123.3	—		.6	.3	21.8	off	700
26		—	123.3	—		.6	.3	17.4	on	700
27		940	118.5	4.8		.6	.3	21.8	off	700
28		—	118.5	—		.6	.3	17.8	ON	710
29		627	115.1	3.4		.6	.3	21.7	off	700
30		—	115.1	—		.6	.3	17.2	on	700
31		871	110.3	4.8		.6	.3	21.6	off	9:20
TOTAL		12,164								
AVG.		392								

Chlorine Mix Ratio = ——— quarts/gallons of ——— % chlorine added to ——— gallons of water in crock.

Reported by: Peter Aitken Jr Title: W/S operator NYSDOH Operator Certification Number: NY-0030046

Signature: Peter Aitken Jr Date: 2/3/2020 Operator Grade Level: IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	1-2-20	1	YES [NO X]	YES [NO X]	.7
Waldin Glass Booster Sta.	1-2-20	1	YES [NO X]	YES [NO X]	.6
Blue Creek Booster	1-2-20	1	YES [NO X]	YES [NO X]	.5
Red Apple McLean Rd / RT 13	1-6-20	1	YES [NO X]	YES [NO X]	.6
Collie Highway RT 41	1-6-20	1	YES [NO X]	YES [NO X]	.3
Terrace Rd Well (RAW)	1-6-20		[YES X] NO	YES [NO X]	Ø
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	
			YES NO	YES NO	

Population Served: 4060

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation occur? Yes☐ No☒

If "Yes," check reason (s) below:

___Actual number of samples is fewer than required
___Did not collect/analyze repeat sample
___Did not collect/analyze for E. coli for positive total coliform from routine / repeat sample

Did an MCL violation occur? Yes☐ No☒

If "Yes," check reason(s) below (see also Part 5, Table 6 for Additional information).

___For systems collecting less than 40 samples per month: two or more of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

___The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," copy of this form shall be sent to your local health department the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain:

Comments:

TOWN OF CORTLANDVILLE DAILY PUMPAGE FOR LIME-HOLLOW WELLS

Date	Well #2 Daily Pumpage (Gallons)	Well #2 Pump Starter	Well #2 Pump Hrs/Day	Pump 2 Well Level	Well #7 Daily Pumpage (Gallons)	Well #7 Pump Starter	Well #7 Pump Hrs/Day	Pump 7 Well Level	Chlorine Pump Electric	Chlorine Pump Hrs/Day
Prev. Rdg		17393.4				10774.1			47638.63	
1/1/2020	—	17393.4	—	29.1	—	10774.1	—	12.2	47638.63	—
1/2/2020	—	17393.4	—	30.2	965	10786.0	11.9	20.3	47650.48	11.85
1/3/2020	—	17393.4	—	30.4	—	10786.0	—	20.5	47650.48	—
1/4/2020	898	17407.4	14	29.6	—	10786.0	—	13.1	47664.93	14.45
1/5/2020	—	17407.4	—	30.5	870	10796.7	10.7	20.6	47675.10	10.17
1/6/2020	—	17407.4	—	30.7	—	10796.7	—	20.8	47675.10	—
1/7/2020	735	17418.9	11.5	30.7	—	10796.7	—	20.9	47686.54	11.44
1/8/2020	—	17418.9	—	30.7	—	10796.7	—	20.8	47686.54	—
1/9/2020	—	17418.9	—	30.8	858	10807.2	10.5	21.0	47697.08	10.54
1/10/2020	—	17418.9	—	30.9	—	10807.2	—	21.1	47697.08	—
1/11/2020	1,073	17435.6	16.7	30.0	—	10807.2	—	13.5	47715.00	17.92
1/12/2020	—	17435.6	—	31.1	663	10815.3	8.1	21.2	47721.91	6.91
1/13/2020	—	17435.6	—	29.2	—	10815.3	—	20.3	47721.91	—
1/14/2020	884	17449.4	13.8	31.2	—	10815.3	—	21.4	47735.68	13.77
1/15/2020	—	17449.4	—	31.4	—	10815.3	—	21.5	47735.68	—
1/16/2020	—	17449.4	—	31.4	798	10825.1	9.8	21.5	47745.49	9.81
1/17/2020	—	17449.4	—	31.5	—	10825.1	—	21.6	47745.49	—
1/18/2020	484	17464.8	15.4	31.5	—	10825.1	—	21.6	47760.79	15.3
1/19/2020	—	17464.8	—	31.5	587	10832.3	7.2	21.6	47767.96	7.17
1/20/2020	—	17464.8	—	31.6	—	10832.3	—	21.7	47767.96	—
1/21/2020	598	17474.2	9.4	31.6	—	10832.3	—	21.7	47777.35	9.36
1/22/2020	—	17474.2	—	31.7	—	10832.3	—	21.8	47777.35	—
1/23/2020	—	17474.2	—	31.6	675	10840.6	8.3	21.8	47785.67	8.32
1/24/2020	—	17474.2	—	31.7	—	10840.6	—	21.9	47785.67	—
1/25/2020	671	17484.7	10.5	31.8	—	10840.6	—	21.9	47796.14	10.47
1/26/2020	—	17484.7	—	31.8	536	10847.2	6.6	22.0	47802.69	6.55
1/27/2020	—	17484.7	—	31.9	—	10847.2	—	22.1	47802.69	—
1/28/2020	754	17496.5	11.8	31.9	—	10847.2	—	22.0	47814.47	11.78
1/29/2020	—	17496.5	—	31.9	—	10847.2	—	22.0	47814.47	—
1/30/2020	—	17496.5	—	31.9	737	10856.3	9.1	22.1	47823.50	9.03
1/31/2020	—	17496.5	—	31.9	—	10856.3	—	22.1	47823.50	—
TOTAL	6597		103.1		6689		82.2			184.57
AVERAGE	213				216					

Rev: 1/2015

Town of Cortlandville Daily Pumpage for Terrace Rd. Well

Date	PumpTotalizer	60 HP Well Pumpage (Gal/Day)	Electric Rdg	Hrs/Day	Well Level
Prev. Rdg			24857.9		
1/1/2020		674	24875.2	17.3	21.4
1/2/2020		—	24875.2	—	17.3
1/3/2020		714	24893.5	18.3	21.6
1/4/2020		—	24893.5	—	22.0
1/5/2020		—	24893.5	—	17.0
1/6/2020		933	24917.5	24	21.8
1/7/2020		—	24917.5	—	17.5
1/8/2020		895	24940.4	22.9	21.5
1/9/2020		—	24940.4	—	16.7
1/10/2020		834	24964.4	24	21.8
1/11/2020		—	24964.4	—	22.2
1/12/2020		—	24964.4	—	17.5
1/13/2020		945	24988.4	24	21.9
1/14/2020		—	24988.4	—	17.3
1/15/2020		1,056	25015.6	27.2	21.8
1/16/2020		—	25015.6	—	17.4
1/17/2020		940	25039.6		21.8
1/18/2020		—	25039.6	—	21.9
1/19/2020		—	25039.6	—	17.0
1/20/2020		937	25063.6	24	21.4
1/21/2020		—	25063.6	—	16.8
1/22/2020		901	25086.8	23.2	21.2
1/23/2020		—	25086.8	—	16.9
1/24/2020		897	25109.8	23.0	21.1
1/25/2020		—	25109.8	—	21.8
1/26/2020		—	25109.8	—	17.4
1/27/2020		940	25133.8	24.0	21.8
1/28/2020		—	25133.8	—	17.8
1/29/2020		627	25151.4	17.6	21.7
1/30/2020		—	25151.4	—	17.2
1/31/2020		871	25173.7	22.3	21.6
TOTAL		12,164		315.8	
Average		392			

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0A0322

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/06/2020
Reported: 01/08/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J0A0322-01
Collected By: JM-Client
Collection Date: 01/06/2020 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	**Present**			per 100mL		01/06/20 1549	01/07/20 1121	EDB
Escherichia coli	Absent			per 100mL		01/06/20 1549	01/07/20 1121	EDB

ient Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J0A0322-02
Collected By: JM-Client
Collection Date: 01/06/2020 9:26

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		01/06/20 1549	01/07/20 1121	EDB
Escherichia coli	Absent			per 100mL		01/06/20 1549	01/07/20 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		01/06/20 0926	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0A0322

Client Sample ID:	Cortlandville Highway Garage - Rt. 41/Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0A0322-03	**Collection Date:**	01/06/2020 10:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		01/06/20 1549	01/07/20 1121	EDB
Escherichia coli	Absent			per 100mL		01/06/20 1549	01/07/20 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		01/06/20 1050	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

he data and information on this, and other accompanying documents, represents nly the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 01/08/2020 11:15

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0A0102

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/02/2020
Reported: 01/06/2020

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J0A0102-01
Collected By: JM-Client
Collection Date: 01/02/2020 7:31

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB
Escherichia coli	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.70	4.00 MCL		mg/L	Y1		01/02/20 0731	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J0A0102-02
Collected By: JM-Client
Collection Date: 01/02/2020 8:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB
Escherichia coli	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/02/20 0800	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J0A0102

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J0A0102-03	**Collection Date:**	01/02/2020 8:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM9223 B-1997								
Total Coliform	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB
Escherichia coli	Absent			per 100mL		01/02/20 1738	01/03/20 1212	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		01/02/20 0825	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
mg/L: Milligrams per Liter
RL: Reporting Limit
Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 01/06/2020 16:04

MIC AC[A]

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 [illegible]ain Avenue
Scran A 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

2-4

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)

Therm ID

Holding Time 10.0

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri J.R.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT	Additional Notes
	Terrace Rd well	1-6-20	9:10 AM	1	DW	1	Na2S2O3	1	Raw water
	Rt 13/McLean Rd Apple	1-6-20	9:26 AM	1	DW	1	Na2S2O3	1	C10.6
	Cortlandville Highway Garage Rt 41 Polkville	1-6-20	10:50 AM	1	DW	1	Na2S2O3	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-6-2020 1103 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			1/6/20 1103
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ____ of ____

J0A0322

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 [illegible]ain Avenue Scra[illegible]·A 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC:

Temperature Upon Receipt (°C): 8.6
Therm ID:
Holding Time:
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Municipal BLDG.	1-2-20	7:31 AM	1	DW	1	Na2S2O3	1	C10.7
	Walden Oaks BS	1-2-20	8:50 AM	1	DW	1	Na2S2O3	1	C10.6
	Blue Creek BS	1-2-20	8:25 AM	1	DW	1	Na2S2O3	1	C10.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-2-20 858 AM	[signature]	1/2/20 858
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Water Operations Reports 2021

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Dec-21	1/3/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		72.2							
1	682,828	65.1	7.1	0.6	0.3	22.7	☐	☑	7:04
2	0	65.1	0	0.6	0.3	18.1	☐	☑	8:22
3	826,098	60	5.1	0.6	0.3	22.6	☐	☑	9:33
4	0	60	0	0.6	0.3	22.8	☐	☑	9:25
5	0	60	0	0.6	0.3	17.7	☑	☐	8:09
6	888,084	54.4	5.6	0.6	0.3	22.5	☐	☑	8:06
7	0	54.4	0	0.6	0.3	22.2	☐	☑	8:44
8	254,492	53.6	0.8	0.6	0.3	22.5	☐	☑	8:50
9	0	53.6	0	0.6	0.3	17.7	☑	☐	7:10
10	883,542	47.7	5.9	0.6	0.3	21.1	☐	☑	6:38
11	0	47.7	0	0.6	0.3	22.7	☐	☑	607
12	0	47.7	0	0.6	0.3	17.9	☑	☐	7:03
13	889,574	41.9	5.8	0.6	0.3	22.2	☐	☑	7:04
14	0	41.9	0	0.6	0.3	22.3	☐	☑	7:20
15	676,157	37.3	4.6	0.6	0.3	22.2	☐	☑	7:00
16	0	37.3	0	0.6	0.3	17.9	☑	☐	7:35
17	845,954	31.7	5.6	0.6	0.3	21.2	☐	☑	12:30
18	0	31.7	0	0.6	0.3	22.8	☐	☑	6:19
19	0	31.7	0	0.6	0.3	18.2	☑	☐	7:30
20	888,229	26	5.7	0.6	0.3	22.6	☐	☑	8:00
21	0	26	0	0.6	0.3	18.3	☑	☐	7:20
22	718,108	21.3	4.7	0.6	0.3	22.6	☐	☑	7:00
23	0	21.3	0	0.6	0.3	18	☑	☐	7:30
24	826,835	15.8	5.5	0.6	0.3	22.5	☐	☑	8:25
25	0	15.8	0	0.6	0.3	23.2	☐	☑	8:58
26	0	15.8	0	0.6	0.3	18.5	☑	☐	7:00
27	891,453	10	5.8	0.6	0.3	23	☐	☑	8:02
28	0	10	0	0.6	0.3	18.6	☑	☐	7:33
29	697,430	5.4	4.6	0.6	0.3	22.9	☐	☑	7:07
30	0	5.4	0	0.6	0.3	18.4	☑	☐	8:26
31	886,422	137.8	6.8	0.6	0.3	22.9	☐	☑	9:51
Total	10,855,206		73.6						
AVG.	350,168		2.374193548						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: **NY0036757**

Signature: Brian R. Congdon — Operator Grade Level **IIB/C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			31,131		
1		682,828	31,149	18	23
2		0	31,149	0	18
3		826,098	31,171	22	23
4		0	31,171	0	23
5		0	31,171	0	18
6		888,084	31,195	24	23
7		0	31,195	0	22
8		253,492	31,202	7	23
9		0	31,202	0	18
10		883,542	31,226	24	22
11		0	31,226	0	23
12		0	31,226	0	18
13		889,574	31,250	24	22
14		0	31,250	0	22
15		676,157	31,269	19	22
16		0	31,269	0	18
17		845,954	31,292	23	21
18		0	31,292	0	23
19		0	31,292	0	18
20		888,229	31,316	24	23
21		0	31,316	0	18
22		718,108	31,335	19	23
23		0	31,335	0	18
24		826,835	31,358	23	23
25		0	31,358	0	23
26		0	31,358	0	19
27		891,453	31,382	24	23
28		0	31,382	0	19
29		697,430	31,400	18	23
30		0	31,400	0	18
31		886,422	31,424	24	23
Total		10,854,206		293	
Average		350,136		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Dec-21	1/3/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		17.3							
1	0	17.3	0	0.6	0.3	35.8	☐	☑	7:26
2	998,369	12.9	4.4	0.6	0.3	35.8	☐	☑	8:12
3	0	12.9	0	0.6	0.3	35.7	☐	☑	9:27
4	1,030,697	6.4	6.5	0.6	0.3	35.6	☐	☑	9:07
5	621,799	3.7	2.7	0.6	0.3	35.7	☐	☑	8:44
6	0	3.7	0	0.6	0.3	35.6	☐	☑	9:07
7	922,500	-1.9	5.6	0.6	0.3	33.9	☐	☑	7:30
8	465,759	-5.1	3.2	0.6	0.3	35.4	☐	☑	9:03
9	832,761	147.7	2.3	0.6	0.3	35.4	☐	☑	8:57
10	0	147.7	0	0.6	0.3	35.3	☐	☑	6:50
11	883,384	142.7	5	0.6	0.3	35.3	☐	☑	5:52
12	626,120	139.8	2.9	0.6	0.3	35.3	☐	☑	8:04
13	0	139.8	0	0.6	0.3	35.1	☐	☑	7:42
14	1,028,435	132.5	7.3	0.6	0.3	35.1	☐	☑	7:30
15	0	132.5	0	0.6	0.3	35.2	☐	☑	7:30
16	800,957	129.4	3.1	0.6	0.3	35.1	☐	☑	7:44
17	0	129.4	0	0.6	0.3	35.1	☐	☑	4:33
18	593,884	125.4	4	0.6	0.3	35.1	☐	☑	6:30
19	483,246	123.8	1.6	0.6	0.3	35.1	☐	☑	7:40
20	0	123.8	0	0.6	0.3	35	☐	☑	8:10
21	725,417	119.5	4.3	0.6	0.3	35	☐	☑	7:30
22	0	119.5	0	0.6	0.3	35	☐	☑	6:50
23	650,734	116.6	2.9	0.6	0.3	35	☐	☑	7:45
24	0	116.6	0	0.6	0.3	35.1	☐	☑	8:33
25	432,447	113.8	2.8	0.6	0.3	34	☑	☐	9:08
26	490,054	111.6	2.2	0.6	0.3	35	☐	☑	7:32
27	0	111.6	0	0.6	0.3	35.1	☐	☑	8:10
28	820,400	107.4	4.2	0.6	0.3	35	☐	☑	7:40
29	0	107.4	0	0.6	0.3	35	☐	☑	7:28
30	666,630	104.3	3.1	0.6	0.3	35	☐	☑	8:42
31	0	104.3	0	0.6	0.3	35	☐	☑	10:06
Total	13,073,593		68.1						
AVG.	421,729		2.196774194						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: B.R.C. Operator Grade Level **IIB/C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20452				12246.3			52145			
1	0	20,452	0	36	0	12,246	0	25	52,145	0	0.00	0.00
2	0	20,452	0	36	998,369	12,258	12	25	52,157	12	0.00	0.00
3	0	20,452	0	36	0	12,258	0	25	52,157	0	0.00	0.00
4	1,030,697	20,468	16	36	0	12,258	0	25	52,174	17	0.00	0.00
5	0	20,468	0	36	621,799	12,266	8	25	52,181	7	0.00	0.00
6	0	20,468	0	36	0	12,266	0	25	52,181	0	0.50	0.00
7	922,500	20,482	14	34	0	12,266	0	25	52,195	14	0.00	0.20
8	465,759	20,490	8	35	0	12,266	0	25	52,205	10	0.00	1.50
9	0	20,490	0	35	832,761	12,276	10	25	52,212	7	0.00	0.00
10	0	20,490	0	35	0	12,276	0	25	52,212	0	0.50	0.00
11	883,384	20,503	13	35	0	12,276	0	25	52,226	14	0.00	0.00
12	0	20,503	0	35	626,120	12,284	8	25	52,234	8	0.00	0.00
13	0	20,503	0	35	0	12,284	0	25	52,234	0	0.00	0.00
14	1,028,435	20,519	16	35	0	12,284	0	25	52,250	16	0.00	0.00
15	0	20,519	0	35	0	12,284	0	25	52,250	0	1.00	0.00
16	0	20,519	0	35	800,957	12,294	10	25	52,259	9	0.00	0.00
17	0	20,519	0	35	0	12,294	0	25	52,259	0	0.00	0.00
18	593,884	20,529	10	35	0	12,294	0	25	52,269	10	1.00	0.10
19	0	20,529	0	35	483,246	12,299	5	25	52,275	6	0.00	0.20
20	0	20,529	0	35	0	12,299	0	25	52,275	0	0.00	0.00
21	725,417	20,540	11	35	0	12,299	0	25	52,286	11	0.00	0.00
22	0	20,540	0	35	0	12,299	0	25	52,286	0	0.00	1.00
23	0	20,540	0	35	650,734	12,307	8	25	52,294	8	0.00	1.00
24	0	20,540	0	35	0	12,307	0	25	52,294	0	0.00	0.00
25	432,447	20,547	7	34	0	12,307	0	17	52,302	8	1.00	0.00
26	0	20,547	0	35	490,054	12,313	6	25	52,307	5	0.00	0.10
27	0	20,547	0	35	0	12,313	0	25	52,307	0	0.00	0.00
28	820,400	20,560	13	35	0	12,313	0	25	52,320	13	0.00	1.00
29	0	20,560	0	35	0	12,313	0	25	52,320	0	0.00	0.00
30	0	20,560	0	35	666,630	12,322	9	25	52,328	8	0.00	0.00
31	0	20,560	0	35	0	12,322	0	25	52,328	0	0.50	0.00
Total	**6,902,923**		**108**		**6,170,670**		**76**			**183**	**4.50**	**5.10**
Average	**222,675**		**3**		**199,054**		**2**			**6**		

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	12/1/2021	1			0.6
Terrace Rd. Well RAW WATER	12-1-2021	1			RAW WATER
Walden Oaks B.S.	12-1-2021	1			0.4
Blue Creek B.S.	12-1-2021	1			0.4
Red Apple Rt. 13/McLean Rd.	12-6-2021	1			6
C-Ville Highway Garage Rt 41 Polkville	12-6-2021	1			0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1L0491

Town of Cortlandville Water

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/06/2021
Reported: 12/07/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt.13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1L0491-01
Collected By: JM-Client
Collection Date: 12/06/2021 9:28

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/06/21 1531	12/07/21 1106	MMG
Escherichia coli	Absent			per 100mL		12/06/21 1531	12/07/21 1106	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/06/21 0928	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1L0491-02
Collected By: JM-Client
Collection Date: 12/06/2021 11:10

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/06/21 1531	12/07/21 1106	MMG
Escherichia coli	Absent			per 100mL		12/06/21 1531	12/07/21 1106	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		12/06/21 1110	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1L0491

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/07/2021 19:19

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 N[illegible] Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY RECO 4-5

Number 1382

Instructions on back

TO BE COMPLETED BY MICROBAC:
Temperature Upon Receipt (ID)
Therm ID
Holding Time
Samples Received on Ice: Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT										Additional Notes
	Red Apple Rt 13/Leonard	12-6-2021	9:28 AM	1	DW	1	Sodium Thiosulfate	1										CL 0.6
	Cortlandville Highway Garage Rt 41 Polkville	12-6-2021	11:10 AM	1	DW	1	"	1										CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-6-2021 11:17 AM	[signature]	12/6/21 1118
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ___ of ___

J1L0491
Cortlandville Water, Town of
PM: Shannon Weeks

Page 3 of 3

rev.12/28/2017

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1L0215

Town of Cortlandville Water

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 12/01/2021
Reported: 12/02/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1L0215-01
Collected By: JM-Client
Collection Date: 12/01/2021 8:42

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG
Escherichia coli	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		12/01/21 0842	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J1L0215-02
Collected By: Client
Collection Date: 12/01/2021 9:00

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG
Escherichia coli	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1L0215

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1L0215-03	**Collection Date:**	12/01/2021 9:18

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG
Escherichia coli	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		12/01/21 0918	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1L0215-04	**Collection Date:**	12/01/2021 9:50

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG
Escherichia coli	Absent			per 100mL		12/01/21 1554	12/02/21 1109	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		12/01/21 0950	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1L0215

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 12/02/2021 14:35

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number 2-5

Instructions on back

TO BE COMPLETED BY MICROBAC: 12.8
Temperature Upon Receipt (°C)
Therm. ID
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: (Mail) [ ] Fax [X] e-mail (address)
Send Invoice via: (Mail) [ ] Fax [X] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BAcT										Additional Notes
	Municipal BLDG	12-1-2021	8:42 AM	1	DW	1	Sodium thiosulfate	1										Clo.6
	Terrace Rd Well	12-1-2021	9:00 AM	1	DW	1	"	1										Raw Water
	Walden Oaks B.S.	12-1-2021	9:18 AM	1	DW	1	"	1										Clo.4
	Blue Creek B.S.	12-1-2021	9:50 AM	1	DW	1	"	1										Clo.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	12-1-2021 1010 AM	[illegible]	12/2/21 1011
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J1L0215
Cortlandville Water, Town of
PM: Shannon Weeks

Page 4 of 4

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Nov-21	12/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		140.1							
1	897,406	133.7	6.4	0.6	0.3	24.8	☐	☑	5:40
2	0	133.7	0	0.6	0.3	20.1	☑	☐	7:30
3	711,025	129.2	4.5	0.6	0.3	24.5	☐	☑	8:00
4	0	129.2	0	0.6	0.3	19.8	☑	☐	8:00
5	892,271	123.3	5.9	0.6	0.3	24.1	☐	☑	9:11
6	0	123.3	0	0.6	0.3	24.1	☐	☑	8:47
7	0	123.3	0	0.6	0.3	19.2	☑	☐	7:45
8	891,805	117.6	5.7	0.6	0.3	23.6	☐	☑	8:06
9	0	117.6	0	0.6	0.3	18.9	☑	☐	7:34
10	598,449	113.2	4.4	0.6	0.3	23.2	☐	☑	8:22
11	0	113.2	0	0.6	0.3	18.5	☑	☐	7:12
12	872,995	107.6	5.6	0.6	0.3	24	☐	☑	7:51
13	0	107.6	0	0.6	0.3	24.3	☐	☑	8:27
14	0	107.6	0	0.6	0.3	19.3	☑	☐	7:36
15	892,399	102.1	5.5	0.6	0.3	24	☐	☑	7:47
16	0	102.1	0	0.6	0.3	19.5	☑	☐	7:43
17	713,877	97.5	4.6	0.6	0.3	23.9	☐	☑	7:58
18	0	97.5	0	0.6	0.3	19.3	☑	☐	7:00
19	887,521	91.7	5.8	0.6	0.3	23.8	☐	☑	5:40
20	0	91.7	0	0.6	0.3	23.9	☐	☑	6:00
21	0	91.7	0	0.6	0.3	19	☑	☐	7:30
22	889,707	86	5.7	0.6	0.3	23.6	☐	☑	7:15
23	0	86	0	0.6	0.3	19	☑	☐	7:30
24	772,192	81	5	0.6	0.3	23.3	☐	☑	5:45
25	0	81	0	0.6	0.3	18.8	☑	☐	6:15
26	786,731	75.9	5.1	0.6	0.3	23.3	☐	☑	6:14
27	0	75.9	0	0.6	0.3	23.4	☐	☑	7:45
28	0	75.9	0	0.6	0.3	18.7	☑	☐	7:22
29	883,689	70.2	5.7	0.6	0.3	22.9	☐	☑	7.2
30	0	72.2	0	0.6	0.3	18.4	☑	☐	7:26
31							☐	☐	
Total	10,690,067		69.9						
AVG.	356,336		2.33						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: NY0036757

Signature: B. R. Congdon — Operator Grade Level II-B/C

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Nov-21		Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		78							
1	0	78	0	0.6	0.3	35	☐	☑	5.55
2	738,013	73.2	4.8	0.6	0.3	35	☐	☑	8:25
3	0	73.2	0	0.6	0.3	35.2	☐	☑	8:12
4	549,700	70.2	3	0.6	0.3	35.3	☐	☑	8:14
5	0	70.2	0	0.6	0.3	35.4	☐	☑	9:02
6	624,706	66.4	3.8	0.6	0.3	34.5	☑	☐	8:35
7	518,118	64.4	2	0.6	0.3	35.6	☐	☑	8:37
8	0	64.4	0	0.6	0.3	35.7	☐	☑	8:47
9	708,583	59.8	4.6	0.6	0.3	35.6	☐	☑	7:46
10	0	59.8	0	0.6	0.3	35.6	☐	☑	8:14
11	676,964	56.5	3.3	0.6	0.3	35.7	☐	☑	7:23
12	0	56.5	0	0.6	0.3	36.1	☐	☑	8:07
13	532,810	52.1	4.4	0.6	0.3	34.9	☑	☐	8:39
14	567,797	50.1	2	0.6	0.3	36.1	☐	☑	8:25
15	0	50.1	0	0.6	0.3	36.1	☐	☑	8:06
16	729,830	45.7	4.4	0.6	0.3	36.1	☐	☑	7:53
17	0	45.7	0	0.6	0.3	36.1	☐	☑	8:08
18	656,054	42.6	3.1	0.6	0.3	36.1	☐	☑	7:52
19	0	42.6	0	0.6	0.3	36.1	☐	☑	5:30
20	579,004	39.1	3.5	0.6	0.3	36.1	☐	☑	5:30
21	621,532	36	3.1	0.6	0.3	36.1	☐	☑	8:00
22	0	36	0	0.6	0.3	36	☐	☑	7:30
23	669,014	31.7	4.3	0.6	0.3	36	☐	☑	8:00
24	0	31.7	0	0.6	0.3	36	☐	☑	5:30
25	560,209	29.3	2.4	0.6	0.3	36.1	☐	☑	6:00
26	0	29.3	0	0.6	0.3	36.1	☐	☑	6:30
27	605,568	24.3	5	0.6	0.3	34.9	☑	☐	8:00
28	689,430	22.4	1.9	0.6	0.3	36	☐	☑	7:55
29	0	22.4	0	0.6	0.3	36	☐	☑	7:10
30	851,583	17.3	5.1	0.6	0.3	35.9	☐	☑	7:40
31							☐	☐	
Total	10,878,915		60.7						
AVG.	362,631		2.023333333						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: B. R. Congdon Operator Grade Level IIB/C

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	11/1/2021	1	No	NO	0.6
Terrace Rd Well	11/1/2021	RAW	YES	NO	RAW
Walden Oaks	11/1/2021	1	NO	NO	0.4
Blue Creek B.S.	11/1/2021	1	NO	NO	0.3
Red Apple Rt13 and McLean Rd	11/8/2021	1	NO	NO	0.6
Coetlandville Highway Garage Rt 41 Polkville	11/8/2021	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			30,839		
1		897,408	30,863	0	25
2		0	30,863	24	20
3		711,025	30,883	20	25
4		0	30,883	0	20
5		892,271	30,907	24	24
6		0	30,907	0	24
7		0	30,907	0	19
8		891,805	30,931	24	24
9		0	30,931	0	19
10		598,449	30,950	19	23
11		0	30,950	0	19
12		872,995	30,973	23	24
13		0	30,973	0	24
14		0	30,973	0	19
15		892,399	30,997	24	24
16		0	30,997	0	20
17		713,877	31,017	20	24
18		0	31,017	0	19
19		887,521	31,040	23	24
20		0	31,040	0	24
21		0	31,040	0	19
22		889,707	31,065	24	24
23		0	31,065	0	19
24		772,192	31,085	20	23
25		0	31,085	0	19
26		786,731	31,107	22	23
27		0	31,107	0	23
28		0	31,107	0	19
29		883,689	31,131	24	23
30		0	31,131	0	18
31					
Total		10,690,069		291	
Average		356,336		10	

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20358				12187.1			51992			
1	0	20,350	0	35	0	12,187	0	25	51,992	0	0.00	0.00
2	738,013	20,370	20	35	0	12,187	0	25	52,004	12	0.00	0.00
3	0	20,370	0	35	0	12,187	0	25	52,004	0	0.00	0.00
4	0	20,370	0	35	549,700	12,194	7	25	52,011	7	0.00	0.00
5	0	20,370	0	35	0	12,194	0	25	52,011	0	0.00	0.00
6	624,706	20,379	9	35	0	12,194	0	18	52,021	10	0.00	0.00
7	0	20,379	0	36	518,118	12,200	6	25	52,027	6	0.00	0.00
8	0	20,379	0	36	0	12,200	0	25	52,027	0	0.00	0.00
9	708,583	20,390	11	36	0	12,200	0	25	52,038	11	0.00	0.00
10	0	20,390	0	36	0	12,200	0	25	52,038	0	0.00	0.00
11	0	20,390	0	36	676,964	12,209	9	25	52,046	8	1.00	0.00
12	0	20,390	0	36	0	12,209	0	25	52,046	0	1.00	0.00
13	532,810	20,399	9	35	0	12,209	0	18	52,056	10	1.00	0.00
14	0	20,399	0	36	567,797	12,215	6	25	52,061	5	0.10	0.10
15	0	20,399	0	36	0	12,215	0	25	52,061	0	0.00	1.00
16	729,830	20,410	11	36	0	12,215	0	25	52,072	11	0.00	0.10
17	0	20,410	0	36	0	12,215	0	25	52,072	0	0.00	0.00
18	0	20,410	0	36	656,054	12,223	8	25	52,080	8	0.00	0.10
19	0	20,410	0	36	0	12,223	0	25	52,080	0	0.00	0.00
20	579,004	20,419	9	36	0	12,223	0	25	52,089	9	0.00	0.00
21	0	20,419	0	36	621,532	12,231	8	25	52,097	8	0.20	0.00
22	0	20,419	0	36	0	12,231	0	25	52,097	0	0.00	0.50
23	669,014	20,430	11	36	0	12,231	0	25	52,107	10	0.00	0.00
24	0	20,430	0	36	0	12,231	0	25	52,107	0	0.00	0.00
25	0	20,430	0	36	560,209	12,238	7	25	52,114	7	0.30	0.00
26	0	20,430	0	36	0	12,238	0	25	52,114	0	0.00	0.25
27	605,568	20,439	9	35	0	12,238	0	18	52,126	12	0.00	0.25
28	0	20,439	0	36	689,430	12,246	8	25	52,132	6	0.00	1.00
29	0	20,439	0	36	0	12,246	0	25	52,132	0	0.00	0.00
30	851,583	20,452	13	36	0	12,246	0	25	52,145	13	0.00	0.00
31												
Total	6,039,111		102		4,839,804		59			153	3.60	3.30
Average	201,304		3		161,327		2			5		

MICROBAC

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4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contac Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contac Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.4
Therm ID 044
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT.	Additional Notes
	Red Apple R413/McLean Rd	11-8-2021	9:57 AM	1	DW	1	Sodium thiosulfate	1	CL. 0.6
	Cortlandville Highway Garage R41 Polkville	11-8-2021	11:37 AM	1	DW	1	"	1	CL. 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-8-2021 11:51 AM	Jennifer Walter	11/8/21 1152
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0644

Town of Cortlandville Water

Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/08/2021
Reported: 11/15/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt.13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1K0644-01
Collected By: JM-Client
Collection Date: 11/08/2021 9:57

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/08/21 1610	11/09/21 1109	MMG
Escherichia coli	Absent			per 100mL		11/08/21 1610	11/09/21 1109	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		11/08/21 0957	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1K0644-02
Collected By: JM-Client
Collection Date: 11/08/2021 11:37

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/08/21 1610	11/09/21 1109	MMG
Escherichia coli	Absent			per 100mL		11/08/21 1610	11/09/21 1109	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		11/08/21 1137	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0644

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 11/15/2021 12:00

MICROBAC

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CHAIN OF CUSTODY RECO

Number 2-3

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contac Brian Congdon
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contac Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (C) 1.6 °C
Therm ID: 04
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/ Comp	Preservative Types **	BACT.	Additional No
	Red Apple R413/McLean Rd	11-8-2021	9:57 AM	1	DW	1	Sodium thiosulfate	1	CL. 0.6
	Cortlandville Highway Garage Rt41 Polkville	11-8-2021	11:37 AM	1	DW	1	"	1	CL. 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-8-2021 11:51 AM	Jennifer Walter	11/8/21 1152
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1K0644

Cortlandville Water, Town of

PM: Shannon Weeks

Page 3 of 3

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0179

Town of Cortlandville Water

Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 11/01/2021
Reported: 11/15/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Building
Sample Matrix: Drinking Water
Lab Sample ID: J1K0179-01
Collected By: Client
Collection Date: 11/01/2021 8:15

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		11/01/21 0815	CUS

Client Sample ID: Terrace Rd well
Sample Matrix: Drinking Water
Lab Sample ID: J1K0179-02
Collected By: Client
Collection Date: 11/01/2021 8:40

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	**Present**			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0179

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-03	**Collection Date:**	11/01/2021 8:41

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	73.6		1.00	mg/L		11/05/21 1342	11/08/21 1330	DLO

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-04	**Collection Date:**	11/01/2021 9:17

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		11/01/21 0917	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1K0179-05	**Collection Date:**	11/01/2021 9:39

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB
Escherichia coli	Absent			per 100mL		11/01/21 1557	11/02/21 1110	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		11/01/21 0939	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

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4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE[illegible]

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Type: **	Bac-T-	Sodium									Additional Notes
	Municipal BLDG.	11-1-2021	8:15 AM	1	DW	C	Sodium Thiosulfate	1										CL 0.6
	Terrace Rd Well	11-1-2021	8:40 AM	1	DW	1	"	1										Raw Water
	Terrace Rd. well	11-1-2021	8:41 AM	1	DW	1			1									Raw Water
	Walden Oaks BS	11-1-2021	9:17 AM	1	DW	1	"	1										CL 0.4
	Blue Creek BS	11-1-2021	9:39 AM	1	DW	1	"	1										CL 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-1-2021 9:54 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1K0179

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 11/15/2021 12:03

MICROBAC

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4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 13.4°C
Therm ID: TOU20004
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Type **	BacT-	Sodium								Additional Note
	Municipal BLDG.	11-1-2021	8:15 AM	1	DW	C	Sodium thiosulfate	1									CL0.6
	Terrace Rd well	11-1-2021	8:40 AM	1	DW	1	"	1									Raw Water
	Terrace Rd. well	11-1-2021	8:41 AM	1	DW	1			1								Raw water
	Walden Oaks BS	11-1-2021	9:17 AM	1	DW	1	"	1									CL 0.4
	Blue Creek BS	11-1-2021	9:39 AM	1	DW	1	"	1									CL 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	11-1-2021 9:54 AM	Pamela Brown	11/01/2021 10:00
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

Page 4 of 4

J1K0179
Cortlandville Water, Town of
PM: Shannon Weeks

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Oct-21	11/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		52.7							
1	871,749	47.5	5.2	0.6	0.3	19.6	☐	☑	9:10
2	0	47.5	0	0.6	0.3	20	☐	☑	7:45
3	0	47.5	0	0.6	0.3	15.6	☑	☐	7:06
4	882,552	42.1	5.4	0.6	0.3	21.1	☐	☑	6:55
5	0	42.1	0	0.6	0.3	17.5	☑	☐	7:10
6	639,645	38.2	3.9	0.6	0.3	21.3	☐	☑	7:36
7	0	38.2	0	0.6	0.3	16.7	☑	☐	7:46
8	853,766	33	5.2	0.6	0.3	21.2	☐	☑	8:55
9	0	33	0	0.6	0.3	21.3	☐	☑	9:24
10	0	33	0	0.6	0.3	16.4	☑	☐	8:00
11	885,434	27.7	5.3	0.6	0.3	20.8	☐	☑	7:25
12	0	27.7	0	0.6	0.3	16.5	☑	☐	7:51
13	658,858	23.4	4.3	0.6	0.3	20.6	☐	☑	9:25
14	0	23.4	0	0.6	0.3	15.9	☑	☐	7:22
15	879,640	18.1	5.3	0.6	0.3	20.4	☐	☑	9:05
16	0	18.1	0	0.6	0.3	21.1	☐	☑	9:20
17	0	18.1	0	0.6	0.3	16.2	☑	☐	7:42
18	881,533	13.3	4.8	0.6	0.3	20.7	☐	☑	7:14
19	0	13.3	0	0.6	0.3	16.5	☑	☐	7:02
20	690,431	9.2	4.1	0.6	0.3	20.6	☐	☑	8:09
21	0	9.2	0	0.6	0.3	16.2	☑	☐	8:15
22	874,203	147.6	4.8	0.6	0.3	20.7	☐	☑	6:15
23	0	147.6	0	0.6	0.3	21.1	☐	☑	6:00
24	0	147.6	0	0.6	0.3	16.3	☑	☐	7:00
25	866,429	144.2	3.4	0.6	0.3	21	☐	☑	7:15
26	0	144.2	0	0.6	0.3	19.6	☑	☐	7:15
27	787,460	145.2	4.8	0.6	0.3	24.5	☐	☑	7:30
28	0	145.2	0	0.6	0.3	20	☑	☐	7:44
29	683,576	140.1	5.1	0.6	0.3	25	☐	☑	10:00
30	0	140.1	0	0.6	0.3	25	☐	☑	7:40
31	0	140.1	0	0.6	0.3	20.4	☑	☐	7:00
Total	10,455,276		61.6						
AVG.	337,267		1.987096774						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: B R. Cgn Operator Grade Level _____

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	10/1/2021	1	NO	NO	0.6
Terrace Rd. Well	10-1-2021	RAW	NO	NO	RAW WATER
Walden Oaks B.S.	10-1-2021	1	NO	NO	0.5
Blue Ceeek Rd. B.S.	10-1-2021	1	NO	NO	0.4
Red Apple McLean Rd	10-5-2021	1	NO	NO	0.5
C-Ville Highway Garage Rt.41 Polkville	10-5-2021	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below: (NO)

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			30,549		
1		871,748	30,573	24	20
2		0	30,573	0	20
3		0	30,573	0	16
4		882,552	30,597	24	21
5		0	30,597	0	18
6		639,645	30,615	18	21
7		0	30,615	0	17
8		853,766	30,638	23	21
9		0	30,638	0	21
10		0	30,638	0	16
11		885,434	30,662	24	21
12		0	30,662	0	17
13		658,858	30,680	18	21
14		0	30,680	0	16
15		879,640	30,704	24	20
16		0	30,704	0	21
17		0	30,704	0	16
18		881,533	30,728	24	21
19		0	30,728	0	17
20		690,431	30,746	18	21
21		0	30,746	0	16
22		874,203	30,770	24	21
23		0	30,770	0	21
24		0	30,770	0	16
25		866,429	30,794	24	21
26		0	30,794	0	19
27		787,460	30,815	21	25
28		0	30,815	0	20
29		683,576	30,839	24	25
30		0	30,839	0	25
31		0	30,839	0	20
Total		10,455,275		290	
Average		337,267		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Oct-21	11/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		-14.5							
1	0	-14.5	0	0.6	0.3	32	☐	☑	9:00
2	939,132	144.7	5.3	0.6	0.3	32	☐	☑	8:00
3	553,201	142.1	2.6	0.6	0.3	32	☐	☑	7:17
4	0	142.1	0	0.6	0.3	31.9	☐	☑	7:13
5	1,000,610	138.5	3.6	0.6	0.3	32	☐	☑	7:33
6	0	138.5	0	0.6	0.3	32.1	☐	☑	7:49
7	838,276	134.3	4.2	0.6	0.3	32.2	☐	☑	8:13
8	0	134.3	0	0.6	0.3	32.2	☐	☑	8:36
9	772,258	129.1	5.2	0.6	0.3	31.4	☑	☐	9:13
10	532,370	126.6	2.5	0.6	0.3	32.3	☐	☑	7:53
11	0	126.6	0	0.6	0.3	32.2	☐	☑	7:49
12	918,087	120.9	5.7	0.6	0.3	32.3	☐	☑	8:00
13	0	120.9	0	0.6	0.3	32.4	☐	☑	9:38
14	701,300	117.5	3.4	0.6	0.3	32.4	☐	☑	7:33
15	0	117.5	0	0.6	0.3	32.4	☐	☑	9:16
16	685,709	112.3	5.2	0.6	0.3	31.4	☑	☐	9:31
17	567,152	109.8	2.5	0.6	0.3	32.4	☐	☑	7:54
18	0	109.8	0	0.6	0.3	32.4	☐	☑	7:26
19	786,841	104.6	5.2	0.6	0.3	32.4	☐	☑	7:17
20	0	104.6	0	0.6	0.3	32.4	☐	☑	8:38
21	822,203	101.1	3.5	0.6	0.3	32.5	☐	☑	8:35
22	0	101.1	0	0.6	0.3	32.6	☐	☑	6:00
23	690,143	96.4	4.7	0.6	0.3	32.6	☐	☑	6:15
24	585,200	93.6	2.8	0.6	0.3	32.7	☐	☑	7:30
25	315,434	91.6	2	0.6	0.3	32.7	☐	☑	7:30
26	646,153	87.6	4	0.6	0.3	33.8	☐	☑	7:30
27	0	87.6	0	0.6	0.3	34	☐	☑	8:00
28	665,476	83.9	3.7	0.6	0.3	34.1	☐	☑	7:56
29	0	83.9	0	0.6	0.3	34.4	☐	☑	10:10
30	601,824	80.5	3.4	0.6	0.3	34.6	☐	☑	7:25
31	493,391	78	2.5	0.6	0.3	34.7	☐	☑	7:30
Total	13,114,760		72						
AVG.	423,057		2.322580645						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: B.R. Gdn Operator Grade Level II-B,C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20242				12116			51806			
1	0	20,242	0	32	0	12,116	0	22	51,806	0	0.00	0.00
2	939,132	20,257	15	32	0	12,116	0	22	51,821	15	0.00	0.00
3	0	20,257	0	32	553,201	12,123	7	22	51,828	7	1.40	0.00
4	0	20,257	0	32	0	12,123	0	22	51,828	0	0.60	0.00
5	1,000,613	20,273	16	32	0	12,123	0	22	51,843	15	0.10	0.00
6	0	20,273	0	32	0	12,123	0	22	51,843	0	0.00	0.00
7	0	20,273	0	32	838,276	12,133	10	22	51,854	11	0.00	0.00
8	0	20,273	0	32	0	12,133	0	22	51,854	0	0.00	0.00
9	772,258	20,285	12	31	0	12,133	0	15	51,866	12	0.00	0.00
10	0	20,285	0	32	532,370	12,140	7	22	51,872	6	0.00	0.00
11	0	20,285	0	32	0	12,140	0	22	51,872	0	0.00	0.00
12	918,087	20,299	14	32	0	12,140	0	22	51,887	15	0.00	0.00
13	0	20,299	0	32	0	12,140	0	22	51,887	0	0.00	0.00
14	0	20,299	0	32	701,300	12,149	9	22	51,895	8	0.00	0.00
15	0	20,299	0	32	0	12,149	0	22	51,895	0	0.00	0.00
16	685,709	20,310	11	31	0	12,149	0	15	51,908	13	1.10	0.00
17	0	20,310	0	32	567,152	12,156	7	22	51,913	5	0.30	0.00
18	0	20,310	0	32	0	12,156	0	22	51,913	0	0.30	0.00
19	786,841	20,323	13	32	0	12,156	0	22	51,925	12	0.00	0.00
20	0	20,323	0	32	0	12,156	0	22	51,925	0	0.00	0.00
21	0	20,323	0	33	822,203	12,165	9	23	51,936	11	0.70	0.00
22	0	20,323	0	33	0	12,165	0	23	51,936	0	0.00	0.00
23	690,143	20,333	10	33	0	12,165	0	23	51,946	10	0.00	0.00
24	0	20,333	0	33	585,200	12,173	8	23	51,954	8	0.50	0.00
25	315,434	20,338	5	33	0	12,173	0	23	51,959	5	0.20	0.00
26	646,153	202,349	11	34	0	12,173	0	24	51,969	10	2.80	0.00
27	0	20,349	0	34	0	12,173	0	24	51,969	0	0.00	0.00
28	0	20,349	0	34	665,476	12,181	8	24	51,977	8	0.00	0.00
29	0	20,349	0	34	0	12,181	0	24	51,977	0	0.70	0.00
30	601,824	20,358	9	35	0	12,181	0	25	51,986	9	0.10	0.00
31	0	20,358	0	35	493,391	12,187	6	25	51,992	6	0.00	0.00
Total	**7,356,194**		**116**		**5,758,569**		**71**			**186**	**8.80**	**0.00**
Average	**237,297**		**4**		**185,760**		**2**			**6**		

MICR_ .AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contac Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	Additional Notes
	Red Apple Rt 13/Mc Lean Rd C-Ville Highway Garage	10-5-2021	11:50 AM	1	DW	1	Sodium thiosulfate	Cl. 0.5
	Rt 41 Polkville	10-5-2021	1:28 PM	1	DW	1	"	Cl. 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-5-2021 1:39 PM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1J0408

Town of Cortlandville Water

Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/05/2021
Reported: 10/07/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt.13/McLean Road
Sample Matrix: Drinking Water
Lab Sample ID: J1J0408-01
Collected By: JM-Client
Collection Date: 10/05/2021 11:50

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/05/21 1624	10/06/21 1138	EDB
Escherichia coli	Absent			per 100mL		10/05/21 1624	10/06/21 1138	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		10/05/21 1150	CUS

Client Sample ID: Cortlandville Highway Garage - Rt. 41 Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1J0408-02
Collected By: JM-Client
Collection Date: 10/05/2021 13:28

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/05/21 1624	10/06/21 1138	EDB
Escherichia coli	Absent			per 100mL		10/05/21 1624	10/06/21 1138	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		10/05/21 1328	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1J0408

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 10/07/2021 15:01

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 N[illegible]ain Avenue Scranton, PA 18508 570.348.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY RECO

Number _____

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 1.5c

Therm ID 014

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BHOT										Additional Notes
	Municipal BLDG.	10-1-2021	6:45 AM	4	DW	I	✓	1										CL 0.6
	Terrace Rd Well	10-1-2021	6:58 AM	4	DW	I	✓	1										Raw Water
	Walden Oaks B.S.	10-1-2021	7:10 AM	4	DW	I	✓	1										CL 0.5
	Blue Creek B.S.	10-1-2021	7:42 AM	4	DW	I	✓	1										CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	10-1-2021 8:00 AM	[illegible]	10/1/21 800
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1J0298

Town of Cortlandville Water

Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 10/01/2021
Reported: 10/07/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1J0298-01
Collected By: JM-Client
Collection Date: 10/01/2021 6:45

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB
Escherichia coli	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		10/01/21 0645	CUS

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1J0298-02
Collected By: JM-Client
Collection Date: 10/01/2021 6:58

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB
Escherichia coli	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1J0298

Client Sample ID:	Walden Oaks BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1J0298-03	**Collection Date:**	10/01/2021 7:10

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB
Escherichia coli	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		10/01/21 0710	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1J0298-04	**Collection Date:**	10/01/2021 7:42

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB
Escherichia coli	Absent			per 100mL		10/01/21 1718	10/02/21 1158	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		10/01/21 0742	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Sep-21	10/4/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		116.2							
1	655,061	112.4	3.8	0.6	0.3	21.5	☐	☑	7:00
2	0	112.4	0	0.6	0.3	16.9	☑	☐	6:00
3	882,079	107.1	5.3	0.6	0.3	21.1	☐	☑	8:55
4	0	107.1	0	0.6	0.3	21.3	☐	☑	8:20
5	0	107.1	0	0.6	0.3	16.4	☑	☐	8:06
6	887,969	101.7	5.4	0.6	0.3	20.8	☐	☑	6:34
7	0	101.7	0	0.6	0.3	16.8	☑	☐	7:04
8	656,758	97.8	3.9	0.6	0.3	20.9	☐	☑	7:00
9	0	97.8	0	0.6	0.3	16.6	☑	☐	7:08
10	888,318	92.3	5.5	0.6	0.3	21	☐	☑	8:38
11	0	92.3	0	0.6	0.3	21.2	☐	☑	8:28
12	0	92.3	0	0.6	0.3	16.5	☐	☑	8:02
13	891,723	86.8	5.5	0.6	0.3	20.9	☐	☑	7:13
14	0	86.8	0	0.6	0.3	16.3	☑	☐	7:27
15	883,039	81.5	5.3	0.6	0.3	21.1	☐	☑	7:17
16	0	81.5	0	0.6	0.3	16.7	☑	☐	6:00
17	888,368	76.1	5.4	0.6	0.3	21	☐	☑	8:56
18	0	76.1	0	0.6	0.3	21.2	☐	☑	8:50
19	0	76.1	0	0.6	0.3	16.3	☑	☐	7:15
20	888,544	70.9	5.2	0.6	0.3	20.6	☐	☑	7:07
21	0	70.9	0	0.6	0.3	16.6	☑	☐	6:52
22	670,684	66.8	4.1	0.6	0.3	20.3	☐	☑	7:04
23	0	66.8	0	0.6	0.3	16.5	☑	☐	6:59
24	889,141	61.8	5	0.6	0.3	20.9	☐	☑	8:00
25	0	61.8	0	0.6	0.3	21.1	☐	☑	7:30
26	0	61.8	0	0.6	0.3	16.2	☑	☐	8:00
27	884,924	56.5	5.3	0.6	0.3	20.5	☐	☑	7:00
28	0	56.5	0	0.6	0.3	16.5	☑	☐	7:00
29	668,316	52.7	3.8	0.6	0.3	20.3	☐	☑	7:00
30	0	52.7	0	0.6	0.3	15.9	☑	☐	6:31
31							☐	☐	
Total	10,634,924		63.5						
AVG.	354,497		2.116666667						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: _____ Operator Grade Level IIB/C

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Terrace Rd. Well Raw Water	9/1/2021	1	YES	NO	0
Municipal Bldg.	9/1/2021	1	NO	NO	0.6
Walden Oaks B.S.	9/1/2021	1	NO	NO	0.4
BlueCreek B.S.	9/1/2021	1	NO	NO	0.4
Red Apple Rt.13/ Mclean Rd.	9/14/2021	1	NO	NO	0.6
Cortlandville Highway Garage Rt.41 Polkville	9/14/2021	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			30,262		
1		655,061	30,279	17	22
2		0	30,279	0	17
3		882,079	30,303	24	21
4		0	30,303	0	21
5		0	30,303	0	16
6		887,969	30,327	24	21
7		0	30,327	0	17
8		656,758	30,345	18	21
9		0	30,345	0	17
10		888,318	30,369	24	21
11		0	30,369	0	21
12		0	30,369	0	17
13		891,723	30,393	24	21
14		0	30,393	0	16
15		883,039	30,417	24	21
16		0	30,417	0	17
17		888,368	30,441	24	21
18		0	30,441	0	21
19		0	30,441	0	16
20		888,544	30,465	24	21
21		0	30,465	0	17
22		670,684	30,483	18	20
23		0	30,483	0	17
24		889,141	30,507	24	21
25		0	30,507	0	21
26		0	30,507	0	16
27		884,924	30,531	24	21
28		0	30,531	0	17
29		668,316	30,549	18	20
30		0	30,549	0	16
31					
Total		10,634,924		287	
Average		354,497		10	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
NY1101755 Lime Hollow Well	Sep 2021	10/4/2021	Ground

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump ON	Pump OFF	Time
Prev Rdg.		69.6							
1	0	69.6	0	0.6	0.3	32.7	☐	☑	7:00
2	711,940	66.1	3.5	0.6	0.3	32.7	☐	☑	6:12
3	0	66.1	0	0.6	0.3	32.7	☐	☑	9.17
4	836,559	60.5	5.6	0.6	0.3	31.8	☑	☐	8:42
5	558,949	57.8	2.7	0.6	0.3	32.6	☐	☑	8:16
6	0	57.8	0	0.6	0.3	32.5	☐	☑	6:48
7	1,031,938	51	6.8	0.6	0.3	32.5	☐	☑	7:18
8	0	51	0	0.6	0.3	32.6	☐	☑	7:12
9	785,545	46.9	4.1	0.6	0.3	32.6	☐	☑	7:21
10	0	46.9	0	0.6	0.3	32.6	☐	☑	8:25
11	920,692	40.8	6.1	0.6	0.3	32.5	☐	☑	8:12
12	571,942	37.8	3	0.6	0.3	32.6	☐	☑	8:24
13	0	37.8	0	0.6	0.3	32.2	☐	☑	8:54
14	1,048,038	30.8	7	0.6	0.3	32.5	☐	☑	7:51
15	0	30.8	0	0.6	0.3	32.6	☐	☑	7:39
16	788,746	26.7	4.1	0.6	0.3	32.5	☐	☑	6:20
17	0	26.7	0	0.6	0.3	32.5	☐	☑	9:07
18	992,778	20.1	6.6	0.6	0.3	31.6	☑	☐	8:58
19	599,104	16.8	3.3	0.6	0.3	32.4	☐	☑	7:42
20	0	16.8	0	0.6	0.3	32.3	☐	☑	7:18
21	972,192	10.2	6.6	0.6	0.3	32.3	☐	☑	7:00
22	0	10.2	0	0.6	0.3	32.2	☐	☑	7:14
23	826,935	6	4.2	0.6	0.3	32.3	☐	☑	7:16
24	0	6	0	0.6	0.3	32.1	☐	☑	8:15
25	1,059,440	-1	7	0.6	0.3	32.2	☐	☑	7:20
26	566,592	-4.1	3.1	0.6	0.3	32.2	☐	☑	8:00
27	0	-4.1	0	0.6	0.3	32.2	☐	☑	7:15
28	957,656	-10.2	6.1	0.6	0.3	32.1	☐	☑	7:10
29	0	-10.2	0	0.6	0.3	32	☐	☑	7:00
30	867,999	-14.5	4.3	0.6	0.3	32.1	☐	☑	6:07
31							☐	☐	
Total	14,097,045		84.1						
AVG.	469,902		2.803333333						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: _____ Operator Grade Level IIB/C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20120				12039			51607			
1	0	20,120	0	33	0	12,039	0	23	51,607	0	0.00	0.00
2	0	20,120	0	33	711,940	12,048	9	23	51,615	8	0.10	0.00
3	0	20,120	0	33	0	12,048	0	23	51,615	0	0.10	0.00
4	836,559	20,133	13	32	0	12,048	0	15	51,629	14	0.10	0.00
5	0	20,133	0	33	558,949	12,055	7	23	51,635	6	0.20	0.00
6	0	20,133	0	33	0	12,055	0	23	51,635	0	0.00	0.00
7	1,031,938	20,149	16	33	0	12,055	0	23	51,651	16	0.00	0.00
8	0	20,149	0	33	0	12,055	0	23	51,651	0	0.70	0.00
9	0	20,149	0	33	784,545	12,064	9	23	51,661	10	0.30	0.00
10	0	20,149	0	33	0	12,064	0	23	51,661	0	0.00	0.00
11	920,692	20,163	14	33	0	12,064	0	23	51,676	15	0.00	0.00
12	0	20,163	0	33	571,942	12,071	7	23	51,683	7	0.60	0.00
13	0	20,163	0	32	0	12,071	0	22	51,683	0	0.20	0.00
14	1,048,038	20,180	17	33	0	12,071	0	23	51,699	16	0.00	0.00
15	0	20,180	0	33	0	12,071	0	23	51,699	0	0.70	0.00
16	0	20,180	0	33	788,746	12,081	10	23	51,709	10	0.00	0.00
17	0	20,180	0	33	0	12,081	0	23	51,709	0	0.00	0.00
18	992,778	20,195	15	32	0	12,081	0	15	51,724	15	0.00	0.00
19	0	20,195	0	32	599,104	12,088	7	22	51,731	7	0.00	0.00
20	0	20,195	0	32	0	12,088	0	22	51,731	0	0.00	0.00
21	972,192	20,211	16	32	0	12,088	0	22	51,747	16	0.00	0.00
22	0	20,211	0	32	0	12,088	0	22	51,747	0	0.10	0.00
23	0	20,211	0	32	826,935	12,099	11	22	51,757	10	1.30	0.00
24	0	20,211	0	32	0	12,099	0	22	51,757	0	0.00	0.00
25	1,059,440	20,227	16	32	0	12,099	0	22	51,773	16	0.00	0.00
26	0	20,227	0	32	566,592	12,106	7	22	51,780	7	0.00	0.00
27	0	20,227	0	32	0	12,106	0	22	51,780	0	0.30	0.00
28	957,656	20,242	15	32	0	12,106	0	22	51,795	15	0.00	0.00
29	0	20,242	0	32	0	12,106	0	22	51,795	0	0.00	0.00
30	0	20,242	0	32	867,999	12,116	10	22	51,806	11	0.00	0.00
31												
Total	7,819,293		122		6,276,752		77			199	4.70	0.00
Average	260,643		4		209,225		3			7		

MI AC[a]

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162 [illegible]ain Avenue, Scr[illegible] PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number _____

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.										Additional Notes
	Red Apple Rt13/McLean Rd	9-14-2021	8:40 AM	1	DW	1	Yes	1										CL 0.6
	Cortlandville Highway Garage Rt41	9-14-2021	10:27 AM	1	DW	1	Yes	1										CL 0.7

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-14-2021 10:49 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1I0835

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/14/2021
Reported: 09/20/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Road
Sample Matrix: Drinking Water
Lab Sample ID: J1I0835-01
Collected By: JM-Client
Collection Date: 09/14/2021 8:40

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		09/14/21 2059	09/15/21 1520	EDB
Escherichia coli	Absent			per 100mL		09/14/21 2059	09/15/21 1520	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		09/14/21 0840	CUS

Client Sample ID: Cortlandville HWY Garage -Rt.41
Sample Matrix: Drinking Water
Lab Sample ID: J1I0835-02
Collected By: JM-Client
Collection Date: 09/14/2021 10:27

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		09/14/21 2059	09/15/21 1520	EDB
Escherichia coli	Absent			per 100mL		09/14/21 2059	09/15/21 1520	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		09/14/21 1027	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1I0835

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division

NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner

Customer Relationship Coordinator

Reported: 09/20/2021 11:17

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scrar[illegible] A 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE(

Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 18.8
Therm. ID: 64
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Samples/Quarterly Sodium
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT	Sodium									Additional Notes
	Terrace Rd well	9-1-2021	6:35 AM	1	DW	1		1										Raw water
	Terrace Rd well	9-1-2021	6:36 AM		DW	1	Nitric Acid		1									Raw Water
	Municipal BLDG.	9-1-2021	6:50 AM		DW	1		1										CL 0.6
	Walden Oaks BS.	9-1-2021	7:14 AM		DW	1		1										CL 0.4
	Blue Creek BS.	9-1-2021	7:43 AM		DW	1		1										CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-1-2021 805 AM	Jwalker	9/1/21 8:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1I0105

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 09/01/2021
Reported: 09/29/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1I0105-01
Collected By: JM-Client
Collection Date: 09/01/2021 6:35

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	**Present**			per 100mL		09/01/21 1621	09/02/21 1121	EDB
Escherichia coli	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1I0105-02
Collected By: JM-Client
Collection Date: 09/01/2021 6:36

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	74.1		1.02	mg/L		09/09/21 1815	09/09/21 1942	DLO

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1I0105

Client Sample ID:	Municipal BLDG		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1I0105-03	**Collection Date:**	09/01/2021 6:50

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB
Escherichia coli	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		09/01/21 0650	CUS

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1I0105-04	**Collection Date:**	09/01/2021 7:14

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB
Escherichia coli	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		09/01/21 0714	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1I0105

Client Sample ID:	Blue Crek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1I0105-05	**Collection Date:**	09/01/2021 7:43

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB
Escherichia coli	Absent			per 100mL		09/01/21 1621	09/02/21 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		09/01/21 0743	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

efinitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 09/29/2021 15:24

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number _____

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC?

Temperature Upon Receipt (°C) 18.8
Therm ID: 04
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Samples/Quarterly Sodium
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT	Sodium	Additional Notes
	Terrace Rd well	9-1-2021	6:35 AM	1	DW	1		1		Raw Water
	Terrace Rd well	9-1-2021	6:36 AM		DW	1	Nitric Acid		1	Raw Water
	Municipal BLDG.	9-1-2021	6:50 AM		DW	1		1		CL 0.6
	Walden Oaks BS.	9-1-2021	7:14 AM		DW	1		1		CL 0.4
	Blue Creek BS.	9-1-2021	7:43 AM		DW	1		1		CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	9-1-2021 805 AM	[illegible]	9/1/21 8:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/[illegible]

Page ____ of ____

Page 4 of 4

J110105

Cortlandville Water, Town of

PM: Shannon Weeks

MICROBAC®

INVOICE

Questions? **607-753-3403**
Ask for: **Shannon Weeks**

Invoice Number: PP1I03012
Invoice Date: 09/29/2021
Due Date: 10/29/2021
PO Number:
Client ID: J945

Bill to: Town of Cortlandville Water
Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Services for: Town of Cortlandville Water
3577 Terrace Road
Cortland, NY 13045

Work Order: J1I0105

QUANTITY	ANALYSIS	MATRIX	UNIT COST	UNIT SURCHARGE	TOTAL COST
Project:	Monthly Water Samples				Subtotal $140.00
1	Sodium ICP-AES	Drinking Water	$14.00		$14.00
3	Field Chlorine, Free, Field Test	Drinking Water	$0.00		$0.00
4	Coliform, E-Coli P-A 18hr	Drinking Water	$31.50		$126.00
Line Item					Subtotal $2.50
1	Admin - DOH Reporting		$2.50		$2.50

Total Current Charges **$142.50**

Total charges due by October 29, 2021 **$142.50**

The services being invoiced were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.

Microbac Laboratories Inc. | New York Division
3821 Buck Dr. | Cortland, NY 13045 | 607-753-3403 p | None f | www.microbac.com

---

MICROBAC®

Invoice Number: PP1I03012
Due Date: 10/29/2021
Client ID: J945

Town of Cortlandville Water
Brian Congdon
3577 Terrace Road
Cortland, NY 13045

Total charges due by October 29, 2021 **$142.50**



Make checks payable to: **Microbac Laboratories, Inc.**
Please return this remit slip with payment

Microbac Laboratories, Inc.
c/o Dollar Bank
PO Box 3510
Pittsburgh, PA 15230-3510

0010 00000000J945 PP1I03012 0000014250

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Aug-21	9/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg									
1	0	27.8	0	0.6	0.3	16	☑	☐	7:30
2	883,700	23.3	4.5	0.6	0.3	20.3	☐	☑	7:30
3	0	23.3	0	0.6	0.3	15.8	☑	☐	8:00
4	678,649	19.6	3.7	0.6	0.3	19.9	☐	☑	6:05
5	0	18.7	0	0.6	0.3	15.5	☑	☐	6:07
6	795,135	15.1	3.6	0.6	0.3	19.7	☐	☑	9:40
7	0	15.1	0	0.6	0.3	19.9	☐	☑	7:35
8	0	15.1	0	0.6	0.3	15	☑	☐	7:24
9	882,779	9.9	5.2	0.6	0.3	19.3	☐	☑	7:05
10	0	9.9	0	0.6	0.3	15.7	☑	☐	7:10
11	644,265	5.8	4.1	0.6	0.3	19.3	☐	☑	7:05
12	0	5.8	0	0.6	0.3	14.9	☑	☐	7:20
13	872,054	2.7	3.1	0.6	0.3	19.2	☐	☑	8:46
14	0	2.7	0	0.6	0.3	19.4	☐	☑	9:24
15	0	150	0	0.6	0.3	14.6	☑	☐	7:48
16	881,037	145.3	4.7	0.6	0.3	19	☐	☑	7:09
17	0	145.3	0	0.6	0.3	16.6	☑	☐	7:02
18	649,868	141.4	3.9	0.6	0.3	22.9	☐	☑	7:26
19	0	141.4	0	0.6	0.3	19	☑	☐	6:05
20	898,697	135.9	5.5	0.6	0.3	23.4	☐	☑	7:36
21	0	135.9	0	0.6	0.3	23.5	☐	☑	8:04
22	0	135.9	0	0.6	0.3	18.5	☑	☐	7:06
23	899,650	130.5	5.4	0.6	0.3	22.8	☐	☑	7:06
24	0	130.5	0	0.6	0.3	19.2	☑	☐	7:01
25	638,206	126.5	4	0.6	0.3	22.3	☐	☑	7:16
26	0	126.5	0	0.6	0.3	17.5	☑	☐	6:10
27	894,076	121.5	5	0.6	0.3	22.4	☐	☑	8:45
28	0	121.5	0	0.6	0.3	22.4	☐	☑	9:00
29	0	121.5	0	0.6	0.3	17.6	☑	☐	7:00
30	895,583	116.2	5.3	0.6	0.3	21.8	☐	☑	7:00
31	0	116.2	0	0.6	0.3	17.5	☐	☑	7:00
Total	10,513,699		58						
AVG.	339,152		1.870967742						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon

Operator Grade Level **IIB,C**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	8/4/2021	1	NO	NO	0.6
Terrace Rd. Well	8/4/2021	1	YES	NO	RAW WATER
Walden Oaks B.S.	8/4/2021	1	NO	NO	0.5
Blue Creek B.S.	8/4/2021	1	NO	NO	0.4
Red Apple Rt 13 & McLean Rd.	8/10/2021	1	NO	NO	0.5
Cortlandville Highway Garage Rt 41	8/10/2021	1	NO	NO	0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg					
1		0	29,985	0	16
2		883,700	30,002	17	20
3		0	30,002	0	16
4		678,649	30,020	18	20
5		0	30,020	0	16
6		795,135	30,042	22	20
7		0	30,042	0	20
8		0	30,042	0	15
9		882,779	30,057	15	19
10		0	30,057	0	16
11		644,265	30,083	26	19
12		0	30,083	0	15
13		872,054	30,107	24	19
14		0	30,107	0	20
15		0	30,107	0	15
16		881,037	30,131	24	19
17		0	30,131	0	17
18		649,868	30,149	18	23
19		0	30,149	0	19
20		898,697	30,173	24	23
21		0	30,173	0	24
22		0	30,173	0	19
23		899,650	30,197	24	23
24		0	30,197	0	19
25		638,206	30,214	17	22
26		0	30,214	0	18
27		894,076	30,238	24	22
28		0	30,238	0	22
29		0	30,238	0	18
30		895,583	30,262	24	22
31		0	30,262	0	18
Total		10,513,699		277	
Average		339,152		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Aug-21	9/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				Time
		Gaseous			End of System Chlorine	Well Level	Pump		
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		38.8							
1	523,960	36.2	2.6	0.6	0.3	30.8	☐	☑	7:45
2	0	36.2	0	0.6	0.3	30.9	☐	☑	7:30
3	836,711	147.6	4.5	0.6	0.3	30.8	☐	☑	8:00
4	0	147.6	0	0.6	0.3	30.8	☐	☑	6:20
5	828,426	143.1	4.5	0.6	0.3	30.8	☐	☑	6:24
6	0	143.1	0	0.6	0.3	30.8	☐	☑	9:55
7	874,941	137.6	4.5	0.6	0.3	30.8	☐	☑	7:50
8	550,562	134.7	2.9	0.6	0.3	30.7	☐	☑	7:46
9	0	134.7	0	0.6	0.3	30.6	☐	☑	7:25
10	1,013,719	127.9	6.8	0.6	0.3	30.6	☐	☑	7:28
11	0	127.9	0	0.6	0.3	30.6	☐	☑	7:20
12	831,438	123.6	4.3	0.6	0.3	30.6	☐	☑	7:30
13	0	123.6	0	0.6	0.3	30.5	☐	☑	8:15
14	932,475	117.2	6.4	0.6	0.3	29.6	☑	☐	9:10
15	587,795	114.2	3	0.6	0.3	30.3	☐	☑	7:59
16	0	114.2	0	0.6	0.3	30.2	☐	☑	7:32
17	933,599	108	6.2	0.6	0.3	30.4	☐	☑	7:13
18	0	108	0	0.6	0.3	31.1	☐	☑	7:41
19	730,138	104.2	3.8	0.6	0.3	31.5	☐	☑	6:20
20	0	104.2	0	0.6	0.3	31.7	☐	☑	7:43
21	738,301	99.3	4.9	0.6	0.3	31.8	☐	☑	8:19
22	544,936	96.4	2.9	0.6	0.3	31.9	☐	☑	7:26
23	0	96.4	0	0.6	0.3	31.9	☐	☑	7:24
24	940,853	90.1	6.3	0.6	0.3	32	☐	☑	7:18
25	0	90.1	0	0.6	0.3	32.1	☐	☑	7:41
26	758,774	85.6	4.5	0.6	0.3	32.2	☐	☑	6:30
27	0	85.6	0	0.6	0.3	32.4	☐	☑	8:30
28	844,026	79.8	5.8	0.6	0.3	32.4	☐	☑	9:00
29	566,946	77	2.8	0.6	0.3	33.5	☐	☑	7:00
30	0	77	0	0.6	0.3	33.5	☐	☑	7:00
31	971,975	69.6	7.4	0.6	0.3	32.6	☐	☑	7:00
Total	14,009,575		84.1						
AVG.	451,922		2.712903226						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: NY0036757

Signature: B. R. Congdon

Operator Grade Level IIB,C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg						11966			51406			
1	0	19,992	0	31	523,960	11,972	6	21	51,412	6	1.50	0.00
2	0	19,992	0	31	0	11,972	0	21	51,412	0	0.00	0.00
3	836,711	20,005	13	31	0	11,972	0	21	51,426	14	0.00	0.00
4	0	20,005	0	31	0	11,972	0	21	51,426	0	0.00	0.00
5	0	20,005	0	31	828,426	11,982	10	21	51,437	11	0.00	0.00
6	0	20,005	0	31	0	11,982	0	21	51,437	0	0.00	0.00
7	874,941	20,019	14	31	0	11,982	0	21	51,450	13	0.10	0.00
8	0	20,019	0	31	550,562	11,989	7	21	51,457	7	0.10	0.00
9	0	20,019	0	31	0	11,989	0	21	51,457	0	0.00	0.00
10	1,013,719	20,035	16	31	0	11,989	0	21	51,472	15	0.10	0.00
11	0	20,035	0	31	0	11,989	0	21	51,472	0	0.10	0.00
12	0	20,035	0	31	831,438	12,000	11	21	51,483	11	0.10	0.00
13	0	20,035	0	31	0	12,000	0	21	51,483	0	0.10	0.00
14	932,475	20,050	15	30	0	12,000	0	13	51,498	15	0.00	0.00
15	0	20,050	0	30	587,795	12,007	7	20	51,505	7	0.00	0.00
16	0	20,050	0	30	0	12,007	0	20	51,505	0	0.20	0.00
17	933,599	20,065	15	30	0	12,007	0	20	51,519	14	3.20	0.00
18	0	20,065	0	31	0	12,007	0	21	51,519	0	2.20	0.00
19	0	20,065	0	32	730,138	12,016	9	22	51,529	10	0.20	0.00
20	0	20,065	0	32	0	12,016	0	22	51,529	0	0.20	0.00
21	738,301	20,076	11	32	0	12,016	0	22	51,540	11	0.10	0.00
22	0	20,076	0	32	544,936	12,023	7	22	51,547	7	0.00	0.00
23	0	20,076	0	32	0	12,023	0	22	51,547	0	0.00	0.00
24	940,853	20,091	15	32	0	12,023	0	22	51,562	15	0.00	0.00
25	0	20,091	0	32	0	12,023	0	22	51,562	0	0.00	0.00
26	0	20,091	0	32	758,774	12,032	9	22	51,571	9	0.00	0.00
27	0	20,091	0	32	0	12,032	0	22	51,571	0	1.10	0.00
28	844,026	20,105	14	32	0	12,032	0	22	51,585	14	0.00	0.00
29	0	20,105	0	33	566,946	12,039	7	23	51,591	6	0.00	0.00
30	0	20,105	0	33	0	12,039	0	23	51,591	0	0.00	0.00
31	971,975	20,120	15	33	0	12,039	0	23	51,607	16	0.00	0.00
Total	**8,086,600**		**128**		**5,922,975**		**73**			**201**	**9.30**	**0.00**
Average	**260,858**		**4**		**191,064**		**2**			**6**		

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0698

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/10/2021
Reported: 08/12/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt.13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1H0698-01
Collected By: JM-Client
Collection Date: 08/10/2021 10:33

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/10/21 1556	08/11/21 1049	EDB
Escherichia coli	Absent			per 100mL		08/10/21 1556	08/11/21 1049	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		08/10/21 1033	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1H0698-02
Collected By: JM-Client
Collection Date: 08/10/2021 12:30

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/10/21 1556	08/11/21 1049	EDB
Escherichia coli	Absent			per 100mL		08/10/21 1556	08/11/21 1049	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		08/10/21 1230	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0698

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 08/12/2021 20:07

MICR. .AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N. ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

1+2

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 19.3
Therm ID 049
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT										Additional Note
	Red Apple Rt13/McLean Rd	8-10-2021	10:33 AM	1	DW	1		1										CL 0.5
	Cortlandville Highway Garage Rt 41 Polkville	8-10-2021	12:30 PM	1	DW	1		1										CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-10-2021 12:40 PM	J Walk	8/10/21 1240
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1H0698
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0514

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monitoring Samples

Project / PO Number: N/A
Received: 08/05/2021
Reported: 08/11/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well - Raw Water 125 HP
Sample Matrix: Drinking Water
Lab Sample ID: J1H0514-01
Collected By: Jeff MacLean
Collection Date: 08/05/2021 8:38

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/05/21 1653	08/06/21 1200	EDB
Escherichia coli	Absent			per 100mL		08/05/21 1653	08/06/21 1200	EDB

Client Sample ID: Lime Hollow Well - Raw Water 100 HP
Sample Matrix: Drinking Water
Lab Sample ID: J1H0514-02
Collected By: Jeff MacLean
Collection Date: 08/05/2021 9:02

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/05/21 1653	08/06/21 1200	EDB
Escherichia coli	Absent			per 100mL		08/05/21 1653	08/06/21 1200	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent: A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0514

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 08/11/2021 15:47

MICRO BAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

23+24

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 12.1
Therm ID 044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

J1H0514
Cortlandville Water, Town of
PM: Shannon Weeks

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monitoring Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Lime Hollow Well	8-5-2021	838 AM	1	DW	1	Sodium thiosulfate	1									Raw Water 125 HP
	" " "	8-5-2021	902 AM	1	DW	1	"	1									Raw Water 100 HP

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-5-2021 924 AM	[signature]	8/5/21 924
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0455

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 08/04/2021
Reported: 08/11/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1H0455-01
Collected By: Jeff MacLean
Collection Date: 08/04/2021 6:22

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB
Escherichia coli	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		08/04/21 0622	CUS

Client Sample ID: Terrace Road Well
Sample Matrix: Drinking Water
Lab Sample ID: J1H0455-02
Collected By: Jeff MacLean
Collection Date: 08/04/2021 6:41

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	**Present**			per 100mL		08/04/21 1744	08/05/21 1221	EDB
Escherichia coli	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0455

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1H0455-03	**Collection Date:**	08/04/2021 7:14

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB
Escherichia coli	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		08/04/21 0714	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1H0455-04	**Collection Date:**	08/04/2021 7:45

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB
Escherichia coli	Absent			per 100mL		08/04/21 1744	08/05/21 1221	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		08/04/21 0745	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

...ject Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1H0455

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 08/11/2021 15:47

41-41

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 [illegible]ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scranton, PA 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C): 1.2.3
Therm ID: 04
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	(Grab) Comp	Preservative Type **	BACT.										Additional Notes
	Municipal BLDG.	8-4-2021	6:22 AM	1	DW	1	Sodium Thiosulfate	1										Cl 0.6
	Terrace Rd Well	8-4-2021	6:41 AM	1	DW	1	"	1										Raw water
	Walden Oaks. BS.	8-4-2021	7:14 AM	1	DW	1	"	1										Cl 0.5
	Blue Creek BS.	8-4-2020	7:45 AM	1	DW	1	"	1										Cl 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	8-4-2021	Brooks	8/4/21 808
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

J1H0455

Cortlandville Water, Town of

PM: Shannon Weeks

Page 4 of 4

rev.12/26/2017

Page ____ of ____

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jul-21	8/2/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		86.4							
1	0	86.4	0	0.6	0.3	14	☑	☐	6:54
2	881,585	82	4.4	0.6	0.3	18.9	☐	☑	8:34
3	0	82	0	0.6	0.3	19	☐	☑	8:30
4	0	82	0	0.6	0.3	14.2	☑	☐	9:15
5	880,347	77.2	4.8	0.6	0.3	18.5	☐	☑	7:30
6	0	77.2	0	0.6	0.3	14.3	☑	☐	8:00
7	706,745	73.1	4.1	0.6	0.3	18.6	☐	☑	7:30
8	0	73.1	0	0.6	0.3	14.7	☑	☐	6:00
9	880,847	68.4	4.7	0.6	0.3	19.5	☐	☑	7:50
10	0	68.4	0	0.6	0.3	19.7	☐	☑	8:00
11	0	68.4	0	0.6	0.3	15.4	☑	☐	7:04
12	889,270	63.7	4.7	0.6	0.3	19.6	☐	☑	6:50
13	0	63.7	0	0.6	0.3	15.4	☑	☐	7:00
14	886,543	58.8	4.9	0.6	0.3	20.5	☐	☑	8:00
15	0	58.8	0	0.6	0.3	16.5	☑	☐	7:05
16	772,397	53.8	5	0.6	0.3	20.3	☐	☑	9:09
17	0	53.8	0	0.6	0.3	20.5	☐	☑	9.07
18	0	53.8	0	0.6	0.3	15.8	☑	☐	7:58
19	887,526	49.1	4.7	0.6	0.3	20.1	☐	☑	7:10
20	0	49.1	0	0.6	0.3	16.1	☑	☐	7:14
21	677,015	45.4	3.7	0.6	0.3	20.2	☐	☑	7:50
22	0	45.4	0	0.6	0.3	15.6	☑	☐	6:10
23	883,093	40.7	4.7	0.6	0.3	20.1	☐	☑	8:00
24	0	40.7	0	0.6	0.3	20.3	☐	☑	9:10
25	0	40.7	0	0.6	0.3	15.5	☑	☐	6:35
26	882,516	35.8	4.9	0.6	0.3	19.8	☐	☑	7:03
27	0	35.8	0	0.6	0.3	16.5	☑	☐	7:03
28	626,802	32.5	3.3	0.6	0.3	19.6	☐	☑	7:03
29	0	32.5	0	0.6	0.3	15.1	☑	☐	7:10
30	882,621	27.8	4.7	0.6	0.3	19.5	☐	☑	8:15
31	0	27.8	0	0.6	0.3	19.5	☐	☑	8:45
Total	10,737,307		58.6						
AVG.	346,365		1.890322581						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: Operator Grade Level IIB,C

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			29,683		
1		0	29,683	0	14
2		881,585	29,707	24	19
3		0	29,707	0	19
4		0	29,707	0	14
5		880,347	29,731	24	19
6		0	29,731	0	14
7		706,745	29,750	19	19
8		0	29,750	0	15
9		880,847	29,774	24	20
10		0	29,774	0	20
11		0	29,774	0	15
12		889,270	29,798	24	20
13		0	29,798	0	15
14		886,543	29,822	24	21
15		0	29,822	0	17
16		772,397	29,846	24	20
17		0	29,846	0	21
18		0	29,846	0	16
19		887,526	29,870	24	20
20		0	29,870	0	16
21		677,015	29,889	19	20
22		0	29,889	0	16
23		883,093	29,913	24	20
24		0	29,913	0	20
25		0	29,913	0	16
26		882,516	29,937	24	20
27		0	29,937	0	17
28		626,802	29,954	17	20
29		0	29,954	0	15
30		882,621	29,978	24	20
31		0	29,978	0	20
Total		10,737,307		295	
Average		346,365		10	

Microbiological and free chlorine residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	7/1/2021	1	NO	NO	0.6
Walden Oaks B.S.	7/1/2021	1	NO	NO	0.5
BlueCreek B.S.	7/1/2021	1	NO	NO	0.3
Terrace Rd. Well	7/7/2021	1	NO	NO	RAW WATER
Red Apple Rt.13/ Mclean Rd.	7/7/2021	1	NO	NO	0.6
Cortlandville Highway Garage Rt.41 Polkville	7/7/2021	1	NO	NO	0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jul-21	8/2/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		111.8							
1	824,898	109.7	2.1	0.6	0.3	30.2	☐	☑	7:23
2	0	109.7	0	0.6	0.3	30.1	☐	☑	9:00
3	835,290	106.7	3	0.6	0.3	30.1	☐	☑	8:41
4	564,899	105.3	1.4	0.6	0.3	30	☐	☑	9:30
5	0	105.3	0	0.6	0.3	30	☐	☑	7:45
6	779,226	101.3	4	0.6	0.3	29.9	☐	☑	7:45
7	0	101.3	0	0.6	0.3	30	☐	☑	7:45
8	617,537	98.3	3	0.6	0.3	30	☐	☑	6:20
9	0	98.3	0	0.6	0.3	30	☐	☑	8:00
10	1,069,646	91.1	7.2	0.6	0.3	30	☐	☑	8:15
11	587,533	87.8	3.3	0.6	0.3	30	☐	☑	7:22
12	0	87.8	0	0.6	0.3	28.1	☑	☐	7:30
13	1,079,754	80.8	7	0.6	0.3	30	☐	☑	7:30
14	0	80.8	0	0.6	0.3	30.4	☐	☑	8:20
15	808,540	76.8	4	0.6	0.3	30.5	☐	☑	8:16
16	0	76.8	0	0.6	0.3	30.6	☐	☑	8:55
17	563,671	72.1	4.7	0.6	0.3	29.8	☑	☐	8:48
18	462,865	70.2	1.9	0.6	0.3	30.8	☐	☑	8:18
19	0	70.2	0	0.6	0.3	30.7	☐	☑	7:24
20	858,214	64.7	5.5	0.6	0.3	30.8	☐	☑	7:29
21	0	64.7	0	0.6	0.3	30.9	☐	☑	8:03
22	718,993	61.1	3.6	0.6	0.3	30.9	☐	☑	6:28
23	0	61.1	0	0.6	0.3	31	☐	☑	8:00
24	665,551	56.3	4.8	0.6	0.3	30	☑	☐	9:00
25	584,770	53.9	2.4	0.6	0.3	31	☐	☑	6:46
26	0	53.9	0	0.6	0.3	31	☐	☑	7:17
27	881,509	48.2	5.7	0.6	0.3	30.9	☐	☑	7:12
28	0	48.2	0	0.6	0.3	30.9	☐	☑	7:14
29	715,276	44.7	3.5	0.6	0.3	30.9	☐	☑	7:35
30	0	44.7	0	0.6	0.3	30.8	☐	☑	8:00
31	911,737	38.8	5.9	0.6	0.3	30.8	☐	☑	8:30
Total	13,529,909		73						
AVG.	436,449		2.35483871						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: Operator Grade Level IIB,C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19870				11891			51210			
1	0	19,870	0	30	824,898	11,905	14	20	51,220	10	1.00	0.00
2	0	19,870	0	30	0	11,905	0	20	51,220	0	0.40	0.00
3	835,290	19,883	13	30	0	11,905	0	20	51,233	13	0.10	0.00
4	0	19,883	0	30	564,899	11,909	4	20	51,240	7	0.00	0.00
5	0	19,883	0	30	0	11,909	0	20	51,240	0	0.00	0.00
6	779,226	19,895	12	30	0	11,909	0	20	51,252	12	0.40	0.00
7	0	19,895	0	30	0	11,909	0	20	51,252	0	0.80	0.00
8	0	19,895	0	30	617,537	11,916	7	20	51,260	8	1.10	0.00
9	0	19,895	0	30	0	11,916	0	20	51,260	0	0.10	0.00
10	1,069,646	19,912	17	30	0	11,916	0	20	51,277	17	0.00	0.00
11	0	19,912	0	30	587,533	11,925	9	20	51,285	8	0.80	0.00
12	0	19,912	0	28	0	11,925	0	19	51,285	0	0.10	0.00
13	1,079,754	19,929	17	30	0	11,925	0	20	51,302	17	0.70	0.00
14	0	19,929	0	30	0	11,925	0	20	51,302	0	0.70	0.00
15	0	19,929	0	31	808,540	11,935	10	21	51,312	10	0.00	0.00
16	0	19,929	0	31	0	11,935	0	21	51,312	0	0.00	0.00
17	563,671	19,940	11	30	0	11,935	0	13	51,324	12	0.50	0.00
18	0	19,940	0	31	462,865	11,941	6	21	51,329	5	0.10	0.00
19	0	19,940	0	31	0	11,941	0	21	51,329	0	0.00	0.00
20	858,214	19,953	13	31	0	11,941	0	21	51,342	13	0.50	0.00
21	0	19,953	0	31	0	11,941	0	21	51,342	0	0.00	0.00
22	0	19,953	0	31	718,993	11,950	9	21	51,351	9	0.00	0.00
23	0	19,953	0	31	0	11,950	0	21	51,351	0	0.00	0.00
24	665,551	19,964	11	30	0	11,950	0	13	51,363	12	0.10	0.00
25	0	19,964	0	31	584,770	11,957	7	21	51,369	6	0.00	0.00
26	0	19,964	0	31	0	11,957	0	21	51,369	0	0.00	0.00
27	881,509	19,978	14	31	0	11,957	0	21	51,383	14	0.40	0.00
28	0	19,978	0	31	0	11,957	0	21	51,383	0	0.00	0.00
29	0	19,978	0	31	715,276	11,966	9	21	51,392	9	0.40	0.00
30	0	19,978	0	31	0	11,966	0	21	51,392	0	0.00	0.00
31	911,737	19,992	14	31	0	11,966	0	21	51,406	14	0.00	0.00
Total	**7,644,598**		**122**		**5,885,311**		**75**			**196**	**8.20**	**0.00**
Average	**246,600**		**4**		**189,849**		**2**			**6**		

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G0686

Client Sample ID:	Cortlandville Highway Garage		
Sample Matrix:	Drinking Water	**Collected By:**	Jeff MacLean
Lab Sample ID:	J1G0686-03	**Collection Date:**	07/07/2021 9:54

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB
Escherichia coli	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		07/07/21 0954	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/13/2021 11:48

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G0686

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/07/2021
Reported: 07/13/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1G0686-01
Collected By: Jeff MacLean
Collection Date: 07/07/2021 7:52

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB
Escherichia coli	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB

Client Sample ID: Red Apple Rt.13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1G0686-02
Collected By: Jeff MacLean
Collection Date: 07/07/2021 8:25

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB
Escherichia coli	Absent			per 100mL		07/07/21 1638	07/08/21 1114	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/07/21 0825	CUS

7-9

MICRO.AC* | 3821 Buck Drive, Cortland, NY 13045, 607.753.3403 | 2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169 | 1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775 | 4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C): 13.2
Therm ID: 44
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Terrace Rd well	7-7-21	7:52 AM	1	DW	G	Na2S	1									Raw water
	Red Apple Rt 13/McLean Rd	7-7-21	8:25 AM	1	DW	G		1									CL 0.6
	Cortlandville Highway Garage Rt 41 Polkville	7-7-21	9:54 AM	1	DW	G		1									CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-7-2021 10:05 AM	[illegible]	7-7-21 1000
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1G0686
Cortlandville Water, Town of
PM: Shannon Weeks

Page 3 of 3

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G0425

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 07/01/2021
Reported: 07/07/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1G0425-01
Collected By: Client
Collection Date: 07/01/2021 6:18

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB
Escherichia coli	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/01/21 0618	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J1G0425-02
Collected By: JM-Client
Collection Date: 07/01/2021 6:55

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB
Escherichia coli	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/01/21 0655	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1G0425

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1G0425-03	**Collection Date:**	07/01/2021 7:28

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB
Escherichia coli	Absent			per 100mL		07/01/21 1737	07/02/21 1237	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		07/01/21 0728	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:



Chris Long
Director
Reported: 07/07/2021 23:17

MICRO BAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N ain Avenue
Scranton, PA 18508
570.343.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number _____
Instructions on back

1-3

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 13.1
Therm ID OWL
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **											Additional Not
	Municipal BLDG.	7-1-2021	6:18 AM	1	DW	1	Na25203											CL 0.6
	Walden Oaks BS	7-1-2021	6:55 AM	1	DW	1	"											CL 0.5
	Blue Creek BS	7-1-2021	7:28 AM	1	DW	1	"											CL 0.3

J1G0425
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	7-1-2021 753 AM	AS 7/1/21	7:55
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jun-21	7/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		-19							
1	1,066,437	-24.4	5.4	0.6	0.3	32.1	☐	☑	7:07
2	0	-24.4	0	0.6	0.3	32.1	☐	☑	7:11
3	870,924	148.7	2.4	0.6	0.3	32.2	☐	☑	7:12
4	0	148.7	0	0.6	0.3	32.2	☐	☑	7:15
5	896,734	145.8	2.9	0.6	0.3	32.1	☐	☑	8:15
6	573,540	144.2	1.6	0.6	0.3	32.1	☐	☑	8:00
7	0	144.2	0	0.6	0.3	32	☐	☑	7:10
8	835,068	141.4	2.8	0.6	0.3	32	☐	☑	7:10
9	0	141.4	0	0.6	0.3	32	☐	☑	7:45
10	878,292	139.1	2.3	0.6	0.3	31.9	☐	☑	6:20
11	0	139.1	0	0.6	0.3	31.8	☐	☑	9:00
12	775,819	136.4	2.7	0.6	0.3	31.7	☐	☑	8:24
13	591,626	134.8	1.6	0.6	0.3	31.7	☐	☑	6:59
14	0	134.8	0	0.6	0.3	31.5	☐	☑	7:28
15	914,724	131.7	3.1	0.6	0.3	31.5	☐	☑	7:35
16	0	131.7	0	0.6	0.3	31.4	☐	☑	7:45
17	888,193	129.3	2.4	0.6	0.3	31.3	☐	☑	7:22
18	0	129.3	0	0.6	0.3	31.3	☐	☑	8:09
19	788,700	126.6	2.7	0.6	0.3	31.2	☐	☑	7:44
20	514,746	125.3	1.3	0.6	0.3	31.1	☐	☑	7:42
21	0	125.3	0	0.6	0.3	31	☐	☑	7:41
22	874,919	122.3	3	0.6	0.3	30.9	☐	☑	8:05
23	0	122.3	0	0.6	0.3	30.9	☐	☑	8:46
24	797,406	120.2	2.1	0.6	0.3	30.7	☐	☑	6:17
25	0	120.2	0	0.6	0.3	30.7	☐	☑	8:21
26	815,112	117.1	3.1	0.6	0.3	30.6	☐	☑	8:17
27	597,419	115.5	1.6	0.6	0.3	30.5	☐	☑	6:33
28	0	115.5	0	0.6	0.3	30.2	☐	☑	7:14
29	1,101,148	111.8	3.7	0.6	0.3	30.2	☐	☑	7:23
30	0	111.8	0	0.6	0.3	30.2	☐	☑	7:31
31							☐	☐	
Total	13,780,807		44.7						
AVG.	459,360		1.49						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr. NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Jr. Operator Grade Level IIB

30												
Reporting Month June 2021	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19,742				11,821			51,012			
1	1,066,437	19,759	17	32	0	11,821	0	22	51,029	17	0.00	0.00
2	0	19,759	0	32	0	11,821	0	22	51,029	0	0.20	0.00
3	0	19,759	0	32	870,924	11,832	11	22	51,040	11	1.30	0.00
4	0	19,759	0	32	0	11,832	0	22	51,040	0	0.00	0.00
5	896,734	19,773	14	32	0	11,832	0	22	51,053	13	0.00	0.00
6	0	19,773	0	32	573,540	11,839	7	22	51,061	7	0.00	0.00
7	0	19,773	0	32	0	11,839	0	22	51,061	0	0.00	0.00
8	835,068	19,786	13	32	0	11,839	0	22	51,074	13	0.10	0.00
9	0	19,786	0	32	0	11,839	0	22	51,074	0	0.00	0.00
10	0	19,786	0	32	878,292	11,849	10	22	51,085	10	0.00	0.00
11	0	19,786	0	32	0	11,849	0	22	51,085	0	0.00	0.00
12	775,819	19,798	12	32	0	11,849	0	22	51,097	12	0.00	0.00
13	0	19,798	0	32	591,626	11,857	8	22	51,104	7	0.10	0.00
14	0	19,798	0	32	0	11,857	0	22	51,104	0	0.30	0.00
15	914,724	19,813	15	32	0	11,857	0	22	51,119	15	0.10	0.00
16	0	19,813	0	31	0	11,857	0	21	51,119	0	0.00	0.00
17	0	19,813	0	31	888,193	11,868	11	21	51,130	11	0.00	0.00
18	0	19,813	0	31	0	11,868	0	21	51,130	0	0.00	0.00
19	788,700	19,825	12	31	0	11,868	0	21	51,142	12	0.40	0.00
20	0	19,825	0	31	514,746	11,874	6	21	51,148	6	0.20	0.00
21	0	19,825	0	31	0	11,874	0	21	51,148	0	0.50	0.00
22	874,919	19,839	14	31	0	11,874	0	21	51,162	14	0.00	0.00
23	0	19,839	0	31	0	11,874	0	21	51,162	0	0.00	0.00
24	0	19,839	0	31	797,406	11,884	10	21	51,172	10	0.00	0.00
25	0	19,839	0	31	0	11,884	0	21	51,172	0	0.00	0.00
26	815,112	19,852	13	31	0	11,884	0	21	51,185	13	0.00	0.00
27	0	19,852	0	31	597,419	11,891	7	21	51,192	7	0.00	0.00
28	0	19,852	0	30	0	11,891	0	20	51,192	0	0.10	0.00
29	1,101,148	19,870	18	30	0	11,891	0	20	51,210	18	0.50	0.00
30	0	19,870	0	30	0	11,891	0	20	51,210	0	0.90	0.00
31												
Total	8,068,661		128		5,712,146		70			196	4.70	0.00
Average	268,955		4		190,405		2			7		

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jun-21	7/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		141.3							
1	0	141.3	0	0.6	0.3	19.8	☐	☑	6:58
2	643,706	137.9	3.4	0.6	0.3	19.6	☐	☑	7:01
3	0	137.9	0	0.6	0.3	15.8	☑	☐	7:01
4	846,388	132.9	5	0.6	0.3	20	☐	☑	7:20
5	0	132.9	0	0.6	0.3	20	☐	☑	8:00
6	0	132.9	0	0.6	0.3	15.3	☑	☑	7:50
7	886,316	127.7	5.2	0.6	0.3	20	☐	☑	7:00
8	0	127.7	0	0.6	0.3	16	☑	☐	7:00
9	653,183	124.6	3.1	0.6	0.3	19.7	☐	☑	7:30
10	0	124.6	0	0.6	0.3	15.1	☑	☐	6:00
11	863,383	120.4	4.2	0.6	0.3	19.4	☐	☑	8:45
12	0	120.4	0	0.6	0.3	19.5	☐	☑	8:12
13	0	120.4	0	0.6	0.3	15	☑	☐	6:29
14	885,948	116	4.4	0.6	0.3	19.2	☐	☑	6:58
15	0	116	0	0.6	0.3	15.1	☑	☐	7:11
16	675,014	112.9	3.1	0.6	0.3	19	☐	☑	7:25
17	0	112.9	0	0.6	0.3	14.4	☑	☐	7:08
18	852,240	108.5	4.4	0.6	0.3	18.8	☐	☑	8:22
19	0	108.5	0	0.6	0.3	19.1	☐	☑	7:56
20	0	108.5	0	0.6	0.3	14.4	☑	☐	7:38
21	882,051	103.5	5	0.6	0.3	18.8	☐	☑	7:31
22	0	103.5	0	0.6	0.3	14.6	☑	☐	7:42
23	659,661	100.3	3.2	0.6	0.3	18.6	☐	☑	7:47
24	0	100.3	0	0.6	0.3	14.2	☑	☐	6:05
25	877,827	95.4	4.9	0.6	0.3	18.4	☐	☑	8:06
26	0	95.3	0	0.6	0.3	18.5	☐	☑	7:50
27	0	95.3	0	0.6	0.3	13.9	☑	☐	6:18
28	881,408	90.1	5.2	0.6	0.3	18.1	☐	☑	7:03
29	0	90.1	0	0.6	0.3	18.4	☐	☑	6:57
30	626,227	86.4	3.7	0.6	0.3	18.5	☐	☑	7:12
31							☐	☐	
Total	10,233,352		54.8						
AVG.	341,112		1.826666667						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Jr Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	6/2/2021	1	no	no	0.6
Walden Oaks BS	6/2/2021	1	no	no	0.5
Blue Creek BS	6/2/2021	1	no	no	0.4
Red Apple Rt 13/Mclean Rd	6/8/2021	1	no	no	0.6
Cville Hwy Rt 41	6/8/2021	1	no	no	0.4
Terrace Rd well	6/2/2021		no	no	Raw

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? no

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac Labs

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month June 2021	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			29,404		
1		0	29,404	0	20
2		643,706	29,422	18	20
3		0	29,422	0	16
4		846,388	29,445	23	20
5		0	29,445	0	20
6		0	29,445	0	15
7		886,316	29,469	24	20
8		0	29,469	0	16
9		653,183	29,487	18	20
10		0	29,487	0	15
11		863,383	29,510	23	19
12		0	29,510	0	20
13		0	29,510	0	15
14		885,948	29,534	24	19
15		0	29,534	0	15
16		675,014	29,552	18	19
17		0	29,552	0	14
18		852,240	29,576	24	19
19		0	29,576	0	19
20		0	29,576	0	14
21		882,051	29,600	24	19
22		0	29,600	0	15
23		659,661	29,618	18	19
24		0	29,618	0	14
25		877,827	29,642	24	18
26		0	29,642	0	19
27		0	29,642	0	14
28		881,408	29,666	24	18
29		0	29,666	0	18
30		626,227	29,683	17	19
31					
Total		10,233,352		279	
Average		341,112		9	

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1F0823

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/08/2021
Reported: 06/20/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1F0823-01
Collected By: JM-Client
Collection Date: 06/08/2021 10:50

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/08/21 1328	06/09/21 1343	EDB
Escherichia coli	Absent			per 100mL		06/08/21 1328	06/09/21 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/08/21 1050	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1F0823-02
Collected By: JM-Client
Collection Date: 06/08/2021 11:57

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/08/21 1328	06/09/21 1343	EDB
Escherichia coli	Absent			per 100mL		06/08/21 1328	06/09/21 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		06/08/21 1157	CUS

*ults in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, obac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1F0823

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 06/20/2021 21:14

MIC... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 ... ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number _____
Instructions on back

1+2

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 9.6
Therm ID 044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Red Apple Rt13/McLean Rd	6-8-2021	1050 AM	1	DW	1	Na2S203	1									CL 0.6
	C-ville Highway Garage Rt41 Polkville	6-8-2021	11:57 AM	1	DW	1	Na2S203	1									CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-8-2021 1207 PM	Jennifer Wall	6/8/21 1210

J1F0823
Cortlandville Water, Town of
PM: Shannon Weeks

rev.12/26/2017

Page ___ of ___

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1F0468

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 06/02/2021
Reported: 06/20/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1F0468-01
Collected By: Client
Collection Date: 06/02/2021 13:48

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB
Escherichia coli	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/02/21 1348	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J1F0468-02
Collected By: Client
Collection Date: 06/02/2021 13:55

Analyses Performed by: Microbac Laboratories Inc., Pittsburgh Division

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	75.2		0.200	mg/L		06/08/21 1537	06/08/21 1537	SEA

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB
Escherichia coli	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1F0468

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1F0468-03	**Collection Date:**	06/02/2021 14:20

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB
Escherichia coli	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		06/02/21 1420	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J1F0468-04	**Collection Date:**	06/02/2021 14:53

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB
Escherichia coli	Absent			per 100mL		06/02/21 1721	06/03/21 1155	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		06/02/21 1453	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1F0468

Project Requested Certification(s)

Microbac Laboratories Inc., Pittsburgh Division	
10121	New York State Department of Health
02-00257	PA Department of Environmental Protection
	PADEP Accreditation by Rule
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 06/20/2021 21:14

MIC AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 ain Avenue, Scrar A 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 12
Therm ID 64
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Type: **	BACT	Sodium	Additional Notes
	Municipal Bldg	6-2-2021	148 PM	1	DW	1	Na2S2O3	1		CL 0.6
	Terrace Rd Well	6-2-2021	155 PM	2	DW	2		1	1	Raw Water
	Walden Oaks B.S.	6-2-2021	220PM	1	DW	1	Na2S2O3	1		CL 0.5
	Blue Creek B.S.	6-2-2021	253 PM	1	DW	1	Na2S2O3	1		CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	6-2-2021 320 PM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			6/2/21 1521
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

J1F0468
Cortlandville Water, Town of
PM: Shannon Weeks

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	May-21	6/3/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		49.7							
1	762,964	45.8	3.9	0.6	0.3	32.1	☐	☑	8:24
2	544,880	43.7	2.1	0.6	0.3	32.2	☐	☑	8:51
3	0	43.7	0	0.6	0.3	32.2	☐	☑	7:57
4	950,418	38.9	4.8	0.6	0.3	32.2	☐	☑	8:28
5	0	38.9	0	0.6	0.3	32.2	☐	☑	8:09
6	883,733	35.4	3.5	0.6	0.3	32.3	☐	☑	6:30
7	0	35.4	0	0.6	0.3	32.3	☐	☑	7:10
8	830,552	31.1	4.3	0.6	0.3	32.4	☐	☑	7:00
9	533,335	29	2.1	0.6	0.3	32.6	☐	☑	9:00
10	0	29	0	0.6	0.3	32.7	☐	☑	7:00
11	880,068	24.4	4.6	0.6	0.3	32.7	☐	☑	7:10
12	0	24.4	0	0.6	0.3	32.8	☐	☑	7:40
13	829,674	21	3.4	0.6	0.3	32.8	☐	☑	6:25
14	0	21	0	0.6	0.3	32.9	☐	☑	8:15
15	915,732	16.4	4.6	0.6	0.3	32.9	☐	☑	8:20
16	608,463	14	2.4	0.6	0.3	32.9	☐	☑	7:22
17	0	14	0	0.6	0.3	32.8	☐	☑	7:15
18	1,057,414	8.6	5.4	0.6	0.3	32.8	☐	☑	7:15
19	0	8.6	0	0.6	0.3	32.8	☐	☑	7:45
20	1,025,734	4.5	4.1	0.6	0.3	32.8	☐	☑	7:15
21	0	4.5	0	0.6	0.3	32.7	☐	☑	9:49
22	1,017,998	-0.7	5.2	0.6	0.3	32.7	☐	☑	7:11
23	571,235	-3	-2.3	0.6	0.3	32.6	☐	☑	7:25
24	0	-3	0	0.6	0.3	30.6	☑	☐	7:36
25	1,095,356	-8.8	5.8	0.6	0.3	32.5	☐	☑	7:35
26	0	-8.8	0	0.6	0.3	32.4	☐	☑	7:30
27	846,441	-12.1	3.3	0.6	0.3	32.4	☐	☑	6:45
28	0	-12.1	0	0.6	0.3	32.5	☐	☑	7:38
29	728,369	-17	4.9	0.6	0.3	31.2	☑	☐	9:50
30	643,090	-19	2	0.6	0.3	32.3	☐	☑	9:10
31	0	-19	0	0.6	0.3	32.1	☐	☑	7:12
Total	14,725,456		64.1						
AVG.	475,015		2.067741935						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: _____ Operator Grade Level IIB-C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19,613				11,741			50,804			
1	762,964	19,625	12	32	0	11,741	0	22	50,816	12	0.00	0.00
2	0	19,625	0	32	544,880	11,748	7	22	50,823	7	0.00	0.00
3	0	19,625	0	32	0	11,748	0	22	50,823	0	0.50	0.00
4	950,418	19,640	15	32	0	11,748	0	22	50,838	15	0.20	0.00
5	0	19,640	0	32	0	11,748	0	22	50,838	0	0.10	0.00
6	0	19,640	0	32	883,733	11,759	10	22	50,848	10	0.00	0.00
7	0	19,640	0	32	0	11,759	0	22	50,848	0	0.60	0.50
8	830,552	19,653	13	32	0	11,759	0	22	50,861	13	0.10	0.00
9	0	19,653	0	33	533,335	11,765	6	23	50,868	7	0.50	0.00
10	0	19,653	0	33	0	11,765	0	23	50,868	0	0.00	0.00
11	880,068	19,667	14	33	0	11,765	0	23	50,882	14	0.00	0.00
12	0	19,667	0	33	0	11,765	0	23	50,882	0	0.00	0.00
13	0	19,667	0	33	829,674	11,775	10	23	50,892	10	0.00	0.00
14	0	19,667	0	33	0	11,775	0	23	50,892	0	0.00	0.00
15	915,732	19,681	14	33	0	11,775	0	23	50,906	14	0.00	0.00
16	0	19,681	0	33	608,463	11,783	8	23	50,914	8	0.00	0.00
17	0	19,681	0	33	0	11,783	0	23	50,914	0	0.00	0.00
18	1,057,414	19,698	17	33	0	11,783	0	23	50,930	16	0.00	0.00
19	0	19,698	0	33	0	11,783	0	23	50,930	0	0.00	0.00
20	0	19,698	0	33	1,025,734	11,796	13	23	50,943	13	0.00	0.00
21	0	19,698	0	33	0	11,796	0	23	50,943	0	0.00	0.00
22	1,017,998	19,714	16	33	0	11,796	0	23	50,959	16	0.00	0.00
23	0	19,714	16	33	571,235	11,803	7	23	50,966	7	0.00	0.00
24	0	19,714	0	31	0	11,803	0	22	50,966	0	0.00	0.00
25	1,095,356	19,731	17	33	0	11,803	0	23	50,983	17	0.00	0.00
26	0	19,731	0	32	0	11,803	0	23	50,983	0	0.30	0.00
27	0	19,731	0	32	846,441	11,813	10	23	50,993	10	0.00	0.00
28	0	19,731	0	33	0	11,813	0	23	50,993	0	0.80	0.00
29	728,369	19,742	11	31	0	11,813	0	15	51,006	13	0.20	0.00
30	0	19,742	0	32	643,090	11,821	8	22	51,012	6	0.20	0.00
31	0	19,742	0	32	0	11,821	0	22	51,012	0	0.00	0.00
Total	8,238,871		145		6,486,585		79			208	3.50	0.50
Average	265,770		5		209,245		3			7		

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			29,123		
1		0	29,123	0	21
2		0	29,123	0	16
3		890,558	29,147	24	21
4		0	29,147	0	17
5		659,689	29,164	17	21
6		0	29,164	0	17
7		814,218	29,186	22	21
8		0	29,186	0	21
9		0	29,186	0	17
10		892,901	29,210	24	22
11		0	29,210	0	18
12		679,086	29,229	19	22
13		0	29,229	0	17
14		885,173	29,253	24	21
15		0	29,253	0	22
16		0	29,253	0	17
17		894,078	29,277	24	21
18		0	29,277	0	21
19		663,729	29,294	17	22
20		0	29,292	0	16
21		780,423	29,316	24	21
22		0	29,316	0	21
23		0	29,316	0	16
24		891,922	29,340	24	20
25		0	29,340	0	21
26		689,024	29,358	18	20
27		0	29,358	0	16
28		815,466	29,380	22	20
29		0	29,380	0	20
30		0	29,380	0	16
31		888,646	29,404	24	20
Total		10,444,913		283	
Average		336,933		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	May-21	6/3/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous					PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	ON	OFF	
Prev Rdg		51.5							
1	0	51.5	0	0.6	0.3	20.9	☐	☑	8:37
2	0	51.5	0	0.6	0.3	16.3	☑	☐	8:19
3	890,558	46.1	5.4	0.6	0.3	20.7	☐	☑	7:34
4	0	46.1	0	0.6	0.3	16.9	☑	☐	7:29
5	659,689	42.1	4	0.6	0.3	20.8	☐	☑	7:37
6	0	42.1	0	0.6	0.3	16.6	☑	☐	6:10
7	814,218	37.6	4.5	0.6	0.3	20.9	☐	☑	7:00
8	0	37.6	0	0.6	0.3	21.4	☐	☑	7:15
9	0	37.6	0	0.6	0.3	17.3	☑	☐	9:00
10	892,901	32.5	5.1	0.6	0.3	21.6	☐	☑	7:00
11	0	32.5	0	0.6	0.3	17.5	☑	☐	7:00
12	679,086	28.5	4	0.6	0.3	21.5	☐	☑	7:30
13	0	28.5	0	0.6	0.3	17.2	☑	☐	6:05
14	885,173	23.2	5.3	0.6	0.3	21.4	☐	☑	8:30
15	0	23.2	0	0.6	0.3	21.5	☑	☐	8:10
16	0	23.2	0	0.6	0.3	17	☑	☐	7:03
17	894,078	17.8	5.4	0.6	0.3	21	☐	☑	6:55
18	0	17.8	0	0.6	0.3	21	☐	☑	7:05
19	663,729	13.7	4.1	0.6	0.3	20.8	☐	☑	7:15
20	0	13.7	0	0.6	0.3	16.4	☑	☐	7:00
21	780,423	8.9	4.8	0.6	0.3	20.5	☐	☑	9:38
22	0	8.9	0	0.6	0.3	20.5	☐	☑	7:36
23	0	8.9	0	0.6	0.3	15.9	☑	☐	7:14
24	891,922	4	4.9	0.6	0.3	20	☐	☑	7:17
25	0	4	0	0.6	0.3	20.5	☐	☑	7:15
26	689,024	148.8	4	0.6	0.3	20.3	☐	☑	7:12
27	0	148.8	0	0.6	0.3	16	☑	☐	6:00
28	815,466	145.5	3.3	0.6	0.3	19.8	☐	☑	7:30
29	0	145.5	0	0.6	0.3	20.1	☐	☑	9:41
30	0	145.5	0	0.6	0.3	15.5	☑	☐	9:00
31	888,646	141.3	4.2	0.6	0.3	19.7	☐	☑	6:53
Total	10,444,913		59						
AVG.	336,933		1.903225806						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: _____ Operator Grade Level **IIB-C**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	5/4/2021	**Routine**	NO	NO	0.6
Walden Oaks BS.	5-4-2021	**Routine**	NO	NO	0.5
Blue Creek BS.	5-4-2021	**Routine**	NO	NO	0.4
Terrace Rd. Well	5-12-2021	**Routine**	NO	NO	Raw Water
Red Apple Rt.13/ Mclean Rd.	5-12-2021	**Routine**	NO	NO	0.6
C-Ville Highway Garage Rt. 41 Polkville	5-12-2021	**Routine**	NO	NO	0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MICROBAC LABS

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1E0995

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/12/2021
Reported: 05/18/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1E0995-01	**Collection Date:**	05/12/2021 7:26

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB
Escherichia coli	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB

Client Sample ID:	Red Apple - Rt. 13/McLean Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1E0995-02	**Collection Date:**	05/12/2021 7:40

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB
Escherichia coli	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/12/21 0740	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1E0995

Client Sample ID:	C-Ville Highway Garage - Rt 41, Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1E0995-03	**Collection Date:**	05/12/2021 9:00

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB
Escherichia coli	Absent			per 100mL		05/12/21 1313	05/13/21 1343	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		05/12/21 0900	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

nitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Jennifer M. Walker

Jennifer Walker
Operations Manager
Reported: 05/18/2021 13:03

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2269 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1820 Main Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 1.1
Therm ID 044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Notes
	Terrace Rd well	5-12-2021	7:26 AM	1	DW	1	Na2S2O3	1	Raw water
	Red Apple Rt13/Mcgean Rd	5-12-2021	7:40 AM	1	DW	1	Na2S2O3	1	CL 0.6
	C-ville Highway Garage Rt41 Polkville	5-12-2021	9:00 AM	1	DW	1	Na2S2O3	1	CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-12-2021 9:14 AM		5/12/21 9:14

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1E0490

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 05/04/2021
Reported: 05/10/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J1E0490-01
Collected By: JM-Client
Collection Date: 05/04/2021 7:04

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB
Escherichia coli	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/04/21 0704	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J1E0490-02
Collected By: JM-Client
Collection Date: 05/04/2021 7:22

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB
Escherichia coli	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/04/21 0722	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1E0490

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1E0490-03	**Collection Date:**	05/04/2021 7:56

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB
Escherichia coli	Absent			per 100mL		05/04/21 1404	05/05/21 1417	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		05/04/21 0756	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

nitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 05/10/2021 16:07

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.346.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number
Instructions on back

10-1

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.7
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Manthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BTEX									Additional Notes
	Municipal BLDG.	5-4-2021	704 AM	1	DW	1	Na2S2O3	1									CL 0.6
	Walden Oaks BS.	5-4-2021	722 AM	1	DW	1	Na2S2O3	1									CL 0.5
	Blue Creek BS.	5-4-2021	756 AM	1	DW	1	Na2S2O3	1									CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-4-2021 822 AM	S Weeks	5/4/21 829
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ___ of ___

Page 3 of 3

J1E0490
Cortlandville Water, Town of
PM: Shannon Weeks

MICROBAC

3821 Buck Drive Cortland, NY 13045 607.753.3403	2369 Elmira Street, Suite C Sayre, PA 18840 570.888.0169	1620 I[illegible]ain Avenue Scran[illegible]A 18508 570.346.0775	4359 Linglestown Road Harrisburg, PA 17112 717.651.9700

CHAIN OF CUSTODY REC
Number _____
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BTEX	Additional Notes
	Municipal BLDG.	5-4-2021	704 AM	1	DW	1	Na2S2O3	1	CL 0.6
	Walden Oaks BS.	5-4-2021	722 AM	1	DW	1	Na2S2O3	1	CL 0.5
	Blue Creek BS.	5-4-2021	756 AM	1	DW	1	Na2S2O3	1	CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-4-2021 822 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Apr-21	5/3/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		113.1							
1	0	113.1	0	0.6	0.3	17.4	☐	☑	7:15
2	879,971	108.1	5	0.6	0.3	21.3	☐	☑	7:50
3	0	108.1	0	0.6	0.3	21.4	☐	☑	7:10
4	0	108.1	0	0.6	0.3	16.8	☑	☐	8:30
5	891,217	102.8	5.3	0.6	0.3	21	☐	☑	8:00
6	0	102.8	0	0.6	0.3	17	☑	☐	7:30
7	622,078	98.8	4	0.6	0.3	21.9	☐	☑	8:00
8	0	98.8	0	0.6	0.3	16.5	☑	☐	7:00
9	889,166	93.6	5.2	0.6	0.3	20.7	☐	☑	8:00
10	0	93.6	0	0.6	0.3	20.8	☐	☑	8:20
11	0	93.6	0	0.6	0.3	16.4	☑	☐	7:05
12	890,455	88.6	5	0.6	0.3	20.6	☐	☑	7:00
13	0	88.6	0	0.6	0.3	16.7	☑	☐	7:00
14	674,271	84.6	4	0.6	0.3	20.5	☐	☑	7:00
15	0	84.6	0	0.6	0.3	16.2	☑	☐	7:00
16	863,750	79.8	4.8	0.6	0.3	20.4	☐	☑	8:12
17	0	79.8	0	0.6	0.3	20.6	☐	☑	8:07
18	0	79.8	0	0.6	0.3	16	☑	☐	7:29
19	889,391	74.5	5.3	0.6	0.3	20.2	☐	☑	8:11
20	0	74.5	0	0.6	0.3	16.4	☑	☐	7:14
21	661,982	71	3.5	0.6	0.3	20.3	☐	☑	7:40
22	0	71	0	0.6	0.3	16.2	☑	☐	7:53
23	882,768	65.6	5.4	0.6	0.3	20.2	☐	☑	8:57
24	0	65.6	0	0.6	0.3	20.4	☐	☑	9:06
25	0	65.6	0	0.6	0.3	15.9	☑	☐	7:02
26	887,753	60.5	5.1	0.6	0.3	20.1	☐	☑	7:08
27	0	60.5	0	0.6	0.3	16	☑	☐	7:44
28	670,611	56.3	4.2	0.6	0.3	19.9	☐	☑	7:59
29	0	56.3	0	0.6	0.3	16.3	☑	☐	7:10
30	885,889	51.5	4.8	0.6	0.3	20.6	☐	☑	8:44
31							☐	☐	
Total	10,589,302		61.6						
AVG.	352,977		2.053333333						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: **NY0036757**

Signature: B R. Congdon

Operator Grade Level **2-B,C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month April 2021	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			28,836		
1	0		28,836	0	17
2	880		28,859	23	21
3	0		28,859	0	21
4	0		28,859	0	17
5	891,217		28,883	24	21
6	0		28,883	0	17
7	622,078		28,901	18	22
8	0		28,901	0	17
9	889,166		28,925	24	21
10	0		28,925	0	21
11	0		28,925	0	16
12	890,455		28,949	24	21
13	0		28,949	0	17
14	674,271		28,967	18	21
15	0		28,967	0	16
16	863,750		28,991	24	20
17	0		28,991	0	21
18	0		28,991	0	16
19	889,391		29,015	24	20
20	0		29,015	0	16
21	661,982		29,033	18	20
22	0		29,033	0	16
23	882,768		29,057	24	20
24	0		29,057	0	20
25	0		29,057	0	16
26	887,753		29,081	24	20
27	0		29,081	0	16
28	670,611		29,099	18	20
29	0		29,099	0	16
30	885,889		29,123	24	21
31					
Total		0		287	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Apr-21	5/3/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		111.4							
1	701,317	108.5	2.9	0.6	0.3	32.4	☐	☑	7:35
2	0	108.5	0	0.6	0.3	32.5	☐	☑	7:45
3	804,876	104.4	4.1	0.6	0.3	32.4	☐	☑	7:00
4	576,935	102.1	2.3	0.6	0.3	32.5	☐	☑	8:30
5	0	102.1	0	0.6	0.3	32.5	☐	☑	8:00
6	872,584	97.8	4.3	0.6	0.3	32.5	☐	☑	8:45
7	0	97.8	0	0.6	0.3	32.4	☐	☑	7:45
8	832,287	94.3	3.5	0.6	0.3	32.4	☐	☑	7:15
9	0	94.3	0	0.6	0.3	32.4	☐	☑	7:50
10	982,881	89.3	5	0.6	0.3	32.4	☐	☑	7:55
11	541,340	87.2	2.1	0.6	0.3	32.4	☐	☑	7:30
12	0	87.2	0	0.6	0.3	32.3	☐	☑	7:20
13	947,784	82.3	4.9	0.6	0.3	32.2	☐	☑	7:20
14	0	82.3	0	0.6	0.3	32.2	☐	☑	7:15
15	858,207	78.3	4	0.6	0.3	32.2	☐	☑	7:10
16	0	78.3	0	0.6	0.3	32.3	☐	☑	8:18
17	780,080	74.3	4	0.6	0.3	31.4	☑	☐	8:16
18	588,149	72	2.3	0.6	0.3	32.2	☐	☑	7:40
19	0	72	0	0.6	0.3	32.1	☐	☑	8:19
20	917,764	67.4	4.6	0.6	0.3	32.1	☐	☑	7:21
21	0	67.4	0	0.6	0.3	32.1	☐	☑	7:51
22	765,917	64.3	3.1	0.6	0.3	32.1	☐	☑	8:14
23	0	64.3	0	0.6	0.3	32.1	☐	☑	8:47
24	912,886	59.8	4.5	0.6	0.3	32.1	☐	☑	8:53
25	533,542	57.6	2.2	0.6	0.3	32	☐	☑	7:11
26	0	57.6	0	0.6	0.3	32	☐	☑	7:25
27	937,251	52.9	4.7	0.6	0.3	32	☐	☑	7:55
28	0	52.9	0	0.6	0.3	32	☐	☑	8:09
29	802,465	49.7	3.2	0.6	0.3	32.1	☐	☑	7:55
30	0	49.7	0	0.6	0.3	32.1	☐	☑	8:35
31							☐	☐	
Total	13,356,265		61.7						
AVG.	445,209		2.056666667						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon

Operator Grade Level **2-B,C**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	4/2/2021	1	NO	NO	0.6
Walden Oaks B.S.	4/2/2021	1	NO	NO	0.5
Bluecreek B.S.	4/2/2021	1	NO	NO	0.4
Terrace Rd. Well	4/2/2021	**RAW**	NO	NO	RAW WATER
Red Apple Rt. 13/McLean Rd.	4/5/2021	1	NO	NO	0.6
Highway Garage Rt.41 Polkville	4/5/2021	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff Maclean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
April 2021	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19501				11665			50616			
1	0	19,501	0	32	701,317	11,674	9	23	50,624	8	0.00	0.25
2	0	19,501	0	33	0	11,674	0	23	50,624	0	0.00	0.00
3	804,876	19,513	12	32	0	11,674	0	23	50,637	13	0.00	0.00
4	0	19,513	0	33	576,935	11,681	7	23	50,644	7	0.00	0.00
5	0	19,513	0	33	0	11,681	0	23	50,644	0	0.00	0.00
6	879,584	19,527	14	33	0	11,681	0	23	50,658	14	0.00	0.00
7	0	19,527	0	32	0	11,681	0	23	50,658	0	0.00	0.00
8	0	19,527	0	32	832,287	11,691	10	23	50,668	10	0.00	0.00
9	0	19,527	0	32	0	11,691	0	23	50,668	0	0.00	0.00
10	982,881	19,542	15	32	0	11,691	0	22	50,683	15	0.00	0.00
11	0	19,542	0	32	541,340	11,698	7	22	50,690	7	0.00	0.00
12	0	19,542	0	32	0	11,698	0	22	50,690	0	0.00	0.00
13	947,784	19,557	15	32	0	11,698	0	22	50,705	15	0.00	0.00
14	0	19,557	0	32	0	11,698	0	22	50,705	0	0.00	0.00
15	0	19,557	0	32	858,207	11,708	10	22	50,715	10	0.20	0.00
16	0	19,557	0	32	0	11,708	0	22	50,715	0	0.50	0.00
17	780,080	19,570	13	31	0	11,708	0	15	50,728	13	0.00	0.00
18	0	19,570	0	32	588,149	11,715	7	22	50,735	7	0.10	0.00
19	0	19,570	0	32	0	11,715	0	22	50,735	0	0.10	0.00
20	917,764	19,584	14	32	0	11,715	0	22	50,749	14	0.10	0.10
21	0	19,584	0	32	0	11,715	0	22	50,749	0	0.20	0.50
22	0	19,584	0	32	765,917	11,725	10	22	50,759	10	0.00	0.50
23	0	19,584	0	32	0	11,725	0	22	50,759	0	0.00	0.00
24	912,886	19,598	14	32	0	11,725	0	22	50,773	14	0.50	0.00
25	0	19,598	0	32	533,542	11,731	6	22	50,779	6	0.00	0.00
26	0	19,598	0	32	0	11,731	0	22	50,779	0	0.50	0.00
27	937,251	19,613	15	32	0	11,731	0	22	50,794	15	0.00	0.00
28	0	19,613	0	32	0	11,731	0	22	50,794	0	0.50	0.00
29	0	19,613	0	32	802,465	11,741	10	22	50,804	10	1.00	0.00
30	0	19,613	0	32	0	11,741	0	22	50,804	0	0.50	0.50
31												
Total	7,163,106		112		6,200,159		76			188	4.20	1.85
Average	238,770		4		206,672		3			6		

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1D0415

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/05/2021
Reported: 04/16/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1D0415-01
Collected By: JM-Client
Collection Date: 04/05/2021 9:34

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/05/21 1559	04/06/21 1118	EDB
Escherichia coli	Absent			per 100mL		04/05/21 1559	04/06/21 1118	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/05/21 0934	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1D0415-02
Collected By: JM-Client
Collection Date: 04/05/2021 10:54

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/05/21 1559	04/06/21 1118	EDB
Escherichia coli	Absent			per 100mL		04/05/21 1559	04/06/21 1118	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		04/05/21 1054	CUS

*...ults in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, ...obac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1D0415

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/16/2021 14:22

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 [illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number _____

Instructions on back

Lab Report Address

Client Name: Townof Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.6
Therm ID 041
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	REQUESTED ANALYSIS: BACT.	Additional Notes
	Red Apple Rt13/McLean Rd	4-5-2021	9:34AM	1	DW	1	Na2S2O3	1	C/0.6
	Cortlandville Highway Garage Rt41 Polkville	4-5-2021	10:54AM	1	DW	1	Na2S2O3	1	C/0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	4-5-2021 11:07 AM	[signature]	4/5/21 11:07
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1D0378

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 04/02/2021
Reported: 04/05/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J1D0378-01
Collected By: JM-Client
Collection Date: 04/02/2021 9:11

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB
Escherichia coli	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/02/21 0911	CUS

Client Sample ID: Walden Oaks BS.
Sample Matrix: Drinking Water
Lab Sample ID: J1D0378-02
Collected By: JM-Client
Collection Date: 04/02/2021 10:07

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB
Escherichia coli	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/02/21 1007	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1D0378

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1D0378-03	**Collection Date:**	04/02/2021 10:45

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB
Escherichia coli	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		04/02/21 1045	CUS

Client Sample ID:	Terrace Rd. Well		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1D0378-04	**Collection Date:**	04/02/2021 9:28

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB
Escherichia coli	Absent			per 100mL		04/02/21 1615	04/03/21 1039	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.00	4.00 MCL		mg/L	**Y1**		04/02/21 0928	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

ct Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1D0378

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner

Customer Relationship Coordinator

Reported: 04/05/2021 14:24

MICI AC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N ain Avenue, Scrant 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back

6-9

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C): 6.5
Therm ID: Old
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	1								Additional Notes
	Municipal BLDG.	4-2-2021	9:11 AM	1	DW	G	Na2S2O3	1									Cl 0.6
	Walden Oaks BS	4-2-2021	10:07 AM	1	DW	G		1									Cl 0.5
	Blue Creek BS	4-2-2021	10:45 AM	1	DW	G		1									Cl 0.4
	Terrace Rd Well	4-2-2021	9:28 AM	1	DW	G		1									Raw Water

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	4-2-2021 11:08 AM		4/2/21 11:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

Page 4 of 4

J1D0378
Cortlandville Water, Town of
PM: Shannon Weeks

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	March	4/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		64.2							
1	0	64.2	0	0.6	0.3	28	☐	☑	6:49
2	1,026,469	56.2	8	0.6	0.3	28.2	☐	☑	7:58
3	0	56.2	0	0.6	0.3	28.2	☐	☑	7:35
4	969,179	52.2	4	0.6	0.3	28.4	☐	☑	8:15
5	0	52.2	0	0.6	0.3	28.5	☐	☑	10:00
6	989,063	47	5.2	0.6	0.3	28.5	☐	☑	9:22
7	672,209	44.2	2.8	0.6	0.3	28.6	☐	☑	8:03
8	0	44.2	0	0.6	0.3	28.5	☐	☑	7:37
9	1,054,389	38.7	5.5	0.6	0.3	28.6	☐	☑	7:38
10	0	38.7	0	0.6	0.3	28.6	☐	☑	7:32
11	1,049,958	34.3	4.4	0.6	0.3	29.1	☐	☑	7:37
12	0	34.3	0	0.6	0.3	29.5	☐	☑	7:10
13	783,469	30.1	4.2	0.6	0.3	29.8	☐	☑	7:00
14	482,489	28.2	1.9	0.6	0.3	30	☐	☑	8:00
15	0	28.2	0	0.6	0.3	30.3	☐	☑	8:15
16	740,015	24.3	3.9	0.6	0.3	30.4	☐	☑	7:48
17	0	24.3	0	0.6	0.3	30.6	☐	☑	8:00
18	691,199	21.5	2.8	0.6	0.3	30.8	☐	☑	7:25
19	0	21.5	0	0.6	0.3	31	☐	☑	7:50
20	780,292	17.3	4.2	0.6	0.3	31.1	☐	☑	7:40
21	635,226	14.7	2.6	0.6	0.3	31.3	☐	☑	7:30
22	0	14.7	0	0.6	0.3	31.4	☐	☑	7:14
23	847,617	10.1	4.6	0.6	0.3	31.5	☐	☑	7:25
24	0	124.5	0	0.6	0.3	31.7	☐	☑	7:30
25	691,951	121.5	3	0.6	0.3	31.9	☐	☑	8:03
26	0	121.5	0	0.6	0.3	32	☐	☑	8:25
27	673,384	118	3.5	0.6	0.3	31.7	☑	☐	8:23
28	521,942	115.9	2.1	0.6	0.3	32.1	☐	☑	7:35
29	0	115.9	0	0.6	0.3	32.1	☐	☑	7:32
30	884,138	111.4	4.5	0.6	0.3	32.2	☐	☑	8:06
31	0	111.4	0	0.6	0.3	32.3	☐	☑	7:42
Total	13,492,989		67.2						
AVG.	435,258		2.167741935						

Chlorine Mix N/A quarts/gallons of N/A % chlorine added to N/A gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY 0036757

Signature: B.R. Congdon Operator Grade Level II-B

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month March	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19,378				11,594			50,423			
1	0	19,378	0	28	0	11,594	0	18	50,423	0	0.00	1.00
2	1,026,469	19,394	16	28	0	11,594	0	18	50,439	16	0.00	0.00
3	0	19,394	0	28	0	11,594	0	18	50,439	0	0.00	0.00
4	0	19,394	0	28	969,179	11,606	12	19	50,451	12	0.00	0.00
5	0	19,394	0	29	0	11,606	0	19	50,451	0	0.00	1.00
6	989,063	19,410	16	29	0	11,606	0	19	50,467	16	0.00	2.00
7	0	19,410	0	29	672,209	11,615	9	19	50,475	8	0.00	0.00
8	0	19,410	0	29	0	11,615	0	19	50,475	0	0.00	0.00
9	1,054,389	19,426	16	29	0	11,615	0	19	50,491	16	0.00	0.00
10	0	19,426	0	29	0	11,615	0	19	50,491	0	0.00	0.00
11	0	19,426	0	29	1,049,958	11,628	13	19	50,504	13	0.00	0.00
12	0	19,426	0	30	0	11,628	0	20	50,504	0	0.00	0.00
13	783,469	19,439	13	30	0	11,628	0	20	50,517	13	0.00	0.00
14	0	19,439	0	30	482,489	11,634	6	20	50,523	6	0.00	1.00
15	0	19,439	0	30	0	11,634	0	20	50,523	0	0.00	0.00
16	740,015	19,450	11	30	0	11,634	0	21	50,534	11	0.00	0.00
17	0	19,450	0	31	0	11,634	0	21	50,534	0	0.00	0.00
18	0	19,450	0	31	691,199	11,642	8	21	50,543	9	0.10	0.00
19	0	19,450	0	31	0	11,642	0	21	50,543	0	0.00	0.00
20	780,292	19,463	13	31	0	11,642	0	21	50,555	12	0.00	0.00
21	0	19,463	0	31	635,226	11,650	8	21	50,563	8	0.00	0.00
22	0	19,463	0	31	0	11,650	0	22	50,563	0	0.00	0.00
23	847,617	19,476	13	32	0	11,650	0	22	50,576	13	0.10	0.00
24	0	19,476	0	32	0	11,650	0	22	50,576	0	0.00	0.00
25	0	19,476	0	32	691,951	11,658	8	22	50,585	9	0.00	0.00
26	0	19,476	0	32	0	11,658	0	22	50,585	0	0.10	0.00
27	673,384	19,487	11	32	0	11,658	0	15	50,595	10	0.00	0.00
28	0	19,487	0	32	521,942	11,665	8	22	50,602	7	0.30	0.00
29	0	19,487	0	32	0	11,665	0	22	50,602	0	0.00	0.00
30	884,138	19,501	14	32	0	11,665	0	22	50,616	14	0.00	0.00
31	0	19,501	0	32	0	11,665	0	22	50,616	0	0.10	1.50
Total	**7,778,836**		**123**		**5,714,153**		**72**			**193**	**0.70**	**6.50**
Average	**250,930**		**4**		**184,328**		**2**			**6**		

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	March,2021	4/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101753 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous					PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	ON	OFF	
Prev Rdg		33.3							
1	873,045	29	4.3	0.6	0.3	18.5	☐	☑	6:57
2	0	29	0	0.6	0.3	18.8	☐	☑	7:27
3	549,695	25.5	3.5	0.6	0.3	18.6	☐	☑	7:25
4	0	25.5	0	0.6	0.3	14.4	☑	☐	7:00
5	770,045	21.7	3.8	0.6	0.3	18.6	☐	☑	9:50
6	0	21.7	0	0.6	0.3	18.7	☐	☑	9:14
7	0	21.7	0	0.6	0.3	14	☑	☐	7:43
8	876,834	17.1	4.6	0.6	0.3	18.4	☐	☑	7:30
9	0	17.1	0	0.6	0.3	18.7	☐	☑	7:30
10	696,667	13.1	4	0.6	0.3	18.7	☐	☑	7:05
11	0	13.1	0	0.6	0.3	15.5	☐	☑	7:24
12	809,622	8.9	4.2	0.6	0.3	20.7	☐	☑	7:00
13	0	8.9	0	0.6	0.3	21.4	☐	☑	8:20
14	0	8.9	0	0.6	0.3	17	☑	☐	8:00
15	889,862	4.8	4.1	0.6	0.3	21.5	☐	☑	8:00
16	0	4.8	0	0.6	0.3	17.6	☑	☐	7:00
17	665,333	0	4.8	0.6	0.3	21.6	☐	☑	7:30
18	0	146	0	0.6	0.3	17.6	☑	☐	7:00
19	846,222	139.6	6.4	0.6	0.3	21.8	☐	☑	8:00
20	0	139.6	0	0.6	0.3	22.1	☐	☑	7:55
21	0	139.6	0	0.6	0.3	17.6	☑	☐	7:05
22	893,836	131.7	7.9	0.6	0.3	21.8	☐	☑	7:00
23	0	131.7	0	0.6	0.3	17.9	☑	☐	7:15
24	703,906	127.2	4.5	0.6	0.3	21.9	☐	☑	7:10
25	0	127.2	0	0.6	0.3	17.5	☑	☐	7:46
26	891,678	122.2	5	0.6	0.3	21.7	☐	☑	8:37
27	0	122.2	0	0.6	0.3	21.9	☐	☑	8:02
28	0	122.2	0	0.6	0.3	17.4	☑	☐	7:26
29	895,012	117.1	5.1	0.6	0.3	21.6	☐	☑	7:09
30	0	117.1	0	0.6	0.3	17.6	☑	☐	7:43
31	692,754	113.1	4	0.6	0.3	21.5	☐	☑	7:31
Total	11,054,511		66.2						
AVG.	356,597		2.135483871						

Chlorine Mix N/A quarts/gallons of **N/A** % chlorine added to N/A gallons of water in crock

Reported by: Brian Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: Brian Congdon Operator Grade Level **II-B**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month March	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			28,533		
1		873,045	28,557	24	18
2		0	28,557	0	19
3		549,695	28,575	18	19
4		0	28,575	0	14
5		770,045	28,596	21	19
6		0	28,596	0	19
7		0	28,596	0	14
8		876,834	28,620	24	18
9		0	28,620	0	19
10		696,667	28,639	19	19
11		0	28,639	0	16
12		809,622	28,661	22	21
13		0	28,661	0	21
14		0	28,661	0	17
15		889,862	28,685	24	22
16		0	28,685	0	18
17		665,333	28,703	18	22
18		0	28,703	0	18
19		846,222	28,726	23	22
20		0	28,726	0	22
21		0	28,726	0	18
22		893,836	28,750	24	22
23		0	28,750	0	18
24		703,906	28,769	19	22
25		0	28,769	0	18
26		891,678	28,793	24	22
27		0	28,793	0	22
28		0	28,793	0	17
29		895,012	28,817	24	22
30		0	28,817	0	18
31		692,754	28,836	19	22
Total		11,054,511		303	
Average		356,597		10	

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Red Apple Rt.13	3/9/2021	1	0	0	0.6
C-Ville Highway Garage	03/09/2021	1	0	0	0.3
Municipal Bldg	03/01/2021	1	0	0	0.6
Terrace Rd. Well	03/01/2021		0	0	Raw
Walden Oaks B.S.	03/01/2021	1	0	0	0.5
Blue Creek B.S.	03/01/2021	1	0	0	0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

No

Comments:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0210

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Sodium

Project / PO Number: N/A
Received: 03/01/2021
Reported: 03/08/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J1C0210-01
Collected By: JM-Client
Collection Date: 03/01/2021 7:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB
Escherichia coli	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/01/21 0752	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J1C0210-02
Collected By: JM-Client
Collection Date: 03/01/2021 8:02

Analyses Subcontracted to: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	72.8		1.02	mg/L		03/03/21 1125	03/03/21 1325	JDF

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1C0210-03
Collected By: JM-Client
Collection Date: 03/01/2021 8:03

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB
herichia coli	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0210

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0210-04	**Collection Date:**	03/01/2021 8:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB
Escherichia coli	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/01/21 0825	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1C0210-05	**Collection Date:**	03/01/2021 8:52

·obiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
hod: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB
Escherichia coli	Absent			per 100mL		03/01/21 1610	03/02/21 1144	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		03/01/21 0852	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville	
11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division	
NY Lab ID No.: 10795	New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0913

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/09/2021
Reported: 03/11/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1C0913-01
Collected By: JM-Client
Collection Date: 03/09/2021 8:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/09/21 1620	03/10/21 1129	EDB
Escherichia coli	Absent			per 100mL		03/09/21 1620	03/10/21 1129	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		03/09/21 0852	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1C0913-02
Collected By: JM-Client
Collection Date: 03/09/2021 10:10

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		03/09/21 1620	03/10/21 1129	EDB
Escherichia coli	Absent			per 100mL		03/09/21 1620	03/10/21 1129	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		03/09/21 1010	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate ıral, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0913

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 03/11/2021 13:50

MICRO AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scrant[illegible] 18508, 570.343.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC(

Number

Instructions on back

1+2

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.0

Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Type**	BACT									Additional Notes
	Red Apple Rt13/MacLean Rd	3-9-2021	952 AM	1	DW	1	Na2S2O3	1									CL016
	C-Ville Highway Garage Rt41 Polkville	3-9-2021	1010 AM	1	DW	1	Na2S2O3	1									CL013

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-9-2021 1030 AM	[signature]	3/9/21 10:46
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ___ of ___

rev.12/26/2017

Page 3 of 3

J1C0913

Cortlandville Water, Town of

PM: Shannon Weeks

MI AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
162(ain Avenue, Scr..., PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RE

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACTr										Additional Notes
	Red Apple Rt13/McLean Rd	3-9-2021	852 AM	1	DW	1	Na2S2O3	1										CL 0.6
	C-ville Highway Garage Rt41 Polkville	3-9-2021	1010 AM	1	DW	1	Na2S2O3	1										CL 0.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-9-2021 1630 PM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev. 12/26/2017

Page ____ of ____

Sample Acceptance Policy for Environmental Chemistry and Microbiology

Chain of Custody

A chain of custody MUST accompany all samples received at the laboratory. The following information on the Chain of Custody must be complete: client name and address, sample collector's name, sample description/identification, matrix, date and time of collection, number of containers, preservative and requested analysis. Any missing receipt information will be documented in the final report. The laboratory will analyze those target analyses identified by the client on a project-specific basis. If project-specific information is not available, then the laboratory's default reference methods and target list of analyses will be used.

Sample Containers

Upon receipt at the laboratory sample containers will be evaluated to ensure that all of the containers are intact, that the container type meets the requirement of the specific analytical method, and that the Sample Containers are properly filled.

Preservatives

Chemical preservatives are required by many analytical methods in order to render a specific analyte stable until analysis can be performed at the laboratory. Chemical preservatives are to be added AT THE TIME OF SAMPLING (either added directly or via pre-preserved bottles), unless it is unsafe to do so.

Transport/Receipt Temperature

Many of the analytical methods utilized require that samples be kept cool during sample transport. Microbac will assess and document the receipt temperature of each cooler received at the laboratory. Where thermal preservation is required, the receipt temperature must be in a range of 0.1 – 6°C for environmental chemistry samples or <10 °C for environmental microbiology samples. Samples received on the same day as collection will be measured for temperature but will be evaluated based on the sample transport conditions. Samples delivered on the same calendar day as collection must be presented to the lab such that an attempt has been made to cool the samples, such as storage in a cooler on ice .

Holding Time

Samples should be provided to the laboratory as soon as possible after collection to ensure that analysis can be performed within the method specified Holding Time. Upon receipt at the laboratory, the sample date and time as well as the required chemistries will be evaluated to identify if any of the samples may be past the maximum holding time.

If it is determined that a container or sample condition has been compromised, is inappropriate for the requested analysis, improperly filled, improperly preserved or received outside of the required temperature range or received with inadequate holding time available, your Microbac Project Manager will contact you for direction. Documentation of decisions made to proceed with analysis will be provided to you as part of the Cooler Inspection form in the final report.

In the absence of a written agreement to the contrary, by delivering or arranging for delivery of samples to the lab, the customer agrees to our standard terms and conditions which can be found at https://www.microbac.com/standard-terms-conditions.

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1C0210

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/08/2021 19:19

1-4

MICROBAC

3821 Buck Drive	2369 Elmira Street, Suite C	1620 ain Avenue	4359 Linglestown Road
Cortland, NY 13045	Sayre, PA 18840	Scran 18508	Harrisburg, PA 17112
607.753.3403	570.888.0169	570.348.0775	717.651.9700

CHAIN OF CUSTODY REC

Number _____

Instructions on back

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd.

City, State, Zip: Cortland N.Y. 13045

Contact: Peter Alteri JR.

Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 10.9

Therm ID 044

Holding Time

Samples Received on Ice? Yes No N/A

Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample

Location:

PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Bact.	Sodium								Additional Notes
	Municipal BLDG.	3-1-2021	7:52 AM	1	DW	1	Na2S2O3	1									C10.6
	Terrace Rd well	3-1-2021	802 AM	1	DW	1	Nitric Acid		1								Raw water
	Terrace Rd well	3-1-2021	803 AM	1	DW	1	Na2S2O3	1									Raw Water
	Walden Oaks BS.	3-1-2021	825 AM	1	DW	1	Na2S2O3	1									C10.5
	Blue Creek BS.	3-1-2021	852 AM	1	DW	1	Na2S2O3	1									C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-1-2021 936 AM	[signature]	3/1/21 10:35
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

J1C02210

Cortlandville Water, Town of

PM: Shannon Weeks

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
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Client Name: Town of Cortlandville
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Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Sample
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

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	Terrace Rd well	3-1-2021	802 AM	1	DW	1	Nitric Acid		1								Raw Water
	Terrace Rd well	3-1-2021	803 AM	1	DW	1	Na2S2O3	1									Raw Water
	Walden Oaks BS.	3-1-2021	825 AM	1	DW	1	Na2S2O3	1									C10.5
	Blue Creek BS.	3-1-2021	852 AM	1	DW	1	Na2S2O3	1									C10.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-1-2021 7:36 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev 12/26/2017

Sample Acceptance Policy for Environmental Chemistry and Microbiology

Chain of Custody

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In the absence of a written agreement to the contrary, by delivering or arranging for delivery of samples to the lab, the customer agrees to our standard terms and conditions which can be found at https://www.microbac.com/standard-terms-conditions.

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Feb-21	3/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		125.7							
1	0	125.7	0	0.6	0.3	29	☐	☑	8:17
2	750,326	121.8	3.9	0.6	0.3	28.9	☐	☑	9:33
3	0	121.8	0	0.6	0.3	28.9	☐	☑	8:17
4	882,189	118.2	3.6	0.6	0.3	28.9	☐	☑	7:51
5	0	118.2	0	0.6	0.3	28.9	☐	☑	8:00
6	917,497	113.4	4.8	0.6	0.3	28.2	☑	☐	9:21
7	581,120	111	2.4	0.6	0.3	28.8	☐	☑	7:34
8	0	111	0	0.6	0.3	28.6	☐	☑	8:06
9	988,833	105.8	5.2	0.6	0.3	28.6	☐	☑	8:22
10	0	105.8	0	0.6	0.3	28.6	☐	☑	7:37
11	848,322	102.3	3.5	0.6	0.3	28.6	☐	☑	7:44
12	0	102.3	0	0.6	0.3	28.6	☐	☑	7:30
13	805,025	99.1	3.2	0.6	0.3	28.6	☐	☑	8:40
14	554,722	95.6	3.5	0.6	0.3	28.6	☐	☑	8:45
15	0	95.6	0	0.6	0.3	28.6	☐	☑	8:10
16	849,426	91.3	4.3	0.6	0.3	28.4	☐	☑	7:40
17	0	91.3	0	0.6	0.3	28.3	☐	☑	7:40
18	963,379	87.3	4	0.6	0.3	28.4	☐	☑	7:25
19	0	87.3	0	0.6	0.3	28.2	☐	☑	7:00
20	925,758	82.4	4.9	0.6	0.3	28.2	☐	☑	6:48
21	679,409	79.7	2.7	0.6	0.3	28.3	☐	☑	7:30
22	0	79.7	0	0.6	0.3	28.2	☐	☑	7:15
23	979,833	74.6	5.1	0.6	0.3	28.1	☐	☑	7:15
24	0	74.6	0	0.6	0.3	27.9	☐	☑	7:15
25	1,106,790	70	4.6	0.6	0.3	28	☐	☑	8:11
26	0	70	0	0.6	0.3	27.8	☐	☑	7:40
27	1,049,600	64.2	5.8	0.6	0.3	27.9	☐	☑	7:37
28	679,798	64.2	0	0.6	0.3	28.1	☐	☑	7:59
29							☐	☐	
30							☐	☐	
31							☐	☐	
Total	13,562,027		61.5						
AVG.	484,358		2.196428571						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Peter Alteri Jr

NYS DOH Operator Certification Number: NY0030046

Signature: _____

Operator Grade Level IIB

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month Feb 2021	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19,263				11,516.40			50,230.32			
1	0	19,263	0	29	0	11,516	0	19	50,230	0	0.00	7.00
2	750,326	19,275	12	29	0	11,516	0	19	50,242	12	0.00	12.00
3	0	19,275	0	29	0	11,516	0	19	50,242	0	0.00	0.00
4	0	19,275	0	29	882,189	11,527	11	19	50,253	11	0.00	1.50
5	0	19,275	0	29	0	11,527	0	19	50,253	0	0.00	0.00
6	917,497	19,289	14	28	0	11,527	0	12	50,268	15	0.00	0.00
7	0	19,289	0	29	581,120	11,534	7	19	50,275	7	0.00	0.00
8	0	19,289	0	29	0	11,534	0	19	50,275	0	0.00	0.00
9	988,833	19,305	16	29	0	11,534	0	19	50,290	15	0.00	0.25
10	0	19,305	0	29	0	11,534	0	19	50,290	0	0.00	0.50
11	0	19,305	0	29	848,322	11,545	11	19	50,301	11	0.00	0.00
12	0	19,305	0	29	0	11,545	0	19	50,301	0	0.00	0.00
13	805,025	19,318	13	29	0	11,545	0	19	50,313	12	0.00	0.20
14	0	19,318	0	29	554,722	11,552	7	19	50,320	7	0.00	0.00
15	0	19,318	0	29	0	11,552	0	19	50,320	0	0.00	3.00
16	849,426	19,331	13	28	0	11,552	0	19	50,334	14	0.00	0.20
17	0	19,331	0	28	0	11,552	0	19	50,334	0	0.00	0.10
18	0	19,331	0	28	963,379	11,564	12	19	50,346	12	0.00	0.15
19	0	19,331	0	28	0	11,564	0	18	50,346	0	0.00	2.50
20	925,758	19,346	15	28	0	11,564	0	18	50,360	14	0.00	4.00
21	0	19,346	0	28	679,409	11,572	8	18	50,369	9	0.00	0.00
22	0	19,346	0	28	0	11,572	0	18	50,369	0	0.00	2.00
23	979,833	19,361	15	28	0	11,572	0	18	50,384	15	0.00	2.00
24	0	19,361	0	28	0	11,572	0	18	50,384	0	0.00	0.00
25	0	19,361	0	28	1,106,790	11,586	14	18	50,398	14	0.00	0.00
26	0	19,361	0	28	0	11,586	0	18	50,398	0	0.00	0.00
27	1,049,600	19,378	17	28	0	11,586	0	18	50,415	17	0.00	0.00
28	0	19,378	0	28	679,798	11,594	8	18	50,423	8	0.00	0.00
29												
30												
31												
Total	7,266,298		115		6,295,729		78			193	0.00	35.40
Average	259,511		4		224,847		3			7		

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Feb-21	3/1/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE Feb 2021	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		80.7							
1	874,468	76.3	4.4	0.6	0.3	19.4	☐	☑	7:34
2	0	76.3	0	0.6	0.3	14.8	☑	☐	8:00
3	564,020	72.9	3.4	0.6	0.3	19.2	☐	☑	7:52
4	0	72.9	0	0.6	0.3	14.9	☑	☐	7:42
5	795,763	68.8	4.1	0.6	0.3	19.1	☐	☑	7:52
6	0	68.8	0	0.6	0.3	19.3	☐	☑	9:36
7	0	68.8	0	0.6	0.3	14.4	☑	☐	7:27
8	876,669	64.6	4.2	0.6	0.3	18.9	☐	☑	7:56
9	0	64.6	0	0.6	0.3	15.6	☑	☐	7:22
10	613,721	61.5	3.1	0.6	0.3	18.8	☐	☑	7:28
11	0	61.5	0	0.6	0.3	14.2	☑	☐	7:25
12	802,655	57.5	4	0.6	0.3	18.6	☐	☑	7:30
13	0	57.5	0	0.6	0.3	18.8	☐	☑	8:30
14	0	57.5	0	0.6	0.3	14	☑	☐	8:30
15	872,066	52.8	4.7	0.6	0.3	18.5	☐	☑	8:00
16	0	52.8	0	0.6	0.3	14.2	☑	☐	7:30
17	669,099	49.6	3.2	0.6	0.3	18.3	☑	☐	8:00
18	0	49.6	0	0.6	0.3	13.7	☑	☐	7:00
19	801,253	45.3	4.3	0.6	0.3	18.2	☐	☑	6:45
20	0	45.3	0	0.6	0.3	18.3	☐	☑	6:35
21	0	45.3	0	0.6	0.3	13.7	☑	☐	7:00
22	872,021	40.7	4.6	0.6	0.3	18.1	☐	☑	7:00
23	0	40.7	0	0.6	0.3	13.9	☑	☐	7:00
24	655,886	37.1	3.6	0.6	0.3	18	☐	☑	7:00
25	0	37.1	0	0.6	0.3	13.8	☑	☐	7:31
26	758,318	33.3	3.8	0.6	0.3	18	☐	☑	7:47
27	0	33.3	0	0.6	0.3	18.2	☐	☑	7:27
28	0	33.3	0	0.6	0.3	13.7	☑	☐	7:17
29							☐	☐	
30							☐	☐	
31							☐	☐	
Total	9,155,939		47.4						
AVG.	326,998		1.692857143						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Peter Alteri Jr. NYS DOH Operator Certification Number: **NY00030046**

Signature: _____ Operator Grade Level **IIB**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	2/1/2021	**1**	no	no	0.7
Terrace Rd Well	2/1/2021	**Raw**	no	no	0
Walden Okas Booster	2/1/2021	**1**	no	no	0.5
Blue Creek Booster	2/1/2021	**1**	no	no	0.4
Red Apple McLean Rd/Rt 13	2/8/2021	**1**	no	no	0.5
Cville Highway Rt 41	2/8/2021	**1**	no	no	0.3

Population Served: 4,000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MicroBac Labs

Did any MCL violation occur? If so, please describe: No

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			28,278		
1		874,468	28,302	24	19
2		0	28,302	0	15
3		564,020	28,321	19	19
4		0	28,321	0	15
5		795,763	28,342	21	19
6		0	28,342	0	19
7		0	28,342	0	14
8		876,669	28,366	24	19
9		0	28,366	0	16
10		613,721	28,383	17	19
11		0	28,383	0	15
12		802,655	28,405	22	19
13		0	28,405	0	19
14		0	28,405	0	14
15		872,066	28,429	24	19
16		0	28,429	0	14
17		669,099	28,448	19	18
18		0	28,448	0	14
19		801,253	28,470	22	18
20		0	28,470	0	18
21		0	28,470	0	14
22		872,021	28,494	24	18
23		0	28,494	0	14
24		655,886	28,512	18	18
25		0	28,512	0	14
26		758,318	28,533	21	18
27		0	28,533	0	18
28		0	28,533	0	14
29					
30					
31					
Total		9,155,939		255	
Average		326,998		9	

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1B0612

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/08/2021
Reported: 02/17/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1B0612-01
Collected By: JM-Client
Collection Date: 02/08/2021 9:24

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/08/21 1636	02/09/21 1140	EDB
Escherichia coli	Absent			per 100mL		02/08/21 1636	02/09/21 1140	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		02/08/21 0924	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1B0612-02
Collected By: JM-Client
Collection Date: 02/08/2021 10:29

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/08/21 1636	02/09/21 1140	EDB
Escherichia coli	Absent			per 100mL		02/08/21 1636	02/09/21 1140	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		02/08/21 1029	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1B0115

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/01/2021
Reported: 02/02/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J1B0115-01
Collected By: JM-Client
Collection Date: 02/01/2021 7:38

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB
Escherichia coli	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.70	4.00 MCL		mg/L	Y1		02/01/21 0738	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J1B0115-02
Collected By: Client
Collection Date: 02/01/2021 7:52

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB
Escherichia coli	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1B0115

Client Sample ID:	Walden Oaks BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1B0115-03	**Collection Date:**	02/01/2021 8:14

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB
Escherichia coli	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		02/01/21 0814	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1B0115-04	**Collection Date:**	02/01/2021 8:54

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB
Escherichia coli	Absent			per 100mL		02/01/21 1601	02/02/21 1133	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		02/01/21 0854	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1B0612

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/17/2021 20:51

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECORD

Number 172

Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 7.5
Therm ID 20411
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Mouthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Type **	BACT.	Additional Notes
	Red Apple Rt 13/Main Rd	2-8-2021	9:24 AM	1	DW	1	Na2S2O3	1	C10.5
	Cortlandville Highway Garage Rt 41 Polkville	2-8-2021	10:29 AM	1	DW	1	Na2S2O3	1	C10.3

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-8-2021 10:55 AM	Dawn Walls	2/8/21 22:03
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page ___ of ___

rev.12/26/2017

Cortlandville Water, Town of
PM: Shannon Weeks
J1B0612

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1B0115

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/02/2021 16:39

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

2-5

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 16.6
Therm ID 2044
Holding Time
Samples Received on Ice? (Yes) No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT.	Additional Notes
	Municipal BLDG.	2-1-2021	7:38 AM	1	DW	1	Na2S2O3	1	Cl0.7
	Terrace Rd Well	2-1-2021	7:52 AM	1	DW	1	Na2S2O3	1	Raw Water
	Walden Oaks BS	2-1-2021	8:14 AM	1	DW	1	Na2S2O3	1	Cl0.5
	Blue Creek BS.	2-1-2021	8:54 AM	1	DW	1	Na2S2O3	1	Cl0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-1-2021 9:51 AM	David Wall	2/1/2021 9:54
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev 12/26/2017

Page ___ of ___

Page 4 of 4



Cortlandville Water, Town of
PM: Shannon Weeks

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jan-21	2/2/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings			
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump	Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON OFF	
Prev Rdg.		47.5						
1	0	47.4	0	0.6	0.3	25.4	☐ ☑	8:15
2	495,249	44.9	2.5	0.6	0.3	25.6	☐ ☑	8.24
3	535,993	42.2	2.7	0.6	0.3	25.9	☐ ☑	8:05
4	0	42.2	0	0.6	0.3	26.4	☐ ☑	8:24
5	564,209	39	3.2	0.6	0.3	26.5	☐ ☑	7:42
6	0	39	0	0.6	0.3	26.9	☐ ☑	7:17
7	554,921	36.7	2.3	0.6	0.3	27.1	☐ ☑	7:19
8	0	36.7	0	0.6	0.3	27.4	☐ ☑	8:51
9	677,898	33	3.7	0.6	0.3	27.4	☐ ☑	8:37
10	525,059	30.9	2.1	0.6	0.3	27.5	☐ ☑	7:32
11	0	30.9	0	0.6	0.3	27.8	☐ ☑	7:19
12	708,710	27	3.9	0.6	0.3	27.8	☐ ☑	7:48
13	0	27	0	0.6	0.3	28	☐ ☑	7:59
14	638,811	24.4	6	0.6	0.3	28	☐ ☑	7:45
15	0	24.4	0	0.6	0.3	28.2	☐ ☑	8:00
16	712,173	21	3.4	0.6	0.3	28.2	☐ ☑	7:00
17	558,760	18.8	2.2	0.6	0.3	28.3	☐ ☑	7:30
18	0	18.8	0	0.6	0.3	28.4	☐ ☑	8:00
19	687,308	15.2	3.6	0.6	0.3	28.4	☐ ☑	7:45
20	0	15.2	0	0.6	0.3	28.7	☐ ☑	8:11
21	591,837	12.6	2.6	0.6	0.3	28.7	☐ ☑	8:26
22	0	12.6	0	0.6	0.3	28.8	☐ ☑	8:20
23	622,796	9.4	3.2	0.6	0.3	28.7	☐ ☑	7:45
24	521,066	7.3	2.1	0.6	0.3	28.8	☐ TRUE7:25	
25	0	139.6	0	0.6	0.3	28.8	☐ ☑	7:23
26	810,755	135.6	4	0.6	0.3	28.8	☐ ☑	7:12
27	0	135.6	0	0.6	0.3	28.8	☐ ☑	7:12
28	782,429	132.3	3.3	0.6	0.3	28.9	☐ ☑	8:09
29	0	132.3	0	0.6	0.3	28.9	☐ ☑	8:00
30	800,783	128.1	4.2	0.6	0.3	28.9	☐ ☑	8:14
31	584,564	125.7	2.7	0.6	0.3	28.9	☐ ☑	8:27
Total	11,373,321		57.7					
AVG.	366,881		1.861290323					

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY 0030046

Signature: Peter Alteri Jr Operator Grade Level IIB

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month Jan 2021	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		19,158				11,457			50,066			
1	0	19,158	0	25	0	11,457	0	16	50,066	0	0.40	0.00
2	495,249	19,166	8	26	0	11,457	0	16	50,074	8	0.00	0.00
3	535,993	19,175	9	26	0	11,457	0	16	50,083	9	0.00	1.00
4	0	19,175	0	26	0	11,457	0	17	50,083	0	0.10	0.00
5	564,209	19,183	8	27	0	11,457	0	17	50,092	9	0.00	0.00
6	0	19,183	0	27	0	11,457	0	17	50,092	0	0.00	0.00
7	0	19,183	0	27	554,921	11,464	7	17	50,099	7	0.00	0.00
8	0	19,183	0	27	0	11,464	0	18	50,099	0	0.00	0.00
9	677,898	19,194	11	27	0	11,464	0	18	50,110	11	0.00	0.00
10	0	19,194	0	28	525,059	11,471	7	18	50,116	6	0.00	0.00
11	0	19,194	0	28	0	11,471	0	18	50,116	0	0.00	0.00
12	708,710	19,205	11	28	0	11,471	0	18	50,127	11	0.00	0.00
13	0	19,205	0	28	0	11,471	0	18	50,127	0	0.00	0.00
14	0	19,205	0	28	638,811	11,479	8	18	50,135	8	0.00	0.00
15	0	19,205	0	28	0	11,479	0	18	50,135	0	0.00	0.20
16	712,173	19,216	11	28	0	11,479	0	18	50,147	12	0.00	0.10
17	0	19,216	0	28	558,760	11,486	7	19	50,153	6	0.00	3.00
18	0	19,216	0	28	0	11,486	0	19	50,153	0	0.00	2.00
19	687,308	19,228	12	28	0	11,486	0	19	50,164	11	0.00	1.00
20	0	19,228	0	29	0	11,486	0	19	50,164	0	0.00	0.50
21	0	19,228	0	29	591,837	11,493	7	19	50,172	8	0.00	1.00
22	0	19,228	0	29	0	11,493	0	19	50,172	0	0.00	2.00
23	622,796	19,238	10	29	0	11,493	0	19	50,182	10	0.00	1.00
24	0	19,238	0	29	521,066	11,500	7	19	50,188	6	0.00	0.00
25	0	19,238	0	29	0	11,500	0	19	50,188	0	0.00	0.00
26	810,755	19,250	12	29	0	11,500	0	19	50,201	13	0.00	0.50
27	0	19,250	0	29	0	11,500	0	19	50,201	0	0.00	1.00
28	0	19,250	0	29	782,429	11,509	9	19	50,210	9	0.00	2.00
29	0	19,250	0	29	0	11,509	0	19	50,210	0	0.00	0.50
30	800,783	19,263	13	29	0	11,509	0	19	50,223	13	0.00	0.00
31	0	19,263	0	29	584,564	11,516	7	19	50,230	7	0.00	2.00
Total	**6,615,874**		**105**		**4,757,447**		**59**			**164**	**0.50**	**17.80**
Average	**213,415**		**3**		**153,466**		**2**			**5**		

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jan-21	2/2/2021	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		130.8							
1	667,702	127.4	3.4	0.6	0.3	20	☐	☑	8:27
2	0	127.4	0	0.6	0.3	20.5	☐	☑	8:37
3	0	127.4	0	0.6	0.3	15.7	☐	☑	7:25
4	751,333	123.9	3.5	0.6	0.3	20.6	☐	☑	7:35
5	0	123.9	0	0.6	0.3	15.8	☐	☑	7:27
6	536,864	120.1	3.8	0.6	0.3	20.3	☐	☑	7:08
7	0	120.1	0	0.6	0.3	15.7	☑	☐	7:08
8	873,329	116	4.1	0.6	0.3	20.4	☐	☑	8:41
9	0	116	0	0.6	0.3	20.7	☐	☑	8:29
10	0	116	0	0.6	0.3	15.5	☑	☐	7:20
11	876,008	111.5	4.5	0.6	0.3	20.3	☐	☑	7:10
12	0	111.5	0	0.6	0.3	16.1	☑	☐	7:35
13	685,569	108.2	3.3	0.6	0.3	20.3	☐	☑	7:49
14	0	108.2	0	0.6	0.3	15.6	☑	☐	7:25
15	862,331	104.2	4	0.6	0.3	20.3	☐	☑	8:15
16	0	104.2	0	0.6	0.3	20.7	☐	☑	7:15
17	0	104.2	0	0.6	0.3	15.6	☑	☐	7:30
18	877,054	99.7	4.7	0.6	0.3	20.2	☐	☑	7:30
19	0	99.7	0	0.6	0.3	16	☐	☑	7:30
20	677,580	96.7	3	0.6	0.3	20.2	☐	☑	7:44
21	0	96.7	0	0.6	0.3	15.4	☑	☐	7:28
22	874,000	92.4	4.3	0.6	0.3	20	☐	☑	8:00
23	0	92.4	0	0.6	0.3	20.2	☐	☑	8:00
24	0	92.4	0	0.6	0.3	15.2	☑	☐	7:10
25	879,027	88.1	4.3	0.6	0.3	19.9	☐	☑	7:00
26	0	88.1	0	0.6	0.3	15.9	☑	☐	7:00
27	655,900	84.8	3.3	0.6	0.3	19.7	☐	☑	7:00
28	0	84.8	0	0.6	0.3	15.1	☑	☐	7:41
29	844,650	80.7	4.1	0.6	0.3	19.5	☐	☑	8.08
30	0	80.7	0	0.6	0.3	19.8	☐	☑	8:22
31	0	80.7	0	0.6	0.3	14.9	☑	☐	7:50
Total	10,061,347		50.3						
AVG.	324,560		1.622580645						

Chlorine Mix NA quarts/gallons of NA % chlorine added to NA gallons of water in crock

Reported by: Peter Alteri Jr NYS DOH Operator Certification Number: NY0030046

Signature: Peter Alteri Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg Terrace Rd	1/4/2021	**1**	no	no	0.6
Walden Oaks Booster Station	1/4/2021	**1**	no	no	0.5
Blue Creek Booster Station	1/4/2021	**1**	no	no	0.4
Terrace Rd Well	1/4/2021	**Raw**	yes	no	0
Red Apple Rt 12/ McLean Rd	1/11/2021	**1**	No	No	0.5
Cvill Highway Rt 41	1/11/2021	**1**	No	No	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 5

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: MICROBAC

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in

No

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg	0		27,994		
1		667,702	28,013	19	20
2		0	28,013	0	21
3		0	28,013	0	16
4		751,333	28,034	21	21
5		0	28,034	0	16
6		536,864	28,055	21	20
7		0	28,055	0	16
8		873,329	28,079	24	20
9		0	28,079	0	21
10		0	28,079	0	16
11		876,008	28,103	24	20
12		0	28,103	0	16
13		685,569	28,122	19	20
14		0	28,122	0	16
15		862,331	28,145	23	20
16		0	28,145	0	21
17		0	28,145	0	16
18		877,054	28,170	25	20
19		0	28,170	0	16
20		677,580	28,188	18	20
21		0	28,188	0	15
22		874,000	28,213	25	20
23		0	28,213	0	20
24		0	28,213	0	15
25		879,027	28,237	24	20
26		0	28,237	0	16
27		655,900	28,254	17	20
28		0	28,254	0	15
29		844,650	28,278	24	20
30		0	28,278	0	20
31		0	28,278	0	15
Total		10,061,347		284	
Average		324,560		9	

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0730

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/11/2021
Reported: 01/13/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple - Rt. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J1A0730-01
Collected By: JM-Client
Collection Date: 01/11/2021 9:00

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		01/11/21 1710	01/12/21 1139	EDB
Escherichia coli	Absent			per 100mL		01/11/21 1710	01/12/21 1139	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		01/11/21 0900	CUS

Client Sample ID: C-Ville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J1A0730-02
Collected By: JM-Client
Collection Date: 01/11/2021 10:30

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		01/11/21 1710	01/12/21 1139	EDB
Escherichia coli	Absent			per 100mL		01/11/21 1710	01/12/21 1139	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		01/11/21 1030	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate ...eral, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0730

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division

NY Lab ID No.: 10795 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

he data and information on this, and other accompanying documents, represents only the ample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks

Customer Relationship Coordinator

Reported: 01/13/2021 09:43

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Main Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY REC

Number

Instructions on back

2 of 3

Lab Report Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address

Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time

[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)

(needed by)

Report Type

[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 8.1
Therm ID 2044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)

Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.	Additional Note
	Red Apple Rt13/McLean Rd	1-11-2021	900 AM	1	DW	1	Na2S2O3	1	C10.5
	Cortlandville Highway Garage Rt41 Polkville	1-11-2021	10:30 AM	1	DW	1	Na2S2O3	1	C10.3

J1A0730

Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-11-2021 1055 AM	Darrell Wallace	1/11/2021 11:34
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

Page 3 of 3

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0296

Town of Cortlandville Water

Peter Alteri
3577 Terrace Road
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/04/2021
Reported: 01/07/2021

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal BLDG
Sample Matrix: Drinking Water
Lab Sample ID: J1A0296-01
Collected By: JM-Client
Collection Date: 01/04/2021 7:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB
Escherichia coli	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		01/04/21 0712	CUS

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J1A0296-02
Collected By: JM-Client
Collection Date: 01/04/2021 7:32

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	**Present**			per 100mL		01/04/21 1710	01/05/21 1151	EDB
Escherichia coli	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0296

Client Sample ID:	Walden Oaks BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1A0296-03	**Collection Date:**	01/04/2021 7:50

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB
Escherichia coli	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		01/04/21 0750	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J1A0296-04	**Collection Date:**	01/04/2021 8:18

obiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
od: SM 9223 B (Colilert)-1997								
Total Coliform	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB
Escherichia coli	Absent			per 100mL		01/04/21 1710	01/05/21 1151	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		01/04/21 0818	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

Absent:	A result of "Absent" for Total Coliform in drinking water indicates the sample is currently IN COMPLIANCE with the Total Coliform Rule as established under the Safe Drinking Water Act.
MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J1A0296

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 01/07/2021 10:32

MIC... AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N... ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY REC

Number
Instructions on back

9-1

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.1
Therm ID 044
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Peter Alteri JR.
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.									Additional Notes
	Municipal BLDG.	1-4-2021	7:12 AM	1	DW	1	Na2S203	1									Cl 0.6
	Terrace Rd Well	1-4-2021	7:32 AM	1	DW	1	Na2S203	1									Raw Water
	Walden Oaks BS.	1-4-2021	7:50 AM	1	DW	1	Na2S203	1									Cl 0.5
	Blue Creek BS	1-4-2021	8:18 AM	1	DW	1	Na2S203	1									Cl 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-4-2021 839 AM	[signature]	1/4/21 856

rev.12/26/2017

Page ___ of ___

J1A0296
Cortlandville Water, Town of
PM: Shannon Weeks

Water Operations Reports 2022

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2H0009

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Red Apple, Cortlandville Hwy. Garage
Project / PO Number: N/A
Received: 08/09/2022
Reported: 08/11/2022

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J2H0009-01
Collected By: Client
Collection Date: 08/09/2022 8:04

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/09/22 1647	08/10/22 1121	EDB
Escherichia coli	Absent			per 100mL		08/09/22 1647	08/10/22 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		08/09/22 0804	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J2H0009-02
Collected By: Client
Collection Date: 08/09/2022 9:56

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/09/22 1647	08/10/22 1121	EDB
Escherichia coli	Absent			per 100mL		08/09/22 1647	08/10/22 1121	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		08/09/22 0956	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

1+5

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2H0009

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Red Apple, Cortlandville Hwy. Garage

Project/PO Number: N/A
Tenatively Scheduled: 8/1/2022
Route:

Client Sample ID: Red Apple
Lab Sample ID: J2H0009-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 8-9-2022 8:04 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.6	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Client Sample ID: Cortlandville Highway Garage
Lab Sample ID: J2H0009-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 8-9-2022 9:56 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.3	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	8-9-2022 1036 AM	Printed Name:	8.9.22 10:37
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 12.9 °C Thermometer ID: IR2 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2H0457

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Lime Hollow

Project / PO Number: N/A
Received: 08/02/2022
Reported: 08/03/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well #2
Sample Matrix: Drinking Water
Lab Sample ID: J2H0457-01
Collected By: JM-Client
Collection Date: 08/02/2022 8:21

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/02/22 1644	08/03/22 1207	MMG
Escherichia coli	Absent			per 100mL		08/02/22 1644	08/03/22 1207	MMG

Client Sample ID: Lime Hollow Well #7
Sample Matrix: Drinking Water
Lab Sample ID: J2H0457-02
Collected By: JM-Client
Collection Date: 08/02/2022 8:46

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/02/22 1644	08/03/22 1207	MMG
Escherichia coli	Absent			per 100mL		08/02/22 1644	08/03/22 1207	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICR. .AC*

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 N[illegible]ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number

Instructions on back

Page 3 of 3

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm. ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLaan
Sampler Signature: Jeff MacLaan
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT					Additional Notes
	Lime Hollow well #2	8-2-2022	8:21 AM	1	DW	1		1					100 HP Raw Water
	Lime Hollow well #7	8-2-2022	8:46 AM	1	DW	1		1					125 HP Raw Water

J 2 H 0 4 5 7
Cortlandville Water, Town of
PM: Ron Boquist

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLaan	8-2-2022 1011 AM	[illegible]	8-2-22 10:10
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/28/2017

Page ____ of ____

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2H0010

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Terrace Rd.

Project / PO Number: N/A
Received: 08/03/2022
Reported: 08/04/2022

Analytical Testing Parameters

Client Sample ID: Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2H0010-01
Collected By: Client
Collection Date: 08/03/2022 12:48

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG
Escherichia coli	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 08/04/2022 17:56

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2H0010

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 8/1/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2H0010-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 8-3-2022 12:48 PM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	RAW Water	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	8-3-2022 1:54 PM	Printed Name:	8/3/22 13:54
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 16.8 °C Thermometer ID: IR-1 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2H0008

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Municipal Bldg, Walden, Blue Creek

Project / PO Number: N/A
Received: 08/03/2022
Reported: 08/04/2022

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J2H0008-01
Collected By: Client
Collection Date: 08/03/2022 12:40

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG
Escherichia coli	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		08/03/22 1240	CUS

Client Sample ID: Walden Oaks
Sample Matrix: Drinking Water
Lab Sample ID: J2H0008-02
Collected By: Client
Collection Date: 08/03/2022 13:05

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG
Escherichia coli	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		08/03/22 1305	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2H0008

Client Sample ID:	Blue Creek		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2H0008-03	**Collection Date:**	08/03/2022 13:32

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG
Escherichia coli	Absent			per 100mL		08/03/22 1613	08/04/22 1120	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		08/03/22 1332	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 08/04/2022 17:56

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2H0008

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 8/1/2022
Route:

Client Sample ID: **Municipal Bldg.**
Lab Sample ID: **J2H0008-01**
Matrix: **Drinking Water**
Type: **Grab**

Sampled Date & Time: 8-3-2022 12:40 PM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.6	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Client Sample ID: **Walden Oaks**
Lab Sample ID: **J2H0008-02**
Matrix: **Drinking Water**
Type: **Grab**

Sampled Date & Time: 8-3-2022 1:05 PM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.4	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Client Sample ID: **Blue Creek**
Lab Sample ID: **J2H0008-03**
Matrix: **Drinking Water**
Type: **Grab**

Sampled Date & Time: 8-3-2022 1:32 PM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.3	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2H0008

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 8/1/2022
Route:

Relinquished by: Jeff MacLean	Date/Time: 8-3-2022 1654 PM	Received by:	Date/Time: 8/3/22 13:54
Printed Name: Jeff MacLean		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 10.8 °C Thermometer ID: IR7 Total Containers: 3.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jul-22	8/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		26.5							
1	710,546	21.1	5.4	0.6	0.3	18.3	☐	☑	8:30
2	0	21.1	0	6	0.3	18.5	☐	☑	0
3	0	21.1	0	0.6	0.3	14.3	☑	☐	7:06
4	724,416	15.8	5.3	0.6	0.3	18.1	☐	☑	6:57
5	0	15.8	0	0.6	0.3	18.3	☐	☑	6:53
6	574,757	11.6	4.2	0.6	0.3	18	☐	☑	7:00
7	0	11.6	0	0.6	0.3	14	☑	☐	7:04
8	703,425	6.2	5.4	0.6	0.3	17.8	☐	☑	8:38
9	0	6.2	0	0.6	0.3	17.9	☐	☑	8:19
10	0	6.2	0	0.6	0.3	14.2	☑	☐	6:29
11	657,127	1.4	4.8	0.6	0.3	17.6	☐	☑	7:13
12	0	1.4	0	0.6	0.3	17.7	☐	☑	6:34
13	520,660	147	4.4	0.6	0.3	17.5	☐	☑	6:55
14	0	147	0	0.6	0.3	13.3	☑	☐	6:01
15	671,750	140.3	6.7	0.6	0.3	17.2	☐	☑	7:01
16	0	140.3	0	0.6	0.3	17.3	☐	☑	8:38
17	0	140.3	0	0.6	0.3	13	☑	☐	7:23
18	613,818	136.3	4	0.6	0.3	17.1	☐	☑	6:59
19	0	136.3	0	0.6	0.3	17.2	☐	☑	7:00
20	584,944	134.7	1.6	0.6	0.3	16.9	☐	☑	7:03
21	0	134.7	0	0.6	0.3	12.8	☑	☐	7:26
22	629,960	130.8	3.9	0.6	0.3	16.8	☐	☑	7:13
23	0	130.8	0	0.6	0.3	16.8	☐	☑	7:06
24	0	130.8	0	0.6	0.3	12.7	☑	☐	7:19
25	668,561	126.6	4.2	0.6	0.3	17.1	☐	☑	7:15
26	0	126.6	0	0.6	0.3	17	☐	☑	6:29
27	584,969	122.9	3.7	0.6	0.3	16.7	☐	☑	9:46
28	0	122.9	0	0.6	0.3	12.3	☑	☐	6:06
29	748,950	118.2	4.7	0.6	0.3	16.5	☐	☑	7:04
30	0	118.2	0	0.6	0.3	16.6	☐	☑	7:15
31	0	118.2	0	0.6	0.3	12.1	☑	☐	6:45
Total	8,393,883		58.3						
AVG.	270,770		1.880645161						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Gn — Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			32,983		
1		710,546	33,003	20	18
2		0	33,003	0	18
3		0	33,003	0	14
4		724,416	33,024	21	18
5		0	33,024	0	18
6		574,757	33,040	16	18
7		0	33,040	0	14
8		703,425	33,060	20	18
9		0	33,060	0	18
10		0	33,060	0	14
11		657,127	33,078	18	18
12		0	33,078	0	18
13		520,660	33,093	15	18
14		0	33,093	0	13
15		671,750	33,112	19	17
16		0	33,112	0	17
17		0	33,112	0	13
18		613,818	33,129	17	17
19		0	33,129	0	17
20		584,944	33,146	17	17
21		0	33,146	0	13
22		629,960	33,163	17	17
23		0	33,163	0	17
24		0	33,163	0	13
25		668,561	33,182	19	17
26		0	33,182	0	17
27		584,969	33,199	17	17
28		0	33,199	0	12
29		748,950	33,220	21	17
30		0	33,220	0	17
31		0	33,220	0	12
Total		8,393,883		237	
Average		270,770		8	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jul-22	8/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		116.1							
1	0	116.1	0	0.6	0.3	30.3	☐	☑	8:42
2	661,215	112.2	3.9	0.6	0.3	30.1	☐	☑	7:29
3	477,948	109.8	2.4	0.6	0.3	30	☐	☑	7:34
4	0	109.8	0	0.6	0.3	30	☐	☑	7:08
5	502,560	106.9	2.9	0.6	0.3	29.8	☐	☑	7.09
6	0	106.9	0	0.6	0.3	29.8	☐	☑	7:08
7	505,222	104.7	2.2	0.6	0.3	29.6	☐	☑	7:14
8	0	104.7	0	0.6	0.3	29.6	☐	☑	8:27
9	545,067	101.7	3	0.6	0.3	29.4	☐	☑	8:03
10	485,858	99	2.7	0.6	0.3	29.2	☐	☑	6:40
11	0	99	0	0.6	0.3	29.1	☐	☑	7:15
12	681,086	95.1	3.9	0.6	0.3	28.9	☐	☑	6:21
13	0	95.1	0	0.6	0.3	28.9	☐	☑	6:22
14	715,699	91.8	3.3	0.6	0.3	28.7	☐	☑	6:30
15	0	91.8	0	0.6	0.3	28.5	☐	☑	6:50
16	813,963	86.8	5	0.6	0.3	28.5	☐	☑	8:18
17	472,164	84.9	1.9	0.6	0.3	28.4	☐	☑	7:34
18	0	84.9	0	0.6	0.3	28.4	☐	☑	7:27
19	564,194	81.3	3.6	0.6	0.3	28.1	☐	☑	7:15
20	0	81.3	0	0.6	0.3	28.1	☐	☑	7:23
21	631,220	78.4	2.9	0.6	0.3	27.9	☐	☑	7:42
22	0	78.4	0	0.6	0.3	27.8	☐	☑	7:24
23	682,476	74.3	4.1	0.6	0.3	27.7	☐	☑	7:21
24	489,084	72.1	2.2	0.6	0.3	27.6	☐	☑	7:30
25	0	72.1	0	0.6	0.3	27.7	☐	☑	7:32
26	563,281	68.5	3.6	0.6	0.3	27.4	☐	☑	6:40
27	0	68.5	0	0.6	0.3	27.4	☐	☑	10:00
28	715,156	65.3	3.2	0.6	0.3	27.2	☐	☑	6:18
29	0	65.3	0	0.6	0.3	27.1	☐	☑	7:18
30	723,397	60.8	4.5	0.6	0.3	26.9	☐	☑	7:27
31	499,106	58.7	2.1	0.6	0.3	26.8	☐	☑	7:02
Total	10,728,696		57.4						
AVG.	346,087		1.851612903						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		21262				12801			53508			
1	0	21,262	0	30	0	12,801	0	20	53,508	0	0.10	0.00
2	661,215	21,273	11	30	0	12,801	0	20	53,518	10	0.00	0.00
3	0	21,273	0	30	477,948	12,807	6	20	53,524	6	0.00	0.00
4	0	21,273	0	30	0	12,807	0	20	53,524	0	0.00	0.00
5	502,560	21,281	8	30	0	12,807	0	20	53,532	8	0.20	0.00
6	0	21,281	0	30	0	12,807	0	20	53,532	0	0.00	0.00
7	0	21,281	0	30	505,222	12,814	7	20	53,538	6	0.00	0.00
8	0	21,281	0	30	0	12,814	0	20	53,538	0	0.00	0.00
9	545,067	21,289	8	29	0	12,814	0	19	53,547	9	0.00	0.00
10	0	21,289	0	29	485,858	12,820	6	19	53,553	6	0.00	0.00
11	0	21,289	0	29	0	12,820	0	19	53,553	0	0.00	0.00
12	681,086	21,300	11	29	0	12,820	0	19	53,564	11	0.00	0.00
13	0	21,300	0	29	0	12,820	0	19	53,564	0	0.00	0.00
14	0	21,300	0	29	715,699	12,829	9	19	53,573	9	0.00	0.00
15	0	21,300	0	29	0	12,829	0	18	53,573	0	0.00	0.00
16	813,963	21,313	13	29	0	12,829	0	18	53,586	13	0.10	0.00
17	0	21,313	0	28	472,164	12,835	6	18	53,592	6	0.10	0.00
18	0	21,313	0	28	0	12,835	0	18	53,592	0	0.50	0.00
19	564,194	21,322	9	28	0	12,835	0	18	53,601	9	0.00	0.00
20	0	21,322	0	28	0	12,835	0	18	53,601	0	0.00	0.00
21	0	21,322	0	28	631,220	12,843	8	18	53,609	8	0.00	0.00
22	0	21,322	0	28	0	12,843	0	18	53,609	0	0.50	0.00
23	682,476	21,333	11	28	0	12,843	0	18	53,619	10	0.00	0.00
24	0	21,333	0	28	489,084	12,849	6	18	53,626	7	1.50	0.00
25	0	21,333	0	28	0	12,849	0	18	53,626	0	0.00	0.00
26	563,281	21,342	9	27	0	12,849	0	17	53,635	9	0.00	0.00
27	0	21,342	0	27	0	12,849	0	17	53,635	0	0.00	0.00
28	0	21,342	0	27	715,156	12,858	9	17	53,644	9	0.30	0.00
29	0	21,342	0	27	0	12,858	0	17	53,644	0	0.00	0.00
30	723,397	21,353	11	27	0	12,858	0	17	53,655	11	0.00	0.00
31	0	21,353	0	27	499,106	12,864	6	17	53,661	6	0.00	0.00
Total	5,737,239		91		4,991,457		63			153	3.30	0.00
Average	185,072		3		161,015		2			5		

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	7/1/2022	1	NO	NO	0.6
Walden Oaks B.S.	7/1/2022	1	NO	NO	0.5
Blue Creek B.S.	7/1/2022	1	NO	NO	0.4
Terrace Rd Well	7/1/2022	1	NO	NO	RAW WATER
Red Apple RT 13/McLean Rd	7/6/2022	1	NO	NO	0.6
Cortlandville Highway Garage Rt 41 Polkville	7/6/2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0014

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Red Apple, Cortlandville Hwy. Garage
Project / PO Number: N/A
Received: 07/06/2022
Reported: 07/13/2022

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J2G0014-01
Collected By: BC-Client
Collection Date: 07/06/2022 9:18

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/06/22 1603	07/07/22 1038	EDB
Escherichia coli	Absent			per 100mL		07/06/22 1603	07/07/22 1038	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/06/22 0918	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J2G0014-02
Collected By: Client
Collection Date: 07/06/2022 11:36

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/06/22 1603	07/07/22 1038	EDB
Escherichia coli	Absent			per 100mL		07/06/22 1603	07/07/22 1038	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		07/06/22 1136	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0014

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 07/13/2022 19:25

MICROBAC

4:5

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0014

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Red Apple, Cortlandville Hwy. Garage

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

Client Sample ID: Red Apple
Lab Sample ID: J2G0014-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-6-2022 9:18 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.6	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3 — Designator: A

Client Sample ID: Cortlandville Highway Garage
Lab Sample ID: J2G0014-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-6-2022 11:36 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.3	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3 — Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	7-6-2022 11:46 AM	Printed Name: Ken Bennett	7/6/22 1146
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	7-6-22 1352
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 16.1 °C Thermometer ID: 044 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0015

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Terrace Rd.

Project / PO Number: N/A
Received: 07/01/2022
Reported: 07/06/2022

Analytical Testing Parameters

Client Sample ID: Terrace Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2G0015-01
Collected By: Client
Collection Date: 07/01/2022 7:32

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB
Escherichia coli	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Ron Boquist
Laboratory Manager
Reported: 07/06/2022 16:01

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Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0015

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2G0015-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-1-2022 7:32 AM

Raw Water

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004		30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	7-1-2022 832 AM	Printed Name:	7.1.22
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) No Temp: 14.9 °C Thermometer ID: OHY Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0013

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Municipal Bldg, Walden, Blue Creek

Project / PO Number: N/A
Received: 07/01/2022
Reported: 07/06/2022

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J2G0013-01
Collected By: Client
Collection Date: 07/01/2022 7:20

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB
Escherichia coli	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		07/01/22 0720	CUS

Client Sample ID: Walden Oaks
Sample Matrix: Drinking Water
Lab Sample ID: J2G0013-02
Collected By: Client
Collection Date: 07/01/2022 7:48

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB
Escherichia coli	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		07/01/22 0748	CUS

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2G0013

Client Sample ID:	Blue Creek		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2G0013-03	**Collection Date:**	07/01/2022 8:08

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB
Escherichia coli	Absent			per 100mL		07/01/22 1606	07/02/22 1036	EDB

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		07/01/22 0808	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

efinitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Ron Boquist
Laboratory Manager
Reported: 07/06/2022 16:01

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Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2G0013

TAT 7 days

52-54

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 7/4/2022
Route:

Client Sample ID: Municipal Bldg.
Lab Sample ID: J2G0013-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-1-2022 7:20 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.6	30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

Client Sample ID: Walden Oaks
Lab Sample ID: J2G0013-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-1-2022 7:48 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.5	30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

Client Sample ID: Blue Creek
Lab Sample ID: J2G0013-03
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 7-1-2022 8:08 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.4	30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jun-22	7/3/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		91.3							
1	571,535	86.9	4.4	0.6	0.3	20	☐	☑	7:20
2	0	86.9	0	0.6	0.3	16.3	☑	☐	6:02
3	732,199	81.8	5.1	0.6	0.3	20	☐	☑	7:38
4	0	81.8	0	0.6	0.3	20	☐	☑	8:03
5	0	81.8	0	0.6	0.3	15.8	☑	☐	6:33
6	826,783	75.9	5.9	0.6	0.3	19.7	☐	☑	6:57
7	0	75.9	0	0.6	0.3	19.8	☐	☑	6:44
8	619,852	71.3	4.6	0.6	0.3	19.7	☐	☑	6:58
9	0	71.3	0	0.6	0.3	16.2	☑	☐	6:54
10	668,079	66.4	4.9	0.6	0.3	19.7	☐	☑	7:36
11	0	66.4	0	0.6	0.3	19.8	☐	☑	8:17
12	0	66.4	0	0.6	0.3	15.8	☑	☐	8:33
13	651,184	61.3	5.1	0.6	0.3	19.5	☐	☑	7:27
14	0	61.3	0	0.6	0.3	19.6	☐	☑	7:41
15	568,674	56.8	4.5	0.6	0.3	19.7	☐	☑	7:23
16	0	56.8	0	0.6	0.3	15.8	☑	☐	5:59
17	753,178	51.3	5.5	0.6	0.3	19.6	☐	☑	7:57
18	0	51.3	0	0.6	0.3	19.6	☐	☑	9:17
19	0	51.3	0	0.6	0.3	15.5	☑	☐	8:05
20	741,704	46.1	5.2	0.6	0.3	19.2	☐	☑	8:27
21	0	46.1	0	0.6	0.3	19.3	☐	☑	7:20
22	558,775	41.2	4.9	0.6	0.3	19.1	☐	☑	6:58
23	0	41.2	0	0.6	0.3	15.3	☑	☐	7:05
24	666,745	36.2	5	0.6	0.3	18.9	☐	☑	5:50
25	0	36	0.2	0.6	0.3	18.9	☐	☑	6:00
26	0	36	0	0.6	0.3	15	☐	☑	7:32
27	722,376	30.7	5.3	0.6	0.3	18.9	☐	☑	5:06
28	0	30.7	0	0.6	0.3	15.7	☑	☐	7:46
29	585,790	26.5	4.2	0.6	0.3	18.5	☐	☑	8:11
30	0	26.5	0	0.6	0.3	14.7	☑	☐	6:10
31							☐	☐	
Total	8,666,874		64.8						
AVG.	288,896		2.16						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: **NY0036757**

Signature: B.R.C. — Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			32,743		
1		571,535	32,759	16	20
2		0	32,759	0	16
3		732,199	32,779	20	20
4		0	32,779	0	20
5		0	32,779	0	16
6		826,783	32,802	23	20
7		0	32,802	0	20
8		619,852	32,819	17	20
9		0	32,819	0	16
10		668,079	32,837	18	20
11		0	32,837	0	20
12		0	32,837	0	16
13		651,184	32,855	18	20
14		0	32,855	0	20
15		568,674	32,871	16	20
16		0	32,871	0	16
17		753,178	32,892	21	20
18		0	32,892	0	20
19		0	32,892	0	16
20		741,704	32,913	21	19
21		0	32,913	0	19
22		558,775	32,928	15	19
23		0	32,928	0	15
24		666,745	32,947	19	19
25		0	32,947	0	19
26		0	32,947	0	15
27		722,376	32,967	20	19
28		0	32,967	0	16
29		585,790	32,983	16	19
30		0	32,983	0	15
31					
Total		8,666,874		240	
Average		288,896		8	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jun-22	7/3/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				Time
		Gaseous			End of System Chlorine	Well Level	Pump		
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		11.7							
1	0	11.7	0	0.6	0.3	33.2	☐	☑	7:34
2	637,608	8.5	3.2	0.6	0.3	33.1	☐	☑	6:22
3	0	8.5	0	0.6	0.3	33	☐	☑	7:50
4	768,996	3.8	4.7	0.6	0.3	32.8	☐	☑	8:13
5	584,557	1	2.8	0.6	0.3	32.6	☐	☑	6:42
6	0	1	0	0.6	0.3	32.6	☐	☑	7:20
7	747,523	-3.3	4.3	0.6	0.3	32.4	☐	☑	6:53
8	0	-3.3	0	0.6	0.3	32.4	☐	☑	7:08
9	708,533	-6.7	3.4	0.6	0.3	32.3	☐	☑	7:03
10	0	-6.7	0	0.6	0.3	32.2	☐	☑	7:25
11	652,823	-10.8	4.1	0.6	0.3	32.1	☐	☑	8:06
12	473,946	-13.2	2.4	0.6	0.3	32	☐	☑	8:46
13	0	-13.2	0	0.6	0.3	32	☐	☑	9:17
14	662,160	145.3	3.8	0.6	0.3	31.8	☐	☑	7:33
15	0	145.3	0	0.6	0.3	31.8	☐	☑	7:14
16	631,129	142.8	2.5	0.6	0.3	31.8	☐	☑	6:12
17	0	142.8	0	0.6	0.3	31.7	☐	☑	8:08
18	653,126	138.8	4	0.6	0.3	31.5	☐	☑	9:29
19	506,405	136.6	2.2	0.6	0.3	31.4	☐	☑	8:16
20	0	135.5	1.1	0.6	0.3	31.4	☐	☑	8:13
21	779,082	132.2	3.3	0.6	0.3	31.2	☐	☑	7:31
22	0	132.2	0	0.6	0.3	31.2	☐	☑	7:08
23	674,492	129.2	3	0.6	0.3	31.1	☐	☑	7:20
24	0	128.2	1	0.6	0.3	30.8	☐	☑	6:03
25	804,723	125.3	2.9	0.6	0.3	30.8	☐	☑	6:28
26	494,216	123.1	2.2	0.6	0.3	30.8	☐	☑	7:41
27	0	123.1	0	0.6	0.3	30.7	☐	☑	5:18
28	647,532	118.7	4.4	0.6	0.3	30.5	☐	☑	8:02
29	0	118.7	0	0.6	0.3	30.5	☐	☑	7:38
30	693,710	116.1	2.6	0.6	0.3	30.3	☐	☑	6:27
31							☐	☐	
Total	11,120,561		57.9						
AVG.	370,685		1.93						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: Bri R. Congdon Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		21172				12734			53351			
1	0	21,172	0	33	0	12,734	0	23	53,351	0	0.50	0.00
2	0	21,172	0	33	637,608	12,742	8	23	53,359	8	0.00	0.00
3	0	21,172	0	33	0	12,742	0	23	53,359	0	0.00	0.00
4	768,996	21,184	12	33	0	12,742	0	23	53,371	12	0.00	0.00
5	0	21,184	0	33	584,557	12,750	8	23	53,378	7	0.00	0.00
6	0	21,184	0	33	0	12,750	0	23	53,378	0	0.00	0.00
7	747,523	21,196	12	32	0	12,750	0	22	53,390	12	0.30	0.00
8	0	21,196	0	32	0	12,750	0	22	53,390	0	0.70	0.00
9	0	21,196	0	32	708,533	12,758	8	22	53,398	8	0.10	0.00
10	0	21,196	0	32	0	12,758	0	22	53,398	0	0.00	0.00
11	652,823	21,205	9	32	0	12,758	0	22	53,409	11	0.00	0.00
12	0	21,205	0	32	473,946	12,764	6	22	53,415	6	0.00	0.00
13	0	21,205	0	32	0	12,764	0	22	53,415	0	0.00	0.00
14	662,160	21,216	11	32	0	12,764	0	22	53,425	10	0.00	0.00
15	0	21,216	0	32	0	12,764	0	22	53,425	0	1.00	0.00
16	0	21,216	0	32	631,129	12,772	8	22	53,433	8	0.00	0.00
17	0	21,216	0	32	0	12,772	0	22	53,433	0	0.00	0.00
18	653,126	21,227	11	32	0	12,772	0	21	53,443	10	0.10	0.00
19	0	21,227	0	31	506,405	12,778	6	21	53,449	6	0.00	0.00
20	0	21,227	0	31	0	12,778	0	21	53,449	0	0.10	0.00
21	779,082	21,239	12	31	0	12,778	0	21	53,462	13	0.00	0.00
22	0	21,239	0	31	0	12,778	0	21	53,462	0	0.10	0.00
23	0	21,239	0	31	674,492	12,787	9	21	53,470	8	0.00	0.00
24	0	21,239	0	31	0	12,787	0	21	53,470	0	0.00	0.00
25	804,723	21,252	13	31	0	12,787	0	21	53,482	12	0.00	0.00
26	0	21,252	0	31	494,216	12,793	6	21	53,489	7	0.50	0.00
27	0	21,252	0	31	0	12,793	0	21	53,489	0	0.00	0.00
28	647,532	21,262	10	31	0	12,793	0	20	53,499	10	0.00	0.00
29	0	21,262	0	31	0	12,793	0	20	53,499	0	0.00	0.00
30	0	21,262	0	30	693,710	12,801	8	20	53,508	9	0.00	0.00
31												
Total	5,715,965		90		5,404,596		67			157	3.40	0.00
Average	190,532		3		180,153		2			5		

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	6/1/2022	1	NO	NO	0.6
Walden Oaks B.S.	6/1/2022	1	NO	NO	0.4
Blue Creek B.S.	6/1/2022	1	NO	NO	0.5
Terrace Rd. Well	6/1/2022	1	NO	NO	RAW WATER
Red Apple RT13/McLean Rd.	6/7/2022	1	NO	NO	0.6
Cortlandville Highway GarageRt 41 Polkville	6/7/2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2F0011

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Red Apple, Cortlandville Hwy. Garage
Project / PO Number: N/A
Received: 06/07/2022
Reported: 06/23/2022

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J2F0011-01
Collected By: JM-Client
Collection Date: 06/07/2022 11:24

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/07/22 1600	06/08/22 1100	MMG
Escherichia coli	Absent			per 100mL		06/07/22 1600	06/08/22 1100	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/07/22 1124	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J2F0011-02
Collected By: Client
Collection Date: 06/07/2022 13:04

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/07/22 1600	06/08/22 1100	MMG
Escherichia coli	Absent			per 100mL		06/07/22 1600	06/08/22 1100	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		06/07/22 1304	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC

1142

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2F0011

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Red Apple, Cortlandville Hwy. Garage

Project/PO Number: N/A
Tenatively Scheduled: 6/6/2022
Route:

Client Sample ID: Red Apple
Lab Sample ID: J2F0011-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-7-2022 11:24 AM

Analysis	Method	Field Results/Comments	Hold Time	Designator
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.6	30.00 hrs	A

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Client Sample ID: Cortlandville Highway Garage
Lab Sample ID: J2F0011-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-7-2022 1:04 PM

Analysis	Method	Field Results/Comments	Hold Time	Designator
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.3	30.00 hrs	A

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	6-7-2022 1:11 PM	Printed Name: SWeeks	6/8/22 1340
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 12.1 °C Thermometer ID: 044 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2F0012

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Terrace Rd.

Project / PO Number: N/A
Received: 06/01/2022
Reported: 06/03/2022

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Raw water
Sample Matrix: Drinking Water
Lab Sample ID: J2F0012-01
Collected By: Client
Collection Date: 06/01/2022 8:35

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG
Escherichia coli	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/03/2022 11:10

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Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2F0012

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 6/6/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2F0012-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-1-2022 8:35 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Raw water	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3 — Designator: A

Relinquished by: Jeff MacLean Printed Name: Jeff MacLean	Date/Time: 6-1-2022 850 AM	Received by: D Wells Printed Name:	Date/Time: 6/1/22 855
Relinquished by: Printed Name:	Date/Time:	Received by: Printed Name:	Date/Time:
Relinquished by: Printed Name:	Date/Time:	Received by: Printed Name:	Date/Time:

As Received at Laboratory: On Ice: Yes / No Temp: 3.4 °C Thermometer ID: DW Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2F0010

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Municipal Bldg, Walden, Blue Creek

Project / PO Number: N/A
Received: 06/01/2022
Reported: 06/03/2022

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J2F0010-01
Collected By: Client
Collection Date: 06/01/2022 7:26

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG
Escherichia coli	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		06/01/22 0726	CUS

Client Sample ID: Walden Oaks
Sample Matrix: Drinking Water
Lab Sample ID: J2F0010-02
Collected By: Client
Collection Date: 06/01/2022 7:45

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG
Escherichia coli	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		06/01/22 0745	CUS

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CERTIFICATE OF ANALYSIS

J2F0010

Client Sample ID:	Blue Creek		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2F0010-03	**Collection Date:**	06/01/2022 8:10

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG
Escherichia coli	Absent			per 100mL		06/01/22 1535	06/02/22 1016	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		06/01/22 0810	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

efinitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 06/03/2022 11:10

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2F0010

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 6/6/2022
Route:

Client Sample ID: Municipal Bldg.
Lab Sample ID: J2F0010-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-1-2022 7:26 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.6	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3
Designator: A

Client Sample ID: Walden Oaks
Lab Sample ID: J2F0010-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-1-2022 745 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.4	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3
Designator: A

Client Sample ID: Blue Creek
Lab Sample ID: J2F0010-03
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 6-1-2022 8:10 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.5	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3
Designator: A

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2F0010

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 6/6/2022
Route:

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	6-1-2022 8:50 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 3.4 °C Thermometer ID: 214 Total Containers: 3.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	May-22	6/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		14.6							
1	0	14.6	0	0.6	0.3	18.1	☑	☐	7:54
2	751,484	9.6	5	0.6	0.3	21.9	☐	☑	7:26
3	0	9.6	0	0.6	0.3	18.5	☑	☑	7:11
4	647,839	5.4	4.2	0.6	0.3	21.6	☐		7:34
5	0	5.4	0	0.6	0.3	17.6	☑	☐	6:10
6	751,887	145.9	5.1	0.6	0.3	21.4	☐	☑	8:19
7	0	145.9	0	0.6	0.3	21.5	☐	☑	6:59
8	0	145.9	0	0.6	0.3	17.3	☑	☐	6:50
9	803,335	140	5.9	0.6	0.3	21	☐	☑	6:50
10	0	140	0	0.6	0.3	21.2	☐	☑	6:55
11	590,354	133.4	6.6	0.6	0.3	21.3	☐	☑	7:09
12	0	133.4	0	0.6	0.3	17.4	☑	☐	7:04
13	742,617	127.8	5.6	0.6	0.3	21.1	☐	☑	8:14
14	0	127.8	0	0.6	0.3	21.1	☐	☑	7:33
15	0	127.8	0	0.6	0.3	17	☑	☐	7:25
16	785,492	122.1	5.7	0.6	0.3	21.2	☐	☑	7:27
17	0	122.1	0	0.6	0.3	18.7	☑	☐	7:27
18	602,283	117.7	4.4	0.6	0.3	20.9	☐	☑	6:4
19	0	117.7	0	0.6	0.3	17.3	☑	☐	6:02
20	686,184	112.5	5.2	0.6	0.3	20.8	☐	☑	8:19
21	0	112.5	0	0.6	0.3	20.8	☐	☑	8:28
22	0	112.5	0	0.6	0.3	20.8	☐	☑	7:15
23	744,278	106.9	5.6	0.6	0.3	20.5	☐	☑	7:04
24	0	106.9	0	0.6	0.3	20.6	☐	☑	7:01
25	602,787	102.1	4.8	0.6	0.3	20.3	☐	☑	7:06
26	0	102.1	0	0.6	0.3	16.7	☑	☐	6:12
27	673,888	97	5.1	0.6	0.3	20.3	☐	☑	6:54
28	0	97	5.1	0.6	0.3	20.3	☐	☑	6:13
29	0	97	5.1	0.6	0.3	20.3	☑	☐	6:30
30	634,418	91.3	5.7	0.6	0.3	20.1	☐	☑	6:28
31	0	91.3	0	0.6	0.3	20.1	☐	☑	7:13
Total	9,016,846		79.1						
AVG.	290,866		2.551612903						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: Brian R. Congdon Operator Grade Level **IIB-C**

NEW YORK STATE DEPARTMENT OF HEALTH

Water Systems Operation Report LH

Bureau of Water Supply Protection

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	May-22	6/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		75.2							
1	503,685	72.7	2.5	0.6	0.3	36.1	☐	☑	8:12
2	0	72.7	0	0.6	0.3	36.1	☐	☑	7:50
3	632,799	68.8	3.9	0.6	0.3	36.1	☐	☑	7:23
4	0	68.8	0	0.6	0.3	36.1	☐	☑	7:47
5	611,619	65.7	3.1	0.6	0.3	35.9	☐	☑	6:25
6	0	65.7	0	0.6	0.3	35.9	☐	☑	8:07
7	669,916	61.6	4.1	0.6	0.3	35.7	☐	☑	6:49
8	514,184	59	2.6	0.6	0.3	35.7	☐	☑	7:00
9	0	59	0	0.6	0.3	35.6	☐	☑	7:17
10	804,172	53.9	5.1	0.6	0.3	35.5	☐	☑	7:04
11	0	53.9	0	0.6	0.3	35.4	☐	☑	7:24
12	792,363	49.8	4.1	0.6	0.3	35.3	☐	☑	7:16
13	0	49.8	0	0.6	0.3	35.2	☐	☑	8:52
14	754,391	45.1	4.7	0.6	0.3	35.1	☐	☑	7:42
15	554,486	42.2	2.9	0.6	0.3	34.9	☐	☑	7:35
16	0	42.2	0	0.6	0.3	34.9	☐	☑	8:08
17	594,337	38.6	3.6	0.6	0.3	34.7	☐	☑	7:35
18	0	38.6	0	0.6	0.3	34.7	☐	☑	6:14
19	590,824	35.9	2.7	0.6	0.3	34.5	☐	☑	6:12
20	0	35.9	0	0.6	0.3	34.4	☐	☑	8:37
21	695,928	31.2	4.7	0.6	0.3	34.3	☐	☑	8:38
22	462,373	29	2.2	0.6	0.3	34.2	☐	☑	7:26
23	0	29	0	0.6	0.3	34.1	☐	☑	7:13
24	623,075	25.1	3.9	0.6	0.3	34	☐	☑	7:07
25	0	25.1	0	0.6	0.3	33.9	☐	☑	7:30
26	661,508	21.8	3.3	0.6	0.3	33.8	☐	☑	6.27
27	0	21.8	0	0.6	0.3	33.8	☐	☑	7:06
28	528,146	18.8	3	0.6	0.3	33.6	☐	☑	6:48
29	493,575	16.4	2.4	0.6	0.3	33.5	☐	☑	6:40
30	0	16.4	0	0.6	0.3	33.4	☐	☑	6:51
31	747,983	11.7	4.7	0.6	0.3	33.2	☐	☑	7:22
Total	11,235,364		63.5						
AVG.	362,431		2.048387097						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon Operator Grade Level **IIB-C**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Lime Hollow Well #2	5/4/2022	1	NO	NO	Raw Water
Lime Hollow Well # 7	5/4/2022	1	NO	NO	Raw Water
Municipal Garage	5/4/2022	1	NO	NO	0.6
Walden Oaks BS	5/4/2022	1	NO	NO	0.5
Blue Creek BS	5/4/2022	1	NO	NO	0.5
Terrace Rd Well	5/4/2022	1	NO	NO	Raw Water
Red Apple Rt 13/ McLean Rd	5/10/2022	1	NO	NO	0.6
Cortlandville Highway Garage Rt 41 Polkville	5/10/2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 8

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			32,495		
1		0	32,495	0	18
2		751,484	32,516	21	22
3		0	32,517	0	19
4		647,839	32,533	16	22
5		0	32,533	0	18
6		751,887	32,554	21	21
7		0	32,554	0	22
8		0	32,554	0	17
9		803,335	32,576	22	21
10		0	32,576	0	21
11		590,354	32,592	16	21
12		0	32,592	0	17
13		742,617	32,612	20	21
14		0	32,612	0	21
15		0	32,612	0	17
16		785,492	32,634	22	21
17		0	32,634	0	19
18		602,283	32,651	17	21
19		0	32,651	0	17
20		686,184	32,670	19	21
21		0	32,670	0	21
22		0	32,670	0	21
23		744,278	32,690	20	21
24		0	32,690	0	21
25		602,787	32,707	17	20
26		0	32,707	0	17
27		673,888	32,725	18	20
28		0	32,725	0	20
29		0	32,725	0	20
30		634,418	32,743	18	20
31		0	32,743	0	20
Total		9,016,846		247	
Average		290,866		8	

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		21077				12670			53193			
1	0	21,077	0	36	503,685	12,677	7	25	53,199	6	0.00	0.00
2	0	21,077	0	36	0	12,677	0	25	53,199	0	0.01	0.00
3	632,799	21,087	10	36	0	12,677	0	25	53,208	9	0.01	0.00
4	0	21,087	0	36	0	12,677	0	25	53,208	0	0.03	0.00
5	0	21,087	0	36	611,619	12,684	7	25	53,216	8	0.00	0.00
6	0	21,087	0	36	0	12,684	0	25	53,216	0	0.00	0.00
7	669,916	21,097	10	36	0	12,684	0	25	53,227	11	0.00	0.00
8	0	21,097	0	36	514,184	12,691	7	25	53,233	6	0.00	0.00
9	0	21,097	0	36	0	12,691	0	25	53,233	0	0.00	0.00
10	804,172	21,110	13	36	0	12,691	0	25	53,245	12	0.00	0.00
11	0	21,110	0	35	0	12,691	0	25	53,245	0	0.00	0.00
12	0	21,110	0	35	792,363	12,700	9	25	53,255	10	0.00	0.00
13	0	21,110	0	35	0	12,700	0	25	53,255	0	0.00	0.00
14	754,391	21,122	12	35	0	12,700	0	25	53,267	12	0.00	0.00
15	0	21,122	0	35	554,486	12,707	7	25	53,274	7	0.00	0.00
16	0	21,122	0	35	0	12,707	0	25	53,274	0	1.00	0.00
17	594,337	21,131	9	35	0	12,707	0	25	53,283	9	0.00	0.00
18	0	21,131	0	35	0	12,707	0	25	53,283	0	0.10	0.00
19	0	21,131	0	35	590,824	12,715	8	24	53,290	7	0.10	0.00
20	0	21,131	0	34	0	12,715	0	24	53,290	0	0.00	0.00
21	695,928	21,142	11	34	0	12,715	0	24	53,301	11	0.00	0.00
22	0	21,142	0	34	462,373	12,720	5	24	53,307	6	0.10	0.00
23	0	21,142	0	34	0	12,720	0	24	53,307	0	0.00	0.00
24	623,075	21,152	10	34	0	12,720	0	24	53,317	10	0.00	0.00
25	0	21,152	0	34	0	12,720	0	24	53,317	0	0.00	0.00
26	0	21,152	0	34	661,508	12,728	8	24	53,325	8	0.00	0.00
27	0	21,152	0	34	0	12,728	0	24	53,325	0	0.10	0.00
28	528,146	21,160	8	34	0	12,728	0	24	53,333	8	0.00	0.00
29	0	21,160	0	34	493,575	12,734	6	23	53,339	6	0.00	0.00
30	0	21,160	0	34	0	12,734	0	23	53,339	0	0.00	0.00
31	747,983	21,172	12	33	0	12,734	0	23	53,351	12	0.00	0.00
Total	6,050,747		95		5,184,617		64			158	1.45	0.00
Average	195,185		3		167,246		2			5		

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0014

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Red Apple, Cortlandville Hwy. Garage
Project / PO Number: N/A
Received: 05/10/2022
Reported: 05/16/2022

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J2E0014-01
Collected By: Client
Collection Date: 05/10/2022 10:32

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/10/22 1609	05/11/22 1122	MMG
Escherichia coli	Absent			per 100mL		05/10/22 1609	05/11/22 1122	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/10/22 1032	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J2E0014-02
Collected By: Client
Collection Date: 05/10/2022 12:06

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/10/22 1609	05/11/22 1122	MMG
Escherichia coli	Absent			per 100mL		05/10/22 1609	05/11/22 1122	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
mg/L: Milligrams per Liter
RL: Reporting Limit
Y1: Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0014

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 05/16/2022 10:12

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2E0014

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Red Apple, Cortlandville Hwy. Garage

Project/PO Number: N/A
Tenatively Scheduled: 5/2/2022
Route:

Client Sample ID: Red Apple
Lab Sample ID: J2E0014-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-10-2022 10:32 AM

CL 0.6

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004		30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

Client Sample ID: Cortlandville Highway Garage
Lab Sample ID: J2E0014-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-10-2022 12:06 PM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004		30.00 hrs

Container(s)	Designator
120ml-Bottle LDPE-Sterile, Na2S2O3	A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	5-10-2022 12:15 PM	Printed Name:	5/10/22 1317
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 14.9 °C Thermometer ID: 044 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0015

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Terrace Rd.

Project / PO Number: N/A
Received: 05/04/2022
Reported: 05/16/2022

Analytical Testing Parameters

Client Sample ID:	Terrace Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2E0015-01	**Collection Date:**	05/04/2022 6:56

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 05/16/2022 10:11

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2E0015

TAT 7 days

1

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 5/2/2022
Route:

Client Sample ID: Terrace Rd.
Lab Sample ID: J2E0015-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-4-2022 6:56 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	RAW WATER	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by: Jeff MacLean	Date/Time: 5-4-2022 1:45PM	Received by: J. Decker	Date/Time: 5.4.22 13:53
Printed Name: Jeff MacLean		Printed Name: Shannon Decker	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 11.1°C Thermometer ID: 044 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0013

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Municipal Bldg, Walden, Blue Creek

Project / PO Number: N/A
Received: 05/04/2022
Reported: 05/16/2022

Analytical Testing Parameters

Client Sample ID: Municipal Bldg.
Sample Matrix: Drinking Water
Lab Sample ID: J2E0013-01
Collected By: JM-Client
Collection Date: 05/04/2022 6:45

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		05/04/22 0645	CUS

Client Sample ID: Walden Oaks
Sample Matrix: Drinking Water
Lab Sample ID: J2E0013-02
Collected By: JM-Client
Collection Date: 05/04/2022 7:14

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		05/04/22 0714	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0013

Client Sample ID:	Blue Creek		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2E0013-03	**Collection Date:**	05/04/2022 7:38

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		05/04/22 0738	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

efinitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 05/16/2022 10:12

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2E0013

TAT 7 days

8-10

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 5/2/2022
Route:

Client Sample ID: Municipal Bldg.
Lab Sample ID: J2E0013-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-4-2022 645 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.6	30.00 hrs
		Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3	Designator: A

Client Sample ID: Walden Oaks
Lab Sample ID: J2E0013-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-4-2022 7:14 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.5	30.00 hrs
		Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3	Designator: A

Client Sample ID: Blue Creek
Lab Sample ID: J2E0013-03
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 5-4-2022 7:38 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Cl 0.5	30.00 hrs
		Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3	Designator: A

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2E0013

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Municipal Bldg, Walden, Blue Creek

Project/PO Number: N/A
Tenatively Scheduled: 5/2/2022
Route:

Relinquished by: Jeff MacLean	Date/Time: 5-4-2022 1:45 PM	Received by: S. Dexter	Date/Time: 5.4.22 13:53
Printed Name: Jeff MacLean		Printed Name: Sharon Dexter	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 4.4 °C Thermometer ID: 044 Total Containers: 3.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2E0484

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Coliform Lime Hollow

Project / PO Number: N/A
Received: 05/04/2022
Reported: 05/06/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well #2
Sample Matrix: Drinking Water
Lab Sample ID: J2E0484-01
Collected By: JM-Client
Collection Date: 05/04/2022 8:14

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

Client Sample ID: Lime Hollow Well #7
Sample Matrix: Drinking Water
Lab Sample ID: J2E0484-02
Collected By: JM-Client
Collection Date: 05/04/2022 8:40

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG
Escherichia coli	Absent			per 100mL		05/04/22 1627	05/05/22 1115	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC

3821 Buck Dr.	2369 Elmira St., Suite C	428 Route 315 Hwy	4359 Linglestown Rd.	3719 Garrett Rd.
Cortland, NY 13045	Sayre, PA 18840	Pittston, PA 18640	Harrisburg, PA 17112	Drexel Hill, PA 19026
607.753.3403	570.888.0169	570.348.0775	717.651.9700	484.461.9722

CHAIN OF CUSTODY RECORD

Number

Instructions on back

TO BE COMPLETED BY MICROBAC

Temperature Upon Receipt (°C) 13.0

Therm ID 044

Holding Time

Samples Received on Ice? (Yes) No N/A

Custody Seals Intact? (Yes) No N/A

Lab Report Address

Client Name: Town of Cortlandville

Address: 3577 Terrace Rd

City, State, Zip: Cortland NY 13045

Contact: Brian Congdon

Telephone No.: 607 591-2770

Send Report via: [ ] Mail [ ] Fax [ ] e-mail (address)

Invoice Address

Client Name:

Address:

City, State, Zip:

Contact:

Telephone No.:

Send Invoice via: [ ] Mail [ ] Fax [ ] e-mail (address)

Turnaround Time

[ ] Routine (5 to 7 business days)

[ ] RUSH* (notify lab)

(needed by)

Report Type

[ ] Results Only [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4 [ ] EDD

Project: Location: Water Dist. PO No.:

Compliance Monitoring? [ ] Yes [ ] No

( ) Agency/Program

Sampled by (PRINT): Jeff MacLean

Sampler Signature: Jeff MacLean

Sampler Phone No.:

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

BAC

Lab ID	Client Sample ID (Location of sample taken. Ex: Kitchen sink, bathroom sink etc.)	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **
~~well #2~~		5/4/22	8:14	1	DW		
	Lime Hollow well	5-4-2022	8:40 AM	2	DW	2	Sodium thiosulfate

J 2 E 0 4 8 4

Cortlandville Water, Town of

PM: Shannon Weeks

Additional Notes

Raw Water Well #2 100 HP

" " Well #7 125 HP

****PLEASE BE SURE TO FILL THE CONTAINER(S) UP TO THE SHOULDER****

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive

Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

PLEASE SUBMIT PAYMENT WITH SAMPLES.

PLEASE RETURN SAMPLES ON ICE.

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	5-4-2022 1:45 PM	J. Reuter	5.4.22 13:57
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Apr-22	5-2-2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		78							
1	771,269	73.1	4.9	0.6	0.3	22.5	☐	☑	9:30
2	0	73.1	0	0.6	0.3	22.5	☐	☑	9:00
3	0	73.1	0	0.6	0.3	18.7	☑	☐	7:00
4	730,406	68.9	4.2	0.6	0.3	22.3	☐	☑	7:30
5	0	68.9	0	0.6	0.3	17.8	☑	☐	7:15
6	884,796	63	5.9	0.6	0.3	22.1	☐	☑	7:00
7	0	63	0	0.6	0.3	18.7	☑	☐	7:06
8	766,271	57.4	5.6	0.6	0.3	23	☐	☑	6:51
9	0	57.4	0	0.6	0.3	23.3	☐	☑	7:36
10	0	57.4	0	0.6	0.3	18.8	☑	☐	6:52
11	836,963	52.4	5	0.6	0.3	23.2	☐	☑	6:45
12	0	52.4	0	0.6	0.3	19	☑	☐	6:57
13	698,952	47.7	5.3	0.6	0.3	23.1	☐	☑	7:18
14	0	47.7	0	0.6	0.3	18.7	☑	☐	7:30
15	725,668	42.9	4.6	0.6	0.3	23	☐	☑	9:31
16	0	42.9	4.6	0.6	0.3	23.2	☐	☑	7:52
17	0	42.9	0	0.6	0.3	18.4	☑	☐	8:07
18	850,056	37.6	5.3	o.6	0.3	22.8	☐	☑	7:57
19	0	37.6	0	0.6	0.3	19.4	☑	☐	7:26
20	614,879	33.6	4	0.6	0.3	23.1	☐	☑	7:54
21	0	33.6	0	0.6	0.3	19	☑	☐	7:44
22	807,322	28.4	5.2	0.6	0.3	23.1	☐	☑	7:58
23	0	28.4	0	0.6	0.3	23.2	☐	☑	8:00
24	0	28.4	0	0.6	0.3	18.9	☑	☐	8:00
25	889,342	22.3	6.1	0.6	0.3	22.8	☐	☑	8:30
26	0	22.3	6.1	0.6	0.3	22.9	☐	☑	7:27
27	573,887	19.1	3.2	0.6	0.3	22.7	☐	☑	
28	0	19.1	0	0.6	0.3	18.5	☑	☐	9:08
29	700,013	14.6	4.5	0.6	0.3	22.3	☐	☑	6:40
30	0	14.6	0	0.6	0.3	22.3	☐	☑	7:14
31							☐	☐	
Total	9,849,824		74.5						
AVG.	328,327		2.483333333						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: NY0036757

Signature: B. R. Congdon — Operator Grade Level IIB-C

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	4/4/2022	1	NO	NO	0.6
Terrace Rd Well	4/4/2022	1	NO	NO	RAW WATER
Walden Oaks B.S.	4/4/2022	1	NO	NO	0.5
BlueCreek B.S.	4/4/2022	1	NO	NO	0.5
Red Apple RT 13/ McLean Rd	4/18/2022	1	NO	NO	0.6
Cortlandville Highway Garage Rt 41 Polkville	4/18/2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			32,224		
1		771,269	32,245	21	23
2		0	32,245	0	23
3		0	32,245	0	19
4		730,406	32,265	20	20
5		0	32,265	0	18
6		884,796	32,289	24	22
7		0	32,289	0	19
8		766,271	32,313	24	23
9		0	32,313	0	23
10		0	32,313	0	19
11		836,963	32,336	23	23
12		0	32,336	0	19
13		698,952	32,355	19	23
14		0	32,355	0	23
15		728,668	32,375	20	23
16		0	32,375	0	23
17		0	32,375	0	18
18		850,056	32,398	23	23
19		0	32,398	0	19
20		614,879	32,414	16	23
21		0	32,414	0	19
22		807,322	32,436	22	23
23		0	32,436	0	23
24		0	32,436	0	19
25		889,342	32,460	24	23
26		0	32,460	0	23
27		573,887	32,476	16	23
28		0	32,476	0	19
29		700,013	32,495	19	22
30		0	32,495	0	22
31					
Total		9,852,824		271	
Average		328,427		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Apr-22	5/2/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination		Free chlorine residual at entry point (mg/l)	Other Treatments / Readings				
		Gaseous			End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		7.9							
1	0	7.9	0	0.6	0.3	33.5	☑	☐	9:30
2	1,106,632	-0.8	8.7	0.6	0.3	35.3	☐	☑	8:30
3	1,394,729	-4.4	3.6	0.6	0.3	35.4	☐	☑	7:30
4	0	150	0	0.6	0.3	35.5	☐	☑	7:45
5	1,538,743	139.8	10.2	0.6	0.3	35.4	☐	☑	7:30
6	0	139.8	0	0.6	0.3	34.2	☑	☐	7:15
7	1,414,189	133.1	6.7	0.6	0.3	35.6	☐	☑	7:44
8	0	133.1	0	0.6	0.3	33.8	☑	☐	7:03
9	1,139,055	124.4	8.7	0.6	0.3	35.7	☐	☑	7:48
10	1,044,709	120.5	3.9	0.6	0.3	35.7	☐	☑	7:01
11	0	120.5	0	0.6	0.3	0			
12	1,286,835	112.1	8.4	0.6	0.3	35.8	☐	☑	7:51
13	0	112.1	0	0.6	0.3	35.9	☐	☑	7:29
14	758,149	108.2	3.9	0.6	0.3	36	☐	☑	8:23
15	0	108.2	0	0.6	0.3	36	☐	☑	9:13
16	682,955	103.8	4.4	0.6	0.3	36	☐	☑	7:43
17	507,384	101.2	2.6	0.6	0.3	36	☐	☑	8:25
18	0	101.2	0	0.6	0.3	36	☐	☑	8:15
19	766,389	96.7	4.5	0.6	0.3	36	☐	☑	7:42
20	0	96.7	0	0.6	0.3	36	☐	☑	
21	716,616	92.9	3.8	0.6	0.3	36	☐	☑	7:58
22	0	92.9	0	0.6	0.3	36.3	☐	☑	8:06
23	634,795	88.8	4.1	0.6	0.3	36.2	☐	☑	8:10
24	545,625	85.9	2.9	0.6	0.3	36.3	☐	☑	8:43
25	0	85.9	0	0.6	0.3	36.3	☐	☑	843
26	629,725	81.9	4	0.6	0.3	36.2	☐	☑	7:34
27	0	81.9	0	0.6	0.3	36	☐	☑	9:02
28	558,891	79	2.9	0.6	0.3	36.2	☐	☑	9:17
29	0	79	0	0.6	0.3	36.2	☐	☑	6:51
30	616,582	75.2	3.8	0.6	0.3	36.1	☐	☑	7:34
31							☐	☐	
Total	15,342,003		87.1						
AVG.	511,400		2.903333333						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon

Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20946				12586			52978			
1	0	20,946	0	34	0	12,586	0	24	52,978	0	0.00	0.20
2	1,106,632	20,964	18	35	0	12,586	0	25	52,996	18	0.20	0.10
3	0	20,964	0	35	1,394,729	12,603	17	25	53,012	16	0.10	0.20
4	0	20,964	0	36	0	12,603	0	25	53,012	0	0.00	0.00
5	1,538,743	20,987	23	35	0	12,603	0	25	53,036	24	0.00	0.00
6	0	20,987	0	34	0	12,603	0	25	53,036	0	0.20	0.00
7	0	20,987	0	36	1,414,189	12,620	17	25	53,053	17	1.00	0.00
8	0	20,987	0	34	0	12,620	0	25	53,053	0	0.00	0.00
9	1,139,055	21,005	18	36	0	12,620	0	25	53,073	20	0.00	0.00
10	0	21,005	0	36	1,044,709	12,633	13	25	53,083	10	0.00	0.00
11	0	21,005	0	36	0	12,633	0	25	53,083	0	0.00	0.00
12	1,286,835	21,025	20	36	0	12,633	0	25	53,103	20	0.00	0.00
13	0	21,025	0	36	0	12,633	0	25	53,103	0	0.00	0.00
14	0	21,025	0	36	758,149	12,642	9	25	53,112	9	0.00	0.00
15	0	21,025	0	36	0	12,642	0	25	53,112	0	0.00	0.00
16	682,955	21,036	11	36	0	12,642	0	25	53,123	11	0.00	0.00
17	0	21,036	0	36	507,384	12,648	6	25	53,129	6	0.00	0.00
18	0	21,036	0	36	0	12,648	0	25	53,129	0	0.00	0.00
19	766,389	21,048	12	36	0	12,648	0	25	53,141	12	0.00	0.00
20	0	21,048	0	36	0	12,648	0	25	53,141	0	0.00	0.00
21	0	21,048	0	36	716,616	12,657	9	25	53,150	9	0.20	0.00
22	0	21,048	0	36	0	12,657	0	25	53,150	0	0.00	0.00
23	634,795	21,058	10	36	0	12,657	0	25	53,160	10	0.00	0.00
24	0	21,058	0	36	545,625	12,664	7	25	53,166	6	0.00	0.00
25	0	21,058	0	36	0	12,664	0	25	53,166	0	0.00	0.00
26	629,725	21,067	9	36	0	12,664	0	25	53,176	10	0.00	0.00
27	0	21,067	0	36	0	12,664	0	25	53,176	0	0.00	0.00
28	0	21,067	0	36	558,891	12,670	6	25	53,183	7	0.00	0.00
29	0	21,067	0	36	0	12,670	0	25	53,183	0	0.00	0.00
30	616,582	21,077	10	36	0	12,670	0	25	53,193	10	0.00	0.00
31												
Total	8,401,711		131		6,940,292		84			215	1.70	0.50
Average	280,057		4		231,343		3			7		

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2L0002

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Red Apple, Cortlandville Hwy. Garage
Project / PO Number: N/A
Received: 04/18/2022
Reported: 04/22/2022

Analytical Testing Parameters

Client Sample ID: Red Apple
Sample Matrix: Drinking Water
Lab Sample ID: J2L0002-01
Collected By: Client
Collection Date: 04/18/2022 9:08

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/18/22 1615	04/19/22 1121	MMG
Escherichia coli	Absent			per 100mL		04/18/22 1615	04/19/22 1121	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		04/18/22 0908	CUS

Client Sample ID: Cortlandville Highway Garage
Sample Matrix: Drinking Water
Lab Sample ID: J2L0002-02
Collected By: Client
Collection Date: 04/18/2022 10:56

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/18/22 1615	04/19/22 1121	MMG
Escherichia coli	Absent			per 100mL		04/18/22 1615	04/19/22 1121	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		04/18/22 1056	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2L0002

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/22/2022 16:44

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2L0002

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Red Apple, Cortlandville Hwy. Garage

Project/PO Number: N/A
Tenatively Scheduled: 12/5/2022
Route:

Client Sample ID: Red Apple
Lab Sample ID: J2L0002-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4-18-2022 908 AM

CL 0.6

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004		30.00 hrs
		Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3	Designator: A

Client Sample ID: Cortlandville Highway Garage
Lab Sample ID: J2L0002-02
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4-18-2022 1056 AM

CL 0.3

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004		30.00 hrs
		Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3	Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	4-18-2022 11:00 AM	Printed Name:	4/18/22 1100
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 11.0 °C Thermometer ID: 014 Total Containers: 2.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2L0003

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Blue Creek

Project / PO Number: N/A
Received: 04/04/2022
Reported: 04/06/2022

Analytical Testing Parameters

Client Sample ID: Blue Creek BS
Sample Matrix: Drinking Water
Lab Sample ID: J2L0003-01

Collected By: Client
Collection Date: 04/04/2022 8:12

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG
Escherichia coli	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/06/2022 10:28

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2L0003

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 12/5/2022
Route:

Client Sample ID: ~~Terrace Rd.~~ BlueCreek BS
Lab Sample ID: J2L0003-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4-4-2022 8:12 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL. O.	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	4-4-2022 8:32 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	4/4/22 8:34
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 8.1 °C Thermometer ID: 0114 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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CERTIFICATE OF ANALYSIS

J2K0004

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Walden Oaks BS

Project / PO Number: N/A
Received: 04/04/2022
Reported: 04/06/2022

Analytical Testing Parameters

Client Sample ID:	Walden Oaks B.S.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2K0004-01	**Collection Date:**	04/04/2022 7:44

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG
Escherichia coli	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		04/04/22 0744	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/06/2022 10:28

MICROBAC

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2K0004

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 11/7/2022
Route:

Client Sample ID: ~~Terrace Rd.~~ Walden Oaks B.S.
Lab Sample ID: J2K0004-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4.4.2022 7:44

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL.0.5	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3 — Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	4.4.22 8:32AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	4/4/22 8:39
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 0.7 °C Thermometer ID: CUC Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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CERTIFICATE OF ANALYSIS

J2J0010

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Terrace Rd.

Project / PO Number: N/A
Received: 04/04/2022
Reported: 04/06/2022

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well Raw Water
Sample Matrix: Drinking Water
Lab Sample ID: J2J0010-01
Collected By: Client
Collection Date: 04/04/2022 7:25

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG
Escherichia coli	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level
RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/06/2022 10:28

MICROBAC®

Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2J0010

6

TAT 7 days

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 10/3/2022
Route:

Client Sample ID: **Terrace Rd.** Well Raw Water
Lab Sample ID: **J2J0010-01**
Matrix: **Drinking Water**
Type: **Grab**

Sampled Date & Time: 4-4-2022 7:25 Am

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	Raw Water	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Jeff MacLean	4-4-2022 833 AM		
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name: Frank [illegible]	4/4/22 8.39
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: Yes / No Temp: 13.2 °C Thermometer ID: 044 Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2I0009

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Municipal Bldg.

Project / PO Number: N/A
Received: 04/04/2022
Reported: 04/06/2022

Analytical Testing Parameters

Client Sample ID:	Municipal Bldg.		
Sample Matrix:	Drinking Water	**Collected By:**	Client
Lab Sample ID:	J2I0009-01	**Collection Date:**	04/04/2022 7:12

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG
Escherichia coli	Absent			per 100mL		04/04/22 1543	04/05/22 1046	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		04/04/22 0712	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

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Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 04/06/2022 10:29

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Chain of Custody

Microbac Laboratories, Inc., New York Division

Lab Manager: Shannon Weeks

J2I0009

TAT 7 days

1

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045
Phone: (607) 591-2770

Project Name: Terrace Rd.

Project/PO Number: N/A
Tenatively Scheduled: 9/6/2022
Route:

Client Sample ID: ~~Terrace Rd.~~ Municipal BLDG.
Lab Sample ID: J2I0009-01
Matrix: Drinking Water
Type: Grab

Sampled Date & Time: 4-4-2022 7:12 AM

Analysis	Method	Field Results/Comments	Hold Time
TColi Ecoli P-A 18hr SM9223B-Colilert	SM 9223 B (Colilert)-2004	CL 0.6	30.00 hrs

Container(s): 120ml-Bottle LDPE-Sterile, Na2S2O3

Designator: A

Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name: Jeff MacLean	4-4-2022 833 AM	Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time: 4/4/22 8:37
Printed Name:		Printed Name:	
Relinquished by:	Date/Time:	Received by:	Date/Time:
Printed Name:		Printed Name:	

As Received at Laboratory: On Ice: (Yes) / No Temp: 3.7 °C Thermometer ID: CUU Total Containers: 1.00

Microbac Laboratories may be unable to perform a portion of the requested testing in which case we will subcontract the analysis to an appropriately accredited laboratory. By signing this document you are acknowledging that you have been informed by Microbac that testing could be subcontracted and agree with this arrangement.

Notes:

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Mar-22	4/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		140.6							
1	0	140.6	0	0.6	0.3	22.3	☐	☑	7:14
2	614,537	137.3	3.3	0.6	0.3	21.7	☐	☑	7:25
3	0	137.3	0	0.6	0.3	17.5	☑	☐	7:14
4	706,181	133	4.3	0.6	0.3	21.4	☐	☑	7:45
5	0	133	0	0.6	0.3	21.5	☐	☑	8:45
6	0	133	0	0.6	0.3	17.5	☑	☐	7:00
7	789,631	127.9	5.1	0.6	0.3	23	☐	☑	7:15
8	0	127.9	0	0.6	0.3	19.1	☑	☐	7:20
9	642,398	124	3.9	0.6	0.3	23.1	☐	☑	7:15
10	0	124	0	0.6	0.3	19.1	☑	☐	7:04
11	761,041	119.2	4.8	0.6	0.3	23.1	☐	☑	8:09
12	0	119.2	0	0.6	0.3	23.3	☐	☑	8:05
13	0	119.2	0	0.6	0.3	18.9	☑	☐	755
14	774,931	114.2	5	0.6	0.3	23	☐	☑	7:06
15	0	114.2	0	0.6	0.3	23.2	☑	☐	7:03
16	619,445	110.2	4	0.6	0.3	23.1	☐	☑	7:04
17	0	110.2	0	0.6	0.3	18.9	☑	☐	7:44
18	763,935	105	5.2	0.6	0.3	23.3	☐	☑	8:45
19	0	105	0	0.6	0.3	23.7	☐	☑	8:00
20	0	105	0	0.6	0.3	19.4	☑	☐	7:41
21	822,523	100.1	4.9	0.6	0.3	23.5	☐	☑	7:28
22	0	100.1	0	0.6	0.3	23.5	☑	☐	7:04
23	716,531	94.4	5.7	0.6	0.3	23.2	☐	☑	7:56
24	0	94.4	0	0.6	0.3	19	☑	☐	7:04
25	795,646	89.4	5	0.6	0.3	23	☐	☑	9:04
26	0	89.4	0	0.6	0.3	23.1	☐	☑	9:34
27	0	89.4	0	0.6	0.3	18.8	☑	☐	7:40
28	892,472	83.8	5.6	0.6	0.3	22.7	☐	☑	7:21
29	0	83.8	0	0.6	0.3	18.3	☑	☐	7:09
30	778,231	78	5.8	0.6	0.3	22.4	☐	☑	7:02
31	0	78	0	0.6	0.3	18.4	☑	☐	7:10
Total	9,677,502		62.6						
AVG.	312,177		2.019354839						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: Brian R. Congdon Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			31,956		
1		0	31,956	0	22
2		614,537	31,973	17	22
3		0	31,973	0	18
4		706,181	31,991	18	21
5		0	31,991	0	22
6		0	31,991	0	18
7		789,631	32,013	22	23
8		0	32,013	0	19
9		642,398	32,031	18	23
10		0	32,031	0	19
11		761,041	32,051	20	23
12		0	32,051	0	23
13		0	32,051	0	19
14		774,931	32,072	21	23
15		0	32,072	0	23
16		619,445	32,089	17	23
17		0	32,089	0	19
18		763,935	32,109	20	23
19		0	32,109	0	24
20		0	32,109	0	19
21		822,523	32,131	22	24
22		0	32,131	0	19
23		716,531	32,155	24	23
24		0	32,155	0	19
25		795,646	32,176	21	23
26		0	32,176	0	23
27		0	32,176	0	19
28		892,472	32,200	24	23
29		0	32,200	0	18
30		778,231	32,224	24	22
31		0	32,224	0	18
Total		9,677,502		268	
Average		312,177		9	

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	3/2/2022	1	NO	NO	0.6
Terrace Rd Well	3/2/2020	1	NO	NO	RAW WATER
Walden Oaks B.S.	3/2/2022	1	NO	NO	0.5
BlueCreek B.S.	3/2/2022	1	NO	NO	0.5
Red Apple Rt 13/McLean Rd	3/7/2022	1	NO	NO	0.6
Cortlandville Highway Garage Rt.41 Polkville	3/7/2022	1	NO	NO	0.4

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation NO

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur?

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Mar-22	4/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		99.9							
1	951,278	94.5	5.4	0.6	0.3	32.7	☐	☑	7:27
2	0	94.5	0	0.6	0.3	32.8	☐	☑	7:34
3	903,234	89.5	5	0.6	0.3	32.8	☐	☑	7:36
4	0	89.5	0	0.6	0.3	32.9	☐	☑	7:30
5	857,832	83.8	5.7	0.6	0.3	32.9	☐	☑	8:00
6	603,199	81.1	2.7	0.6	0.3	33.1	☐	☑	6:50
7	0	81.1	0	0.6	0.3	33.6	☐	☑	7:30
8	778,200	76	5.1	0.6	0.3	33.8	☐	☑	7:30
9	0	76	0	0.6	0.3	33.9	☐	☑	7:30
10	770,698	72.8	3.2	0.6	0.3	34	☐	☑	7:17
11	0	72.8	0	0.6	0.3	34.1	☐	☑	8:19
12	711,491	68.3	4.5	0.6	0.3	34.1	☐	☑	8:17
13	537,560	65.6	2.7	0.6	0.3	34.2	☐	☑	812
14	0	65.6	0	0.6	0.3	34.3	☐	☑	7:34
15	871,449	60.6	5	6	0.3	34.3	☐	☑	7:20
16	0	60.6	0	0.6	0.3	34.3	☐	☑	7:20
17	1,202,036	54.8	5.8	0.6	0.3	34.6	☐	☑	7:54
18	0	54.8	0	0.6	0.3	32.8	☑	☐	8:34
19	1,055,619	46.6	8.2	0.6	0.3	34.8	☐	☑	8:35
20	936,357	43.6	3	0.6	0.3	35	☐	☑	7:54
21	0	43.6	0	0.6	0.3	33.1	☑	☐	7:47
22	1,115,877	37	6.6	0.6	0.3	35.2	☐	☑	7:13
23	0	37	0	0.6	0.3	35.2	☐	☑	8:11
24	1,101,082	31.8	5.2	0.6	0.3	35.4	☐	☑	7:17
25	0	31.8	0	0.6	0.3	35.2	☐	☑	9:15
26	1,093,916	24.5	7.3	0.6	0.3	35.4	☐	☑	9:10
27	808,775	21.4	3.1	0.6	0.3	35.5	☐	☑	7:47
28	0	21.4	0	0.6	0.3	33.5	☑	☐	7:27
29	1,090,570	15.1	6.3	0.6	0.3	35.5	☐	☑	7:15
30	0	15.1	0	0.6	0.3	35.2	☐	☑	7:11
31	1,568,341	7.9	7.2	0.6	0.3	35.5	☐	☑	7:26
Total	16,957,514		92						
AVG.	547,017		2.967741935						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: BR Gn Operator Grade Level **IIB-C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20814				12483			52743			
1	951,278	20,829	15	33	0	12,483	0	23	52,758	15	0.00	0.20
2	0	20,829	0	33	0	12,483	0	23	52,758	0	0.00	1.00
3	0	20,829	0	33	903,234	12,494	11	23	52,769	11	0.00	0.00
4	0	20,829	0	33	0	12,494	0	23	52,769	0	0.00	0.00
5	857,832	20,842	13	33	0	12,494	0	23	52,782	13	0.20	0.00
6	0	20,842	0	33	603,199	12,502	8	23	52,789	7	0.00	0.00
7	0	20,842	0	34	0	12,502	0	24	52,789	0	0.50	1.00
8	778,200	20,854	12	34	0	12,502	0	24	52,802	13	0.00	0.00
9	0	20,854	0	34	0	12,502	0	24	52,802	0	0.00	5.00
10	0	20,854	0	34	770,698	12,511	9	24	52,811	9	0.00	0.00
11	0	20,854	0	34	0	12,511	0	24	52,811	0	0.00	5.00
12	711,491	20,865	11	34	0	12,511	0	24	52,822	11	0.00	4.00
13	0	20,865	0	34	537,560	12,518	7	24	52,829	7	0.00	0.00
14	0	20,865	0	34	0	12,518	0	24	52,829	0	0.00	0.00
15	871,449	20,879	14	34	0	12,518	0	24	52,842	13	0.00	0.00
16	0	20,879	0	34	0	12,518	0	24	52,842	0	0.00	0.00
17	0	20,879	0	35	1,202,036	12,532	14	25	52,857	15	0.00	0.00
18	0	20,879	0	33	0	12,532	0	24	52,857	0	0.00	0.00
19	1,055,619	20,895	16	35	0	12,532	0	25	52,877	20	0.50	0.00
20	0	20,895	0	35	936,357	12,544	12	25	52,885	8	0.00	0.00
21	0	20,895	0	33	0	12,544	0	24	52,885	0	0.00	0.00
22	1,115,877	20,913	18	35	0	12,544	0	25	52,902	17	0.00	0.00
23	0	20,913	0	35	0	12,544	0	25	52,902	0	0.50	0.00
24	0	20,913	0	35	1,101,082	12,557	13	25	52,915	13	0.10	0.00
25	0	20,913	0	35	0	12,557	0	25	52,915	0	0.20	0.00
26	1,093,916	20,930	17	35	0	12,557	0	25	52,935	20	0.20	0.10
27	0	20,930	0	36	808,775	12,567	10	25	52,942	7	0.00	0.50
28	0	20,930	0	34	0	12,567	0	25	52,942	0	0.00	1.00
29	1,090,570	20,946	16	36	0	12,567	0	25	52,959	17	0.00	1.00
30	0	20,946	0	35	0	12,567	0	25	52,959	0	0.00	0.00
31	0	20,946	0	36	1,568,341	12,586	19	25	52,978	19	0.20	0.00
Total	**8,526,232**		**132**		**8,431,282**		**103**			**235**	**2.40**	**18.80**
Average	**275,040**		**4**		**271,977**		**3**			**8**		

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0634

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/07/2022
Reported: 03/14/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Red Apple Rt.13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2C0634-01
Collected By: JM-Client
Collection Date: 03/07/2022 9:00

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/07/22 1723	03/08/22 1141	MMG
Escherichia coli	Absent			per 100mL		03/07/22 1723	03/08/22 1141	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/07/22 0900	CUS

Client Sample ID: Cortlandville Highway Garage - Rt 41, Polkville
Sample Matrix: Drinking Water
Lab Sample ID: J2C0634-02
Collected By: JM-Client
Collection Date: 03/07/2022 10:22

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/07/22 1723	03/08/22 1141	MMG
Escherichia coli	Absent			per 100mL		03/07/22 1723	03/08/22 1141	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	Y1		03/07/22 1022	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate federal, state or local authorities before acting on the data.*

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Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0634

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 03/14/2022 16:07

MICR. .AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible] ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) [illegible]
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT										Additional Notes
	Red Apple Rt13/McLean Rd	3-7-2022	9:00 AM	1	DW	1		1										CL 0.6
	Cortlandville Highway Garage Rt41 Polkville	3-7-2022	10:22 AM	1	DW	1		1										CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-7-2022 10:33 AM	[signature]	3/7/22 1033
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2[illegible]

Page ____ of ____

MICR. .AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible] ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 11.1
Therm ID [illegible]
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BACT										Additional Notes
	Municipal BLDG.	3-2-2022	750 AM	1	DW	1		1										CL 0.6
	Terrace Rd. Well.	3-2-2022	804 AM	1	DW	1		1										Raw Water
	Walden Oaks BS	3-2-2022	8:20 AM	1	DW	1		1										CL 0.5
	Blue Creek BS	3-2-2022	8:44 AM	1	DW	1		1										CL 0.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	3-2-2022 907 AM	[signature]	3/2/22 907
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0355

Town of Cortlandville, NY

Peter Alteri
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 03/02/2022
Reported: 03/07/2022

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J2C0355-01
Collected By: JM-Client
Collection Date: 03/02/2022 7:50

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG
Escherichia coli	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		03/02/22 0750	CUS

Client Sample ID: Terrace Rd Well
Sample Matrix: Drinking Water
Lab Sample ID: J2C0355-02
Collected By: JM-Client
Collection Date: 03/02/2022 8:04

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG
Escherichia coli	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2C0355

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2C0355-03	**Collection Date:**	03/02/2022 8:20

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG
Escherichia coli	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/02/22 0820	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2C0355-04	**Collection Date:**	03/02/2022 8:44

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-2004								
Total coliforms	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG
Escherichia coli	Absent			per 100mL		03/02/22 1538	03/03/22 1118	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	Y1		03/02/22 0844	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report Terrace Well

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Feb-22	3/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		60.6							
1	0	60.9	0	0.6	0.3	15.4	☑	☐	12:12
2	634,453	55.2	5.7	0.6	0.3	19.5	☐	☑	8:00
3	0	55.2	0	0.6	0.3	15.1	☑	☐	7:51
4	853,446	49.2	6	0.6	0.3	19.4	☐	☑	7:36
5	0	49.2	0	0.6	0.3	19.5	☐	☑	740
6	0	49.2	0	0.6	0.3	15	☑	☐	7:03
7	809,134	43.1	6.1	0.6	0.3	19.1	☐	☑	7:00
8	0	43.1	0	0.6	0.3	19.3	☐	☑	7:00
9	602,123	38.2	5.1	0.6	0.3	19	☐	☑	7:00
10	0	38.2	0	0.6	0.3	14.9	☑	☐	7:35
11	743,201	32.5	5.7	0.6	0.3	19	☐	☑	8:14
12	0	32.5	0	0.6	0.3	19.93	☐	☑	7:08
13	0	32.5	0	0.6	0.3	14.9	☑	☐	7:00
14	799,748	27.1	5.4	0.6	0.3	18.9	☐	☑	7:03
15	0	27.1	0	0.6	0.3	19	☐	☑	7:00
16	620,194	21.7	5.4	0.6	0.3	18.7	☐	☑	6:50
17	0	21.7	0	0.6	0.3	16.1	☑	☐	8:16
18	762,213	16.1	5.6	0.6	0.3	21.2	☐	☑	9:27
19	0	16.1	0	0.6	0.3	21.2	☐	☑	9:11
20	0	16.1	0	0.6	0.3	16.8	☑	☐	8:28
21	820,011	9.7	6.4	0.6	0.3	20.9	☐	☑	8:03
22	0	9.7	0	0.6	0.3	17.6	☑	☐	7:13
23	658,463	5.1	4.6	0.6	0.3	21.9	☐	☑	7:24
24	0	5.1	0	0.6	0.3	17.8	☑	☐	7:21
25	752,857	4.1/146.5	4.5	0.6	0.3	22	☐	☑	6:45
26	0	146.5	0	0.6	0.3	22.1	☐	☑	7:22
27	0	146.5	0	0.6	0.3	17.7	☑	☐	7:05
28	840,443	140.6	5.9	0.6	0.3	21.8	☐	☑	7:04
29							☐	☐	
30							☐	☐	
31							☐	☐	
Total	8,896,286		66.4						
AVG.	317,725		2.371428571						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon

NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon

Operator Grade Level **IIB/C**

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			31,714		
1		0	31,714	0	15
2		634,453	31,731	17	20
3		0	31,731	0	15
4		853,446	31,755	24	19
5		0	31,755	0	20
6		0	31,755	0	15
7		809,134	31,777	22	19
8		0	31,777	0	19
9		602,123	31,793	16	19
10		0	31,793	0	15
11		743,201	31,814	21	19
12		0	31,814	0	19
13		0	31,814	0	15
14		799,748	31,836	22	19
15		0	31,836	0	19
16		620,194	31,853	22	19
17		0	31,853	0	16
18		762,213	31,873	20	21
19		0	31,873	0	21
20		0	31,873	0	17
21		820,011	31,895	22	21
22		0	31,895	0	18
23		658,463	31,913	18	22
24		0	31,913	0	18
25		752,857	31,934	19	22
26		0	31,934	0	22
27		0	31,934	0	18
28		840,443	31,956	22	22
29					
30					
31					
Total		8,896,286		245	
Average		317,725		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Feb-22	3/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		16.2							
1	874,140	11.1	4.1	0.6	0.3	32.5	☐	☑	12:02
2	0	11.1	0	0.6	0.3	32.5	☐	☑	8:15
3	982,193	6.8	4.3	0.6	0.3	32.4	☐	☑	7:30
4	0	6.8	0	0.6	0.3	32.3	☐	☑	7:48
5	956,806	1	5.8	0.6	0.3	32.2	☐	☑	7:25
6	638,039	148.6	2.4	0.6	0.3	32	☐	☑	7:13
7	0	148.6	0	0.6	0.3	32	☐	☑	7:15
8	939,820	143.3	5.3	0.6	0.3	32	☐	☑	7:10
9	0	143.3	0	0.6	0.3	31.8	☐	☑	7:10
10	856,430	139.2	4.1	0.6	0.3	31.8	☐	☑	7:50
11	0	139.2	0	0.6	3	31.7	☐	☑	8:24
12	861,801	134.3	4.9	0.6	0.3	31.6	☐	☑	7:22
13	580,035	131.5	2.8	0.6	0.3	31.5	☐	☑	7:12
14	0	131.5	0	0.6	0.3	31.5	☐	☑	7:12
15	850,216	126.9	4.6	0.6	0.3	31.3	☐	☑	7:07
16	0	126.9	0	0.6	0.3	31.2	☐	☑	6:58
17	904,556	122.5	4.4	0.6	0.3	31.5	☐	☑	8:30
18	0	122.5	0	0.6	0.3	31.8	☐	☑	9:16
19	784,362	118.7	3.8	0.6	0.3	31.8	☐	☑	9:19
20	602,011	115.9	2.8	0.6	0.3	31.8	☐	☑	8:43
21	0	115.9	0	0.6	0.3	31.9	☐	☑	8:12
22	843,530	110.8	5.1	0.6	0.3	32	☐	☑	7:02
23	0	110.8	0	0.6	0.3	32.2	☐	☑	7:41
24	827,466	107.4	3.4	0.6	0.3	32.4	☐	☑	7:28
25	0	107.4	0	0.6	0.3	32.5	☐	☑	6:34
26	757,298	102.6	4.8	0.6	0.3	32.6	☐	☑	7:30
27	565,077	99.9	2.7	0.6	0.3	32.6	☐	☑	7:17
28	0	99.9	0	0.6	0.3	32.7	☐	☑	7:25
29							☐	☐	
30							☐	☐	
31							☐	☐	
Total	12,823,780		65.3						
AVG.	457,992		2.332142857						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: NY0036757

Signature: B. R. Congdon Operator Grade Level IIB/C

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20706				12410			52563			
1	874,140	20,720	16	33	0	12,410	0	22	52,576	13	0.00	0.00
2	0	20,720	0	33	0	12,410	0	22	52,576	0	0.20	0.00
3	0	20,720	0	32	982,193	12,422	12	22	52,588	12	0.00	6.00
4	0	20,720	0	32	0	12,422	0	22	52,588	0	0.00	4.00
5	956,806	20,735	15	32	0	12,422	0	22	52,603	15	0.00	0.00
6	0	20,735	0	32	638,039	12,430	8	22	52,611	8	0.00	0.00
7	0	20,735	0	32	0	12,430	0	22	52,611	0	0.00	0.00
8	939,820	20,750	15	32	0	12,430	0	22	52,626	15	0.00	0.00
9	0	20,750	0	32	0	12,430	0	22	52,626	0	0.00	0.00
10	0	20,750	0	32	856,430	12,441	11	22	52,636	10	0.00	0.50
11	0	20,750	0	32	0	12,441	0	22	52,636	0	0.00	0.00
12	861,801	20,763	13	32	0	12,441	0	22	52,650	14	0.00	0.00
13	0	20,763	0	32	580,035	12,448	7	22	52,657	7	0.00	0.00
14	0	20,763	0	32	0	12,448	0	21	52,657	0	0.00	0.00
15	850,216	20,776	13	31	0	12,448	0	21	52,670	13	0.00	0.00
16	0	20,776	0	31	0	12,448	0	21	52,670	0	0.00	0.00
17	0	20,776	0	32	904,556	12,459	11	22	52,681	11	0.50	0.20
18	0	20,776	0	32	0	12,459	0	22	52,681	0	0.00	0.00
19	784,362	20,789	13	32	0	12,459	0	22	52,693	12	0.50	0.00
20	0	20,789	0	32	602,011	12,466	7	22	52,701	8	0.00	0.00
21	0	20,789	0	32	0	12,466	0	22	52,701	0	0.00	0.00
22	843,530	20,802	13	32	0	12,466	0	22	52,713	12	0.50	0.00
23	0	20,802	0	32	0	12,466	0	22	52,713	0	0.00	0.00
24	0	20,802	0	32	827,466	12,476	10	22	52,724	11	0.00	3.00
25	0	20,802	0	33	0	12,476	0	22	52,724	0	0.00	2.00
26	757,298	20,814	12	33	0	12,476	0	23	52,736	12	0.00	0.00
27	0	20,814	0	33	565,077	12,483	7	23	52,743	7	0.00	1.00
28	0	20,814	0	33	0	12,483	0	23	52,743	0	0.00	0.00
29												
30												
31												
Total	6,867,973		110		5,955,807		73			180	1.70	16.70
Average	245,285		4		212,707		3			6		

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg.	2/2/2022	1	NO	NO	0.6
Terrace Rd Well	2/2/2022	1	NO	NO	Raw Water
Walden Oaks BS	2/2/2022	1	NO	NO	0.5
Blue Creek BS	2/2/2022	1	NO	NO	0.5
Lime Hollow Well # 7	2/7/2022	1	NO	NO	Raw Water
Lime Hollow Well # 2	2/7/2022	1	NO	NO	Raw Water
Red Apple Rt 13 / McLean Rd	2/7/2022	1	NO	NO	0.6
Cortlandville Highway Garage Rt. 41 Polkville	2/7/2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 8

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "Yes," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2B0485

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/07/2022
Reported: 02/09/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Lime Hollow Well #2
Sample Matrix: Drinking Water
Lab Sample ID: J2B0485-01
Collected By: JM-Client
Collection Date: 02/07/2022 8:52

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG
Escherichia coli	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG

Client Sample ID: Lime Hollow Well #7
Sample Matrix: Drinking Water
Lab Sample ID: J2B0485-02
Collected By: JM-Client
Collection Date: 02/07/2022 9:02

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG
Escherichia coli	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2B0485

Client Sample ID:	Red Apple Rt.13/McLean Rd.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2B0485-03	**Collection Date:**	02/07/2022 9:53

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG
Escherichia coli	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	**Y1**		02/07/22 0953	CUS

Client Sample ID:	Cortlandville Highway Garage - Rt 41, Polkville		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2B0485-04	**Collection Date:**	02/07/2022 10:56

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG
Escherichia coli	Absent			per 100mL		02/07/22 1906	02/08/22 1307	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	**Y1**		02/07/22 1056	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2B0485

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Shannon Weeks

Shannon Weeks
Customer Relationship Coordinator
Reported: 02/09/2022 12:20

MICROBAC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible] Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

7-10

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 88
Therm ID [illegible]
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples 1
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types *	BACT						Additional Notes
	Lime Hollow well #2	2-7-2022	852 AM	1	DW	1		1						Raw water 100 HP well #2
	Lime Hollow well #7	2-7-2022	902 AM	1	DW	1		1						Raw water @ 125 HP well #7
	Red Apple Rt 13/McLean Rd	2-7-2022	953 AM	1	DW	1		1						CL 0.6
	Cortlandville Highway Garage Rt 41 Polkville	2-7-2022	1056 AM	1	DW	1		1						CL 0.3

J2B0485
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-7-2022 11:25 AM	[signature]	2/7/22 1126

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2B0333

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 02/02/2022
Reported: 02/07/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J2B0333-01
Collected By: JM-Client
Collection Date: 02/02/2022 7:35

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG
Escherichia coli	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		02/02/22 0735	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J2B0333-02
Collected By: Client
Collection Date: 02/02/2022 7:47

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG
Escherichia coli	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2B0333

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2B0333-03	**Collection Date:**	02/02/2022 8:10

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG
Escherichia coli	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		02/02/22 0810	CUS

Client Sample ID:	Blue Creek BS.		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2B0333-04	**Collection Date:**	02/02/2022 8:39

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG
Escherichia coli	Absent			per 100mL		02/02/22 1654	02/03/22 1114	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		02/02/22 0839	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICR[illegible]AC

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N[illegible]ain Avenue
Scranton, PA 18508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____

Instructions on back

TO BE COMPLETED BY MICROBAC 100
Temperature Upon Receipt (°C) 0.4
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

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Address: 3577 Terrace Rd.
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Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab / Comp	Preservative Types **	BACT.										Additional Notes
	Municipal BLDG.	2-2-2022	7:35 AM	1	DW	1		1										CL 0.6
	Terrace Rd Well	2-2-2022	747 AM	1	DW	1		1										Raw Water
	Walden Oaks BS	2-2-2022	810 AM	1	DW	1		1										CL 0.5
	Blue Creek BS	2-2-2022	839 AM	1	DW	1		1										CL 0.5

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	2-2-2022 900 AM	[signature]	2/22/22 900
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/20

Page ____ of ____

NEW YORK STATE DEPARTMENT OF HEALTH — Water Systems Operation Report Terrace Well

Bureau of Water Supply Protection — Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jan-22	2/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Terrace Rd Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	PUMP		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg		137.8							
1	0	137.8	0	0.6	0.3	23.2	☐	☑	9:42
2	0	137.8	0	0.6	0.3	18.5	☑	☐	7:46
3	892,735	132	5.8	0.6	0.3	22.7	☐	☑	7:26
4	0	132	0	0.6	0.3	18.6	☑	☐	7:58
5	678,807	126.8	5.2	0.6	0.3	22.6	☐	☑	7:43
6	0	126.8	0	0.6	0.3	18.2	☑	☐	7:05
7	824,386	121.2	5.6	0.6	0.3	22.4	☐	☑	8:00
8	0	121.2	0	0.6	0.3	22.4	☐	☑	8:40
9	0	121.2	0	0.6	0.3	17.8	☑	☐	7:50
10	891,158	114.8	6.4	0.6	0.3	22	☐	☑	7:30
11	0	114.8	0	0.6	0.3	17.8	☑	☐	7:30
12	652,834	109.6	5.2	0.6	0.3	21.7	☐	☑	7:00
13	0	109.6	0	0.6	0.3	17.2	☑	☐	7:01
14	838,001	104.2	5.4	0.6	0.3	21.4	☐	☑	8:30
15	0	104.2	0	0.6	0.3	21.5	☐	☑	7:56
16	0	104.2	0	0.6	0.3	16.7	☑	☐	9:12
17	886,263	97.3	6.9	0.6	0.3	21.1	☐	☑	8:37
18	0	97.3	0	0.6	0.3	21	☐	☑	7:04
19	676,833	92.4	4.9	0.6	0.3	20.9	☐	☑	7:08
20	0	92.4	0	0.6	0.3	16.6	☑	☐	8:06
21	825,770	86.6	5.8	0.6	0.3	20.6	☐	☑	9:52
22	0	86.6	0	0.6	0.3	20.7	☐	☑	1:52
23	0	86.6	0	0.6	0.3	16	☑	☐	7:53
24	885,875	79.6	7	0.6	0.3	20	☐	☑	7:35
25	0	79.6	0	0.6	0.3	15.9	☑	☐	7:11
26	874,918	73.6	6	0.6	0.3	20	☐	☑	7:44
27	0	73.6	0	0.6	0.3	15.6	☑	☐	7:03
28	866,149	67.1	6.5	0.6	0.3	19.8	☐	☑	8:00
29	0	67.1	0	0.6	0.3	20.1	☐	☑	8:00
30	0	67.1	0	0.6	0.3	15.5	☑	☐	7:15
31	874,115	60.6	6.5	0.6	0.3	19.6	☐	☑	7:15
Total	10,667,844		77.2						
AVG.	344,124		2.490322581						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon — NYS DOH Operator Certification Number: **NY0036757**

Signature: B. R. Congdon — Operator Grade Level **IIB/C**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2. Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Municipal Bldg	1/3/2022	1	NO	NO	0.6
Terrace Rd. Well	1-3-2022	1	NO	NO	RAW
Walden Oaks B.S.	1-3-2022	1	NO	NO	0.5
Blue Creek B.S.	1-3-2022	1	NO	NO	0.4
Red Apple Rt. 13/ McLean Rd.	1-10-2022	1	NO	NO	0.6
C- Ville Highway Garage Rt 41 Polkville	1-10-2022	1	NO	NO	0.3

Population Served: 4000

Number of microbiological monitoring samples required: 5

Number of microbiological monitoring samples taken: 6

Did an M&R violation

If "Yes," check reason (s) below:

_____ Actual number of samples is fewer than required.

_____ Did not collect/analyze repeat sample.

_____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? NO

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

_____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

_____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

_____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): Jeff MacLean

Name of NYSDOH Certified Laboratory: Microbac Labs

Did any MCL violation occur? If so, please describe: NO

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in t

NO

Comments:

SRBC Daily Pumpage/ Electric Rdgs Terrace Rd Well

Reporting Month	Pump Totalizer	60 HP Well Pumpage (Gal/Day)	Electric Reading	Hrs/Day	Well Level
Prev Rdg			31,424		
1		0	31,424	0	23
2		0	31,424	0	19
3		892,735	31,448	24	23
4		0	31,448	0	19
5		678,807	31,467	19	23
6		0	31,467	0	18
7		824,386	31,489	22	22
8		0	31,489	0	22
9		0	31,489	0	18
10		891,158	31,513	24	22
11		0	31,513	0	18
12		652,834	31,530	17	22
13		0	31,530	0	17
14		838,001	31,553	23	21
15		0	31,553	0	22
16		0	31,553	0	17
17		886,263	31,577	24	21
18		0	31,577	0	21
19		676,833	31,596	19	21
20		0	31,596	0	17
21		825,770	31,618	22	21
22		0	31,618	0	21
23		0	31,618	0	16
24		885,875	31,642	24	20
25		0	31,642	0	16
26		874,918	31,666	24	20
27		0	31,666	0	16
28		866,149	31,690	24	20
29		0	31,690	0	20
30		0	31,690	0	16
31		874,115	31,714	24	20
Total		10,667,844		290	
Average		344,124		9	

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report LH

Microbiological Sample Results

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
Cortlandville Town Water	Jan-22	2/1/2022	Ground
Public Water System ID	**County**	**Town, Village, or City**	
NY1101755 Lime Hollow Well	Cortland	Cortlandville	

DATE	Treated water volume (1,000 gallons/day)	Chlorination			Other Treatments / Readings				
		Gaseous		Free chlorine residual at entry point (mg/l)	End of System Chlorine	Well Level	Pump		Time
		Cylinder weight (lbs.)	Chlorine used per day (lbs.)				ON	OFF	
Prev Rdg.		104.3							
1	509,398	100.9	3.4	0.6	0.3	34	☑	☐	9:52
2	502,545	98.8	2.1	0.6	0.3	35	☐	☑	8:09
3	0	98.8	0	0.6	0.3	34.9	☐	☑	7:13
4	997,863	93.2	5.6	0.6	0.3	34.9	☐	☑	8:15
5	0	93.2	0	0.6	0.3	34.8	☐	☑	7:53
6	895,922	88.2	5	0.6	0.3	34.9	☐	☑	7:31
7	0	88.2	0	0.6	0.3	34.8	☐	☑	8:15
8	908,052	83.6	4.6	0.6	0.3	34.8	☐	☑	8:30
9	516,503	81.2	2.4	0.6	0.3	34.6	☐	☑	8:00
10	0	81.2	0	0.6	0.3	34.5	☐	☑	7:40
11	1,007,376	75.3	5.9	0.6	0.3	34.6	☐	☑	7:40
12	0	75.3	0	0.6	0.3	34.4	☐	☑	7:15
13	978,222	71.4	3.9	0.6	0.3	34.4	☐	☑	7:21
14	0	71.4	0	0.6	0.3	34.3	☐	☑	8:36
15	900,414	65.5	5.9	0.6	0.3	33.3	☑	☐	8:16
16	769,317	62.3	3.2	0.6	0.3	34.3	☐	☑	9:21
17	0	62.3	0	0.6	0.3	34	☐	☑	8:44
18	1,050,485	56.4	5.9	0.6	0.3	34	☐	☑	8:11
19	0	56.4	0	0.6	0.3	33.8	☐	☑	7:39
20	1,013,867	51.5	4.9	0.6	0.3	33.8	☐	☑	8:17
21	0	51.5	0	0.6	0.3	33.5	☐	☑	9:40
22	1,125,516	44.6	5.4	0.6	0.3	32.4	☑	☐	2:02
23	874,279	41.2	3.4	0.6	0.3	33.5	☐	☑	8:19
24	0	41.2	0	0.6	0.3	31.4	☑	☐	8:13
25	1,123,452	34.9	6.3	0.6	0.3	33.2	☐	☑	7:20
26	0	34.9	0	0.6	0.3	33.2	☐	☑	8:05
27	960,258	29.5	5.4	0.6	0.3	33.1	☐	☑	6:57
28	0	29.5	0	0.6	0.3	33.1	☐	☑	8:00
29	1,266,667	22.3	7.2	0.6	0.3	32.8	☐	☑	8:00
30	754,434	19	4.3	0.6	0.3	32.7	☐	☑	7:30
31	430,517	16.2	2.8	0.6	0.3	32.6	☐	☑	7:30
Total	16,585,087		87.6						
AVG.	535,003		2.825806452						

Chlorine Mix _____ quarts/gallons of _____ % chlorine added to _____ gallons of water in crock

Reported by: Brian R. Congdon NYS DOH Operator Certification Number: **NY0036757**

Signature: Brian R. Congdon Operator Grade Level **IIB/C**

SRBC Daily Pumpage/ Electric Rdgs for Lime Hollow Wells

Reporting Month	Lime Hollow Well #2				Lime Hollow Well #7				Chlorine pump Electric	Chlorine pump Hrs/Day	Precipitaion in inches of:	
	Pumpage (Gal x 1,000)	Pump Starter	Pump Hrs/Day	Well Level	Pumpage (Gal. x 1,000)	Pump Starter	Pump Hrs/Day	Well Level			Rain	Snow
Prev Rdg		20,560				12,322			52,328			
1	509,398	20,568	8	34	0	12,322	0	17	52,337	9	0.50	0.00
2	0	20,568	0	35	502,545	12,328	6	25	52,342	5	0.00	0.20
3	0	20,568	0	35	0	12,328	0	25	52,342	0	0.00	0.10
4	997,863	20,583	15	35	0	12,328	0	25	52,357	15	0.00	0.00
5	0	20,583	0	35	0	12,328	0	25	52,357	0	0.00	0.00
6	0	20,583	0	35	895,922	12,339	11	25	52,368	11	0.00	1.00
7	0	20,583	0	35	0	12,339	0	25	52,368	0	0.00	2.00
8	908,052	20,597	14	35	0	12,339	0	25	52,382	14	0.20	0.00
9	0	20,597	0	35	516,503	12,345	6	25	52,389	7	0.20	0.00
10	0	20,597	0	35	0	12,345	0	24	52,389	0	0.00	0.50
11	1,007,376	20,613	16	35	0	12,345	0	25	52,404	15	0.00	0.00
12	0	20,613	0	34	0	12,345	0	24	52,404	0	0.00	0.20
13	0	20,613	0	34	978,222	12,357	12	24	52,416	12	0.00	2.00
14	0	20,613	0	34	0	12,357	0	24	52,416	0	0.00	0.00
15	900,414	20,627	14	33	0	12,357	0	16	52,431	15	0.00	0.00
16	0	20,627	0	34	769,317	12,366	9	24	52,439	8	0.00	6.00
17	0	20,627	0	34	0	12,366	0	24	52,439	0	0.00	2.00
18	1,050,485	20,643	16	34	0	12,366	0	24	52,456	17	0.00	0.00
19	0	20,643	0	34	0	12,366	0	24	52,456	0	0.00	0.00
20	0	20,643	0	34	1,013,867	12,379	13	24	52,468	12	0.00	0.10
21	0	20,643	0	34	0	12,379	0	23	52,468	0	0.00	0.00
22	1,125,516	20,661	18	32	0	12,379	0	16	52,487	19	0.00	0.00
23	0	20,661	0	34	874,279	12,389	10	23	52,496	9	0.00	0.10
24	0	20,661	0	31	0	12,389	0	22	52,496	0	0.00	1.50
25	1,123,452	20,678	17	33	0	12,389	0	23	52,513	17	0.00	0.00
26	0	20,678	0	33	0	12,389	0	23	52,513	0	0.00	0.00
27	0	20,678	0	33	960,258	12,401	12	23	52,528	15	0.00	0.00
28	0	20,678	0	33	0	12,401	0	23	52,528	0	0.00	0.10
29	1,266,667	20,699	21	33	0	12,401	0	23	52,547	19	0.00	0.10
30	0	20,699	0	33	754,434	12,410	9	23	52,556	9	0.00	0.00
31	430,517	20,706	7	33	0	12,410	0	23	52,563	7	0.00	0.00
Total	**9,319,740**		**146**		**7,265,347**		**88**			**235**	**0.90**	**15.90**
Average	**300,637**		**5**		**234,366**		**3**			**8**		

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0565

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/10/2022
Reported: 01/19/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J2A0565-01
Collected By: Client
Collection Date: 01/10/2022 9:04

Analyses Performed by: Microbac Laboratories, Inc. - Dayville

Metals Total by ICP	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 200.7, Rv. 4.4 (1994)								
Sodium	68.0		1.00	mg/L		01/13/22 1332	01/14/22 1445	DLO

Client Sample ID: Red Apple Rte. 13/McLean Rd.
Sample Matrix: Drinking Water
Lab Sample ID: J2A0565-02
Collected By: Client
Collection Date: 01/10/2022 9:17

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG
Escherichia coli	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/10/22 0917	CUS

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0565

Client Sample ID:	Cortlandville Highway Garage Rte. 41 Polkville	**Collected By:**	Client
Sample Matrix:	Drinking Water	**Collection Date:**	01/10/2022 10:26
Lab Sample ID:	J2A0565-03		

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG
Escherichia coli	Absent			per 100mL		01/10/22 1655	01/11/22 1146	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.30	4.00 MCL		mg/L	Y1		01/10/22 1026	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

nitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville 11549	New York State Department of Health
Microbac Laboratories, Inc., New York Division NY Lab ID No.: 10795	New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. ***The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:

Sara Lechleitner

Sara Lechleitner
Customer Relationship Coordinator
Reported: 01/19/2022 11:04

MICR

3821 Buck Drive
Cortland, NY 13045
607.753.3403

2369 Elmira Street, Suite C
Sayre, PA 18840
570.888.0169

1620 N Avenue
Scranton, 508
570.348.0775

4359 Linglestown Road
Harrisburg, PA 17112
717.651.9700

CHAIN OF CUSTODY RECO

Number _____
Instructions on back

4+5

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C) 10.8
Therm ID
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland NY 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLean
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	Sodium	BACT					Additional Notes
	Terrace Rd well	1-10-2022	9:04 AM	1	DW	1	Nitric Acid	1						Raw water
	Red Apple Rt 13/McLean Rd	1-10-2022	9:17 AM	1	DW	1	Sodium thiosulfate		1					CL 0.6
	Cortlandville High Way Garage Rt 41 Polkville	1-10-2022	10:26 AM	1	DW	1	"		1					CL 0.3

J2A0565
Cortlandville Water, Town of
PM: Shannon Weeks

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-10-2021 10:35 AM	S Weeks	1/10/22 1035

rev.12/26/2017

Page ____ of ____

MICROBAC®

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0167

Town of Cortlandville, NY

Brian Congdon
3577 Terrace RD
Cortland, NY 13045

Project Name: Monthly Water Samples

Project / PO Number: N/A
Received: 01/03/2022
Reported: 01/06/2022

Project Special Information

NY1101755

Analytical Testing Parameters

Client Sample ID: Municipal Bldg
Sample Matrix: Drinking Water
Lab Sample ID: J2A0167-01
Collected By: JM-Client
Collection Date: 01/03/2022 7:22

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG
Escherichia coli	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.60	4.00 MCL		mg/L	Y1		01/03/22 0722	CUS

Client Sample ID: Terrace Rd. Well
Sample Matrix: Drinking Water
Lab Sample ID: J2A0167-02
Collected By: JM-Client
Collection Date: 01/03/2022 7:43

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG
Escherichia coli	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG

MICROBAC

Microbac Laboratories, Inc., New York Division

CERTIFICATE OF ANALYSIS

J2A0167

Client Sample ID:	Walden Oaks BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2A0167-03	**Collection Date:**	01/03/2022 8:00

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG
Escherichia coli	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.50	4.00 MCL		mg/L	**Y1**		01/03/22 0800	CUS

Client Sample ID:	Blue Creek BS		
Sample Matrix:	Drinking Water	**Collected By:**	JM-Client
Lab Sample ID:	J2A0167-04	**Collection Date:**	01/03/2022 8:30

Analyses Performed by: Microbac Laboratories, Inc., New York Division

Microbiology	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 9223 B (Colilert)-1997								
Total coliforms	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG
Escherichia coli	Absent			per 100mL		01/03/22 1744	01/04/22 1253	MMG

Analyses Performed by: Customer

Field Parameters	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: NA								
Chlorine - Free Residual	0.40	4.00 MCL		mg/L	**Y1**		01/03/22 0830	CUS

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL:	US EPA Maximum Contaminant Level
mg/L:	Milligrams per Liter
RL:	Reporting Limit
Y1:	Accreditation is not offered by the accrediting body for this analyte.

Project Requested Certification(s)

Microbac Laboratories, Inc., New York Division
NY Lab ID No.: 10795 — New York State Department of Health

MICROBAC

3821 Buck Drive, Cortland, NY 13045, 607.753.3403
2369 Elmira Street, Suite C, Sayre, PA 18840, 570.888.0169
1620 Nt ain Avenue, Scranton, PA 18508, 570.348.0775
4359 Linglestown Road, Harrisburg, PA 17112, 717.651.9700

CHAIN OF CUSTODY RECO

Number
Instructions on back

Lab Report Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607 756-9637

Invoice Address
Client Name: Town of Cortlandville
Address: 3577 Terrace Rd.
City, State, Zip: Cortland N.Y. 13045
Contact: Brian Congdon
Telephone No.: 607-756-9637

Turnaround Time
[X] Routine (5 to 7 business days)
[ ] RUSH* (notify lab)
(needed by)

Report Type
[X] Results Only [ ] Level 1 [ ] Level 2 [ ] Level3 [ ] Level 4 [ ] EDD

TO BE COMPLETED BY MICROBAC
Temperature Upon Receipt (°C)
Therm ID:
Holding Time
Samples Received on Ice? Yes No N/A
Custody Seals Intact? Yes No N/A

Send Report via: [X] Mail [ ] Fax [ ] e-mail (address)
Send Invoice via: [X] Mail [ ] Fax [ ] e-mail (address)

Project: Monthly Water Samples
Location:
PO No.:
Compliance Monitoring? [ ] Yes [ ] No
( ) Agency/Program

Sampled by (PRINT): Jeff MacLaan
Sampler Signature: Jeff MacLean
Sampler Phone No.: 607-756-9637

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

REQUESTED ANALYSIS

Lab ID	Client Sample ID	Date Collected	Time Collected	No. of Containers	Matrix	Grab/Comp	Preservative Types **	BAeT									Additional Notes
	Municipal BCDC	1-3-2022	7:22 AM	1	DW	1	Sodium Thiosulfate	1									CL 0.6
	Terrace Rd well	1-3-2022	743AM	1	DW	1	"	1									Raw Water
	Walden Oaks BS	1-3-2022	800AM	1	DW	1	"	1									CL 0.5
	Blue Creek BS	1-3-2022	830 AM	1	DW	1	"	1									CL 0.4

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive
Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

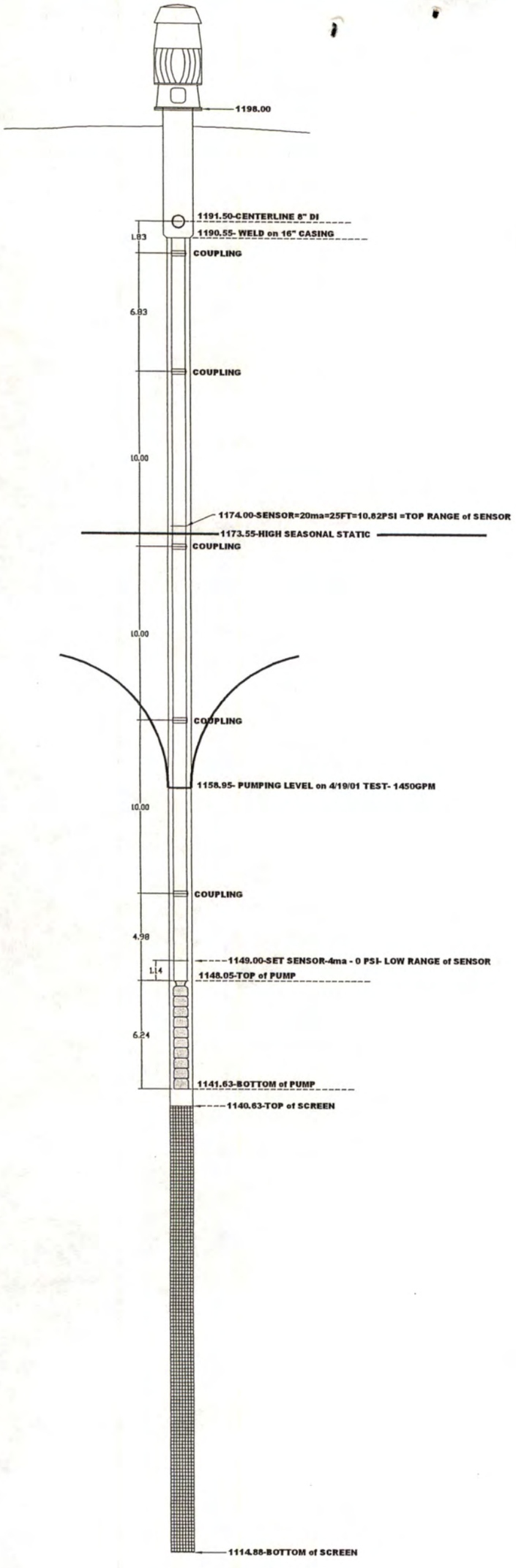
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Jeff MacLean	1-3-2022 853 AM		
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
			1/3/22 8:54
Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time

rev.12/26/20

Lime Hollow Road Well Construction Diagrams

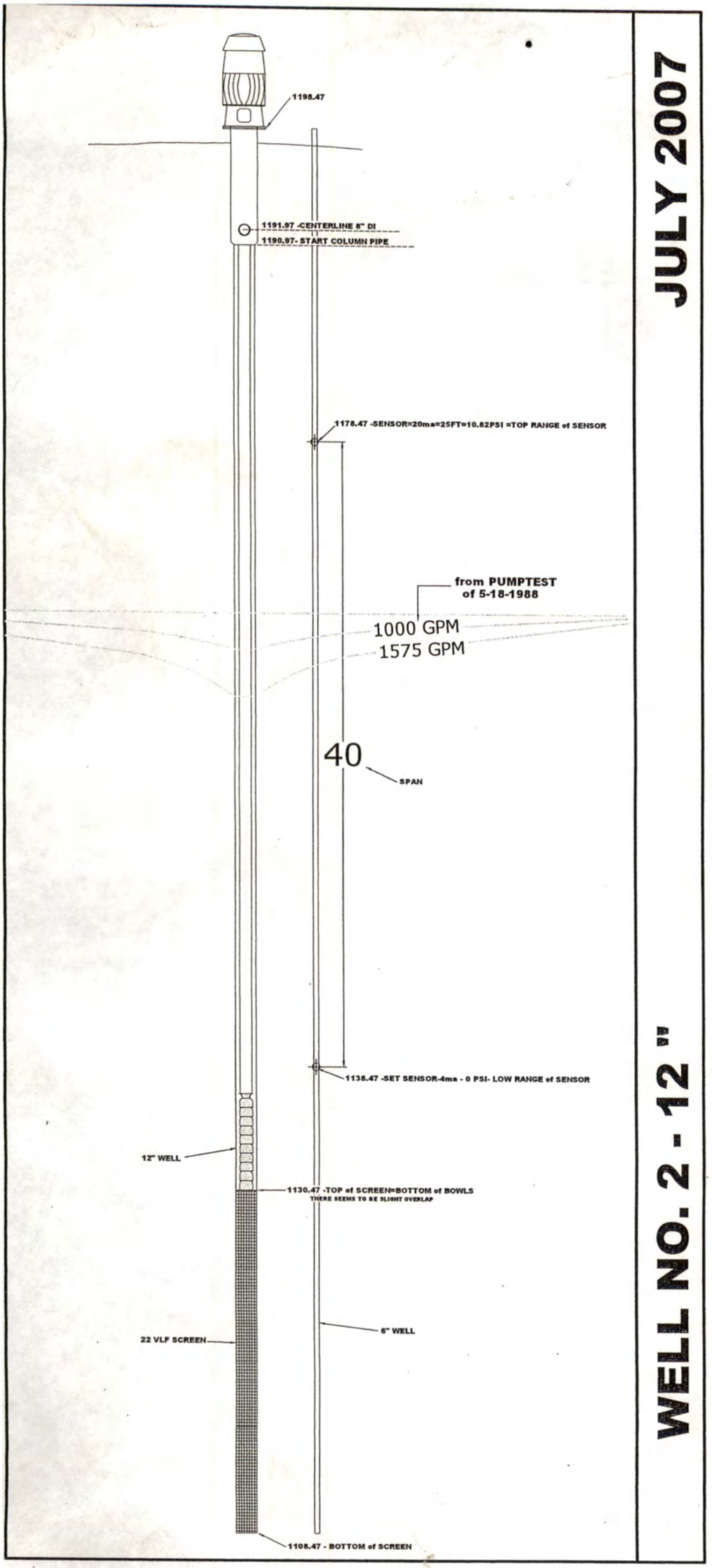
WELL NO. 7 - 16 "

APRIL 2006



WELL NO. 2 - 12"

JULY 2007



Appendix 2.2.A:
Pyrotek Environmental Profile
(USEPA, Accessed 2022)

An official website of the United States government

This page was created on NOV-15-2022
Results are based on data extracted on NOV-12-2022

Note: You are viewing results from the modernized data system, Integrated Compliance Information System (ICIS). The state reporting this data to EPA previously reported the data to a historic data system, Permit Compliance System (PCS). Use the following button to view the historic data from PCS. **Run a PCS Search**

Facility

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

STREET 1	641 STATE RTE 13	**SIC CODE**	3297 = Nonclay Refractories
CITY		**MAJOR / MINOR**	
COUNTY NAME	Cortland	**TYPE OF OWNERSHIP**	Corporation
STATE	NY	**ACTIVITY STATUS**	Effective
ZIP CODE	13045	**INACTIVE DATE**	
REGION	Region 2	**TYPE OF PERMIT ISSUED**	General Permit Covered Facility
LATITUDE	42.557839	**ORIGINAL PERMIT ISSUE DATE**	27-DEC-2006
LONGITUDE	-76.231052	**PERMIT ISSUED DATE**	16-FEB-2018
LAT/LON CODE OF ACCURACY	5	**PERMIT EXPIRED DATE**	28-FEB-2023
LAT/LON METHOD	Interpolation-Map		
LAT/LON SCALE	24000	**USGS HYDRO BASIN CODE**	
LAT/LON DATUM	NAD83	**FLOW**	
RECEIVING WATERS	UNNAMED STREAM	**FEDERAL GRANT IND**	
PRETREATMENT CODE		**SLUDGE CLASS FAC IND**	NON-POTW
MAILING NAME		**SLUDGE RELATED PERMIT NUM**	
MAILING STREET (1)		**ANNUAL DRY SLUDGE PROD**	
MAILING STREET (2)			
MAILING CITY			

MAILING STATE			
MAILING ZIP CODE			
COGNIZANT OFFICIAL		**COGNIZANT OFFICIAL TEL**	

Activity

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

ACTIVITY NAME	**ACTIVITY TYPE DESCRIPTION**	**ACTIVITY STATUS DESCRIPTION**	**ACTIVITY STATUS DATE**	**ACTUAL BEGIN DATE**	**ACTUAL END DATE**
Pyrotek, Inc.	Inspection/Evaluation	Active	17-AUG-2016	16-JUN-2016	16-JUN-2016
	Permit	Active	14-FEB-2013		
	Permit	Active	08-NOV-2011		
	Permit	Active	01-OCT-2018		

Contacts

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

No Contacts Found.

Permit Tracking

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PERMIT ISSUED BY	NYSDEC	**ORIGINAL DATE OF ISSUE**	27-DEC-2006
PERMIT ISSUED DATE	28-SEP-2012	**PERMIT EXPIRED DATE**	30-SEP-2017
EFFECTIVE DATE	25-JAN-2013	**RETIREMENT DATE**	28-JUN-2018

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PERMIT ISSUED BY	NYSDEC	**ORIGINAL DATE OF ISSUE**	27-DEC-2006
PERMIT ISSUED DATE	27-DEC-2006	**PERMIT EXPIRED DATE**	31-MAR-2012
EFFECTIVE DATE	01-APR-2007	**RETIREMENT DATE**	24-JAN-2013

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PERMIT ISSUED BY	NYSDEC	**ORIGINAL DATE OF ISSUE**	27-DEC-2006
PERMIT ISSUED DATE	16-FEB-2018	**PERMIT EXPIRED DATE**	28-FEB-2023
EFFECTIVE DATE	29-JUN-2018	**RETIREMENT DATE**	

Permit Tracking Events:

EVENT DESCRIPTION	EVENT DATE
Permit Expiration	28-FEB-2023

Application/NOI Reviewed	01-OCT-2018
Permit Effective	29-JUN-2018
Permit Retired	28-JUN-2018
Permit Reissued	16-FEB-2018
Permit Issued	16-FEB-2018
Permit Expiration	30-SEP-2017
Application/NOI Reviewed	14-FEB-2013
Permit Effective	25-JAN-2013
Permit Retired	24-JAN-2013
Permit Reissued	28-SEP-2012
Permit Issued	28-SEP-2012
Permit Continued	01-APR-2012
Permit Expiration	31-MAR-2012
Application/NOI Reviewed	08-NOV-2011
Application/NOI Received	07-OCT-2011
Application/NOI Received	07-OCT-2011
Application/NOI Received	07-OCT-2011
Permit Effective	01-APR-2007

Permit Issued	27-DEC-2006

Inspections

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

INSPECTION TYPE	DATE OF INSPECTION	INSPECTION PERFORMED BY
Pyrotek, Inc.	17-AUG-2016	State

Outfalls/Pipe Schedules

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
OUTFALL TYPE	External Outfall	**PIPE NUMBER**	001
ACTIVITY STATUS		**REPORT DESIGNATOR**	
LATITUDE		**LONGITUDE**	
LAT/LON ACCURACY		**LAT/LON METHOD**	
LAT/LON SCALE		**LAT/LON DATUM**	
INACTIVE DATE		**USGS HYDRO BASIN CODE**	
INIT DMR DUE DATE		**SUBMISSION UNITS**	

PIPE DESCRIPTION		**UNITS IN SUBM. PERIOD**	
INIT REPORTING DATE		**REPORTING UNITS**	
UNITS IN REPORTING PERIOD		**DMR COMMENT**	

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
OUTFALL TYPE	External Outfall	**PIPE NUMBER**	001A
ACTIVITY STATUS		**REPORT DESIGNATOR**	
LATITUDE		**LONGITUDE**	
LAT/LON ACCURACY		**LAT/LON METHOD**	
LAT/LON SCALE		**LAT/LON DATUM**	
INACTIVE DATE		**USGS HYDRO BASIN CODE**	
INIT DMR DUE DATE		**SUBMISSION UNITS**	
PIPE DESCRIPTION		**UNITS IN SUBM. PERIOD**	
INIT REPORTING DATE		**REPORTING UNITS**	
UNITS IN REPORTING PERIOD		**DMR COMMENT**	

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
OUTFALL TYPE	External Outfall	**PIPE NUMBER**	002

ACTIVITY STATUS		**REPORT DESIGNATOR**	
LATITUDE		**LONGITUDE**	
LAT/LON ACCURACY		**LAT/LON METHOD**	
LAT/LON SCALE		**LAT/LON DATUM**	
INACTIVE DATE		**USGS HYDRO BASIN CODE**	
INIT DMR DUE DATE		**SUBMISSION UNITS**	
PIPE DESCRIPTION		**UNITS IN SUBM. PERIOD**	
INIT REPORTING DATE		**REPORTING UNITS**	
UNITS IN REPORTING PERIOD		**DMR COMMENT**	

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
OUTFALL TYPE	External Outfall	**PIPE NUMBER**	002A
ACTIVITY STATUS		**REPORT DESIGNATOR**	
LATITUDE		**LONGITUDE**	
LAT/LON ACCURACY		**LAT/LON METHOD**	
LAT/LON SCALE		**LAT/LON DATUM**	
INACTIVE DATE		**USGS HYDRO BASIN CODE**	
INIT DMR DUE DATE		**SUBMISSION UNITS**	

PIPE DESCRIPTION		**UNITS IN SUBM. PERIOD**	
INIT REPORTING DATE		**REPORTING UNITS**	
UNITS IN REPORTING PERIOD		**DMR COMMENT**	

Limits Report

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	001		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	001		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

PIPE NUMBER	001A		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	001A		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	002		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	002		

PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	002A		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070
PIPE NUMBER	002A		
PIPE DESCRIPTION		**REPORT DESIGNATOR**	
DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

Limits Report

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

No ICIS Limits Information Found.

Measurements and Violations

FACILITY NAME (1)	PYROTEK INC	NPDES	NYR00F070

No ICIS Measurements Information Found.

Compliance Schedules and Violations

FACILITY NAME (1)	PYROTEK INC	NPDES	NYR00F070

Compliance Schedule Events

SCHEDULE NUMBER	DATA SOURCE	EVENT DESCRIPTION	ACTUAL DATE	SCHEDULED DATE	RECEIVED DATE
3000035317	2600073347	Status/Progress Report	03-APR-13	31-MAR-13	03-APR-13
3400023050	3400051039	Status/Progress Report	02-JAN-15	28-FEB-15	02-JAN-15
3400023051	3400051039	Status/Progress Report	10-DEC-13	28-FEB-14	10-DEC-13
3400023052	3400051039	Status/Progress Report	23-JAN-17	28-FEB-17	23-JAN-17
3400023053	3400051039	Status/Progress Report	03-FEB-16	29-FEB-16	03-FEB-16
3600285226	3400051039	Status/Progress Report	12-FEB-18	28-FEB-18	12-FEB-18

3600434375	3601583074	Annual Report and Certification	01-FEB-19	28-JAN-19	01-FEB-19
3600434376	3601583074	Annual Report and Certification	02-MAR-20	28-JAN-20	02-MAR-20
3600434377	3601583074	Annual Report and Certification	20-JAN-22	28-JAN-22	20-JAN-22
3600434378	3601583074	Annual Report and Certification	26-JAN-21	28-JAN-21	26-JAN-21
3600434379	3601583074	Annual Report and Certification		28-JAN-23	

No Compliance Violations Found.

Pretreatment Inspections/Audits

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

No ICIS Pretreatment Inspections Found.

Pretreatment Performance Summary

FACILITY NAME (1)	PYROTEK INC	**NPDES**	NYR00F070

No ICIS Pretreatment Performance Summary Information Found.

Note: You are viewing results from the modernized data system, Integrated Compliance Information System (ICIS). The state reporting this data to EPA previously reported the data to a historic data system, Permit Compliance System (PCS). Use the following button to view the historic data from PCS. **Run a PCS Search**

Data Refresh Information

<https://epa.gov/resources/echo-data/about-the-data#sources>

Appendix 2.2.B: Pyrotek 2013 and 2018 Annual Certification Reports SPDES MSGPs (NYSDEC)

1739022194

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Annual Certification Report
GP-0-17-004

The owner/operator shall complete this Annual Certification Report form by answering all questions, and signing the certification at the end of this form. This completed report is to be submitted for each calendar year and is due by January 28th of the following year to:

RECEIVED

Stormwater Compliance Coordinator
NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506

FEB 01 2019

NYSDEC BWC

SECTION I: FACILITY INFORMATION:

SPDES I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 8

Owner Name

Pyrotek Inc.

Facility Name

Pyrotek Inc.

SECTION II: GENERAL INFORMATION:

1. Number of stormwater outfalls at the facility that are from areas of industrial activity: 0 0 2

2. Did the facility claim any monitoring waiver(s)? ○ Yes ◉ No

   If yes, which waiver(s) were claimed for the reporting year?

   ○ Representative Outfall ○ Adverse Climatic Conditions ○ Inactive or Unstaffed Sites

3. Is the information provided in your original Notice of Intent (NOI) submission still accurate and up to date? If not, please submit an updated NOI. ◉ Yes ○ No

4. Has a comprehensive site compliance inspection and evaluation been conducted at the facility in the reporting year? ◉ Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ◉ Yes ○ No

SECTION III: QUARTERLY VISUAL MONITORING (Permit Part IV.E)

1. Were the required quarterly visual examinations of stormwater performed during the reporting period? ◉ Yes ○ No

2. Did any of the quarterly visual examinations have observations of color, clarity, odor, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? (If yes, answer question 2.a and 2.b) ○ Yes ◉ No

   2a. Were corrective actions taken (Part IV.E.6)? ○ Yes ○ No

   2b. Was a follow up visual inspection conducted to ensure corrective actions were successful (Part V)? ○ Yes ○ No

SECTION IV: ANNUAL DRY WEATHER FLOW INSPECTION (Permit Part IV.C)

1. Was the annual dry weather flow inspection performed during this reporting period? ◉ Yes ○ No
2. Were any non-stormwater discharges or indicators of non-stormwater discharges identified? (If no, proceed to Section V) ○ Yes ◉ No
3. Was the source of the non-stormwater discharge identified? (If no, proceed to question 5) ○ Yes ○ No
4. Is the source an allowable non-stormwater discharge (i.e., discharge covered by another SPDES permit or an allowable non-stormwater discharge covered in Part I.B.2 of the MSGP)? ○ Yes ○ No
5. Were corrective actions taken to eliminate the unauthorized non-stormwater discharge? (Part IV.C.3) ○ Yes ○ No
6. Were corrective actions successful in eliminating the unauthorized non-stormwater discharge? ○ Yes ○ No

SECTION V: STORMWATER MONITORING - BENCHMARK PARAMETERS (Part IV.F.1.a)

1. Is benchmark monitoring required at the facility? (If no, proceed to Section VI) ◉ Yes ○ No
2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems). Use Section VIII to explain.any monitoring problems. ○ Yes ◉ No
3. Were any of the sampling results from the reporting year higher than the benchmark cut-off concentrations listed in the permit? (If yes, answer questions 3a and 3b) ○ Yes ○ No

3a. Describe all exceedances and their causes.

3b. Describe the short- and long-term corrective actions taken to address the exceedance(s). Include all changes to existing BMPs and any new BMPs implemented. Specify the SWPPP modifications.

SECTION VI: STORMWATER MONITORING - COMPLIANCE MONITORING (Part IV.F.1.b & Part IV.F.1.d)

1. Is compliance monitoring required at the facility? (If no, proceed to Section VII) ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems). Use Section VIII to explain any monitoring problems. ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in the permit? (If yes, answer questions 3a and 3b.) ○ Yes ○ No

3a. Describe all exceedances and their causes.

3b. Describe the short- and long-term corrective actions taken to address the exceedance(s). Include all changes to existing BMPs and any new BMPs implemented. Specify the SWPPP modifications.

SECTION VII: STORMWATER MONITORING - DISCHARGES TO IMPAIRED WATERBODIES:

1. Is monitoring required for discharges to impaired waterbodies?(Part IV.F.1.c) (If no, proceed to Section VIII) ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met of if the laboratory indicated quality insurance assurance/quality control problems) Use Section VIII to explain any monitoring problems. ○ Yes ○ No

3. Were any of the quarterly sampling results from the reporting year higher than the benchmark cut-off concentrations or effluent limitations listed in the permit? (If yes, answer questions 3a, 3b and 3c.) ○ Yes ○ No

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3a. Describe all exceedances and their causes.

3b. Describe the short- and long-term corrective actions taken to address the exceedance(s). Include all changes to existing BMPs and any new BMPs implemented. Specify the SWPPP modifications.

3c. Did the follow-up quarterly sample show the corrective and follow up actions to be successful? ○ Yes ○ No

SECTION VIII: SUMMARY:

Describe any facility changes and problems identified during inspections, quarterly visual observations or monitoring. List actions taken to improve the quality of the stormwater discharge from the facility.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

THOMAS
Owner/Operator First Name (please print or type)

MI

01/28/2019
Date

HOWARD
Owner/Operator Last Name (please print or type)

Thomas L Howard
Owner/Operator Signature

8812243503

RECEIVED
FEB 12 2018
NYSDEC BWC

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-12-001)

The owner/operator shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), providing copies of monitoring results on appropriate Discharge Monitoring Reports forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by February 28th of the following year to:

MSGP Permit Coordinator
NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506

SECTION I: FACILITY INFORMATION:

Permit I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 7

Owner Name

Pyrotek Inc.

Facility Name

Pyrotek Inc.

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity..... 0 0 2

2. Is the facility claiming any monitoring waiver(s)? ..... ○ Yes ⊘ No

If yes, which waiver(s) are you claiming?

- ○ Adverse Climatic Conditions*
- ○ Alternate Certification of "Not Present" or "No Exposure"
- ○ Inactive or Unstaffed Site*
- ○ Representative Outfall*

* If you are claiming a monitoring waiver the appropriate monitoring waiver form must be included with your Discharge Monitoring Report form.

3. Is the information provided in your original Notice of Intent (NOI) submission still accurate and up to date? If not, please submit a Notice of Modification (NOM) to update the facility information ..... ⊘ Yes ○ No

4. Has a comprehensive Site Compliance Inspection and Evaluation been conducted at the facility in the past year? ... ● Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ..... ● Yes ○ No

SECTION III: QUARTERLY VISUAL MONITORING:

1. Have the required quarterly visual examinations of stormwater at the facility been performed during this reporting period (See Part.IV.1.a of the MSGP)? ..... ● Yes ○ No

2. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? (If yes, question 2.A, 2.B, and 2.C below must be answered) ..... ○ Yes ◉ No

A. Were corrective and follow up actions taken (See Part IV.B.1.a.(5) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent stormwater pollution and contamination from reoccurring (See Part IV.B.1.a.(5)(c) of the MSGP)?..... ○ Yes ○ No

C. Was a follow up visual inspection conducted to ensure corrective and follow up actions were successful (See Part IV.B.1.a.(5)(d) of the MSGP)? ..... ○ Yes ○ No

SECTION IV: ANNUAL DRY WEATHER FLOW MONITORING:

1. Was the annual dry weather flow inspection performed during this reporting period (See Part IV.B.1.b of the MSGP)? ... ☑ Yes ○ No

2. Were any non-stormwater dischargers or indicators of non-stormwater discharges identified? (If no, proceed to Section V) ... ○ Yes ◉ No

3. Was the source of the non-stormwater discharge identified? (If no, proceed to question 5) ... ○ Yes ○ No

4. Is the source an allowable non-stormwater discharge (i.e., discharge covered by another SPDES permit or an allowable non-stormwater discharge covered in Part I.C.3 of the MSGP)? (If yes, question 4.A. below must be answered; if no, proceed to question 5) ... ○ Yes ○ No

A. Has the facility's SWPPP been updated to address the newly identified allowable non-stormwater discharge(s) (See Part IV.B.1.b.(3)(d) of the MSGP)? ... ○ Yes ○ No

5. Were corrective and follow up actions taken to eliminate the unauthorized non-stormwater discharge (See Part IV.B.1.b.(3) of the MSGP)? ... ○ Yes ○ No

6. Were corrective and follow up actions successful in eliminating the unauthorized non-stormwater discharge? ... ○ Yes ○ No

Note: If it is not possible to eliminate the non-authorized stormwater discharge the owner/operator must notify the Department with 14 days.

SECTION V: STORMWATER MONITORING - BENCHMARK PARAMETERS:

1. Is the owner/operator required to monitor stormwater at the facility for benchmark parameters (See Part IV.B.1.c)? (If no, proceed to Section VI) ... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations listed in the permit? (If yes, questions 3.A and 3.B below must be answered) ... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.c.(6) of the MSGP)? ... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark exceedance from reoccurring (See Part IV.B.1.c.(6)(c) of the MSGP) ? ... ○ Yes ○ No

Note: If you had a benchmark exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.c.(6)(d)(iii) of the MSGP).

SECTION VI: STORMWATER MONITORING - COAL PILE RUNOFF:

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges from coal piles (See Part IV.B.1.d of the MSGP? (If no, proceed to Section VII) ... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet or if the laboratory indicated quality insurance assurance/quality control problems) ... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in Table IV-1 of the MSGP? (If yes, questions 3.A and 3.B. below must be answered) ... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.d.(6) of the MSGP)? ... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the effluent limitation exceedance from reoccurring (See Part IV.B.1.d.(6) of the MSGP)? ... ○ Yes ○ No

Note: If you had a effluent limitation exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.e.(5)(e)(ii) of the MSGP).

SECTION VII: STORMWATER MONITORING - COMPLIANCE MONITORING

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges subject to Point Source Category Effluent Limitations (See Part IV.B.1.e of the MSGP)? (If no, proceed to Section VIII) ..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in the permit? (If yes, questions 3.A and 3.B. below must be answered) ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.e.(5) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the effluent limitation exceeding from reoccurring (See Part IV.B.1.e.(5)(c) of the MSGP? ..... ○ Yes ○ No

Note: If you had an effluent limitation exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.e.(5)(e)(ii) of the MSGP).

SECTION VIII: STORMWATER MONITORING - DISCHARGES TO IMPAIRED WATERBODIES:

1. Is the owner/operator required to conduct compliance monitoring for discharges to impaired waterbodies (See Part IV.B.1.g of the MSGP)? (If no, proceed to Section IX)..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations or effluent limitations listed in the permit? (If yes, questions 3.A and 3.B below must be answered). ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.g.(6) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark cutoff concentrations or effluent limitations exceedance from reoccurring (See Part IV.B.1.g.(6)(c) of the MSGP)? ..... ○ Yes ○ No

C. Did the follow-up quarterly sample show the corrective and follow up actions to be successful? ..... ○ Yes ○ No

SECTION IX: SUMMARY:

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and actions taken to improve the quality of the stormwater discharge.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas — Owner/Operator First Name (please print or type) — MI

02/08/2018 — Date

Howard — Owner/Operator Last Name (please print or type)

Owner/Operator Signature

8812243503

JAN 23 2017

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-12-01-001)

The owner/operator shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), providing copies of monitoring results on appropriate Discharge Monitoring Reports forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by February 28th of the following year to:

MSGP Permit Coordinator
NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506

SECTION I: FACILITY INFORMATION:

Permit I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 6

Owner Name
Pyrotek Inc.

Facility Name
Pyrotek Inc.

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity..... 0 0 2

2. Is the facility claiming any monitoring waiver(s)? ..... ○ Yes ✓ No

If yes, which waiver(s) are you claiming?

- ○ Adverse Climatic Conditions*
- ○ Alternate Certification of "Not Present" or "No Exposure"
- ○ Inactive or Unstaffed Site*
- ○ Representative Outfall*

* If you are claiming a monitoring waiver the appropriate monitoring waiver form must be included with your Discharge Monitoring Report form.

3. Is the information provided in your original Notice of Intent (NOI) submission still accurate and up to date? If not, please submit a Notice of Modification (NOM) to update the facility information ..... ✓ Yes ○ No

4. Has a comprehensive Site Compliance Inspection and Evaluation been conducted at the facility in the past year? ... ● Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ..... ● Yes ○ No

SECTION III: QUARTERLY VISUAL MONITORING:

1. Have the required quarterly visual examinations of stormwater at the facility been performed during this reporting period (See Part.IV.1.a of the MSGP)? ..... ● Yes ○ No

2. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? (If yes, question 2.A, 2.B, and 2.C below must be answered) ..... ○ Yes ◉ No

A. Were corrective and follow up actions taken (See Part IV.B.1.a.(5) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent stormwater pollution and contamination from reoccurring (See Part IV.B.1.a.(5)(c) of the MSGP)?..... ○ Yes ○ No

C. Was a follow up visual inspection conducted to ensure corrective and follow up actions were successful (See Part IV.B.1.a.(5)(d) of the MSGP)? ..... ○ Yes ○ No

SECTION IV: ANNUAL DRY WEATHER FLOW MONITORING:

1. Was the annual dry weather flow inspection performed during this reporting period (See Part IV.B.1.b of the MSGP)? ..... ☑ Yes ○ No

2. Were any non-stormwater dischargers or indicators of non-stormwater discharges identified? (If no, proceed to Section V)..... ○ Yes ◉ No

3. Was the source of the non-stormwater discharge identified? (If no, proceed to question 5) ..... ○ Yes ○ No

4. Is the source an allowable non-stormwater discharge (i.e., discharge covered by another SPDES permit or an allowable non-stormwater discharge covered in Part I.C.3 of the MSGP)? (If yes, question 4.A. below must be answered; if no, proceed to question 5)..... ○ Yes ○ No

A. Has the facility's SWPPP been updated to address the newly identified allowable non-stormwater discharge(s) (See Part IV.B.1.b.(3)(d) of the MSGP)? ..... ○ Yes ○ No

5. Were corrective and follow up actions taken to eliminate the unauthorized non-stormwater discharge (See Part IV.B.1.b.(3) of the MSGP)? ..... ○ Yes ○ No

6. Were corrective and follow up actions successful in eliminating the unauthorized non-stormwater discharge? ..... ○ Yes ○ No

Note: If it is not possible to eliminate the non-authorized stormwater discharge the owner/operator must notify the Department with 14 days.

SECTION V: STORMWATER MONITORING - BENCHMARK PARAMETERS:

1. Is the owner/operator required to monitor stormwater at the facility for benchmark parameters (See Part IV.B.1.c)? (If no, proceed to Section VI)..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations listed in the permit? (If yes, questions 3.A and 3.B below must be answered)..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.c.(6) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark exceedance from reoccurring (See Part IV.B.1.c.(6)(c) of the MSGP) ? ..... ○ Yes ○ No

Note: If you had a benchmark exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.c.(6)(d)(iii) of the MSGP).

SECTION VI: STORMWATER MONITORING - COAL PILE RUNOFF:

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges from coal piles (See Part IV.B.1.d of the MSGP? (If no, proceed to Section VII)..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet or if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in Table IV-1 of the MSGP? (If yes, questions 3.A and 3.B. below must be answered)..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.d.(6) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the effluent limitation exceedance from reoccurring (See Part IV.B.1.d.(6) of the MSGP)? ..... ○ Yes ○ No

Note: If you had a effluent limitation exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.e.(5)(e)(ii) of the MSGP).

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SECTION VII: STORMWATER MONITORING - COMPLIANCE MONITORING

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges subject to Point Source Category Effluent Limitations (See Part IV.B.1.e of the MSGP)? (If no, proceed to Section VIII) ..... ○ Yes ● No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in the permit? (If yes, questions 3.A and 3.B. below must be answered) ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.e.(5) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the effluent limitation exceeding from reoccurring (See Part IV.B.1.e.(5)(c) of the MSGP? ..... ○ Yes ○ No

Note: If you had an effluent limitation exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.e.(5)(e)(ii) of the MSGP).

SECTION VIII: STORMWATER MONITORING - DISCHARGES TO IMPAIRED WATERBODIES:

1. Is the owner/operator required to conduct compliance monitoring for discharges to impaired waterbodies (See Part IV.B.1.g of the MSGP)? (If no, proceed to Section IX)..... ○ Yes ● No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations or effluent limitations listed in the permit? (If yes, questions 3.A and 3.B below must be answered). ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.g.(6) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark cutoff concentrations or effluent limitations exceedance from reoccurring (See Part IV.B.1.g.(6)(c) of the MSGP)? ..... ○ Yes ○ No

C. Did the follow-up quarterly sample show the corrective and follow up actions to be successful? ..... ○ Yes ○ No

SECTION IX: SUMMARY:

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and actions taken to improve the quality of the stormwater discharge.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas — Owner/Operator First Name (please print or type) — MI

01/20/2017 — Date

Howard — Owner/Operator Last Name (please print or type)

Thomas L Howard — Owner/Operator Signature

8812243503

FEB 03 2016

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-12-01-001)

The owner/operator shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), providing copies of monitoring results on appropriate Discharge Monitoring Reports forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by February 28th of the following year to:

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NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506

SECTION I: FACILITY INFORMATION:

Permit I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 5

Owner Name
Pyrotek Inc.

Facility Name
Pyrotek Inc.

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity..... 0 0 2

2. Is the facility claiming any monitoring waiver(s)? ..... ○ Yes ☑ No

If yes, which waiver(s) are you claiming?

- ○ Adverse Climatic Conditions*
- ○ Alternate Certification of "Not Present" or "No Exposure"
- ○ Inactive or Unstaffed Site*
- ○ Representative Outfall*

* If you are claiming a monitoring waiver the appropriate monitoring waiver form must be included with your Discharge Monitoring Report form.

3. Is the information provided in your original Notice of Intent (NOI) submission still accurate and up to date? If not, please submit a Notice of Modification (NOM) to update the facility information ..... ☑ Yes ○ No

4. Has a comprehensive Site Compliance Inspection and Evaluation been conducted at the facility in the past year? ... ● Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ..... ● Yes ○ No

SECTION III: QUARTERLY VISUAL MONITORING:

1. Have the required quarterly visual examinations of stormwater at the facility been performed during this reporting period (See Part.IV.1.a of the MSGP)? ..... ● Yes ○ No

2. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? (If yes, question 2.A, 2.B, and 2.C below must be answered) ..... ○ Yes ◉ No

A. Were corrective and follow up actions taken (See Part IV.B.1.a.(5) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent stormwater pollution and contamination from reoccurring (See Part IV.B.1.a.(5)(c) of the MSGP)?..... ○ Yes ○ No

C. Was a follow up visual inspection conducted to ensure corrective and follow up actions were successful (See Part IV.B.1.a.(5)(d) of the MSGP)? ..... ○ Yes ○ No

SECTION IV: ANNUAL DRY WEATHER FLOW MONITORING:

1. Was the annual dry weather flow inspection performed during this reporting period (See Part IV.B.1.b of the MSGP)? ... ☑ Yes ○ No

2. Were any non-stormwater dischargers or indicators of non-stormwater discharges identified? (If no, proceed to Section V) ... ○ Yes ◉ No

3. Was the source of the non-stormwater discharge identified? (If no, proceed to question 5) ... ○ Yes ○ No

4. Is the source an allowable non-stormwater discharge (i.e., discharge covered by another SPDES permit or an allowable non-stormwater discharge covered in Part I.C.3 of the MSGP)? (If yes, question 4.A. below must be answered; if no, proceed to question 5) ... ○ Yes ○ No

A. Has the facility's SWPPP been updated to address the newly identified allowable non-stormwater discharge(s) (See Part IV.B.1.b.(3)(d) of the MSGP)? ... ○ Yes ○ No

5. Were corrective and follow up actions taken to eliminate the unauthorized non-stormwater discharge (See Part IV.B.1.b.(3) of the MSGP)? ... ○ Yes ○ No

6. Were corrective and follow up actions successful in eliminating the unauthorized non-stormwater discharge? ... ○ Yes ○ No

Note: If it is not possible to eliminate the non-authorized stormwater discharge the owner/operator must notify the Department with 14 days.

SECTION V: STORMWATER MONITORING - BENCHMARK PARAMETERS:

1. Is the owner/operator required to monitor stormwater at the facility for benchmark parameters (See Part IV.B.1.c)? (If no, proceed to Section VI) ... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations listed in the permit? (If yes, questions 3.A and 3.B below must be answered) ... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.c.(6) of the MSGP)? ... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark exceedance from reoccurring (See Part IV.B.1.c.(6)(c) of the MSGP) ? ... ○ Yes ○ No

Note: If you had a benchmark exceedance your Corrective Action Form with follow up sample results are due by July 31 (See Part IV.B.1.c.(6)(d)(iii) of the MSGP).

SECTION VI: STORMWATER MONITORING - COAL PILE RUNOFF:

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges from coal piles (See Part IV.B.1.d of the MSGP? (If no, proceed to Section VII) ... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet or if the laboratory indicated quality insurance assurance/quality control problems) ... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in Table IV-1 of the MSGP? (If yes, questions 3.A and 3.B. below must be answered) ... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.d.(6) of the MSGP)? ... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the effluent limitation exceedance from reoccurring (See Part IV.B.1.d.(6) of the MSGP)? ... ○ Yes ○ No

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SECTION VII: STORMWATER MONITORING - COMPLIANCE MONITORING

1. Is the owner/operator required to conduct compliance monitoring for storm water discharges subject to Point Source Category Effluent Limitations (See Part IV.B.1.e of the MSGP)? (If no, proceed to Section VIII) ..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the effluent limitations listed in the permit? (If yes, questions 3.A and 3.B. below must be answered) ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.e.(5) of the MSGP)? ..... ○ Yes ○ No

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SECTION VIII: STORMWATER MONITORING - DISCHARGES TO IMPAIRED WATERBODIES:

1. Is the owner/operator required to conduct compliance monitoring for discharges to impaired waterbodies (See Part IV.B.1.g of the MSGP)? (If no, proceed to Section IX)..... ○ Yes ◉ No

2. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not meet of if the laboratory indicated quality insurance assurance/quality control problems) ..... ○ Yes ○ No

3. Were any of the sampling results from this year higher than the benchmark cut-off concentrations or effluent limitations listed in the permit? (If yes, questions 3.A and 3.B below must be answered). ..... ○ Yes ○ No

A. Were corrective and follow up actions taken (See Part IV.B.1.g.(6) of the MSGP)? ..... ○ Yes ○ No

B. Has the facility's SWPPP been updated to include modification to existing BMPs or installation of new BMPs to prevent the benchmark cutoff concentrations or effluent limitations exceedance from reoccurring (See Part IV.B.1.g.(6)(c) of the MSGP)? ..... ○ Yes ○ No

C. Did the follow-up quarterly sample show the corrective and follow up actions to be successful? ..... ○ Yes ○ No

SECTION IX: SUMMARY:

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and actions taken to improve the quality of the stormwater discharge.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas — Owner/Operator First Name (please print or type) — MI

Howard — Owner/Operator Last Name (please print or type)

01/28/2016 — Date

Thomas Howard — Owner/Operator Signature

8812243503

RECEIVED
DEC 31 2014
NYSDEC BWC

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-12-01-001)

The owner/operator shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), providing copies of monitoring results on appropriate Discharge Monitoring Reports forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by February 28th of the following year to:

MSGP Permit Coordinator
NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506

DIVISION OF WATER
RECEIVED
JAN 2 2015
BUREAU OF WATER PERMITS

SECTION I: FACILITY INFORMATION:

Permit I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 4

Owner Name
Pyrotek, Inc.

Facility Name
Pyrotek, Inc.

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity 0 0 2

2. Is the facility claiming any monitoring waiver(s)? ..... ○ Yes ⊘ No

If yes, which waiver(s) are you claiming?

- ○ Adverse Climatic Conditions*
- ○ Alternate Certification of "Not Present" or "No Exposure"
- ○ Inactive or Unstaffed Site*
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* If you are claiming a monitoring waiver the appropriate monitoring waiver form must be included with your Discharge Monitoring Report form.

3. Is the information provided in your original Notice of Intent (NOI) submission still accurate and up to date? If not, please submit a Notice of Modification (NOM) to update the facility information ..... ⊘ Yes ○ No

4. Has a comprehensive Site Compliance Inspection and Evaluation been conducted at the facility in the past year? ... ● Yes ○ No

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2. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? (If yes, question 2.A, 2.B, and 2.C below must be answered) ..... ○ Yes ◉ No

A. Were corrective and follow up actions taken (See Part IV.B.1.a.(5) of the MSGP)? ..... ○ Yes ○ No

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Thomas — Owner/Operator First Name (please print or type)

MI

12/29/2014 — Date

Howard — Owner/Operator Last Name (please print or type)

Thomas L Howard — Owner/Operator Signature

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-12-01-001)

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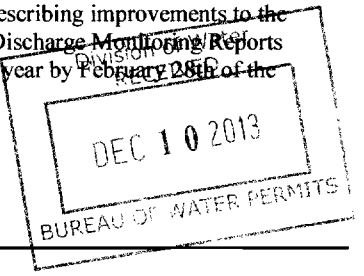
NYSDEC, Bureau of Water Compliance
625 Broadway, Albany, NY, 12233-3506



SECTION I: FACILITY INFORMATION:

Permit I.D. No.: NYR00 F 0 7 0 **Report for Calendar Year:** 2 0 1 3

Owner Name
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Facility Name
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SCANNED
12/13/2013

SECTION III: ANNUAL DRY WEATHER FLOW MONITORING:

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SECTION VIII: SUMMARY:

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and actions taken to improve the quality of the stormwater discharge.

Former EHS Manager is no longer with Pyrotek Inc. Marty Pikarsky is the new EHS Manager. He can be reached at phone number 607-756-3081 or by email at marpik@pyrotek-inc.com. We are currently storing densified Styrofoam outside of the facility that is sent out and sold to a recycling company. Samples of the Styrofoam was sent out to Microlab Laboratories for testing. Results came back as negative in all TCLP aspects and has been documented in our Storm Water Log Book.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas
Owner/Operator First Name (please print or type)

MI

12/06/2013
Date

Howard
Owner/Operator Last Name (please print or type)

Thomas Howard
Owner/Operator Signature

8246197221

Division of Water
RECEIVED
APR 03 2013
BUREAU OF WATER PERMITS

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater
Discharges Associated with Industrial Activity (GP-0-06-002)

The permittee shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), provide copies of monitoring results on appropriate Monitoring Reports Forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by March 31st of the following year to: Industrial Stormwater General Permit Coordinator, NYSDEC, Bureau of Water Permits, 625 Broadway, Albany, NY, 12233-3505

SECTION I: FACILITY INFORMATION

Permit I.D. No.: NYR00 F070 **Report for Calendar Year:** 2012

Owner Name
Pyrotek, Inc.

Facility Name
Pyrotek, Inc.

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity. 002

2. Is the facility claiming any monitoring waivers? ..... ○ Yes ● No
[describe and certify in your cover letter]
   - ○ Representative Outfall
   - ○ Inactive or Unstaffed Site
   - ○ Adverse Climatic Conditions
   - ○ Alternate Certification of "Not Present" or "No Exposure"

3. Is the information provided in your original Notice of Intent or Termination (NOIT) submission still accurate and up to date? If not, please submit an updated NOIT indicating the correct facility information. ..... ● Yes ○ No

4. Has a comprehensive site compliance evaluation been conducted at the facility in the past year? ..... ● Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ..... ● Yes ○ No

SECTION III: QUARTERLY VISUAL EXAMINATIONS AND DRY WEATHER FLOW INSPECTIONS:

6. Have the required quarterly visual examinations of stormwater at the facility been performed during this reporting period? ..... ○ Yes ● No

7. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? ..... ○ Yes ● No

8. Was the annual dry weather flow inspection performed during this reporting period? ..... ● Yes ○ No ○ NA

9. Were any indicators of stormwater pollution or unauthorized discharges identified? ..... ○ Yes ● No ○ NA

10. Did any of these findings result in modification of the SWPPP? ..... ○ Yes ● No ○ NA

ENTERED
5/23/13

2001197224

Division of Water
RECEIVED
APR 03 2013
BUREAU OF WATER PERMITS

SECTION IV: STORMWATER MONITORING - BENCHMARK PARAMETERS:

11. Is the permittee required to monitor stormwater at the facility for benchmark parameters? (If no, skip to Section V) ..... ○ Yes ● No

12. Were there any of the sampling results from this year higher than the cut-off values listed in the permit? ..... ○ Yes ● No

13. Were there any monitoring problems?(Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ..... ○ Yes ● No

14. If any of the sampling results were higher than the benchmark values listed in the permit, was the facility inspected to identify the source? ..... ○ Yes ○ No ● NA

15. Did this result in modification of the SWPPP? ..... ○ Yes ● No

SECTION V: STORMWATER MONITORING - COMPLIANCE MONITORING

16. Is the permittee required to conduct compliance monitoring for storm water discharges subject to Point Source Category Effluent Limitation? ..... ○ Yes ● No

17. Is the permittee required to conduct compliance monitoring for storm water discharges from coal piles? (If no to questions 16 & 17, go to Section VI) ..... ○ Yes ● No

18. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ..... ○ Yes ● No

19. Were any of the sampling results from this year higher than the effluent limitation listed in the permit? ..... ○ Yes ● No

20. If any of the sampling results were higher than the effluent limitations listed in the permit, was the facility inspected to identify the source? ..... ○ Yes ○ No ● NA

21. Did this result in modification of the SWPPP? ..... ○ Yes ● No

SECTION VI: SUMMARY

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and action taken to improve the quality of the stormwater discharge.

Quarterly visual monitoring for the period of April 2012 through June 2012 did not occur as a result of the facility EHS contact person terminating employment with the company during that quarter. All other required inspections were performed.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas
Owner/Operator First Name (please print or type)

MI

03/29/2013
Date

Howard
Owner/Operator Last Name (please print or type)

Thomas L Howard

Pyrotek

Division of Water
RECEIVED
APR 03 2013
BUREAU OF WATER PERMITS

641 State Route 13
Cortland, NY 13045

Industrial Stormwater General Permit Coordinator
NYSDEC, Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway
Albany, NY 12233-3505

March 29, 2013

Subject: Annual Certification Report, Stormwater

Reference: GP-0-12-001

In accordance with the requirements for the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-12-001 (MSGP), enclosed is an Annual Certification Report for SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity for Pyrotek, Inc. in Cortland, New York (permit identification number NYR00F070).

During the period of April 2012 through June 2012, no documented quarterly visual inspection was performed at the outfalls. This was the result of the EHS contact person terminating employment with the company during that quarter. A documented quarterly visual inspection was performed on March 13, 2012 by the former EHS contact for this site. The annual dry weather visual inspection and third quarter documented visual inspection were performed in September by the new EHS contact for the site.

If you have any questions regarding the attached submission, please do not hesitate to contact me at (607) 758-4055.

Sincerely,

Jeffrey J. Hohman
EHS Manager
Pyrotek, Inc.
641 State Route 13
Cortland, NY 13045

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Water Permits
625 Broadway, Albany, New York 12233-3505
P: (518) 402-8111 | F: (518) 402-9029
www.dec.ny.gov

2/20/2019

PYROTEK INC
PYROTEK INC
641 STATE RTE 13
CORTLAND, NY 13045

Re: Acknowledgement of Notice of Intent for Coverage under SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-17-004)

Dear CRAIG COOMBS:

This is to acknowledge that the New York State Department of Environmental Conservation (the Department) has received a complete Notice of Intent (NOI) for coverage under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) GP-0-17-004 for the following facility:

PYROTEK INC
641 STATE RTE 13
CORTLAND, NY 13045

The permit identification number for this facility is **NYR00F070**. Please be sure to include this permit identification number on any forms or correspondence you send the Department related to this general permit.

This authorization becomes effective on 6/29/2018, and is conditioned upon the following:

- The information submitted in the NOI received by the Department is accurate and complete.
- The Owner or Operator has developed and is implementing a Stormwater Pollution Prevention Plan (SWPPP) that complies with MSGP GP-0-17-004.
- When applicable, project review pursuant to the State Environmental Quality Review Act (SEQR) has been satisfied.
- All applicable Uniform Procedures Act (Environmental Conservation Law, 6NYRCC Part 621) permits have been obtained. Contact your Regional Permit Administrator (http://www.dec.ny.gov/permits/363.html) for further information. See Appendix F in the Permit for Regional Offices contact information.

Annual Reporting

Please be advised that an Annual Certification Report (ACR) must be completed and submitted for each facility that has obtained permit coverage under this general permit. A copy of the ACR can be found on the Department's website, listed on the next page. An ACR must be completed at the end of each calendar year and must be submitted by January 28th of the following year to:

Stormwater Compliance Coordinator
NYSDEC, Bureau of Water Compliance,
625 Broadway,
Albany, New York 12233-3506

Monitoring your stormwater discharges

You are responsible for making sure you understand all monitoring requirements. If your facility has stormwater discharges that are subject to semi-annual benchmark or compliance monitoring (based upon information submitted in your NOI), then you are required to submit your sampling results using EPA's NetDMR system. Instructions on how to register for NetDMR are located on the DEC website at: http://www.dec.ny.gov/chemical/8461.html.

If your NOI indicated that you discharge to an impaired waterbody and the pollutant of concern is in the benchmarks or numeric effluent limitations, then you will be required to monitor quarterly for the pollutant of concern. If applicable to your facility, please review the permit requirements and access EPA's NetDMR system to determine your specific quarterly monitoring requirements.

MSGP Monitoring		
Monitoring Frequency	**Monitoring Periods**	**Report Due Date**
Semi-Annual	Period 1 - January 1st through June 30th	July 28th
	Period 2 - July 1st through December 31st	January 28th
Quarterly	Quarter 1 – January 1st through March 31st	April 28th
	Quarter 2 – April 1st through June 30th	July 28th
	Quarter 3 – July 1st through September 30th	October 28th
	Quarter 4 – October 1st through December 31st	January 28th

All questions related to DMR reporting or registering for NetDMR should be directed to (518) 402-8177 or email NetDMR@dec.ny.gov.

If the result of one or more parameters for which analysis of benchmark or compliance monitoring was required exceeds the applicable benchmark cut-off concentration or effluent limitation, the facility must implement corrective actions to address the exceedance. Corrective actions include identifying the cause of the exceedance, implementing BMPs to address the cause of the exceedance and revisions to the facility's SWPPP to prevent the exceedance from reoccurring.

Modifying the facility's NOI data

If you need to make changes to your existing NOI information you must submit those changes on a new paper NOI or electronically on the e-NOI form.

Terminating MSGP coverage

If you no longer need coverage under this general permit, please submit a Notice of Termination (NOT) form to terminate your permit coverage as soon as possible. If you are selling the facility, it is your

responsibility to submit an NOT terminating your coverage and you should notify the new owner, in writing, of the possible requirement to obtain coverage under the general permit for stormwater discharges.

Annual Regulatory Fee
The annual regulatory fee for the MSGP will be billed by the Department each fall. For invoice questions contact the Department's Fee Determination Unit (518) 402-9343.

Additional information
The Department's website contains the following pages and links related to the MSGP:

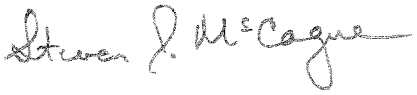
- Multi-Sector General Permit Page http://www.dec.ny.gov/chemical/9009.html. On this page you will find the Permit, Fact Sheet and Responsiveness Summary as well as access to the electronic NOI, and all forms necessary for the MSGP program.

- The MSGP Toolbox http://www.dec.ny.gov/chemical/62803.html. This page has helpful tools to help stay in compliance with the permit

- No Exposure Certification Page http://www.dec.ny.gov/chemical/62833.html. If stormwater exposure to industrial activities and materials is removed, then you may be eligible for No Exposure certification.

If you have any questions or require additional information, please contact me at (518) 402-8108 or steven.mccague@dec.ny.gov

Sincerely,



Steven J McCague, P.E.
MSGP Permit Coordinator

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Water Permits
625 Broadway, Albany, New York 12233-3505
P: (518) 402-8111 | F: (518) 402-9029
www.dec.ny.gov

February 23, 2018

PYROTEK INC
641 STATE RTE 13
CORTLAND, NY 13045

NOI SUBMISSION REQUIRED FOR CONTINUED PERMIT AUTHORIZATION

Re: Renewal of SPDES Multi-Sector General Permit for PYROTEK INC - SPDES ID: NYR00F070

Dear Owner/Operator:

The State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) (GP-0-12-001) that PYROTEK INC currently has coverage under expired on September 30, 2017. The New York State Department of Environmental Conservation (the Department) has issued a new version of the MSGP (GP-0-17-004), which is effective on March 1, 2018 and will expire on February 28, 2023. This new permit replaces the previous MSGP (GP-0-12-001) and will authorize both new and existing discharges of stormwater to surface waters of the State from industrial activities as defined in 40 CFR Part 122.26(b)(14)(i-ix and xi).

The new MSGP (GP-0-17-004), Fact Sheet and Responsiveness Summary detailing the changes to the permit from the previous version of the permit can be found on the Department's website at http://www.dec.ny.gov/chemical/9009.html.

To continue coverage under the MSGP you must submit a new Notice of Intent (NOI) to the Department by May 30, 2018. There are two options when filing the NOI:

1. Electronic Filing – The e-NOI can be filed online at the following website: http://www.dec.ny.gov/chemical/9009.html. **The Department recommends filing the NOI electronically.**

2. Paper submission - The paper NOI is available on the Department's website at http://www.dec.ny.gov/chemical/9009.html.

The completed paper version of the NOI must be returned to:

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

MSGP Permit Coordinator
NYS DEC, Division of Water
Bureau of Water Permits
625 Broadway
Albany, NY 12233-3505

You can find instructions and tools to help complete the Notice of Intent on the Departments website at:
MSGP main page http://www.dec.ny.gov/chemical/9009.html; and,
the MSGP Toolbox http://www.dec.ny.gov/chemical/62803.html

You are allowed up to 90 days from the effective date of the MSGP (GP-0-17-004), to submit your NOI. Failure to submit a new NOI to the Department by May 30, 2018, will result in termination of your MSGP coverage. Failure to operate with a valid SPDES Permit is a violation of Article 17 of the New York State Environmental Conservation Law (ECL) and could result in monetary penalties.

Prior to submitting the NOI, you must **review** the MSGP (GP-0-17-004) and **update** your Stormwater Pollution Prevention Plan (SWPPP) to meet the new requirements of MSGP (GP-0-17-004). The Fact Sheet will assist you in this update. You are not required to submit your SWPPP to the Department, however you must keep a copy of the SWPPP at your facility.

Benchmark and Numeric Effluent Limit monitoring is now required twice per year. The first semi-annual monitoring period that is required in MSGP (GP-0-17-004) will begin on July 1, 2018 and end on Dec 31, 2018, with reporting for that period due on January 28, 2019. If corrective action monitoring sampling results from 2017 were required under MSGP (GP-0-12-001), they are no longer required to be sent to the Department.

With the issuance of GP-0-17-004, all facilities will now be required to submit their DMRs using EPA's NetDMR system. Instructions on how to register for NetDMR are located on the DEC website at: http://www.dec.ny.gov/chemical/8461.html. All questions related to DMR reporting or registering for NetDMR, should be directed to (518) 402-8177 or email NetDMR@dec.ny.gov.

If you have any questions or require additional information, please do not hesitate to contact me by phone at (518) 402-8108 or by email at steven.mccague@dec.ny.gov.

Sincerely,

Steven McCague, P.E.
MSGP Permit Coordinator

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 **Fax:** (518) 402-9029 **Website:** www.dec.state.ny.us

Joe Martens
Commissioner

March 29, 2013

PYROTEK INC
PYROTEK INC
641 STATE RTE 13
CORTLAND, NY 13045

Re: Acknowledgement of Notice of Intent for Coverage under SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-12-001)

Dear JEFFREY HOHMAN:

This is to acknowledge that the New York State Department of Environmental Conservation (the Department) has received a complete Notice of Intent (NOI) for coverage under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) GP-0-12-001 for the following facility:

PYROTEK INC
641 STATE RTE 13
CORTLAND, NY 13045

The permit identification number for this facility is NYR00F070. Please be sure to include this permit identification number on any forms or correspondence you send the Department related to this general permit.

Unless notified by the Department to the contrary, this authorization becomes effective 30 calendar days after the NOI receive date of 12/26/2012, and is conditioned upon the following:

- The information submitted in the NOI received by the Department is accurate and complete.
- The Owner or Operator has developed and is implementing a Stormwater Pollution Prevention Plan (SWPPP) that complies with MSGP GP-0-12-001.
- When applicable, project review pursuant to the State Environmental Quality Review Act (SEQR) has been satisfied.
- All applicable Uniform Procedures Act (Environmental Conservation Law, 6NYRCC Part 621) permits have been obtained. Contact your Regional Permit Administrator (http://www.dec.ny.gov/permits/363.html) for further information.

Please be advised that an Annual Certification Report (ACR) must be completed and submitted for each facility that has obtained permit coverage under this general permit. A copy of the ACR can be found on the Departments website, listed on the next page. An ACR must be completed at the end of calendar year 2013 and must be submitted by February 28, 2014, to:

MSGP Permit Coordinator
NYSDEC, Division of Water
Bureau of Water Permits
625 Broadway
Albany, New York 12233-3505

An ACR must be completed and submitted for each calendar year, thereafter, by February 28th.

In addition to the above, if your facility has stormwater discharges that are subject to benchmark or compliance monitoring (based upon information submitted in your NOI), then you are required to submit your sampling results on Discharge Monitoring Report (DMR) forms. These forms must be completed and submitted along with your Annual Certification Report as indicated above. DMRs will be sent to your facility in 2013. Only results submitted on DMRs provided by the Department will be accepted. The Owner or Operator is responsible for making sure they understand all monitoring requirements and have the appropriate forms. If you do not receive the correct DMRs, please contact the Department.

If the result of one or more parameters for which analysis of benchmark or compliance monitoring was required exceeds the applicable benchmark cut-off concentration or effluent limitation, the facility must implement corrective actions to address the exceedance. Corrective actions include identifying the cause of the exceedance, implementing BMPs to address the cause of the exceedance, revisions to the facility's SWPPP to prevent the exceedance from reoccurring, and collecting an additional sample to determine the effectiveness of the corrective action. The facility must collect the additional sample at the outfall where the exceedance occurred during the first six months of the following calendar year and complete analysis for the pollutant(s) that exceeded the benchmark cut-off concentration or effluent limitation. Results of the analysis must be reported on a Corrective Action Form by July 31st of the calendar year which the sample was collected. A copy of the Corrective Action Form can be found on the Department's website.

If there are changes to your existing general permit or if you no longer need this general permit you must submit a Notice of Modification (NOM) form to modify your general permit or a Notice of Termination (NOT) form to terminate your general permit as soon as possible. If you are selling the facility, it is your responsibility to submit a NOT terminating your coverage and you must notify the new owner, in writing, of the need to obtain the general permit for stormwater discharges.

The Department's website contains the following links related to the MSGP:

Stormwater Information Page	http://www.dec.ny.gov/chemical/8468.html
Multi-Sector General Permit Page	http://www.dec.ny.gov/chemical/9009.html
The MSGP Toolbox	http://www.dec.ny.gov/chemical/62803.html
Notice of Intent Form	http://www.dec.ny.gov/docs/water_pdf/gpnoi.pdf
Notice of Termination Form	http://www.dec.ny.gov/docs/water_pdf/msgp012001not.pdf
Notice of Modification Form	Coming Soon!
Annual Certification Form	http://www.dec.ny.gov/chemical/9009.html
Corrective Action Form	Coming Soon!

No Exposure Page http://www.dec.ny.gov/chemical/62833.html

No Exposure Certification Form http://www.dec.ny.gov/docs/water_pdf/noexposure.pdf

The annual regulatory fee for the MSGP will be billed by the Department each fall.

Coverage under this permit does not necessarily mean that you do not need other permits under the Uniform Procedures Act. You should check with your Regional Permit Administrator (http://www.dec.ny.gov/permits/363.html) for further information.

If you have any questions or require additional information, please contact me at (518) 402-8244 or rpwaldro@gw.dec.state.ny.us.

Sincerely,



Ryan P. Waldron, P.E.
MSGP Permit Coordinator

1686085880

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Representative Outfall Waiver Form GP-0-17-004

The completed Notice of Intent (NOI) should be submitted to:
MSGP Coordinator,
NYSDEC Division of Water,
625 Broadway, 4th Floor
Albany, New York 12233-3505

All sections must be completed unless otherwise noted. Incomplete forms will result in ineligility for this waiver claim and all applicable monitoring and sampling requirements must be performed. For each Representative Outfall being claimed a separate Representative Outfall Waiver Form must be completed and submitted.

Permit Number
NYR00F070

- This form is being submitted as an attachment to the Notice of Intent (Part IV.G.3.c)
- The Representative Outfall waiver is being submitted after corrective actions have been completed and 2 consecutive semi-annual monitoring results show Benchmark Monitoring Cutoff Concentrations have not been exceeded for all outfalls at the facility. (Part IV.G.3.d)

Facility Name
PYROTEK, INC.

Contact First Name
CRAIG

Contact Last Name
COOMBS

Contact Phone
607-758-4087

Contact eMail
CRACOO@PYROTEK.COM

---

1) Are substantially identical industrial activities being conducted in the areas discharging to the outfall that is being sampled and the outfall(s) for which a sampling waiver is being requested?

Yes No **If NO, you are not eligible for this waiver.**

2) Are similar stormwater controls being implemented in the drainage area(s) discharging to the outfall being sampled and the outfall(s) for which the waiver is being claimed?

Yes No **If NO, you are not eligible for this waiver.**

3) Do any of the outfalls for which the waiver is being claimed discharge to an impaired waterbody where the cause of the impairment is a pollutant of concern included in the benchmarks and/or effluent limitations to with the facility is subject to in Part VII of the MSGP?

Yes No **If YES, you are not eligible for this waiver.**

4) The outfall that is being claimed as the representative outfall is:

Outfall No. 002

5) The outfall(s) for which the waiver is being claimed is/are:

Outfall No.(s) 001, , , , ,

8086085881

6) For each outfall, provide an estimate of the Drainage Area (in acres), Impervious Area, Area of Exposed Materials (in acres) within the drainage area and Level of Industrial Activity within the drainage area:

Outfall #	Drainage Area (ac)	Impervious Area (ac)	Area of Exposed Materials (ac)	Level of Industrial Activity
002	7.8	6.0	1.0	• Low ◦ High
001	6.8	5.8	0.8	• Low ◦ High
				Low ◦ High
				Low ◦ High
				Low ◦ High

7) Provide a short description of why the outfall chosen as a representative outfall represents the worst case scenario (e.g. more industrial activity in the drainage area, more impervious area, etc.)

Both Outfalls discharge from the on-site stormwater pond. Outfall 002 also includes drainage from another portion of the facility. Outfall 002 is the main discharge from the pond. Outfall 001 is only an overflow from the pond and rarely discharges. Therefore a waiver is requested for Outfall 001.

Certification

I certify under penalty of law that I have read and understand the eligibility requirements for claiming a condition of "Representative Outfall(s)." Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

THOMAS — O/O Signature First Name (please print or type) — MI

05/30/2018 — Date

HOWARD — O/O Signature Last Name (please print or type)

Signature

Please submit this form and all supporting documentation to:
MSGP Permit Coordinator
NYSDEC, Bureau of Water Permits
625 Broadway,
Albany, New York, 12233-3505

MSGP Data Entry Supplement *DEC Use Only*

Reviewer - TB Date reviewed - 9/27/18

Electronic submission number _____

NPDES Id – NYR00 1070 *State Region Code* - 07

Facility Type Ownership – (Corporation) Federal Individual Municipal State

State Facility ID - _____

Change lat/long Y (N) *Latitude* - _____ *Longitude* - _____

Primary SIC code - 3297 *Sector* - E

Secondary SIC codes & sectors- _____

Effective Date - 6/29/18

Permit User Defined Field 1- CP SP SC

User Defined Field 3 (representative outfalls) – _____

Impaired waterbody - Y (N) POC Y N

Change to permitted features - Y N

Permitted Feature ID

Add	Remove
	001A
	002A

Change to limit sets Y N

Benchmark and Effluent Monitoring – Semi-Annual

Source Limit Set	Target Permitted Feature	Target Limit Set Designator	Initial Monitoring Date	Initial DMR Due Date

Change to quarterly limit sets Y N

Quarterly monitoring

SIC Code	Source Limit Set	Target Permitted Feature	Target Limit Set Designator	Initial Monitoring Date	Initial DMR Due Date

Notes:

SIC code	Impairment	Source Code limit set	POC	Final limit set	
				Bench	Compl

Data entry staff AMS Date entered 10/1/18

Compare old to new and make sure that limit sets match up. Go with the current NOIs limit sets or call permittee to determine the difference.

RECEIVED
MAY 30 2018
BUREAU OF WATER PERMITS

6052362228

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Notice of Intent

GP-0-17-004

This is the Notice of Intent for Stormwater Discharges Associated with Industrial Activity under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-17-004.

The completed Notice of Intent (NOI) should be submitted to:
MSGP Coordinator,
NYSDEC Division of Water,
625 Broadway, 4th Floor
Albany, New York 12233-3505

For Department Use Only
NYR 00F070

Save time by filing your NOI electronically using the E-NOI found on the Departments website

IMPORTANT

- **Applicants must read and understand the conditions of the permit prior to submitting this NOI Form.**
- **Applicants are responsible for identifying and obtaining other DEC permits that may be required.**
- **Use this NOI to obtain coverage under GP-0-17-004 OR to make revisions to a previously submitted NOI.**
- **All sections must be completed unless otherwise noted. Incomplete forms will be returned to you, thereby delaying your coverage under this General Permit.**
- **Type or print in boxes. Avoid contact with the edge of the boxes.**
- **Fill in circles completely and do not use check marks.**
- **The Owner/Operator must sign the NOI.**

SECTION 1

Owner/Operator Information

Federal Tax ID # 91-0699706

Enter the name of the legally responsible entity and the address of the executive office.

O/O Name: PYROTEK, INC.

O/O Street Address: 641 STATE ROUTE 13

O/O City: CORTLAND

O/O State: NY

O/O Zip: 13045-

Contact Information

Enter the name and contact information for the individual responsible for communicating with DEC regarding the implementation of the MSGP on behalf of the owner/operator.

Contact First Name: CRAIG

Contact Last Name: COOMBS

Contact Phone: 607-758-4087

Contact eMail: CRACOO@PYROTEK.COM

3851362222

Facility Information

Enter the complete street address of the physical location of the facility.

Facility Name

PYROTEK, INC.

Facility Street Address

641 STATE ROUTE 13

Facility City

CORTLAND

State: NY

Facility Zip: 13045 -

Facility County

CORTLAND

Provide the geographic coordinates in decimal degrees for the latitude & longitude of the facility. The NYSDEC Stormwater Interactive Map on the DEC's website can be used to get coordinates.
Go to: www.dec.ny.gov/imsmaps/stormwater/viewer.htm

42.557839 (Latitude) -76.231052 (Longitude)

Billing Information

◉ Billing information is same as Owner/Operator (Do not complete this section)

○ Billing information is different from Owner/Operator (Please complete billing information below)

Name

Street Address

City

State

Zip -

2883362226

SECTION 2

1. Does your facility meet all the eligibility requirements listed in Part I.B of the SPDES Multi-Sector General Permit to gain coverage under this general permit? ..... ● Yes ☐ No

   If No, contact the Department to discuss next steps. If Yes, go to question 2(a).

2(a). Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared for this facility in accordance with the requirements of the SPDES Multi-Sector General Permit GP-0-17-004? If No, you are not eligible for permit coverage. ..... ● Yes ☐ No

2(b). How will you make your SWPPP available to the public?

○ Posting a copy online (Provide URL).

◉ Maintain copy at the facility address listed in the facility information section of the NOI.

○ Maintain copy at the following location (Provide address):

Street Address

City | State | Zip

3. Does your facility conduct any activities listed in Part I.C of the SPDES Multi-Sector General Permit which would make your facility ineligible for coverage under this general permit? ..... ☐ Yes ● No

   If Yes, contact the Department to discuss next steps. If No, go to question 4.

4. Provide the name of the nearest surface waterbody into which site runoff will discharge. If more than one, list all that apply:

   UNNAMED STREAM

5(a). Has the surface waterbody in question 4 been identified as an impaired waterbody as defined in MSGP 0-17-004? If No, go to question 6(a). ..... ☐ Yes ● No

To determine if the waterbody in Question 4 is impaired use the following links available on the Department's public web site:

MSGP Toolbox with Map of Impaired Waterbodies http://www.dec.ny.gov/chemical/62803.html
Impaired Waters Listings ..... http://www.dec.ny.gov/chemical/31290.html.

5(b). Is the pollutant(s) causing the impairment a pollutant of concern included in the benchmarks and/or effluent limitations to which the facility is subject to in Part VII of the SPDES Multi-Sector General Permit? A list of applicable pollutant(s) of concern for the SPDES Multi-Sector General Permit can be found in Appendix G of the permit. If No, go to question 6(a). ..... ☐ Yes ☐ No

5(c). Does your SWPPP include measures to address the pollutant(s) of concern as required by Part III.D.2 of the SPDES Multi-Sector General Permit? If No, contact the Department to discuss next steps.. ☐ Yes ☐ No

6(a). Does site runoff enter a Municipal Separate Storm Sewer System (MS4) including roadside drains, swales, ditches, culverts, etc.? If No, go to question 7(a)..... ☐ Yes ● No

6(b). If Yes, enter the name of the municipality/entity that owns the Municipal Separate Storm Sewer System

5110362222

7(a). Has this facility been assigned a SPDES MSGP ID under previous versions of the MSGP? ..... [•] Yes [ ] No
If No, go to question 8.

7(b). If Yes, Provide the ID if known (Note: All SPDES MSGP IDs begin with NYR00)

The facility's existing ID is: N Y R 0 0 F 0 7 0

SECTION 3

8. Does this facility have coal piles that are exposed to precipitation? ..... [ ] Yes [•] No

9. Does this facility have salt piles that are exposed to precipitation? ..... [ ] Yes [•] No

10. Does this facility discharge stormwater from secondary containment areas for liquid bulk storage or transfer areas? ..... [ ] Yes [•] No

11. SECTOR S - Is this facility an airport that uses more than 100,000 gallons of glycol-based deicing/anti-icing chemicals and/or 100 tons or more of urea on an average annual basis? ..... [ ] Yes [•] No

12. Is a Representative Outfall Waiver being claimed in accordance with Part IV.G?
(If Yes, please submit the Representative Outfall waiver form with the NOI). ..... [•] Yes [ ] No

13. For each stormwater discharge associated with industrial activity at your facility identify the outfall number (e.g., 001, 002, etc.); the four digit Standard Industrial Classification (SIC) codes, the Sector Code, the Sector N Subsector, or 2-letter Industrial Activity Codes that best represent the principal products or services rendered by the facility for that drainage area; and the Benchmark (B) and/or Compliance (C) monitoring required; and the acreage of industrial activity exposed to stormwater for each outfall (round to nearest tenth of an acre):

Industrial Activities (SIC or 2-letter Codes)

Outfall Number	Primary SIC	Sector	Monitoring Required	Secondary SIC	Sector	Monitoring Required	Tertiary SIC	Sector	Monitoring Required	Acreage
002	3297	E								7.8
001	3297	E								6.8
										7.8

Total Acreage

Outfall 001 is an overflow from a SW pond associated with a portion of the same drainage area and location as Outfall 002. A sampling waiver is included for Outfall 001.

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14. Is the facility subject to any of the following EPA Point Source Category Effluent Limitations?

(a) SECTOR A - Discharges resulting from spraydown or intentional wetting of logs at wet deck storage areas? ☐ Yes ● No

If Yes, list Outfall numbers.

(b) SECTOR C - Contaminated runoff from phosphate fertilizer manufacturing facilities? ☐ Yes ● No

If Yes, list Outfall numbers.

(c) SECTOR D - Runoff from asphalt emulsion facilities? ☐ Yes ● No

If Yes, list Outfall numbers.

(d) SECTOR E - Runoff from material storage piles at cement manufacturing facilities? ☐ Yes ● No

If Yes, list Outfall numbers.

(e) SECTOR J - Mine dewatering discharges at crushed stone, construction sand and gravel, and industrial sand mines? ☐ Yes ● No

If Yes, list Outfall numbers.

(f) SECTOR L - Runoff from landfills? ☐ Yes ● No

If Yes, list Outfall numbers.

(g) SECTOR O - Coal Pile runoff at steam electric power generating facilities? ☐ Yes ● No

If Yes, list Outfall numbers.

(h) SECTOR S - Discharges from airport deicing using airfield deicing products that contain urea at an airport with at least 1,000 annual non-propeller aircraft departures.? ☐ Yes ● No

If Yes, list Outfall numbers.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

THOMAS
O/O First Name (please print or type)

MI

HOWARD
O/O Last Name (please print or type)

05/30/2018
Date

Thomas L Howard
O/O Signature

2456480920

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor

625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 . Fax: (518) 402-9029
Website: www.dec.state.ny.us

EG 26

NYR 0 0 F 0 7 6

Notice of Intent

For Stormwater Discharges Associated with Industrial Activity under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-12-001 (MSGP)

All Sections must be completed unless otherwise noted. Incomplete forms will be returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit prior to submitting this Notice of Intent (NOI) Form. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

IMPORTANT:

-USE THIS NOI TO OBTAIN COVERAGE UNDER GP-0-12-001.
-TYPE OR PRINT IN BOXES. AVOID CONTACT WITH THE EDGE OF THE BOXES.
-FILL IN CIRCLES COMPLETELY AND DO NOT USE CHECK MARKS.
-OWNER/OPERATOR MUST SIGN FORM.

Owner/Operator Information

Enter the name of the legally responsible party and the address of the executive office

O/O Name: PYROTEK, INC

O/O Street Address: 641 STATE ROUTE 13

O/O City: CORTLAND

O/O State: NY

O/O Zip: 13045-

Contact Information

Enter the name and contact information for the individual responsible for communicating with DEC regarding the implementation of the MSGP on behalf of the owner/operator.

Contact First Name: JEFFREY

Contact Last Name: HOHMAN

Contact Phone: 607-758-4055

Contact Fax: 607-756-3089

Contact eMail: JEFHOH@PYROTEK-INC.COM

ENTERED 2/14/13 BJC

Facility Information

Enter the complete street address of the physical location of the facility.

Facility Name

PYROTEK, INC.

Facility Street Address

641 STATE ROUTE 13

Facility City

CORTLAND

State

NY

Facility Zip

13045 -

Facility County

CORTLAND

Name of Nearest Cross Street

SOUTH CORTLAND-VIRGIL ROAD

Distance to Nearest Cross Street (feet)

3000

Direction to Nearest Cross Street

● North ○ South ○ East ○ West

Mailing Information

Provide address where DMR should be mailed, if different from Owner/Operator Information on page 1.

Name

Street Address

City

State

Zip -

Provide address where SPDES fee (billing) should be mailed, if different from Owner/Operator Information on page 1.

Name

Street Address

City

State

Zip -

1. Does your facility meet all the eligibility requirements listed in Part I.C of the SPDES Multi-Sector General Permit to gain coverage under this general permit? ..... ● Yes ○ No

If No, contact the Department to discuss next steps. If Yes, go to question 2.

2. Does your facility conduct any activities listed in Part I.D of the SPDES Multi-Sector General Permit which would make your facility inelibible for coverage under this general permit? ..... ○ Yes ● No

If Yes, contact the Department to discuss next steps. If No, go to question 3.

3. Provide the name(s) of the nearest surface waterbody(ies) into which site runoff will discharge:

UNNAMED STREAM

4(a). Does site runoff enter a Municipal Separate Storm Sewer System including roadside drains, swales, ditches, culverts, etc.? ..... ○ Yes ● No

4(b). If Yes, what is the name of the municipality/entity that owns the Municipal Separate Storm Sewer System

5(a). Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared for this facility in accordance with the requirements of the SPDES Multi-Sector General Permit? Please be advised that you cannot obtain coverage under this permit without having first prepared a SWPPP. ..... ● Yes ○ No

5(b). How will you make your SWPPP available to the public?

○ Posting a copy online (Provide URL).

● Maintain copy at the facility address listed in the facility information section of the NOI

○ Maintain copy at the following location (Provide address).

Street Address

City State Zip -

6(a). Has the surface waterbody(ies) in question 3 been identified as an impaired waterbody on the CWA 303(D) list or in a watershed for which a Total Maximum Daily Load (TMDL) strategy has been approved? Information about impaired waters identified in the 303(d) list is found on the Department's public web site at: http://www.dec.ny.gov/chemical/31290.html. ..... ○ Yes ● No

6(b). If Yes, is the pollutant(s) causing the impairment a pollutant of concern included in the benchmarks and/or effluent limitations to which the facility is subject to in Part VIII of the SPDES Multi-Sector General Permit? A list of applicable pollutant(s) of concern for the SPDES Multi-Sector General Permit can be found in Appendix G of the permit. ..... ○ Yes ○ No

6(c). If Yes, does your SWPPP include measures to address the pollutant(s) of concern as required by Part III.F.4 of the SPDES Multi-Sector General Permit? ..... ○ Yes ○ No

7. Provide the geographic coordinates in decimal degrees for the latitude & longitude of the facility. The NYS DEC Stormwater Interactive Map on the DEC's website can be used to get coordinates. Go to: www.dec.ny.gov/imsmaps/stormwater/viewer.htm

4	2	.	3	3	2		-	7	6	.	1	3	5

Latitude (NAD83) Longitude

42.558 -76.232

8(a). Has this facility been assigned a SPDES MSGP ID under previous versions of the MSGP? ..... ● Yes ○ No

8(b). If Yes, Provide the ID if known (Note: All SPDES MSGP IDs begin with NYR00:)

○ I don't know the facility's ID

● The facility's existing ID is: NYR00F070

9. Identify all applicable Industrial Activities from the Industrial Sectors shown below that are located within areas subject to the stormwater discharges covered under this permit. Check all that apply to your facility.

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector A: Timber Products	
B,C	○	2411	Log Storage and Handling (Wet deck storage areas are only authorized if no chemical additives are used in the spray water or applied to the logs).
B	○	2421	General Sawmills and Planning Mills
B	○	2426	Hardwood Dimension and Flooring Mills
B	○	2429	Special Product Sawmills, Not Elsewhere
B	○	2431-2439 (except 2434 - see sector W)	Millwork, Veneer, Plywood, and Structural Wood.
B	○	2441, 2448, 2449	Wood Containers
B	○	2451, 2452	Wood Buildings and Mobile Homes
B	○	2491	Wood Preserving
B	○	2493	Reconstituted Wood Products
B	○	2499	Wood Products, Not Elsewhere Classified
		Sector B: Paper and Allied Products	
	○	2611	Pulp Mills
	○	2621	Paper Mills
B	○	2631	Paperboard Mills
	○	2652-2657	Paperboard Containers and Boxes
	○	2671-2679	Converted Paper and Paperboard Products, Except Containers and Boxes
		Sector C: Chemical and Allied Products	
B	○	2812-2819	Industrial Inorganic Chemicals.
B	○	2821-2824	Plastics Materials and Synthetic Resins, Synthetic Rubber, Cellulosic and Other Manmade Fibers Except Glass.
	○	2833-2836	Medicinal Chemicals and Botanical Products; Pharmaceutical Preparations; In Vitro and In Vivo Diagnostic Substances; Biological Products, Except Diagnostic Substances.
B	○	2841-2844	Soaps, Detergents, and Cleaning Preparations; Perfumes, Cosmetics, and Other Toilet Preparations.
	○	2851	Paints, Varnishes, Lacquers, Enamels, and Allied Products.
	○	2861-2869	Industrial Organic Chemicals.
B,C	○	2873-2879	Agricultural Chemicals.
	○	2891-2899	Miscellaneous Chemical Products.
	○	3952 (limited to list)	Inks and Paints, Including China Painting Enamels, India Ink, Drawing Ink, Platinum Paints for Burnt Wood or Leather Work, Paints for China Painting, Artist's Paints and Artist's Watercolors.
B	○	2911	Oil Refineries
		Sector D: Asphalt Paving and Roofing Materials and Lubricants	
B,C	○	2951, 2952	Asphalt Paving and Roofing Materials
	○	2992, 2999	Miscellaneous Products of Petroleum and Coal
		Sector E: Glass Clay, Cement, Concrete, and Gypsum Products	
	○	3211	Flat Glass
	○	3221, 3229	Glass and Glassware, Pressed or Blown
	○	3231	Glass Products Made of Purchased Glass
C	○	3241	Hydraulic Cement
B	○	3251-3259	Structural Clay Products
B	○	3261-3269	Pottery and Related Products
B,C	○	3271-3275	Concrete, Gypsum and Plaster
	○	3281	Cut Stone and Stone Products
	●	3291-3299	Abrasive, Asbestos, and Miscellaneous Non-metallic Mineral Products

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector F: Primary Metals	
B	○	3312-3317	Steel Works, Blast Furnaces, and Rolling and Finishing Mills
B	○	3321-3325	Iron and Steel Foundries
	○	3331-3339	Primary Smelting and Refining of Nonferrous Metals
	○	3341	Secondary Smelting and Refining of Nonferrous Metals
B	○	3351-3357	Rolling, Drawing, and Extruding of Nonferrous
B	○	3363-3369	Nonferrous Foundries (Castings)
	○	3398, 3399	Miscellaneous Primary Metal Products
		Sector G: Metal Mining (Ore Mining and Dressing)	
B,C	○	1011	Iron Ores
B,C	○	1021	Copper Ores
B,C	○	1031	Lead and Zinc Ores
B,C	○	1041, 1044	Gold and Silver Ores
B,C	○	1061	Ferroalloy Ores, Except Vanadium
B,C	○	1081	Metal Mining Services
B,C	○	1094, 1099	Miscellaneous Metal Ores
		Sector H: Coal Mines and Coal Mining Related Facilities	
		Sector I: Oil and Gas Extraction and Refining	
B	○	1311	Crude Petroleum and Natural Gas
B	○	1321	Natural Gas Liquids
B	○	1381-1389	Oil and Gas Field Services
		Sector J: Mineral Mining and Dressing	
B	○	1411	Dimension Stone
B,C	○	1422-1429	Crushed and Broken Stone, Including Rip Rap
B,C	○	1442, 1446	Sand and Gravel
	○	1455, 1459	Clay, Ceramic, and Refractory Materials
	○	1474-1479	Chemical and Fertilizer Mineral Mining
B	○	1481	Nonmetallic Minerals Services, Except Fuels
B	○	1499	Miscellaneous Nonmetallic Minerals, Except Fuels
		Sector K: Hazardous Waste Treatment, Storage, or Disposal Facilities	
B,C	○	HZ	Hazardous Waste Treatment, Storage or Disposal
		Sector L: Land Fills and Land Application Sites	
B,C	○	LF	Landfills, Land Application Sites, and Open Dumps
		Sector M: Automobile Salvage Yards	
B	○	5015	Automobile Salvage Yards
		Sector N: Scrap Recycling Facilities	
	○	5093 N-1	Scrap Recycling Facilities. Source Separated Recycling Only
B	○	5093 N-2	Mixed Waste Stream of Non-Recyclable & Recyclable Wastes
B	○	5093 N-3	Scrap and Waste Recycling (Non-Liquid Wastes)
B,C	○	5093 N-4	Facilities With A Shredder
B	○	5093 N-5	Reclaiming & Recycling of Liquid Wastes
B	○	4499 (limited to list) N-6	Dismantling Ships, Marine Salvaging, and Marine Wrecking - Ships for Scrap

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector O: Steam Electric Generating Facilities	
B,C	○	SE	Steam Electric Generating Facilities
		Sector P: Land Transportation and Warehousing	
B	○	4011, 4013	Railroad Transportation
B	○	4111-4173	Local and Highway Passenger Transportation
B	○	4212-4231	Motor Freight Transportation and Warehousing
B	○	4311	United States Postal Service
B	○	5171	Petroleum Bulk Stations and Terminals
		Sector Q: Water Transportation	
B	○	4412-4499 (except 4499 as specified in Sector N)	Water Transportation
		Sector R: Ship and Boat Building or Repairing Yards	
	○	3731, 3732	Ship and Boat Building or Repair Yards
		Sector S: Air Transportation	
B	○	4512-4581	Air Transportation Facilities
		Sector T: Treatment Works	
B	○	TW	Treatment Works
		Sector U: Food and Kindred Products	
	○	2011-2015	Meat Products
	○	2021-2026	Dairy Products
	○	2032-2038	Canned, Frozen and Preserved Fruits, Vegetables and Food Specialties
B	○	2041-2048	Grain Mill Products
	○	2051-2053	Bakery Products
	○	2061-2068	Sugar and Confectionery Products
B	○	2074-2079	Fats and Oils
	○	2082-2087	Beverages
	○	2091-2099	Miscellaneous Food Preparations and Kindred Products
	○	2111-2141	Tobacco Products
		Sector V: Textile Mills, Apparel, and Other Fabric Product Manufacturing, Leather and Leather Pruducts	
	○	2211-2299	Textile Mill Products
	○	2311-2399	Apparel and Other Finished Products Made From Fabrics and Similiar Materials
	○	3131-3199 (except 3111- see sector Z)	Leather and Leather Products, except Leather Tanning and Finishing
		Sector W: Furniture and Fixtures	
	○	2434	Wood Kitchen Cabinets
	○	2511-2599	Furniture and Fixtures
		Sector X: Printing and Publishing	
	○	2711-2796	Printing, Publishing, and Allied Industries

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries	
B	O	3011	Tires and Inner Tubes
B	O	3021	Rubber and Plastics Footwear
B	O	3052, 3053	Gaskets, Packing, and Sealing Devices and rubber and Plastics Hose and Belting
B	O	3061, 3069	Fabricated Rubber Products, Not Elsewhere Classified
	O	3081-3089	Miscellaneous Plastics Products
	O	3931	Musical Instruments
	O	3942-3949	Dolls, Toys, Games and Sporting and Athletic Goods
	O	3951-3955	Pens, Pencils, and Other Artists' Materials
	O	3961, 3965	Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal
	O	3991-3999	Miscellaneous Manufacturing Industries
		Sector Z: Leather Tanning and Finishing	
B	O	3111	Leather Tanning, Currying and Finishing
		Sector AA: Fabricated Metal Products	
B	O	3411-3499	Fabricated Metal Products, Except Machinery and Transportation Equipment
B	O	3911-3915	Jewelry, Silverware, and Plated Ware
		Sector AB: Transportation Equipment, Industrial or Commercial Machinery	
	O	3511-3599 (except 3571-3579 see Sector AC)	Industrial and Commercial Machinery (Except Computer and Office Equipment)
	O	3711-3799 (except 3731 & 3732 see Sector R)	Transportation Equipment (Except Ship and Boat Building and Repairing)
		Sector AC: Electronic, Electrical, Photographic, and Optical Goods	
B	O	3571-3579	Computer and Office Equipment
B	O	3612-3699	Electronic, Electrical Equipment and Components, Except Computer Equipment
B	O	3812-3873	Measuring, Analyzing and Controlling Instrument; Photographic and Optical Goods
		Sector AD & AE: Non-Classified Facilities/Storm Water Discharges Designated By the Board As Requiring Permits	
B	O	Sector AD	Other Storm Water Discharges Designated By the Department As Needing a Permit or Any Facility Discharging Storm Water Associated With Industrial Activity Not Described By Any of Sectors A-AC. Note: Facilities may not elect to be covered under Sector AD. Only the Department may assign a facility to Sector AD.
B	O	Sector AE	

Notes: B - Benchmark Monitoring Required
C - Compliance Monitoring for Point Source Category Effluent Limitations

10. For each stormwater discharge associated with industrial activity at your facility identify the outfall number (e.g., 001, 002, etc.); the four digit Standard Industrial Classification (SIC) codes, Section N Subsector, or 2-letter Industrial Activity Codes that best represent the principal products or services rendered by the facility for that drainage area; and the acreage of industrial activity exposed to stormwater for each outfall (round to nearest tenth of an acre):

	Outfall No.	Industrial Activities (SIC or 2-letter Codes) A	N	B	N	C	N	Acreage
1	001	3297						5.6
2	002	3297						0.6
3								.
4								.
5								.
6								.
7								.
8								.
9								.
							Total Acreage	6.2

(Note: SIC information can be obtained at the following web sites: http://www.osha.gov/pls/imis/sicsearch.html and http://www.softshare.com/tables/sic/. The 2-letter Industrial Activity Codes are: **HZ** - hazardous waste treatment, storage or disposal facilities; **LF** - landfills/disposal facilities that receive or have received any industrial waste; **SE** - steam electric power generating facilities; or **TW** - treatment works for treating domestic sewage.)

11. Does this facility have coal piles that are exposed to precipitation? ..... ○ Yes ● No

12. Does this facility discharge have salt piles that are exposed to precipitation? ..... ○ Yes ● No

13. Does this facility discharge stormwater from secondary containment areas for liquid bulk storage or transfer areas? ..... ○ Yes ● No

14. Is the facility subject to any of the following EPA Point Source Category Effluent Limitations?

- Runoff from material storage piles at cement manufacturing facilities (40 CFR Part 411 Subpart C)? ○ Yes ● No
  If Yes, list Outfall numbers.

- Contaminated runoff from phosphate fertilizer manufacturing facilities (40 CFR Part 418 Subpart A)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

- Coal Pile runoff at steam electric power generating facilities (40 CFR Part 423)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

- Discharges resulting from spraydown or intentional wetting of logs at wet deck storage areas (40 CFR Part 429 Subpart I)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

- Mine dewatering discharges at crushed stone, construction sand and gravel, and industrial sand mines (40 CFR Part 436)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

- Runoff from asphalt emulsion facilities (40 CFR Part 443 Subpart A)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

- Runoff from landfills (40 CFR 445 Subpart A and B)? ..... ○ Yes ● No
  If Yes, list Outfall numbers.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

THOMAS
O/O Signature First Name (please print or type)

MI

12/21/2012
Date

HOWARD
O/O Signature Last Name (please print or type)

Thomas L Howard
Signature

Pyrotek

641 State Route 13
Cortland, NY 13045

DEC 26 2

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway
Albany, NY 12233

December 21, 2012

Subject: Stormwater Permit Coverage Renewal Notice of Intent

Reference: GP-0-12-001

In accordance with the requirements for the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-12-001 (MSGP), enclosed is a Notice of Intent for Pyrotek, Inc. in Cortland, New York, for the purposes of renewing participation of coverage under the MSGP.

If you have any questions regarding the attached submission, please do not hesitate to contact me at (607) 758-4055.

Sincerely,

Jeffrey J. Hohman
EHS Manager
Pyrotek, Inc.
641 State Route 13
Cortland, NY 13045

MSGP Data Entry Supplement *DEC Use Only*

Reviewer- MLS Date reviewed - 1/4/13

NPDES Id – NYR00 F070 Did not know ____

Effective Date - 1/25/13

Primary SIC code - 3297 *Secondary SIC codes* - _____

Permit User Defined Field 1- CP SP SC

DMR on the Web- (DMR) or PDF

Impaired waters - Y or (N)

Pollutant of Concern in Benchmarks or Effluent Limits - Y or (N)

No benchmarks

Permitted Feature ID
001
002

Benchmark and Effluent Monitoring - Annual

Source Limit Set	Target Permitted Feature	Target Limit Set Designator	Initial Monitoring Date	Initial DMR Due Date
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/
			01/01/	02/28/

Quarterly monitoring

Source Limit Set	Target Permitted Feature	Target Limit Set Designator	Initial Monitoring Date	Initial DMR Due Date

State Facility ID - 7-1122-00061

Facility Type Ownership - (Corporation) Federal Individual Municipal State

State Region Code - 07

Latitude - 42.558 *Longitude* - -76.232

Notes:

SIC code	Impairment	Source Code limit set	POC	Final limit set	
				Bench	Compl

Data entry staff BJC date entered 2/14/13

7-1122-00061

9100215042

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 . **Fax:** (518) 402-9029
Website: www.dec.state.ny.us

NYR 00f070
(for DEC use only)

Notice of Intent or Termination

For Stormwater Discharges Associated with Industrial Activity under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-06-002

All Sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this Notice of Intent or Termination (NOIT) Form. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

"IMPORTANT - PRINT CAPITAL LETTERS USING BLACK INK. AVOID CONTACT WITH THE EDGE OF THE BOXES. FILL IN CIRCLES COMPLETELY AND DO NOT USE CHECK MARKS. OWNER/OPERATOR MUST SIGN FORM."

Owner/Operator Information

O/O Name
PYROTEK, INC.

O/O Street Address
641 STATE ROUTE 13

O/O City
CORTLAND

O/O State
NY

O/O Zip
13045-

Contact Information

Contact First Name
CARL

Contact Last Name
JOHNS

Contact Phone
607-756-3055

Contact Fax

Contact eMail
CARJOH@PYROTEK-INC.COM

11/8/2011
TB

No Benchmarks.

0250215049

Facility Information

Facility Name
PYROTEK, INC.

Facility Street Address
641 STATE ROUTE 13

Facility City
CORTLAND

Facility State
NY

Facility Zip
13045-

Facility County
CORTLAND

Name of Nearest Cross Street
SOUTH CORTLAND-VIRGIL ROAD

Distance to Nearest Cross Street (feet)
3000

Direction to Nearest Cross Street
● North ○ South ○ East ○ West

---

1. Permit I.D Number (for renewals, modifications or terminations) NYR00f070

2. Reason for Submittal:
   - ● Coverage for a new facility (not previously permitted)
   - ○ Permit Renewal
   - ○ Modification (There has been a change in information since the earlier submission)
   - ○ Want to terminate general stormwater permit coverage

3. Provide the Geographic Coordinates for the facility in NYTM units.

   398834
   X Coordinates (Easting)
   42° 33' 23.6"

   4712464
   Y Coordinates (Northing)
   -76° 13' 56.5"

These coordinates can be obtained through the NYSDEC Stormwater Interactive Map on the DEC Website at: http://www.dec.state.ny.us/website/imsmaps/stormwater/viewer.htm
Directions: Go to the above website. Zoom into your project location such that you can accurately click on the center of your facility. Once you have located your facility, go to the drop-down menu on the left and choose "Get Coordinates". Click on the center of your facility and a small window containing the X, Y coordinates in NYTM units will pop up. Transcribe these coordinates into the spaces above. For problems with the interactive map, please try the help function.

4. Identify all applicable Industrial Activities from the Industrial Sectors shown below that are located within areas subject to the stormwater discharges covered under this permit. Check all that apply to your facility.

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector A: Timber Products	
B,C	○	2411	Log Storage and Handling (Wet deck storage areas are only authorized if no chemical additives are used in the spray water or applied to the logs).
B	○	2421	General Sawmills and Planning Mills
B	○	2426	Hardwood Dimension and Flooring Mills
B	○	2429	Special Product Sawmills, Not Elsewhere
B	○	2431-2439 (except 2434 - see sector W)	Millwork, Veneer, Plywood, and Structural Wood.
B	○	2441, 2448, 2449	Wood Containers
B	○	2451, 2452	Wood Buildings and Mobile Homes
B	○	2491	Wood Preserving
B	○	2493	Reconstituted Wood Products
B	○	2499	Wood Products, Not Elsewhere Classified
		Sector B: Paper and Allied Products	
	○	2611	Pulp Mills
	○	2621	Paper Mills
B	○	2631	Paperboard Mills
	○	2652-2657	Paperboard Containers and Boxes
	○	2671-2679	Converted Paper and Paperboard Products, Except Containers and Boxes
		Sector C: Chemical and Allied Products	
B	○	2812-2819	Industrial Inorganic Chemicals.
B	○	2821-2824	Plastics Materials and Synthetic Resins, Synthetic Rubber, Cellulosic and Other Manmade Fibers Except Glass.
	○	2833-2836	Medicinal Chemicals and Botanical Products; Pharmaceutical Preparations; In Vitro and In Vivo Diagnostic Substances; Biological Products, Except Diagnostic Substances.
B	○	2841-2844	Soaps, Detergents, and Cleaning Preparations; Perfumes, Cosmetics, and Other Toilet Preparations.
	○	2851	Paints, Varnishes, Lacquers, Enamels, and Allied Products.
	○	2861-2869	Industrial Organic Chemicals.
B,C	○	2873-2879	Agricultural Chemicals.
	○	2891-2899	Miscellaneous Chemical Products.
	○	3952 (limited to list)	Inks and Paints, Including China Painting Enamels, India Ink, Drawing Ink, Platinum Paints for Burnt Wood or Leather Work, Paints for China Painting, Artist's Paints and Artist's Watercolors.
		Sector D: Asphalt Paving and Roofing Materials and Lubricants	
B,C	○	2951, 2952	Asphalt Paving and Roofing Materials
	○	2992, 2999	Miscellaneous Products of Petroleum and Coal
		Sector E: Glass Clay, Cement, Concrete, and Gypsum Products	
	○	3211	Flat Glass
	○	3221, 3229	Glass and Glassware, Pressed or Blown
	○	3231	Glass Products Made of Purchased Glass
C	○	3241	Hydraulic Cement
B	○	3251-3259	Structural Clay Products
B	○	3261-3269	Pottery and Related Products
B,C	○	3271-3275	Concrete, Gypsum and Plaster
	○	3281	Cut Stone and Stone Products
	●	3291-3299	Abrasive, Asbestos, and Miscellaneous Non-metallic Mineral Products

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector F: Primary Metals	
B	O	3312-3317	Steel Works, Blast Furnaces, and Rolling and Finishing Mills
B	O	3321-3325	Iron and Steel Foundries
	O	3331-3339	Primary Smelting and Refining of Nonferrous Metals
	O	3341	Secondary Smelting and Refining of Nonferrous Metals
B	O	3351-3357	Rolling, Drawing, and Extruding of Nonferrous
B	O	3363-3369	Nonferrous Foundries (Castings)
	O	3398, 3399	Miscellaneous Primary Metal Products
		Sector G: Metal Mining (Ore Mining and Dressing)	
B	O	1011	Iron Ores
B	O	1021	Copper Ores
B	O	1031	Lead and Zinc Ores
B	O	1041, 1044	Gold and Silver Ores
B	O	1061	Ferroalloy Ores, Except Vanadium
B	O	1081	Metal Mining Services
B	O	1094, 1099	Miscellaneous Metal Ores
		Sector H: Coal Mines and Coal Mining Related Facilities	
		Sector I: Oil and Gas Extraction and Refining	
B	O	1311	Crude Petroleum and Natural Gas
B	O	1321	Natural Gas Liquids
B	O	1381-1389	Oil and Gas Field Services
B	O	2911	Petroleum Refineries
		Sector J: Mineral Mining and Dressing	
B	O	1411	Dimension Stone
B,C	O	1422-1429	Crushed and Broken Stone, Including Rip Rap
B,C	O	1442, 1446	Sand and Gravel
	O	1455, 1459	Clay, Ceramic, and Refractory Materials
	O	1474-1479	Chemical and Fertilizer Mineral Mining
B	O	1481	Nonmetallic Minerals Services, Except Fuels
B	O	1499	Miscellaneous Nonmetallic Minerals, Except Fuels
		Sector K: Hazardous Waste Treatment, Storage, or Disposal Facilities	
B,C	O	HZ	Hazardous Waste Treatment, Storage or Disposal
		Sector L: Land Fills and Land Application Sites	
B,C	O	LF	Landfills, Land Application Sites, and Open Dumps
		Sector M: Automobile Salvage Yards	
B	O	5015	Automobile Salvage Yards
		Sector N: Scrap Recycling Facilities	
B	O	5093	Scrap Recycling Facilities
B	O	4499 (limited to list)	Dismantling Ships, Marine Salvaging, and Marine Wrecking - Ships for Scrap
		Sector O: Steam Electric Generating Facilities	
B,C	O	SE	Steam Electric Generating Facilities

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector P: Land Transportation and Warehousing	
B	O	4011, 4013	Railroad Transportation
B	O	4111-4173	Local and Highway Passenger Transportation
B	O	4212-4231	Motor Freight Transportation and Warehousing
B	O	4311	United States Postal Service
B	O	5171	Petroleum Bulk Stations and Terminals
		Sector Q: Water Transportation	
B	O	4412-4499 (except 4499 as specified in Sector N)	Water Transportation
		Sector R: Ship and Boat Building or Repairing Yards	
	O	3731, 3732	Ship and Boat Building or Repair Yards
		Sector S: Air Transportation	
B	O	4512-4581	Air Transportation Facilities
		Sector T: Treatment Works	
B	O	TW	Treatment Works
		Sector U: Food and Kindred Products	
	O	2011-2015	Meat Products
	O	2021-2026	Dairy Products
	O	2032-2038	Canned, Frozen and Preserved Fruits, Vegetables and Food Specialties
B	O	2041-2048	Grain Mill Products
	O	2051-2053	Bakery Products
	O	2061-2068	Sugar and Confectionery Products
B	O	2074-2079	Fats and Oils
	O	2082-2087	Beverages
	O	2091-2099	Miscellaneous Food Preparations and Kindred Products
	O	2111-2141	Tobacco Products
		Sector V: Textile Mills, Apparel, and Other Fabric Product Manufacturing, Leather and Leather Pruducts	
	O	2211-2299	Textile Mill Products
	O	2311-2399	Apparel and Other Finished Products Made From Fabrics and Similiar Materials
	O	3131-3199 (except 3111- see sector Z)	Leather and Leather Products, except Leather Tanning and Finishing
		Sector W: Furniture and Fixtures	
	O	2434	Wood Kitchen Cabinets
	O	2511-2599	Furniture and Fixtures
		Sector X: Printing and Publishing	
	O	2711-2796	Printing, Publishing, and Allied Industries
		Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries	
B	O	3011	Tires and Inner Tubes
B	O	3021	Rubber and Plastics Footwear
B	O	3052, 3053	Gaskets, Packing, and Sealing Devices and rubber and Plastics Hose and Belting
B	O	3061, 3069	Fabricated Rubber Products, Not Elsewhere Classified
B	O	3081-3089	Miscellaneous Plastics Products
	O	3931	Musical Instruments
	O	3942-3949	Dolls, Toys, Games and Sporting and Athletic Goods
	O	3951-3955	Pens, Pencils, and Other Artists' Materials
	O	3961, 3965	Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal
	O	3991-3999	Miscellaneous Manufacturing Industries

Sampling Notes	Mark all that apply	SIC Code or Activity Code	Activity Represented
		Sector Z: Leather Tanning and Finishing	
B	○	3111	Leather Tanning, Currying and Finishing
		Sector AA: Fabricated Metal Products	
B	○	3411-3499	Fabricated Metal Products, Except Machinery and Transportation Equipment
B	○	3911-3915	Jewelry, Silverware, and Plated Ware
		Sector AB: Transportation Equipment, Industrial or Commercial Machinery	
	○	3511-3599 (except 3571-3579 see Sector AC)	Industrial and Commercial Machinery (Except Computer and Office Equipment)
	○	3711-3799 (except 3731 & 3732 see Sector R)	Transportation Equipment (Except Ship and Boat Building and Repairing)
		Sector AC: Electronic, Electrical, Photographic, and Optical Goods	
B	○	3571-3579	Computer and Office Equipment
B	○	3612-3699	Electronic, Electrical Equipment and Components, Except Computer Equipment
B	○	3812-3873	Measuring, Analyzing and Controlling Instrument; Photographic and Optical Goods
		Sector AD & AE: Non-Classified Facilities/Storm Water Discharges Designated By the Board As Requiring Permits	
B	○	Sector AD	Other Storm Water Discharges Designated By the Department As Needing a Permit or Any Facility Discharging Storm Water Associated With Industrial Activity Not Described By Any of Sectors A-AC. Note: Facilities may not elect to be covered under Sector AD. Only the Department may assign a facility to Sector AD.
B	○	Sector AE	

Notes: B - Benchmark Monitoring Required
C - Compliance Monitoring for Point Source Category Effluent Limitations

5. Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared for this facility in accordance with the requirements of the SPDES Multi-Sector General Permit? Please be advised that you cannot obtain coverage under this permit without having first prepared a SWPPP. ..... ● Yes ○ No

6. For each stormwater discharge associated with industrial activity at your facility identify the outfall number (e.g., 001, 002, etc.); the four digit Standard Industrial Classification (SIC) codes or 2-letter Industrial Activity Codes that best represent the principal products or services rendered by the facility for that drainage area; and the acreage of industrial activity exposed to stormwater for each outfall (round to nearest tenth of an acre):

	Outfall No.	Industrial Activities (SIC or 2-letter Codes) A	B	C	Acreage
1	001	3297			5.6
2	002	3297			0.6
3					
4					
5					
6					
7					
8					
9					
				Total Acreage	6.2

(Note: SIC information can be obtained at the following web sites: http://www.osha.gov/pls/imis/sicsearch.html and http://www.softsharc.com/tables/sic/. The 2-letter Industrial Activity Codes are: **HZ** - hazardous waste treatment, storage or disposal facilities; **LF** - landfills/disposal facilities that receive or have received any industrial waste; **SE** - steam electric power generating facilities; or **TW** - treatment works for treating domestic sewage.)

7. Does this facility have coal piles that are exposed to precipitation? ..... ○ Yes ● No

8. Does this facility discharge have salt piles that are exposed to precipitation? ..... ○ Yes ● No

9. Does this facility discharge stormwater from secondary containment areas for liquid bulk storage or transfer areas? ..... ○ Yes ● No

10. Is the facility subject to any of the following EPA Point Source Category Effluent Limitations?

- Runoff from material storage piles at cement manufacturing facilities (40 CFR Part 411 Subpart C)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Contaminated runoff from phosphate fertilizer manufacturing facilities (40 CFR Part 418 Subpart A)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Coal Pile runoff at steam electric power generating facilities (40 CFR Part 423)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Discharges resulting from spraydown or intentional wetting of logs at wet deck storage areas (40 CFR Part 429 Subpart I)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Mine dewatering discharges at crushed stone, construction sand and gravel, and industrial sand mines (40 CFR Part 436)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Runoff from asphalt emulsion facilities (40 CFR Part 443 Subpart A)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

- Runoff from landfills (40 CFR 445 Subpart A and B)? ..... ○ Yes ● No

If yes, list Outfall Nos. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

11. Provide the name(s) of the surface waterbody(ies) into which site runoff will discharge:

UNNAMED STREAM

12(a). Does site runoff enter a Municipal Separate Storm Sewer System including roadside drains, swales, ditches, culverts, etc.? ..... ○ Yes ● No

12(b). If yes, what is the name of the municipality/entity that owns the Municipal Separate Storm Sewer System?

13. Identify any other DEC Permits that are required for this facility:

● Air Pollution Control	○ Stream Protection/Article 15
○ Coastal Erosion	○ Water Quality Certificate
○ Hazardous Waste	○ Dam Safety
○ Long Island Wells	○ Water supply
○ Mined Land Reclamation	○ Freshwater Wetlands
○ Other SPDES	○ Tidal Wetlands
○ Solid Waste	○ Wild, Scenic and Recreational Rivers

Other

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

THOMAS

Owner/Operator First Name (please print or type)

MI

10/05/2011

Date

HOWARD

Owner/Operator Last Name (please print or type)

Signature

Appendix 2.2.C: Pyrotek Air Facility Registration October 2012 (NYSDEC)

New York State Department of Environmental Conservation

Registration ID: 7-1122-00061/00008 **Facility DEC ID:** 7-1122-00061

AIR FACILITY REGISTRATION CERTIFICATE
in accordance with 6 NYCRR Subpart 201-4

Registration Issued to:
PYROTEK INC
705 W 1st Ave
SPOKANE,WA 99201

Contact:
MARTY PIKARSKY
C/O PYROTEK
641 ST RTE 13
CORTLAND,NY 13045
(607) 756-3081

Facility:
PYROTEK INC
641 ST RTE 13
CORTLAND,NY 13045

Description:
This facility is primarily involved in the manufacture of pre-cast refractory shapes and contains ancillary molten metal handling equipment. The facility's operation consists of mixing operations, kilns, painting, plasma cutting, and handheld welding and grinding operations.

Construction and operation of the following emission sources are authorized by this Air Facility Registration:

Eight small kilns (640 cubic feet), one large kiln (4320 cubic feet), a shuttle kiln, four mixing vessels and emission control equipment, a paint spray booth with fabric filter, and a plasma cutting table with control equipment.

The facility also contains miscellaneous exempt sources, including two small (10 and 45 kW) emergency generators, machining activities (cutting, drilling, grinding and welding), lab hoods, and various natural gas space heaters and building H & V units.

Total Number of Emission Points: 13 **Cap By Rule:** No

Authorized Activity By Standard Industrial Classification Code:
3297 - NONCLAY REFRACTORIES

Registration Effective Date: 10/09/2012 **Registration Expiration Date:** (Not Applicable)

List of Regulations in Application:

6 NYCRR Part 200	General Provisions
6 NYCRR Part 201	Permits and Registrations
6 NYCRR Part 202	Emissions Verification
6 NYCRR Part 211	General Prohibitions
6 NYCRR Part 212	General Process Emission Sources
6 NYCRR Part 480	Environmental Regulatory Program Fees

Registration ID: 7-1122-00061/00008 **Facility DEC ID:** 7-1122-00061

AIR FACILITY REGISTRATION CERTIFICATE
in accordance with 6 NYCRR Subpart 201-4

List of Regulations in Application:

40 CFR Part 82 Protection of Stratospheric Ozone

REGINALD G PARKER
REGION 7 AIR POLLUTION CONTROL ENGINEER
NYSDEC - REGION 7
615 ERIE BLVD W
SYRACUSE,NY 13204

This registrant is required to operate this facility in accordance with all air pollution control applicable Federal and State laws and regulations. Failure to comply with these laws and regulations is a violation of the ECL and the registrant is subject to fines and/or penalties as provided by the ECL. If ownership of this facility changes, the registrant is required to notify the Department at the address shown above using the appropriate forms and procedures within 30 days after the transfer takes place. The present registrant will continue to be responsible for all fees and penalties until the Department has been notified of any change in ownership.

Appendix 2.2.D: Byrne Hollow 2019 Conditional No Exposure Certification SPDES MSGP (NYSDEC)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Water Permits
625 Broadway, Albany, New York 12233-3505
P: (518) 402-8111 | F: (518) 402-9029
www.dec.ny.gov

5/29/2019

C'VILLE YOGHURT, INC
3156 BYRNE HOLLOW CROSSING
CORTLAND, NY 13045

Re: Acknowledgement of the Conditional No Exposure Certification for exclusion from permitting under the SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-17-004)

Dear Owner/Operator:

This is to acknowledge that the New York State Department of Environmental Conservation (the Department) has received a complete Conditional No Exposure Certification for exclusion from permitting under the terms and conditions imposed by the New York State Department of Environmental Conservation (DEC) SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-17-004) (MSGP) for the following facility:

BYRNE HOLLOW FARM
3156 BYRNE HOLLOW CROSSING
CORTLAND, NY 13045

The Conditional No Exposure Certification identification number for this facility is NYR00G250. Please be sure to include this identification number on any forms or correspondence you send the Department related to this Conditional No Exposure Certification.

This facility has been granted exclusion from permitting under the terms and conditions imposed by the MSGP, effective 3/21/2019. It is not, however, a Department determination of the validity of the information you provided. Your signature on the Conditional No Exposure Certification form certifies that you have read, understood and are implementing all of the applicable requirements. An important aspect of this certification requires that you have correctly determined whether you are eligible for permitting exclusion under MSGP.

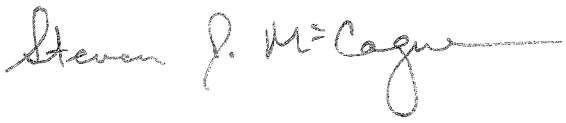
The Conditional No Exposure Certification is valid for a 5-year term. You will need to submit a new Conditional No Exposure Certification Form on or before 3/20/2024 in order to maintain the Conditional No Exposure Certification. The Conditional No Exposure Certification Form can found on the Department's website at http://www.dec.ny.gov/docs/water_pdf/noexposure.pdf.

If you determine you are no longer eligible for the Conditional No Exposure Certification, you must apply for coverage under MSGP. Information regarding the MSGP and a copy of the Notice of Intent needed to obtain coverage under the MSGP can be found on the Department's website at http://www.dec.ny.gov/chemical/9009.html

Conditional No Exposure Certification only relieves a facility of the responsibility to obtain a permit for stormwater discharges covered by the MSGP. If you have questions whether or not your facility needs other permits related to stormwater discharges, you should contact your Regional Permit Administrator (http://www.dec.ny.gov/about/39381.html).

If you have any questions or require additional information, please contact me at (518) 402-8108 or steven.mccague@dec.ny.gov

Sincerely,



Steven J McCague, P.E.
MSGP Permit Coordinator

No Exposure Data Entry Supplement

DEC Use Only

Reviewer- _____ Date reviewed - 5/22/19

NPDES Id – NYR00 G250

Start at - New Facility New No Exposure, Effective permit New No Exposure, Expired permit
No Exposure Renewal, Effective Permit No Exposure Renewal, Expired permit

Effective Date - 3/21/19 *Primary SIC code* - 2026 *Secondary SIC codes* - _____

State Facility ID - _____

Facility Type Ownership - Corporation Federal Individual Municipal State

State Region Code - 07 *Latitude* - 42.6 *Longitude* - -76.2

No Exposure Authorization Date- 3/21/19 *Start Date for Compliance Tracking Status* - _____

Tracking date _____ *Comments* _____

Notes:

11005639015O

Data entry staff MP date entered 5/28/19

New G250

NEW YORK STATE OF OPPORTUNITY

Department of Environmental Conservation

NO EXPOSURE CERTIFICATION

for Exclusion from SPDES Stormwater Permitting

The completed No Exposure Certification should be submitted to:
MSGP Coordinator,
NYSDEC Division of Water,
625 Broadway, 4th Floor
Albany, New York 12233-3505

RECEIVED
MAR 21 2019
BUREAU OF WATER PERMITS

I. Owner/Facility Information

Owner/Operator Name: C'Ville Yoghurt, Inc.

Mailing Address: 3156 Byrne Hollow Crossing | City/State/Zip: Cortland, NY 13045

Contact Name: Tom Corp | Phone No.: (315) 434-8807

Facility Name: Byrne Hollow Farm

Street Address: 3156 Byrne Hollow Crossing | City/State/Zip: Cortland, NY 13045

County: Cortland | Latitude: 42.6 | Longitude: -76.2 | SIC Code: 2026

Was the facility previously covered under a SPDES MSGP permit? ☐ Yes ☑ No

Is there a No Exposure Certification currently on file with the Department? ☒ Yes ☐ No

If Yes to either question, enter SPDES ID: **NYR**_____
If Facility was previously covered under the MSGP, the completion of this section will serve as a termination of your MSGP coverage.

II. Exposure Checklist

	Are any of the following materials or activities exposed to precipitation, now or in the foreseeable future? (Please check either "Yes" or "No" in the appropriate box.) If you answer "Yes" to any of these questions (1) through (11), you are not eligible for the no exposure exclusion.	YES	NO
1	Using, storing or cleaning industrial machinery or equipment, and areas where residuals from using, storing or cleaning industrial machinery or equipment remain and are exposed to stormwater		✔
2	Materials or residuals on the ground or in stormwater inlets from spills/leaks		✔
3	Materials or products from past industrial activity		✔
4	Material handling equipment (except adequately maintained vehicles)		✔
5	Materials or products during loading/unloading or transporting activities		✔
6	Materials or products stored outdoors (except final products intended for outside use [e.g., new cars] where exposure to stormwater does not result in the discharge of pollutants)		✔
7	Materials contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers		✔
8	Materials or products handled/stored on roads or railways owned or maintained by the discharger		✔
9	Waste material (except waste in covered, non-leaking containers [e.g., dumpster])		✔
10	Application or disposal of process wastewater (unless otherwise permitted)		✔
11	Particulate matter or visible deposits of residuals from roof stacks and/or vents not otherwise regulated (i.e., under an air quality control permit) and evident in the storm water outflow		✔

III. Certification

I certify under penalty of law that I have read and understand the eligibility requirements for claiming a condition of "no exposure" and obtaining an exclusion from SPDES stormwater permitting. I certify under penalty of law that there are no discharges of storm water contaminated by exposure to industrial activities or materials from the industrial facility or site identified in this document (except as allowed under 40 CFR 122.26(g)(2)). I understand that I am obligated to submit a no exposure certification form once every five years to the NPDES permitting authority and, if requested, to the operator of the local municipal separate storm sewer system (MS4) into which the facility discharges (where applicable). I understand that I must allow the SPDES permitting authority, or MS4 operator where the discharge is into the local MS4, to perform inspections to confirm the condition of no exposure and to make such inspection reports publicly available upon request.

Printed Name: Daniel Wood | Title/Position: VP Operations

Signature: Daniel Wood | Date: 3/12/19

Clear Form

(1/11/18)

Appendix 2.2.E: Byrne Hollow Storage Tank Environmental Details (NYSDEC)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Environmental Remediation Databases Details

Facility Information

Site No.: 7-000385
Status: Active
Expiration Date: 05/05/2024
Site Type: CBS
Facility Type: Manufacturing (Other than Chemical)/Processing
Site Name: BYRNE HOLLOW FARM
Address: 3156 BYRNE HOLLOW CROSSING
Locality: CORTLAND
State: NY
Zipcode: 13045
County: Cortland

Facility(Property) Owner(s) Information

Facility Owner: CVILLE YOGHURT INC.
3156 BYRNE HOLLOW CROSSING . CORTLAND, NY. 13045

Facility Operator

Facility Operator: JOHN LEYBURN

Tank Information

Tank Information withheld (not releaseable under Freedom of Information Law) in accordance with Public Officers Law Sections 86.5, 87.2(f), 89.5(a)(1)(1-a)

Appendix 2.2.F: Byrne Hollow Farm/ C'Ville Yoghurt Inc. Environmental Profile (USEPA, Accessed 2022)

An official website of the United States government

MENU

Search EPA.gov

This page was created on NOV-15-2022
Results are based on data extracted on NOV-12-2022

Note: You are viewing results from the modernized data system, Integrated Compliance Information System (ICIS). The state reporting this data to EPA previously reported the data to a historic data system, Permit Compliance System (PCS). Use the following button to view the historic data from PCS. **Run a PCS Search**

Facility

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

STREET 1	3156 BYRNE HOLLOW CROSSING	**SIC CODE**	2026 = Fluid Milk
CITY		**MAJOR / MINOR**	
COUNTY NAME	Cortland	**TYPE OF OWNERSHIP**	Corporation
STATE	NY	**ACTIVITY STATUS**	Effective
ZIP CODE	13045	**INACTIVE DATE**	
REGION	Region 2	**TYPE OF PERMIT ISSUED**	General Permit Covered Facility
LATITUDE	42.561333	**ORIGINAL PERMIT ISSUE DATE**	16-FEB-2018
LONGITUDE	-76.22965	**PERMIT ISSUED DATE**	16-FEB-2018
LAT/LON CODE OF ACCURACY	10	**PERMIT EXPIRED DATE**	21-MAR-2024
LAT/LON METHOD			
LAT/LON SCALE		**USGS HYDRO BASIN CODE**	
LAT/LON DATUM		**FLOW**	
RECEIVING WATERS		**FEDERAL GRANT IND**	
PRETREATMENT CODE		**SLUDGE CLASS FAC IND**	NON-POTW
MAILING NAME		**SLUDGE RELATED PERMIT NUM**	
MAILING STREET (1)		**ANNUAL DRY SLUDGE PROD**	

MAILING STREET (2)			
MAILING CITY			
MAILING STATE			
MAILING ZIP CODE			
COGNIZANT OFFICIAL		**COGNIZANT OFFICIAL TEL**	

Activity

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

ACTIVITY NAME	ACTIVITY TYPE DESCRIPTION	ACTIVITY STATUS DESCRIPTION	ACTIVITY STATUS DATE	ACTUAL BEGIN DATE	ACTUAL END DATE
	Permit	Active	28-MAY-2019		

Contacts

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

No Contacts Found.

Permit Tracking

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250
PERMIT ISSUED BY	NYSDEC	**ORIGINAL DATE OF ISSUE**	16-FEB-2018
PERMIT ISSUED DATE	16-FEB-2018	**PERMIT EXPIRED DATE**	21-MAR-2024
EFFECTIVE DATE	21-MAR-2019	**RETIREMENT DATE**	

Permit Tracking Events:

EVENT DESCRIPTION	EVENT DATE
Permit Expiration	21-MAR-2024
Application/NOI Reviewed	28-MAY-2019
Permit Effective	21-MAR-2019
Permit Issued	16-FEB-2018

Inspections

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

No Inspections Found.

Outfalls/Pipe Schedules

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250
OUTFALL TYPE		**PIPE NUMBER**	
ACTIVITY STATUS		**REPORT DESIGNATOR**	
LATITUDE		**LONGITUDE**	
LAT/LON ACCURACY		**LAT/LON METHOD**	
LAT/LON SCALE		**LAT/LON DATUM**	
INACTIVE DATE		**USGS HYDRO BASIN CODE**	
INIT DMR DUE DATE		**SUBMISSION UNITS**	
PIPE DESCRIPTION		**UNITS IN SUBM. PERIOD**	
INIT REPORTING DATE		**REPORTING UNITS**	
UNITS IN REPORTING PERIOD		**DMR COMMENT**	

Limits Report

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250
PIPE NUMBER			
PIPE DESCRIPTION		**REPORT DESIGNATOR**	

DMR COMMENT		**LIMIT SET TYPE**	

No ICIS Limits Report Found.

Limits Report

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

No ICIS Limits Information Found.

Measurements and Violations

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

No ICIS Measurements Information Found.

Compliance Schedules and Violations

FACILITY NAME (1)	BYRNE HOLLOW FARM	**NPDES**	NYR00G250

No Compliance Schedules Found.

Pretreatment Inspections/Audits

FACILITY NAME (1)	BYRNE HOLLOW FARM	NPDES	NYR00G250

No ICIS Pretreatment Inspections Found.

Pretreatment Performance Summary

FACILITY NAME (1)	BYRNE HOLLOW FARM	NPDES	NYR00G250

No ICIS Pretreatment Performance Summary Information Found.

Note: You are viewing results from the modernized data system, Integrated Compliance Information System (ICIS). The state reporting this data to EPA previously reported the data to a historic data system, Permit Compliance System (PCS). Use the following button to view the historic data from PCS. **Run a PCS Search**

Data Refresh Information

<https://epa.gov/resources/echo-data/about-the-data#sources>

Detailed Facility Report



Detailed Facility Report

Facility Summary

BYRNE HOLLOW FARM

3156 BYRNE HOLLOW CROSSING, CORTLAND, NY 13045

FRS (Facility Registry Service) ID: 110070554565
EPA Region: 02
Latitude: 42.561333
Longitude: -76.22965
Locational Data Source: NPDES
Industries: --
Indian Country: N

Enforcement and Compliance Summary

Statute	CWA
Compliance Monitoring Activities (5 years)	--
Date of Last Compliance Monitoring Activity	--
Compliance Status	No Violation Identified
Qtrs in Noncompliance (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--

Penalties from EPA Cases (5 years)	--

Regulatory Information

Clean Air Act (CAA): No Information
Clean Water Act (CWA): Minor, Permit Effective (NYR00G250)
Resource Conservation and Recovery Act (RCRA): No Information
Safe Drinking Water Act (SDWA): No Information

Go To Enforcement/Compliance Details
Known Data Problems

Other Regulatory Reports

Air Emissions Inventory (EIS): No Information
Greenhouse Gas Emissions (eGGRT): No Information
Toxic Releases (TRI): No Information
Compliance and Emissions Data Reporting Interface (CEDRI): No Information

Facility/System Characteristics

Facility/System Characteristics

System	Statute	Identifier	Universe	Status	Areas	Permit Expiration Date	Indian Country	Latitude	Longitude
FRS		110070554565					N	42.561333	-76.22965
ICIS-NPDES	CWA	NYR00G250	Minor: General Permit Covered Facility	Effective	Industrial Stormwater	03/21/2024	N	42.561333	-76.22965

Facility Address

System	Statute	Identifier	Facility Name	Facility Address	Facility County
FRS		110070554565	BYRNE HOLLOW FARM	3156 BYRNE HOLLOW CROSSING, CORTLAND, NY 13045	
ICIS-NPDES	CWA	NYR00G250	BYRNE HOLLOW FARM	3156 BYRNE HOLLOW CROSSING, CORTLAND, NY 13045	Cortland County

Facility SIC (Standard Industrial Classification) Codes

System	Identifier	SIC Code	SIC Description
ICIS-NPDES	NYR00G250	2026	Fluid Milk

Facility NAICS (North American Industry Classification System) Codes

System	Identifier	NAICS Code	NAICS Description

No data records returned

Facility Industrial Effluent Guidelines

Identifier	Effluent Guideline (40 CFR Part)	Effluent Guideline Description

No data records returned

Facility Tribe Information

Reservation Name	Tribe Name	EPA Tribal ID	Distance to Tribe (miles)
Onondaga Nation Reservation	Onondaga Nation	100000184	24.3

Enforcement and Compliance

Compliance Monitoring History

Last 5 Years

Statute	Source ID	System	Activity Type	Compliance Monitoring Type	Lead Agency	Date	Finding (if applicable)

No data records returned

Entries in italics are not counted in EPA compliance monitoring strategies or annual results.

Compliance Summary Data

Statute	Source ID	Current SNC (Significant Noncompliance)/HPV (High Priority Violation)	Current As Of	Qtrs with NC (Noncompliance) (of 12)	Data Last Refreshed
CWA	NYR00G250	No	06/30/2022	0	11/11/2022

Three-Year Compliance History by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12	QTR 13+
CWA (Source ID: NYR00G250)		07/01-09/30/19	10/01-12/31/19	01/01-03/31/20	04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-11/11/22
	Facility-Level Status	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	Undetermined
	Quarterly Noncompliance Report History													

Informal Enforcement Actions

Last 5 Years

Statute	System	Source ID	Type of Action	Lead Agency	Date

No data records returned

Entries in italics are not counted as "informal enforcement actions" in EPA policies pertaining to enforcement response tools.

Formal Enforcement Actions

Last 5 Years

Statute	System	Law/Section	Source ID	Type of Action	Case No.	Lead Agency	Case Name	Issued/Filed Date	Settlements/Actions	Settlement/Action Date	Federal Penalty Assessed	State/Local Penalty Assessed	Penalty Amount Collected	SEP Cost	Comp Action Cost

No data records returned

Environmental Conditions

Watersheds

12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database))	WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database))	State Water Body Name (ICIS (Integrated Compliance Information System))	Beach Closures Within Last Year	Beach Closures Within Last Two Years	Pollutants Potentially Related to Impairment	Watershed with ESA (Endangered Species Act)-listed Aquatic Species?

No data records returned

Assessed Waters From Latest State Submission (ATTAINS)

State	Report Cycle	Assessment Unit ID	Assessment Unit Name	Water Condition	Cause Groups Impaired	Drinking Water Use	Aquatic Life	Fish Consumption Use	Recreation Use	Other Use

No data records returned

Air Quality Nonattainment Areas

Pollutant	Within Nonattainment Status Area?	Nonattainment Status Applicable Standard(s)	Within Maintenance Status Area?	Maintenance Status Applicable Standard(s)

No data records returned

Pollutants

Toxics Release Inventory History of Reported Chemicals Released in Pounds per Year at Site

TRI Facility ID	Year	Total Air Emissions	Surface Water Discharges	Off-Site Transfers to POTWs (Publicly Owned Treatment Works)	Underground Injections	Releases to Land	Total On-Site Releases	Total Off-Site Transfers

No data records returned

Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

Chemical Name

No data records returned

Community

EJScreen EJ Indexes

Twelve environmental justice (EJ) indexes of EJScreen, EPA's screening tool for EJ concerns. EPA uses these indexes to identify geographic areas that may warrant further consideration or analysis for potential EJ concerns. The index values below are for the Census block group or 1-mile maximum (US or State) in which the facility is located. Note that use of these indexes does not designate an area as an "EJ community" or "EJ facility." EJScreen provides screening level indicators, not a determination of the existence or absence of EJ concerns. For more information, see the EJScreen home page.

Show EJ Indexes calculated based on: Census Block Group - US

Census Block Group EJ Indexes (percentile)	
Particulate Matter 2.5	1
Ozone	3
Diesel Particulate Matter	2
Air Toxics Cancer Risk	2
Air Toxics Respiratory Hazard Index	1
Traffic Proximity	1
Lead Paint	15
Risk Management Plan (RMP) Facility Proximity	3
Hazardous Waste Proximity	5
Superfund Proximity	7
Underground Storage Tanks (UST)	0
Wastewater Discharge	--

Number of EJ Indexes Above 80th Percentile
0

View EJScreen Report (US/regional/state percentiles, 1-mile average)

Demographic Profile of Surrounding Area (1 mile)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 U.S. Census and 2015 - 2019 American Community Survey (ACS) 5-year Summary and are accurate to the extent that the facility latitude and longitude listed below are correct. EPA’s spatial processing methodology considers the overlap between the selected radii and the census blocks (for U.S. Census demographics) and

census block groups (for ACS demographics) in determining the demographics surrounding the facility. For more detail about this methodology, see the DFR Data Dictionary.

General Statistics (U.S. Census)	
Total Persons	383
Population Density	131/sq.mi.
Housing Units in Area	212

General Statistics (ACS (American Community Survey))	
Total Persons	529
Percent People of Color	6%
Households in Area	223
Households on Public Assistance	1
Persons With Low Income	97
Percent With Low Income	19%

Geography	
Radius of Selected Area	1 mi.
Center Latitude	42.561333
Center Longitude	-76.22965
Land Area	99%
Water Area	1%

Income Breakdown (ACS (American Community Survey)) - Households (%)	
Less than $15,000	11 (4.95%)
$15,000 - $25,000	10 (4.5%)
$25,000 - $50,000	38 (17.12%)
$50,000 - $75,000	28 (12.61%)
Greater than $75,000	135 (60.81%)

Age Breakdown (U.S. Census) - Persons (%)	
Children 5 years and younger	10 (3%)
Minors 17 years and younger	59 (15%)
Adults 18 years and older	323 (84%)
Seniors 65 years and older	134 (35%)

Race Breakdown (U.S. Census) - Persons (%)	
White	379 (99%)
African-American	2 (1%)
Hispanic-Origin	2 (1%)
Asian/Pacific Islander	1 (0%)
American Indian	1 (0%)
Other/Multiracial	0 (0%)

Education Level (Persons 25 & older) (ACS (American Community Survey)) - Persons (%)	
Less than 9th Grade	7 (1.7%)
9th through 12th Grade	25 (6.07%)
High School Diploma	128 (31.07%)
Some College/2-year	44 (10.68%)
B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More	162 (39.32%)

LAST UPDATED ON SEPTEMBER 21, 2022

DATA REFRESH INFORMATION

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Related Topics: **Envirofacts** <../>

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Envirofacts Report

<< Return

Query executed on JAN-11-2023
Results are based on data extracted on OCT-19-2022

Click on "View Facility Information" to view EPA Facility information for the facility.

Facility Name:	C'VILLE YOGHURT INC	Mailing Name:	C'VILLE YOGHURT INC
Address: <https://epa.gov//enviro.epa.gov/facts/tri/search_userguide.html#address>	3156 FINGER LAKES E DR CORTLAND NY 13045	Mailing Address: <https://epa.gov//enviro.epa.gov/facts/tri/search_userguide.html#mail_address>	3156 FINGER LAKES E DRCORTLAND NY 13045
County:	CORTLAND	Region:	2
Facility Information:	View Facility Information	TRI ID:	1304WCVLLY3156F
		FRS ID <https://epa.gov//enviro.epa.gov/html/registry_id.html>	110056390150
Latitude:	42.561333	Longitude:	-76.22965
Public Contact:	TOM CORP	Phone:	3154348807
Assigned Public Contact:	TOM CORP		
Parent Company:	No US Parent	Standardized Parent Company:	NA
BIA Tribal Code:		Tribe:	

NAICS Codes for 2021

NAICS CODE	PRIMARY	NAICS DESCRIPTION <https://epa.gov//enviro.epa.gov/html/fii/frs_code_description/code_description.html>
311511	YES	Fluid Milk Manufacturing

Industry Code for 2021

INDUSTRY CODE	INDUSTRY DESCRIPTION
311	Food

Map this facility

Map this facility using one of Envirofact's mapping utilities.

More information about these additional regulatory aspects of this facility can be found by pressing the other regulatory data button below.

Other Regulatory Data

Total Aggregate Releases of TRI Chemicals to the Environment:

Total Aggregate Releases of TRI Chemicals excluding Dioxin and Dioxin-like Compounds
(Measured in Pounds)

Media	2021	2020	2019	2018	2017	2016	2015	2014
Air Emissions	NR	NR	NR	NR	NR	NR	NR	NR
Surface Water Discharges	NR	NR	NR	NR	NR	NR	NR	NR
Releases to Land	NR	NR	NR	NR	NR	NR	NR	NR
Underground Injection	NR	NR	NR	NR	NR	NR	NR	NR
Total On-Site Releases	NR	NR	NR	NR	NR	NR	NR	NR
Transfer Off-Site to Disposal	NR	NR	NR	NR	NR	NR	NR	NR
Total Releases	NR	NR	NR	NR	NR	NR	NR	NR

Total Aggregate Releases of Dioxin and Dioxin-like Compounds
(Measured in Grams)

Media	2021	2020	2019	2018	2017	2016	2015	2014
Air Emissions	NR	NR	NR	NR	NR	NR	NR	NR
Surface Water Discharges	NR	NR	NR	NR	NR	NR	NR	NR
Releases to Land	NR	NR	NR	NR	NR	NR	NR	NR
Underground Injection	NR	NR	NR	NR	NR	NR	NR	NR
Total On-Site Releases	NR	NR	NR	NR	NR	NR	NR	NR
Transfer Off-Site to Disposal	NR	NR	NR	NR	NR	NR	NR	NR
Total Releases	NR	NR	NR	NR	NR	NR	NR	NR

TRI Chemicals Reported on Form A:

NOTE:

Names and Amounts of Chemicals Released to the Environment by Year.

Discharge of Chemicals into Streams or Bodies of Water:

Transfer of Chemicals to Off-Site Locations other than POTWs:

Summary of Waste Management Activities

Summary of Waste Management Activities excluding Dioxin and Dioxin-like Compounds (Measured in Pounds)

Year	On-Site Recycling	Off-Site Recycling	On-Site Energy Recovery	Off-Site Energy Recovery	On-Site Treatment	Off-Site Treatment	Total Amount
2020	0	0	0	0	87760	77744.7	165504.7
2021	0	0	0	0	76112	67426.2	143538.2
2022 (Projected)	0	0	0	0	19089	17180	36269
2023 (Projected)	0	0	0	0	65554	58998	124552

Summary of Waste Management Activities for Dioxin and Dioxin-like Compounds (Measured in Grams)

Chemicals Under Waste Management:

Chemical Name	Year	Unit Of Measure	On-Site Recycling	Off-Site Recycling	On-Site Energy Recovery	Off-Site Energy Recovery	On-Site Treated	Off-Site Treated	Total Amount
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2020	Pounds	0	0	0	0	0	77744.7	77744.7
	2021	Pounds	0	0	0	0	0	67426.2	67426.2
	2022 (Projected)	Pounds	0	0	0	0	0	17180	17180
	2023 (Projected)	Pounds	0	0	0	0	0	58998	58998
Nitric acid	2020	Pounds	0	0	0	0	87760	0	87760
	2021	Pounds	0	0	0	0	76112	0	76112
	2022 (Projected)	Pounds	0	0	0	0	19089	0	19089
	2023 (Projected)	Pounds	0	0	0	0	65554	0	65554

Publicly Owned Treatment Works (POTW) that Chemicals were Transferred to in 2011 and after:

Chemical Name	Year	Unit Of Measure	Total Transfer Amount	POTW Name and Address
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2014	Pounds	26898	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2015	Pounds	56844	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2016	Pounds	83634	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2017	Pounds	75104	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2018	Pounds	79460	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2019	Pounds	74882	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2020	Pounds	86383	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	2021	Pounds	74918	LE ROY R SUMMERSON WWTF 251 PORT WATSON STREET CORTLAND, NY 13045

Publicly Owned Treatment Works (POTW) that Chemicals were Transferred to PRIOR to 2011:

Non Production Releases:

Additional Source Reduction and Pollution Prevention Data:

Additional links for TRI:

- National Library of Medicine (NLM) TOXMAP <http://toxmap.nlm.nih.gov> EXIT Disclaimer <http://www.epa.gov/epahome/exitepa.htm> .

Data Refresh Information <https://epa.gov/resources/echo-data/about-the-data#sources>

TRI Facility Report

Chemical Name	TRI Chemical ID	2021	2020	2019	2018	2017	2016	2015	2014	Chem Name
Nitrate compounds	N511	R	R	R	R	R	R	R	R	Nitrate compo
Nitric acid	7697-37-2	R	R	R	R	R	R	R	R	Nitric a

Appendix 2.2.G: Byrne Hollow Air Facility Registration Certificate 2022 (NYSDEC)

Division of Air Resources

Registration ID: 7-1122-00195/00001 **Ren:** 1

AIR FACILITY REGISTRATION CERTIFICATE
in accordance with 6 NYCRR Subpart 201-4

Registration Issued to: BYRNE DAIRY INC
PO BOX 176
LA FAYETTE,NY 13084-0176

Contact: Eric Stone
3156 Byrne Hollow Crossing
Cortland,NY 13045

Facility: BYRNE CORTLANDVILLE, INC.
3156 BYRNE HOLLOW CROSSING
CORTLAND,NY 13045

Description:
Byrne Cortlandville, Inc. is an ultra-pasteurization facility that produces extended shelf-life dairy products. The facility operates two permanent boilers that combust natural gas with heat input ratings of 14.65MMBtu/hr and 25.106 MMBtu/hr. In addition, the facility operates two hydrogen peroxide sterilization lines and contains several exempt and trivial air emission sources (e.g., wastewater treatement, combustion sources < 10 MMBtu/hr).

Total Number of Emission Points: 4 **Cap By Rule:** No

Authorized Activity By Standard Industrial Classification Code:

2026 - FLUID MILK

Registration Effective Date: 09/07/2022 **Registration Expiration Date:** 09/06/2032

List of Regulations in Application:

6 NYCRR Part 200	General Provisions
6 NYCRR Part 201	Permits and Registrations
6 NYCRR Part 202	Emissions Verification
6 NYCRR Part 205	Architectural Surface Coatings
6 NYCRR Part 211	General Prohibitions
6 NYCRR Part 212	Process Operations
6 NYCRR Part 227	Stationary Combustion Installations
6 NYCRR Part 480	Environmental Regulatory Program Fees
40 CFR Part 60, Subpart Dc	Steam generators 10-100 million Btu per hour
40 CFR Part 68	Chemical accident prevention provisions
40 CFR Part 82	Protection of Stratospheric Ozone

AIR FACILITY REGISTRATION CERTIFICATE
in accordance with 6 NYCRR Subpart 201-4

List of Regulations in Application:

40 CFR Part 98	Mandatory Greenhouse Gas Reporting

MICHAEL S WHEELER
REGION 7 AIR POLLUTION CONTROL ENGINEER
NYSDEC - REGION 7
615 ERIE BLVD W
SYRACUSE,NY 13204

This registrant is required to operate this facility in accordance with all air pollution control applicable Federal and State laws and regulations. Failure to comply with these laws and regulations is a violation of the ECL and the registrant is subject to fines and/or penalties as provided by the ECL. If ownership of this facility changes, the registrant is required to notify the Department at the address shown above using the appropriate forms and procedures within 30 days after the transfer takes place. The present registrant will continue to be responsible for all fees and penalties until the Department has been notified of any change in ownership.

Appendix 2.2.H: J M Murray Environmental Profile (USEPA and NYSDEC, Accessed 2022)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Environmental Site Remediation Database Search Details

Site Record

Document Repository

Site-related documents are available for review through the DECInfo Locator on line at DECInfoLocator

Administrative Information

Site Name: J.M. Murray Center
Site Code: 712007
Program: State Superfund Program
Classification: N *
EPA ID Number:

Location

DEC Region: 7
Address: 4057 West Road
City: Cortland Zip: 13045
County: Cortland
Latitude: 42.60307629
Longitude: -76.20349057
Site Type:
Estimated Size: 14.5 Acres

Site Owner(s) and Operator(s)

Current Owner Name: J.M. Murray Center
Current Owner(s) Address: 4057 WEST ROAD, PO BOX 589
CORTLAND,NY, 13045
Current Owner Name: J.M. Murray Center, Inc.
Current Owner(s) Address: 4057 WEST ROAD
CORTLAND,NY, 13045

Owner(s) during disposal: J.M. MURRAY CENTER, INC.
Current On-Site Operator: J.M. Murray Center, Inc.
Stated Operator(s) Address: 4057 WEST ROAD
CORTLAND,NY 13045

Site Description

From 1981 to January 1987 the J.M. Murray Center discharged approximately 78,250 gallons of furniture stripping rinse waters from its furniture stripping operations to a dry well on site. Analysis of the rinse water revealed high levels of both organic and inorganic compounds. J.M. Murray submitted a Phase II Investigation report in October 1987. Analysis of groundwater samples indicates organic contamination above NYS Standards. Samples taken from Pit #1,which received the rinse wat er, indicated a number of metals and volatile organics closely correlating with those in the rinse water, as well as EP Toxic lead, though at levels below regulatory limits. The dry well has subsequently been cleaned and put out of service. While environmental impact from rinse water disposal is well established, rinse water from furniture stripping operations is not a liste d hazardous waste as defined by 6NYCRR Part 371. No evidence exists to document other disposal of materials from the J.M. Murray operation that would constitute hazardous waste dispsoal.

Site Environmental Assessment

Significant groundwater contamination from a non-hazardous source. The site borders the Otter-Dry Creek aquifer which serves as the drinking water source for the Village of Cortlandville and the City of Cortland.

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* **Class N Sites:** "DEC offers this information with the caution that the amount of information provided for Class N sites is highly variable, not necessarily based on any DEC investigation, sometimes of unknown origin, and sometimes is many years old. Due to the preliminary nature of this information, significant conclusions or decisions should not be based solely upon this summary."

For more Information: E-mail Us

Return To Results

Refine This Search

Detailed Facility Report

Detailed Facility Report

Facility Summary

JM MURRAY CENTER

4057 WEST ROAD, CORTLAND, NY 13045

FRS (Facility Registry Service) ID: 110002045974
EPA Region: 02
Latitude: 42.603159
Longitude: -76.202214
Locational Data Source: RCRAINFO
Industries: Furniture and Related Product Manufacturing
Indian Country: N

Enforcement and Compliance Summary

Statute	CAA
Compliance Monitoring Activities (5 years)	--
Date of Last Compliance Monitoring Activity	--
Compliance Status	No Violation Identified
Qtrs in Noncompliance (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--

Penalties from EPA Cases (5 years)	--

Statute	**RCRA**
Compliance Monitoring Activities (5 years)	--
Date of Last Compliance Monitoring Activity	05/13/2008
Compliance Status	No Violation Identified
Qtrs in Noncompliance (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--
Penalties from EPA Cases (5 years)	--

Regulatory Information

Clean Air Act (CAA): Permanently Closed (NY0000007112200047)
Clean Water Act (CWA): No Information
Resource Conservation and Recovery Act (RCRA): Inactive Other, (NYD071601108)
Safe Drinking Water Act (SDWA): No Information

Go To Enforcement/Compliance Details
Known Data Problems

Other Regulatory Reports

Air Emissions Inventory (EIS): No Information
Greenhouse Gas Emissions (eGGRT): No Information
Toxic Releases (TRI): No Information
Compliance and Emissions Data Reporting Interface (CEDRI): No Information

Facility/System Characteristics

Facility/System Characteristics

System	Statute	Identifier	Universe	Status	Areas	Permit Expiration Date	Indian Country	Latitude	Longitude
FRS		110002045974					N	42.603159	-76.202214
ICIS-Air	CAA	NY0000007112200047		Permanently Closed			N	42.603214	76.2036004
RCRAInfo	RCRA	NYD071601108	Other	Inactive ( )			N	42.603934	-76.202962

Facility Address

System	Statute	Identifier	Facility Name	Facility Address	Facility County
FRS		110002045974	JM MURRAY CENTER	4057 WEST ROAD, CORTLAND, NY 13045	Cortland County

System	Statute	Identifier	Facility Name	Facility Address	Facility County
ICIS-Air	CAA	NY0000007112200047	JM MURRAY CENTER	4057 WEST RD, CORTLAND, NY 13045	Cortland County
RCRAInfo	RCRA	NYD071601108	J M MURRAY CENTER INC	4057 WEST RD, CORTLAND, NY 13045	Cortland County

Facility SIC (Standard Industrial Classification) Codes

System	Identifier	SIC Code	SIC Description
ICIS-Air	NY0000007112200047	2511	Wood Household Furniture

Facility NAICS (North American Industry Classification System) Codes

System	Identifier	NAICS Code	NAICS Description
ICIS-Air	NY0000007112200047	337122	Nonupholstered Wood Household Furniture Manufacturing
RCRAInfo	NYD071601108	322223	Coated Paper Bag and Pouch Manufacturing
RCRAInfo	NYD071601108	337127	Institutional Furniture Manufacturing
RCRAInfo	NYD071601108	62431	Vocational Rehabilitation Services
RCRAInfo	NYD071601108	81142	Reupholstery and Furniture Repair

Facility Tribe Information

Reservation Name	Tribe Name	EPA Tribal ID	Distance to Tribe (miles)
Onondaga Nation Reservation	Onondaga Nation	100000184	21.31

Enforcement and Compliance

Compliance Monitoring History

Last 5 Years

Statute	Source ID	System	Activity Type	Compliance Monitoring Type	Lead Agency	Date	Finding (if applicable)

No data records returned

Entries in italics are not counted in EPA compliance monitoring strategies or annual results.

Compliance Summary Data

Statute	Source ID	Current SNC (Significant Noncompliance)/HPV (High Priority Violation)	Current As Of	Qtrs with NC (Noncompliance) (of 12)	Data Last Refreshed
CAA	NY0000007112200047	No	11/12/2022	0	11/11/2022
RCRA	NYD071601108	No	11/12/2022	0	11/11/2022

Three-Year Compliance History by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
CAA (Source ID: NY0000007112200047)		01/01-03/31/20	04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22
	Facility-Level Status	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified
	HPV History												
	Violation Type / Agency / Programs / Pollutants												

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
RCRA (Source ID: NYD071601108)		01/01-03/31/20	04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22
	Facility-Level Status	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified
	Violation Agency												

Informal Enforcement Actions

Last 5 Years

Statute	System	Source ID	Type of Action	Lead Agency	Date

No data records returned

Entries in italics are not counted as "informal enforcement actions" in EPA policies pertaining to enforcement response tools.

Formal Enforcement Actions

Last 5 Years

Statute	System	Law/Section	Source ID	Type of Action	Case No.	Lead Agency	Case Name	Issued/Filed Date	Settlements/Actions	Settlement/Action Date	Federal Penalty Assessed	State/Local Penalty Assessed	Penalty Amount Collected	SEP Cost	Comp Action Cost

No data records returned

Environmental Conditions

Watersheds

12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database))	WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database))	State Water Body Name (ICIS (Integrated Compliance Information System))	Beach Closures Within Last Year	Beach Closures Within Last Two Years	Pollutants Potentially Related to Impairment	Watershed with ESA (Endangered Species Act)-listed Aquatic Species?

No data records returned

Assessed Waters From Latest State Submission (ATTAINS)

State	Report Cycle	Assessment Unit ID	Assessment Unit Name	Water Condition	Cause Groups Impaired	Drinking Water Use	Aquatic Life	Fish Consumption Use	Recreation Use	Other Use

No data records returned

Air Quality Nonattainment Areas

Pollutant	Within Nonattainment Status Area?	Nonattainment Status Applicable Standard(s)	Within Maintenance Status Area?	Maintenance Status Applicable Standard(s)

No data records returned

Pollutants

Toxics Release Inventory History of Reported Chemicals Released in Pounds per Year at Site

TRI Facility ID	Year	Total Air Emissions	Surface Water Discharges	Off-Site Transfers to POTWs (Publicly Owned Treatment Works)	Underground Injections	Releases to Land	Total On-Site Releases	Total Off-Site Transfers

No data records returned

Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

Chemical Name
No data records returned

Community

EJScreen EJ Indexes

Twelve environmental justice (EJ) indexes of EJScreen, EPA's screening tool for EJ concerns. EPA uses these indexes to identify geographic areas that may warrant further consideration or analysis for potential EJ concerns. The index values below are for the Census block group or 1-mile maximum (US or State) in which the facility is located. Note that use of these indexes does not designate an area as an "EJ community" or "EJ facility." EJScreen provides screening level indicators, not a determination of the existence or absence of EJ concerns. For more information, see the EJScreen home page.

Show EJ Indexes calculated based on: Census Block Group - US

Census Block Group EJ Indexes (percentile)	
Particulate Matter 2.5	3
Ozone	17
Diesel Particulate Matter	8
Air Toxics Cancer Risk	9
Air Toxics Respiratory Hazard Index	5
Traffic Proximity	15
Lead Paint	30
Risk Management Plan (RMP) Facility Proximity	33
Hazardous Waste Proximity	37
Superfund Proximity	45
Underground Storage Tanks (UST)	28
Wastewater Discharge	8

Number of EJ Indexes Above 80th Percentile
0

View EJScreen Report (US/regional/state percentiles, 1-mile average)

Demographic Profile of Surrounding Area (1 mile)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 U.S. Census and 2015 - 2019 American Community Survey (ACS) 5-year Summary and are accurate to the extent that the facility latitude and longitude listed below are correct. EPA's spatial processing methodology considers the overlap between the selected radii and the census blocks (for U.S. Census demographics) and census block groups (for ACS demographics) in determining the demographics surrounding the facility. For more detail about this methodology, see the DFR Data Dictionary.

General Statistics (U.S. Census)	
Total Persons	8,403
Population Density	2,711/sq.mi.
Housing Units in Area	2,543

General Statistics (ACS (American Community Survey))	
Total Persons	8,584
Percent People of Color	8%

Age Breakdown (U.S. Census) - Persons (%)	
Children 5 years and younger	285 (3%)
Minors 17 years and younger	1,036 (12%)
Adults 18 years and older	7,367 (88%)
Seniors 65 years and older	825 (10%)

Race Breakdown (U.S. Census) - Persons (%)	
White	7,866 (94%)

General Statistics (ACS (American Community Survey))	
Households in Area	2,467
Households on Public Assistance	46
Persons With Low Income	2,326
Percent With Low Income	38%

Geography	
Radius of Selected Area	1 mi.
Center Latitude	42.603159
Center Longitude	-76.202214
Land Area	100%
Water Area	0%

Income Breakdown (ACS (American Community Survey)) - Households (%)	
Less than $15,000	279 (11.29%)
$15,000 - $25,000	222 (8.98%)
$25,000 - $50,000	561 (22.7%)
$50,000 - $75,000	477 (19.3%)
Greater than $75,000	932 (37.72%)

Race Breakdown (U.S. Census) - Persons (%)	
African-American	211 (3%)
Hispanic-Origin	332 (4%)
Asian/Pacific Islander	102 (1%)
American Indian	8 (0%)
Other/Multiracial	216 (3%)

Education Level (Persons 25 & older) (ACS (American Community Survey)) - Persons (%)	
Less than 9th Grade	78 (2.12%)
9th through 12th Grade	157 (4.26%)
High School Diploma	732 (19.88%)
Some College/2-year	694 (18.85%)
B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More	1,498 (40.68%)

LAST UPDATED ON SEPTEMBER 21, 2022

DATA REFRESH INFORMATION

Appendix 2.2.I: Marl Pond Water Quality Lab Analysis (Alpha Analytical)

ANALYTICAL REPORT

Lab Number:	L2223336
Client:	H2H Associates, LLC 179 River Street Troy, NY 12180
ATTN:	Olya Rizzo
Phone:	(518) 270-1620
Project Name:	CORTLANDVILLE SAND & GRAVEL
Project Number:	Not Specified
Report Date:	06/02/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2223336-01	SET 1 - SOUTH POND	WATER	CORTLAND, NY	05/04/22 11:50	05/04/22
L2223336-02	SET 2 - MID POND	WATER	CORTLAND, NY	05/04/22 11:25	05/04/22

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

The analyses of Enterococci, E-Coli, Fecal Coliform, Plate Count and Total Coliform were subcontracted. Copies of the laboratory reports are included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Chlorophyll A

WG1634841-1: The sample was analyzed with the method required holding time exceeded.

BOD, 5 day

L2223336-02: The sample has an elevated detection limit due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Caitlin Walukevich

Title: Technical Director/Representative Date: 06/02/22

METALS

Project Name: CORTLANDVILLE SAND & GRAVEL **Lab Number:** L2223336

Project Number: Not Specified **Report Date:** 06/02/22

SAMPLE RESULTS

Lab ID: L2223336-01 Date Collected: 05/04/22 11:50

Client ID: SET 1 - SOUTH POND Date Received: 05/04/22

Sample Location: CORTLAND, NY Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	0.470		mg/l	0.100	0.032	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Antimony, Total	ND		mg/l	0.050	0.007	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Arsenic, Total	ND		mg/l	0.005	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Barium, Total	0.044		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Beryllium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Cadmium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Calcium, Total	77.4		mg/l	0.100	0.035	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Chromium, Total	0.002	J	mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Cobalt, Total	ND		mg/l	0.020	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Copper, Total	0.004	J	mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Iron, Total	0.597		mg/l	0.050	0.009	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Lead, Total	ND		mg/l	0.010	0.003	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Magnesium, Total	17.8		mg/l	0.100	0.015	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Manganese, Total	0.049		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Mercury, Total	ND		mg/l	0.00020	0.00009	1	05/25/22 18:49	05/25/22 23:06	EPA 245.1	3,245.1	DMB
Nickel, Total	ND		mg/l	0.025	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Potassium, Total	0.971	J	mg/l	2.50	0.237	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Selenium, Total	ND		mg/l	0.010	0.004	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Silver, Total	ND		mg/l	0.007	0.003	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Sodium, Total	28.4		mg/l	2.00	0.120	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Thallium, Total	ND		mg/l	0.020	0.003	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Vanadium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB
Zinc, Total	0.010	J	mg/l	0.050	0.002	1	05/25/22 17:49	06/02/22 13:09	EPA 3005A	19,200.7	SB

Project Name: CORTLANDVILLE SAND & GRAVEL **Lab Number:** L2223336

Project Number: Not Specified **Report Date:** 06/02/22

SAMPLE RESULTS

Lab ID: L2223336-02 Date Collected: 05/04/22 11:25

Client ID: SET 2 - MID POND Date Received: 05/04/22

Sample Location: CORTLAND, NY Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	0.123		mg/l	0.100	0.032	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Antimony, Total	ND		mg/l	0.050	0.007	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Arsenic, Total	ND		mg/l	0.005	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Barium, Total	0.040		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Beryllium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Cadmium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Calcium, Total	71.4		mg/l	0.100	0.035	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Chromium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Cobalt, Total	ND		mg/l	0.020	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Copper, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Iron, Total	0.193		mg/l	0.050	0.009	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Lead, Total	ND		mg/l	0.010	0.003	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Magnesium, Total	17.5		mg/l	0.100	0.015	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Manganese, Total	0.042		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Mercury, Total	ND		mg/l	0.00020	0.00009	1	05/25/22 18:49	05/25/22 23:23	EPA 245.1	3,245.1	DMB
Nickel, Total	ND		mg/l	0.025	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Potassium, Total	0.958	J	mg/l	2.50	0.237	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Selenium, Total	ND		mg/l	0.010	0.004	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Silver, Total	ND		mg/l	0.007	0.003	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Sodium, Total	25.7		mg/l	2.00	0.120	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Thallium, Total	ND		mg/l	0.020	0.003	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Vanadium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB
Zinc, Total	0.005	J	mg/l	0.050	0.002	1	05/25/22 17:49	06/02/22 13:13	EPA 3005A	19,200.7	SB

Project Name: CORTLANDVILLE SAND & GRAVEL **Lab Number:** L2223336

Project Number: Not Specified **Report Date:** 06/02/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1642796-1										
Aluminum, Total	ND		mg/l	0.100	0.032	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Antimony, Total	ND		mg/l	0.050	0.007	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Arsenic, Total	ND		mg/l	0.005	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Barium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Beryllium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Cadmium, Total	ND		mg/l	0.005	0.001	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Calcium, Total	ND		mg/l	0.100	0.035	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Chromium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Cobalt, Total	ND		mg/l	0.020	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Copper, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Iron, Total	ND		mg/l	0.050	0.009	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Lead, Total	ND		mg/l	0.010	0.003	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Magnesium, Total	ND		mg/l	0.100	0.015	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Manganese, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Nickel, Total	ND		mg/l	0.025	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Potassium, Total	ND		mg/l	2.50	0.237	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Selenium, Total	ND		mg/l	0.010	0.004	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Silver, Total	ND		mg/l	0.007	0.003	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Sodium, Total	ND		mg/l	2.00	0.120	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Thallium, Total	0.003	J	mg/l	0.020	0.003	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Vanadium, Total	ND		mg/l	0.010	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB
Zinc, Total	ND		mg/l	0.050	0.002	1	05/25/22 17:49	06/02/22 12:18	19,200.7	SB

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1642799-1										
Mercury, Total	ND		mg/l	0.00020	0.00009	1	05/25/22 18:49	05/25/22 23:00	3,245.1	DMB

Project Name: CORTLANDVILLE SAND & GRAVEL
Lab Number: L2223336
Project Number: Not Specified
Report Date: 06/02/22

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL

Project Number: Not Specified

Lab Number: L2223336

Report Date: 06/02/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1642796-2								
Aluminum, Total	100		-		85-115	-		
Antimony, Total	100		-		85-115	-		
Arsenic, Total	106		-		85-115	-		
Barium, Total	99		-		85-115	-		
Beryllium, Total	103		-		85-115	-		
Cadmium, Total	102		-		85-115	-		
Calcium, Total	102		-		85-115	-		
Chromium, Total	102		-		85-115	-		
Cobalt, Total	97		-		85-115	-		
Copper, Total	101		-		85-115	-		
Iron, Total	100		-		85-115	-		
Lead, Total	102		-		85-115	-		
Magnesium, Total	103		-		85-115	-		
Manganese, Total	100		-		85-115	-		
Nickel, Total	99		-		85-115	-		
Potassium, Total	100		-		85-115	-		
Selenium, Total	106		-		85-115	-		
Silver, Total	100		-		85-115	-		
Sodium, Total	101		-		85-115	-		
Thallium, Total	104		-		85-115	-		
Vanadium, Total	103		-		85-115	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL

Project Number: Not Specified

Lab Number: L2223336

Report Date: 06/02/22

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1642796-2					
Zinc, Total	100	-	85-115	-	
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1642799-2					
Mercury, Total	102	-	85-115	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642796-3 WG1642796-4 QC Sample: L2223520-01 Client ID: MS Sample												
Aluminum, Total	0.033J	2	1.94	97		1.90	95		75-125	2		20
Antimony, Total	ND	0.5	0.494	99		0.495	99		75-125	0		20
Arsenic, Total	0.002J	0.12	0.126	105		0.124	103		75-125	2		20
Barium, Total	0.004J	2	1.95	98		1.91	96		75-125	2		20
Beryllium, Total	ND	0.05	0.051	101		0.050	99		75-125	2		20
Cadmium, Total	ND	0.053	0.052	98		0.051	97		75-125	1		20
Calcium, Total	23.8	10	33.6	98		33.2	94		75-125	1		20
Chromium, Total	ND	0.2	0.198	99		0.196	98		75-125	1		20
Cobalt, Total	ND	0.5	0.466	93		0.462	92		75-125	1		20
Copper, Total	0.082	0.25	0.324	97		0.320	95		75-125	1		20
Iron, Total	0.110	1	1.07	96		1.06	95		75-125	1		20
Lead, Total	0.007J	0.53	0.529	100		0.522	98		75-125	1		20
Magnesium, Total	3.10	10	13.1	100		12.9	98		75-125	2		20
Manganese, Total	0.004J	0.5	0.496	99		0.488	98		75-125	2		20
Nickel, Total	0.016J	0.5	0.495	99		0.491	98		75-125	1		20
Potassium, Total	2.09J	10	11.9	119		11.8	118		75-125	1		20
Selenium, Total	ND	0.12	0.124	103		0.118	98		75-125	5		20
Silver, Total	ND	0.05	0.048	97		0.048	97		75-125	0		20
Sodium, Total	5.32	10	15.1	98		14.9	96		75-125	1		20
Thallium, Total	ND	0.12	0.119	99		0.118	98		75-125	1		20
Vanadium, Total	ND	0.5	0.499	100		0.495	99		75-125	1		20

Matrix Spike Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642796-3 WG1642796-4 QC Sample: L2223520-01 Client ID: MS Sample									
Zinc, Total	0.034J	0.5	0.518	104	0.513	103	75-125	1	20

Matrix Spike Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642796-7 WG1642796-8 QC Sample: L2223520-02 Client ID: MS Sample									
Aluminum, Total	ND	2	1.94	97	1.90	95	75-125	2	20
Antimony, Total	ND	0.5	0.494	99	0.485	97	75-125	2	20
Arsenic, Total	0.002J	0.12	0.123	102	0.120	100	75-125	2	20
Barium, Total	0.086	2	2.01	96	1.98	95	75-125	2	20
Beryllium, Total	ND	0.05	0.050	100	0.049	99	75-125	1	20
Cadmium, Total	ND	0.053	0.051	97	0.051	95	75-125	1	20
Calcium, Total	24.8	10	34.0	92	34.4	96	75-125	1	20
Chromium, Total	ND	0.2	0.196	98	0.195	98	75-125	1	20
Cobalt, Total	0.003J	0.5	0.465	93	0.457	91	75-125	2	20
Copper, Total	ND	0.25	0.243	97	0.238	95	75-125	2	20
Iron, Total	1.19	1	2.12	93	2.13	94	75-125	0	20
Lead, Total	ND	0.53	0.518	98	0.510	96	75-125	2	20
Magnesium, Total	3.17	10	13.0	98	12.9	97	75-125	1	20
Manganese, Total	0.015	0.5	0.499	97	0.494	96	75-125	1	20
Nickel, Total	0.019J	0.5	0.493	99	0.487	97	75-125	1	20
Potassium, Total	2.19J	10	11.8	118	11.8	118	75-125	0	20
Selenium, Total	ND	0.12	0.124	103	0.120	100	75-125	3	20
Silver, Total	ND	0.05	0.049	98	0.047	93	75-125	4	20
Sodium, Total	5.31	10	15.0	97	14.9	96	75-125	1	20
Thallium, Total	ND	0.12	0.118	98	0.115	96	75-125	3	20
Vanadium, Total	ND	0.5	0.495	99	0.492	98	75-125	1	20

Matrix Spike Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642796-7 WG1642796-8 QC Sample: L2223520-02 Client ID: MS Sample									
Zinc, Total	0.011J	0.5	0.491	98	0.485	97	75-125	1	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642799-3 QC Sample: L2223336-01 Client ID: SET 1 - SOUTH POND									
Mercury, Total	ND	0.005	0.00490	98	-	-	70-130	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL

Project Number: Not Specified

Lab Number: L2223336

Report Date: 06/02/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1642799-4 QC Sample: L2223336-01 Client ID: SET 1 - SOUTH POND						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

SAMPLE RESULTS

Lab ID: L2223336-01
Client ID: SET 1 - SOUTH POND
Sample Location: CORTLAND, NY

Date Collected: 05/04/22 11:50
Date Received: 05/04/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	21.6		mg/l	1.50	0.330	5	05/14/22 09:50	05/16/22 21:22	121,4500NH3-H	AT
Phosphorus, Total	0.979		mg/l	0.025	0.010	2.5	05/17/22 07:30	05/17/22 09:17	121,4500P-E	DE
BOD, 5 day	11.		mg/l	2.0	NA	1	05/05/22 14:20	05/10/22 16:45	121,5210B	MT
Total Organic Carbon	1.91		mg/l	0.500	0.114	1	-	05/18/22 11:10	121,5310C	DW
Chlorophyll A	19.4		mg/m3	2.00	NA	1	05/05/22 09:45	05/17/22 09:35	121,10200H	MT

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

SAMPLE RESULTS

Lab ID: L2223336-02
Client ID: SET 2 - MID POND
Sample Location: CORTLAND, NY

Date Collected: 05/04/22 11:25
Date Received: 05/04/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	2.04		mg/l	0.600	0.132	2	05/14/22 09:50	05/16/22 21:23	121,4500NH3-H	AT
Phosphorus, Total	0.034		mg/l	0.010	0.004	1	05/17/22 07:30	05/17/22 09:18	121,4500P-E	DE
BOD, 5 day	ND		mg/l	4.0	NA	2	05/05/22 14:20	05/10/22 16:45	121,5210B	MT
Total Organic Carbon	1.73		mg/l	0.500	0.114	1	-	05/18/22 11:28	121,5310C	DW
Chlorophyll A	6.39		mg/m3	2.00	NA	1	05/05/22 09:45	05/17/22 09:35	121,10200H	MT

Project Name: CORTLANDVILLE SAND & GRAVEL **Lab Number:** L2223336

Project Number: Not Specified **Report Date:** 06/02/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1634841-1										
Chlorophyll A	ND		mg/m3	2.00	NA	1	05/05/22 09:45	05/17/22 09:35	121,10200H	MT
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1634967-1										
BOD, 5 day	ND		mg/l	2.0	NA	1	05/05/22 14:20	05/10/22 16:45	121,5210B	MT
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1637005-1										
Phosphorus, Total	0.005	J	mg/l	0.010	0.004	1	05/17/22 07:30	05/17/22 08:43	121,4500P-E	DE
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1638428-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	0.022	1	05/14/22 09:50	05/16/22 21:17	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1639728-1										
Total Organic Carbon	ND		mg/l	0.500	0.114	1	-	05/18/22 07:01	121,5310C	DW

Lab Control Sample Analysis

Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1634967-2								
BOD, 5 day	105		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1637005-2								
Phosphorus, Total	100		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1638428-2								
Nitrogen, Total Kjeldahl	103		-		78-122	-		
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1639728-2								
Total Organic Carbon	94		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1634967-4 QC Sample: L2223235-01 Client ID: MS Sample												
BOD, 5 day	5.8	100	110	107		-	-		50-145	-		35
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1637005-4 QC Sample: L2223245-01 Client ID: MS Sample												
Phosphorus, Total	0.102	0.5	0.642	108		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1638428-4 QC Sample: L2223298-01 Client ID: MS Sample												
Nitrogen, Total Kjeldahl	5.54	8	12.5	87		-	-		77-111	-		24
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1639728-4 QC Sample: L2223375-01 Client ID: MS Sample												
Total Organic Carbon	391.	1280	1600	94		-	-		80-120	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1634841-2 QC Sample: L2223344-01 Client ID: DUP Sample						
Chlorophyll A	ND	ND	mg/m3	NC		35
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1634967-3 QC Sample: L2223235-01 Client ID: DUP Sample						
BOD, 5 day	5.8	5.8	mg/l	0		35
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1637005-3 QC Sample: L2223245-01 Client ID: DUP Sample						
Phosphorus, Total	0.102	0.104	mg/l	2		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1638428-3 QC Sample: L2223298-01 Client ID: DUP Sample						
Nitrogen, Total Kjeldahl	5.54	5.78	mg/l	4		24
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1639728-3 QC Sample: L2223375-01 Client ID: DUP Sample						
Total Organic Carbon	391.	390	mg/l	0		20

Project Name: CORTLANDVILLE SAND & GRAVEL
Project Number: Not Specified

Lab Number: L2223336
Report Date: 06/02/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2223336-01A	Vial H2SO4 preserved	A	NA		3.6	Y	Absent		TOC-5310(28)
L2223336-01B	Vial H2SO4 preserved	A	NA		3.6	Y	Absent		TOC-5310(28)
L2223336-01C	Plastic 500ml HNO3 preserved	A	<2	<2	3.6	Y	Absent		BA-UI(180),NI-UI(180),SB-UI(180),AG-UI(180),CA-UI(180),ZN-UI(180),CO-UI(180),K-UI(180),SE-UI(180),FE-UI(180),MG-UI(180),HG-U(28),CD-UI(180),MN-UI(180),CR-UI(180),AL-UI(180),BE-UI(180),NA-UI(180),V-UI(180),CU-UI(180),AS-UI(180),PB-UI(180),TL-UI(180)
L2223336-01D	Plastic 500ml unpreserved	A	7	7	3.6	Y	Absent		BOD-5210(2)
L2223336-01E	Plastic 500ml H2SO4 preserved	A	<2	<2	3.6	Y	Absent		TKN-4500(28),TPHOS-4500(28)
L2223336-01F	Brown Plastic 1000ml unpreserved	A	NA		3.6	Y	Absent		CHLORO-A(1)
L2223336-01G	Brown Plastic 1000ml unpreserved	A	NA		3.6	Y	Absent		CHLORO-A(1)
L2223336-02A	Vial H2SO4 preserved	A	NA		3.6	Y	Absent		TOC-5310(28)
L2223336-02B	Vial H2SO4 preserved	A	NA		3.6	Y	Absent		TOC-5310(28)
L2223336-02C	Plastic 500ml HNO3 preserved	A	<2	<2	3.6	Y	Absent		BA-UI(180),NI-UI(180),SB-UI(180),AG-UI(180),ZN-UI(180),CA-UI(180),CO-UI(180),K-UI(180),SE-UI(180),MG-UI(180),FE-UI(180),HG-U(28),CD-UI(180),CR-UI(180),NA-UI(180),AL-UI(180),MN-UI(180),BE-UI(180),CU-UI(180),AS-UI(180),PB-UI(180),TL-UI(180),V-UI(180)
L2223336-02D	Plastic 500ml unpreserved	A	7	7	3.6	Y	Absent		BOD-5210(2)
L2223336-02E	Plastic 500ml H2SO4 preserved	A	<2	<2	3.6	Y	Absent		TKN-4500(28),TPHOS-4500(28)
L2223336-02F	Brown Plastic 1000ml unpreserved	A	NA		3.6	Y	Absent		CHLORO-A(1)
L2223336-02G	Brown Plastic 1000ml unpreserved	A	NA		3.6	Y	Absent		CHLORO-A(1)

*Values in parentheses indicate holding time in days

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	CORTLANDVILLE SAND & GRAVEL	**Lab Number:**	L2223336
Project Number:	Not Specified	**Report Date:**	06/02/22

REFERENCES

3 Methods for the Determination of Metals in Environmental Samples, Supplement I. EPA/600/R-94/111. May 1994.

19 Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes. Appendix C, Part 136, 40 CFR (Code of Federal Regulations). July 1, 1999 edition.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

ALPHA

NEW YORK CHAIN OF CUSTODY

Page 1 of 2

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Date Rec'd in Lab: 5/6/22

ALPHA Job #: L2223336

Client Information
Client: ~~Cortlandville Sand & Gravel~~ H2M
Address: 179 River St Troy NY 12180
Phone: 518 270 1620
Fax:
Email: Orizzo@H2Mg-e.com

Project Information
Project Name: Cortlandville Sand & Gravel
Project Location: Cortland NY
Project #
(Use Project name as Project #) ☑
Project Manager: Olga Rizzo
ALPHAQuote #:

Turn-Around Time
Standard ☑ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables
☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Billing Information
☑ Same as Client Info
PO #

Regulatory Requirement
☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TOC	BOD-5 Day	TKN	Total Phosphorus	Chlorophyll A	Total Metals	Fecal Coliform	Total Coliform	Sample Specific Comments	Total Bottle
23336-01	Set 1 - South Pond	5/4/22	11:50	SW	CR	/	/	/	/	/	/	/	/		
-02	Set 2 - North Pond Mid	5/4/22	11:25	SW	CR	/	/	/	/	/	/	/	/		

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; K/E = Zn Ac/NaOH; O = Other

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	V	P	P	P	P	P	B	B	
Preservative	D	A	D	D	A	C	A	A	

Relinquished By:	Date/Time	Received By:	Date/Time
	5/4/22 1215	AAL	05/04/22 1215
	05/04/22 1215		5/5/22 0830

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

ALPHA

NEW YORK CHAIN OF CUSTODY

Page 2 of 2

Date Rec'd in Lab: 5/5/22

ALPHA Job #: L2223336

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Project Information
- Project Name: Cortlandville Sand + Gravel
- Project Location: Cortland, NY
- Project #
- (Use Project name as Project #) ☑
- Project Manager: Olya Rizzo
- ALPHAQuote #:

Client Information
- Client: H2M Geoscience Engineering
- Address: 179 River St Troy, NY 12180
- Phone: (518) 270-1620
- Fax:
- Email: orizzo@h2mg-e.com

Turn-Around Time
- Standard ☑ Due Date:
- Rush (only if pre approved) ☐ # of Days:

Deliverables
- ☐ ASP-A ☐ ASP-B
- ☐ EQuIS (1 File) ☐ EQuIS (4 File)
- ☐ Other

Billing Information
- ☑ Same as Client Info
- PO #

Regulatory Requirement
- ☐ NY TOGS ☐ NY Part 375
- ☐ AWQ Standards ☐ NY CP-51
- ☐ NY Restricted Use ☐ Other
- ☐ NY Unrestricted Use
- ☐ NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
- ☐ NJ ☐ NY
- ☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
- ☐ Done
- ☐ Lab to do

Preservation
- ☐ Lab to do

(Please Specify below)

Total Bottles

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Enterococci	Heterotrophic Plate	E. Coli	Sample Specific Comments
23336-01	Set 1 - South Pond	5/4/22	11:50	SW	CR	✓	✓	✓	
-02	Set 2 - Mid Pond	5/4/22	11:25	SW	CR	✓	✓	✓	

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	B	B	B
Preservative	H	A	A

Relinquished By:	Date/Time	Received By:	Date/Time
	5/4/22 1215	AAL	05/04/22 1215
	05/04/22 1215		5/5/22 0000

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Certified Environmental Services
7280 Caswell Street
North Syracuse, NY 13210

Alpha Job Number
L2223336

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 716-427-5223
Email: cfox@alphalab.com

Project Information

Project Location: NY
Project Manager: Candace Fox

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2223336

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	SET 1 - SOUTH POND	05-04-22 11:50	WATER	E. Coli; Fecal Coliform- SM9222D;Heterotrophic Plate Count; Total Coliform - SM9222B	
	SET 2 - MID POND	05-04-22 11:25	WATER	E. Coli; Fecal Coliform- SM9222D;Heterotrophic Plate Count; Total Coliform - SM9222B	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
	AAL	05/04/22 1421		1421 5-4-22

Form No: AL_subcoc

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Converse Laboratories, Inc.
800 Starbuck Ave
Suite B101
Watertown, ny 13601

Alpha Job Number
L2223336

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 716-427-5223
Email: cfox@alphalab.com

Project Information

Project Location: NY
Project Manager: Candace Fox

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2223336

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	SET 1 - SOUTH POND	05-04-22 11:50	WATER	Enterococci	
	SET 2 - MID POND	05-04-22 11:25	WATER	Enterococci	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
	AL	05/04/22 1530		5/4/2022 1530

Form No: AL_subcoc

Converse Laboratories Inc.
800 Starbuck Ave. Suite B101
Watertown, NY 13601

NYS Approved ELAP
ID# 10708

USPH Certified
ID# 36144

Client: Alpha Analytical
8 Walkup Drive
Westborough, MA 01581

Report Date:
5/6/2022

Laboratory Report

Sample ID: 2204073
Sample Date/Time: 5/4/2022 1150
Date/Time Received: 5/4/2022 1530
Sample Type: Grab
Sample Site: Set 1-South Pond
Sampler: Client

Analysis	Result	Units	Method Code	Lab ID	Date/Time/Tech Tested
Enterococci	4.1	100ml	Idexx Enterolert	10708	5/4/2022 1545 ML

Sample ID: 2204074
Sample Date/Time: 5/4/2022 1125
Date/Time Received: 5/4/2022 1530
Sample Type: Grab
Sample Site: Set 2-Mid Pond
Sampler: Client

Analysis	Result	Units	Method Code	Lab ID	Date/Time/Tech Tested
Enterococci	204.6	100ml	Idexx Enterolert	10708	5/4/2022 1545 ML

Authorized Reviewed by/Supervisor : Kathleen M. Bonney

Key: mg/l - Milligrams per liter
ml/l- Millileters per liter
cfu-Colony Forming Units
100 ml- Size of coliform container

The information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services. I certify that these results conform to NYS Department of Health Standards and requirements (10 NYCCR Subpart 55-2)

Sample results are based on samples as they are received, unless sampled by CLI.

This report shall not be reproduced, except in full, without written approval from CLI.

Subcontract Chain of Custody

Converse Laboratories, Inc.
800 Starbuck Ave
Suite B101
Watertown, ny 13601

Alpha Job Number
L2223336

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 716-427-5223
Email: cfox@alphalab.com

Project Information

Project Location: NY
Project Manager: Candace Fox

Regulatory Requirements/Report Limits

State/Federal Program:

Regulatory Criteria:

Turnaround & Deliverables Information

Due Date:
Deliverables:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2223336

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	SET 1 - SOUTH POND	05-04-22 11:50	WATER	Enterococci	4073
	SET 2 - MID POND	05-04-22 11:25	WATER	Enterococci	4074

	Relinquished By:	Date/Time:	Received By:	Date/Time:
	HAL			
	Chris Stahle	05/04/22 1530	Sue Hoffman	5/4/2022 1530
Form No: AL_subcoc				

TR: anf 5/6/2022
FR: KMS 5/6/22

Serial_No:06022218:15

CES Certified Environmental Services, Inc.

7280 Caswell Street
North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861873 SAMPLE ID- Set 1- South Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1150
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
E-Coli Enumeration	Colilert24	05/04/22	1455	BLO	2	per 100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Bonczyk
(Terms and Conditions on Reverse Side)

Rachel R. Bonczyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

Certified Environmental Services, Inc.

7280 Caswell Street
North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861874 SAMPLE ID- Set 1- South Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1150
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Fecal Coliform	Colilert	05/04/22	1505	BLO	< 1	cfu/100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel B. Banczyk
(Terms and Conditions on Reverse Side)

Rachel B. Banczyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

CES Certified Environmental Services, Inc.

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North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861875 SAMPLE ID- Set 1- South Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1150
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Standard Plate Count (SM18-21)	9215B	05/04/22	1635	BLO	580	cfu/ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Baraczyk
(Terms and Conditions on Reverse Side)
Rachel R. Baraczyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

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Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861876 SAMPLE ID- Set 1- South Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1150
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Total Coliform, MF	SM9222B-15	05/04/22	1550	BLO	E 2	cfu/100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Bonczyk
(Terms and Conditions on Reverse Side)

Rachel R. Bonczyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

Certified Environmental Services, Inc.

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North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861877 SAMPLE ID- Set 2- Mid Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1125
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
E-Coli Enumeration	Colilert24	05/04/22	1455	BLO	< 1	per 100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Bunzyk
(Terms and Conditions on Reverse Side)
Rachel R. Bunzyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

Certified Environmental Services, Inc.

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North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861878 SAMPLE ID- Set 2- Mid Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1125
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Fecal Coliform	Colilert	05/04/22	1505	BLO	< 1	cfu/100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Bonczyk
(Terms and Conditions on Reverse Side)

Rachel R. Bonczyk
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

Certified Environmental Services, Inc.

7280 Caswell Street
North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861879 SAMPLE ID- Set 2- Mid Pond
DATE SAMPLED- 05/04/22
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided
TIME RECEIVED- 1421 DELIVERED BY- Alpha

SAMPLE MATRIX- WW
TIME SAMPLED- 1125
RECEIVED BY- EW
TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Standard Plate Count (SM18-21)	9215B	05/04/22	1635	BLO	70	cfu/ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachel R Bunnell
(Terms and Conditions on Reverse Side)

Rachel R Bunnell
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

Certified Environmental Services, Inc.

7280 Caswell Street
North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

REPORT OF ANALYSES

Alpha Analytical
8 Walkup Drive
Westborough, MA 01581-

PROJECT NAME: L2223336
DATE: 05/09/2022

SAMPLE NUMBER- 861880 SAMPLE ID- Set 2- Mid Pond SAMPLE MATRIX- WW
DATE SAMPLED- 05/04/22 TIME SAMPLED- 1125
DATE RECEIVED- 05/04/22 SAMPLER- Information Not Provided RECEIVED BY- EW
TIME RECEIVED- 1421 DELIVERED BY- Alpha TYPE SAMPLE- Grab

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
Total Coliform, MF	SM9222B-15	05/04/22	1550	BLO	E 6	cfu/100ml

NYSDOH LAB ID NO. 11246 APPROVED BY: Rachael R Bancroft
(Terms and Conditions on Reverse Side)

Rachael R. Bancroft
Technical Director

The analytical results on this sample are representative of the sample received by the Laboratory.

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Certified Environmental Services
7280 Caswell Street
North Syracuse, NY 13210

Alpha Job Number
L2223336

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 716-427-5223
Email: cfox@alphalab.com

Project Information

Project Location: NY
Project Manager: Candace Fox

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:

Regulatory Criteria:

55500

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2223336

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
861873→876	SET 1 - SOUTH POND	05-04-22 11:50	WATER	E. Coli; Fecal Coliform- SM9222D;Heterotrophic Plate Count; Total Coliform - SM9222B	
877→880	SET 2 - MID POND	05-04-22 11:25	WATER	E. Coli; Fecal Coliform- SM9222D;Heterotrophic Plate Count; Total Coliform - SM9222B	

Relinquished By:	Date/Time:	Received By:	Date/Time:
AAL			
[signature]	05/04/22 1421	[signature]	1421 5-4-22

Form No: AL_subcoc

Serial_No:06022218:15

CES

7280 Caswell Street
North Syracuse, NY 13212
Phone 315-478-2374
Fax 315-478-2107

Sample Receiving Checklist

Client Name: Alpha

Batch Number: J5500

	Yes	No	If No Explain:
1. Proper Full and Complete Documentation:	☑	☐	
2. Appropriate Sample Containers:	☑	☐	
3. Adequate Sample Volume:	☑	☐	
4. Hold Time(OK):	☑	☐	
5. Proper Sample Labeling:	☑	☐	
6. Sample Temperature:	☑	☐	
7. Preservation OK:	☑	☐	

(If preservation required note Lot # associated with preservative if available.)

H_2SO_4 **WC** HNO_3 **MT** NaOH **WCSP** Ascorbic Acid **WC**

HCl **WCSP** $Na_2S_2O_3$ **WC** Other _____ Not Available ☐

Additional Comments/Client Correspondence

DOCUMENT ID: SRCL 103019 **Approved by: RRB** **Date Put In Place: 10/30/19**

Appendix 2.3.A: Ecological Survey Data Sheets (H2H Geoscience Engineering, PLLC)

Cortland Marl Pond Egg Mass Survey

Date 5/4/22
Time Onsite 1100
Time Offsite 1500
Precipitation Slight Rain
Ice Cover (%) 100

Wind NE 6mph
Air Temp 56
Cloud Cover (%) 100

	North Pond	Middle Pond
Water Temp. (°C)	16.01	14.75
pH	8.29	8.00
Turbidity (NTU)	60.3	14.7
Specific Conductance (µS/cm)	0.603	0.565
Oxidation Reduction Potential (mV)	214	223
Dissolved Oxygen (mgL)	10.13	
Water Depth (ft)	9 ft	12 ft
Water Clarity	To Bottom	To Bottom

Pond	Transect	Species	Approximate No. Eggs	Type of Attachment
North	T3	A. Maculatum	65	Benthic vegetation
Mid	T1	A. Maculatum	100	Benthic vegetation
Mid	T1	A. Maculatum	50	Benthic vegetation
Mid	T1	A. Maculatum	50	Benthic vegetation
Mid	T1	A. Maculatum	40	Benthic Vegetation

Cortland Marl Pond Egg Mass Survey

Date 4/25/22
Time Onsite 1100
Time Offsite 1400
Precipitation None
Wind SE 15mph
Air Temp 64°
Ice Cover (%) 0%
Cloud Cover (%) 15%

	North Pond	Middle Pond
Water Temp. (°C)	14.79	15.01
pH	8.24	7.92
Turbidity (NTU)	4	0
Specific Conductance (µS/cm)	0.646	0.664
Oxidation Reduction Potential (mV)	92	109
Dissolved Oxygen (mgL)	8.35	7.50
Water Depth (ft)	9ft	12
Water Clarity	To Bottom	To Bottom

Pond	Transect	Species	Approximate No. Eggs	Type of Attachment
North	1	Blue-spotted	~50	Bark

Cortland Marl Pond Emergence Survey

Date 3/24/22
Time Onsite 1930
Time Offsite 2030
Humidity 79%
Cloud Cover 0%

Sunset 1922
Traffic Slow ~6/hour

Location	Species	Mortality	Sex	Amplexus (Y/N)
LHR	A. Maculatum	Dead	N/A	N
LHR	A. Maculatum	Alive	M	
LHR	P. Crucifer	Alive	N/A	
LHR	A. Maculatum	Alive	M	
LHR	A. Maculatum	Alive	F	
LHR	A. Maculatum	Dead	N/A	
LHR	A. Maculatum	Dead	N/A	
LHR	A. Maculatum	Dead	N/A	
LHR	A. Maculatum	Alive	M	



Cortland Marl Pond Emergence Survey

Date 3-19-22
Time Onsite 1930
Time Offsite 2230
Humidity 79%
Sunset 1915
Cloud Cover Slightly cloudy
Traffic Low, ~4/hr

Location	Species	Mortality	Sex	Amplexus (Y/N)
Lime Hollow Rd	Lithobates pipiens	Alive	F	N
LHR	Anaxyrus americanus	Alive	F	N
LHR	Ambystoma Jeffersonianum/ lateriale	Alive	F	N
Trail	Ambystoma maculatum	Alive	F	N
LHR	Ambystoma maculatum	Alive	M	N
LHR	Pseudacris crucifer	Alive	N/A	N
LHR	P. Crucifer	Dead	N/A	N
LHR	P. Crucifer	Dead	N/A	N
LHR	P. Crucifer	Dead	N/A	N
LHR	P. Crucifer	Dead	N/A	N
LHR	P. Crucifer	Dead	N/A	N
LHR	Ambystoma maculatum	Dead	N/A	N
LHR	N/A	Dead	N/A	N

Appendix 2.3.B: Ecological Survey Photograph Log (H2H Geoscience Engineering, PLLC)



Date: April 25, 2022

Description:

Southern boundary of the North Pond facing North



Date: May 4, 2022

Description:

Egg mass from the North Pond



Date: March 19, 2022

Description:

Live spotted salamander sample on Lime Hollow Trail during emergence survey



Date: March 19, 2022

Description:

Live frog samples from Lime Hollow Rd during emergence survey



Date: March 24, 2022

Description:

Live peeper sample from Lime Hollow Rd



Date: March 24, 2022

Description: 8 October 2021

Northern boundary of North Pond facing south



Date: July 26, 2022

Description:

Desiccated char sp. in North Pond



Date: July 26, 2022

Description:

Soil sample from North Pond



Date: July 26, 2022

Description:

Desiccation in North Pond



Date: July 26, 2022

Description:

Northern boundary of Middle Pond facing south



Date: March 19, 2022

Description:

Dead spotted salamander on Lime Hollow Rd