OBG

DRAFT REPORT

Remedial Investigation
Former Ithaca Gun Factory Site
Site No. C755019

Ithaca, New York

IFR Development, LLC

November 2018

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Former Ithaca Gun Factory Site

BCP Site No. C755019
Ithaca, New York

Prepared for: IFR Development LLC

I *Douglas M. Crawford, certify that I am currently a NYS registered professional* engineer and that this Remedial Investigation Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications

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ACM	asbestos containing material
amsl	above mean sea level
BCP	Brownfield Cleanup Program
bgs	below ground surface
BWF	biodegradation weighting factor
C&D	construction and demolition
CAMP	Community Air Monitoring Program
CDCE	cis-1,2-dichloroethene
cm/sec	centimeters per second
COCs	primary constituents of concern
CSM	conceptual site model
CVOC	chlorinated volatile organic compound
DCA	1,1-dichloroethane
DCE	1,1-dichloroethene
DER	Division of Environmental Remediation
DO	Dissolved Oxygen
DSNY	Dig Safely New York
DUSR	Data Usability Summary Report
DWP	Demolition Work Plan
EDD	electronic data deliverable
ELAP	Environmental Laboratory Approval Program
ESDRNY	Empire State Development ReStore NY
ERP	Environmental Restoration Program
ESA	*Environmental Site Assessment*
FD	Field duplicate
FSAP	Field Sampling and Analysis Plan
FSI	*Focused Site Investigation*
FSIWP	*Focused Site Investigation Work Plan*
FSIR	*Focused Site Investigation Report*
ft	feet

FWIRA	Fish and Wildlife Resources Impact Assessment
HASP	Health and Safety Plan
IDW	investigation derived waste
IRM	Interim Remedial Measure
mg/kg	milligrams per kilogram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	Oxidation-Reduction Potential
PAHs	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PID	photo-ionization detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QA/QC	quality assurance / quality control
QCD	Quality Control Document
QHHEA	Qualitative Human Health Exposure Assessment
RI	Remedial Investigation
RIR	*Remedial Investigation Report*
RIWP	*Remedial Investigation Work Plan*
RQD	rock quality designation
SCO	Soil Cleanup Objective
SGV	Standard and guidance value
SVOC	semi-volatile organic compound
TAL	target analyte list
TCA	1,1,1-trichloroethane

TCE	trichloroethylene
TCL	Target Compound List
TCLP	Toxicity characteristic leaching procedure
UFPO	underground facilities protective organization
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
µg/L	micrograms per liter
VOC	volatile organic compound
VC	vinyl chloride
VCP	Voluntary Cleanup Program
XRF	xray fluorescence

1. INTRODUCTION

This Remedial Investigation Report (RIR) has been prepared on behalf of IFR Development LLC for the Former Ithaca Gun Factory Site (Site) located at 121-125 Lake Street in Ithaca, New York (**Figure 1-1**). The current site owner entered the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a volunteer in 2013. The Site was accepted into the BCP by NYSDEC and designated as Site No. C755019.

Based on site environmental conditions that were known in 2013, the NYSDEC in consultation with the New York State Department of Health (NYSDOH), determined that the site posed a significant threat to public health and the environment. The significant threat decision was based on the present of high concentrations of lead in surface soil across the site and the presence of chlorinated volatile organic compounds (VOCs) in groundwater on site and the documented migration of impacted groundwater off-site.

The Site, as depicted on **Figure 1-2**, is 1.63 acres in size and consists of two parcels. The Eastern Parcel formerly included the main manufacturing operations of the Ithaca Gun Company, and the smaller, Western Parcel contained the former boiler. The original Ithaca Gun Factory property consisted of approximately 2.6 acres. However, approximately 1 acre was granted to the City of Ithaca to be developed as a City park with a public walkway and overlook area for adjacent Ithaca Falls (**Figure 1-2**).

The property formerly belonged to the Ithaca Gun Company that operated as the Ithaca Gun manufacturing plant and test site for approximately one hundred years. The company filed for bankruptcy in 1979. The Site is currently vacant, with primary buildings demolished in 2009, leaving only a small single-story building and the Ithaca Gun boiler stack on the Western Parcel. The current owner, IFR Development LLC, is in the process of designing a multi-tenant residential housing development that will cover most of the Site.

The primary constituents of concern (COCs) associated with the Site include lead and chlorinated volatile organic compounds (CVOCs), specifically tetrachloroethene (PCE) and associated degradation products: cis-1,2-dichloroethene (CDCE), trichloroethene (TCE), and vinyl chloride (VC). Secondary COCs, include SVOCs and PCBs.

1.1 PROJECT OBJECTIVES

The objective of this RI is to evaluate the nature and extent of contamination resulting from historic site operations. This RI builds on previously-conducted investigations and included additional investigation to address data gaps, including the identification of lead exceeding 400 ppm in shallow soils, and further evaluation of the extent of VOC-impacted groundwater within the underlying bedrock.

1.2 REPORT ORGANIZATION

This report document is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Field Investigation Methods
- Section 4 – Site Characteristics
- Section 5 – Nature and Extent of Constituents
- Section 6 – Conceptual Site Model
- Section 7 – Qualitative Human Health Exposure Assessment
- Section 8 – Summary and Conclusions
- Section 9 - References

2. SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Site is located at 121-124 Lake Street in Ithaca, New York and encompasses approximately 1.6 acres on the eastern side of a broad glacial valley. The Site is located in a residential area bounded to the north by a deep gorge, Cornell University to the east, Lake Street and residential housing to the south, and residential neighborhood to the west. Fall Creek is located at the base of the gorge and Ithaca Falls is located to the east along the gorge where Fall Creek flows westward to Cayuga Lake located in the valley as shown on **Figure 1-1**.

Due to the steep topography, the property was terraced into two flat areas for use. The upper area or Eastern Parcel was the primary location of the manufacturing facility and the lower terrace or Western Parcel housed the boiler house and other support facilities. The manufacturing building (**Figure 1-2**) occupied the majority of the flat surface of the upper terrace with the exception of a narrow access road on the eastern side. A raceway was constructed between the manufacturing building and the gorge to harness the natural waterway for power, resulting in the construction of an "island" adjacent to the gorge. (**Figure 1-2**)

2.2 SITE HISTORY

As stated in an October 29, 2001 *Phase I Environmental Site Assessment (*ESA*)* prepared for the property by Prescott Environmental Associates, Inc. (Prescott, 2001), the property was originally developed for industrial use in 1813 and the property and related structures were expanded and modified several times over the years of operation. The facility was used for the manufacture of Ithaca shotguns. Operations at the facility ceased in 1986. Primary buildings were demolished in 2009, leaving only a small single-story building and the Ithaca Gun boiler stack on the Western Parcel.

The former Ithaca Gun manufacturing included a variety of wood and metal machining operations, as well as the assembly and testing of guns. As noted in the Phase I ESA, historical practices during the Ithaca Gun operations reportedly included the use of indoor, rooftop, and outdoor shooting galleries as well as on-site disposal of lead shot from these test ranges. Subsequent investigations confirmed the presence of lead shot residues on the property as well as on neighboring properties and the adjacent gorge.

2.2.1 Previous Investigations and Remedial Actions

Various environmental investigations have taken place at the former Ithaca Gun property since its closure in 1986. Efforts began in 1995, when the NYSDEC observed lead shot on former Cornell University property northwest of the Site in the gorge. From 1995 through 1998, Cornell University and NYSDEC sampled this area and found elevated levels of lead and other metals. Background samples indicated that elevated levels of metals were widespread throughout the Ithaca Falls area (B&L, 2011). The following provides a summary of the investigation, demolition, and remedial efforts that have taken place since this initial discovery.

EPA Response and Removal

In August 2000, the EPA Region II Response and Prevention Branch and NYSDEC began a Removal Assessment of portions of the adjacent Island and Western Access way (City parcel), the hillside east of the BCP Site (Sigma Nu fraternity), and within the gorge to the west, where lead shot and slag were observed on the surface soils and slope. Additional sampling was conducted by the EPA in 2001 to delineate off-site impacts of lead (B&L, 2011). Between 2001 and 2004, USEPA delineated and removed soil containing lead and other heavy metals originating from lead shot and slag materials from several of the locations included in the assessment. Based on the report from the USEPA on-scene coordinator (www.epaosc.org/site/bulletins) a total of approximately 4,000 tons of non-hazardous materials and 2,000 tons of hazardous materials were removed as part of this action.

Voluntary Cleanup Program (VCP)

The former Ithaca Gun Company property was entered in NYSDEC's VCP in approximately 2001 with a Site Code of V00511. An initial investigation was completed by Prescott Environmental Associates Inc. in 2001. The investigation included completion of soil borings, collection and analysis of soil samples, installation of one bedrock monitoring well, and collection and analysis of groundwater samples from three of four wells present on the property (one well was dry). The investigation found several areas where soil contained lead at concentrations ranging from less than 100 ppm to over 40,000 ppm. Additionally, water and sediment in sumps in the basements of the manufacturing building and the forge/shop building were analyzed. The report identified nine general areas where concentrations of lead were above 6 NYCRR Part 375 (NYSDEC, 2006) Soil Cleanup Objective (SCO) for lead of 400 ppm for Residential and Restricted Residential use.

Building Demolition

As previously discussed, on-site structures included one main manufacturing building and several other outbuildings (**Figure 1-2**). The total area of the building footprints demolished is approximately 40,000 sq ft. The buildings were demolished under the Empire State Development ReStore NY (ESDRNY) program. Work was completed in compliance with the *Demolition Work Plan Former Ithaca Gun Facility, Ithaca, NY* dated May 2008 and prepared by OBG for Fall Creek Development (DWP) as amended and approved by NYSDEC in correspondence dated November 21, 2008. The building demolition was completed by Bianchi Industrial Services (Bianchi) between January 2009 and June 2009. Demolition activities included:

- Removal/management of asbestos containing materials (ACM)
- Identification and management of lead-containing materials within the buildings
- Removal and disposal of electrical transformers
- Removal and disposal of residues within drains, sumps and pits
- Removal and disposal of lights and ballasts
- Removal and disposal of brick material as construction and demolition (C&D) material
- Characterization and demolition of buildings and slabs. The concrete was crushed in anticipation of reuse on the Site as aggregate but due to the presence of low levels of PCBs the material was disposed off-site.

In conjunction with the demolition program, a *Focused Site Investigation (*FSI*)* was also completed. The investigation efforts were outlined in the *Focused Site Investigation Work Plan (*FSIWP*)* as approved by NYSDEC (OBG, 2009). The FSIWP identified thirteen activities that were to be completed. A summary of these items and a discussion of how they were addressed were provided in the *Focused Site Investigation Report (*FSIR*)* dated March 2011 (OBG, 2011a) (**Appendix A**). Of the thirteen items, six were related to evaluation of the nature and extent of constituents of concern at the Site. A summary of these items is provided below. More detailed information can be found in the FSIR.

- ***Collection of soil vapor samples.*** This activity was completed following the demolition. One soil vapor sample was collected from the Western Parcel near the stack of the boiler house and the second sample was collected from the southern side of the Site near Lake Street. The results did not suggest that VOCs were migrating via soil vapor in these areas. Additional information can be found in Section 3 of the FSIR.
- ***Screen soils underneath the basement once the slab has been removed.*** This activity was completed following the demolition using an x-ray florescence (XRF) meter with laboratory analysis of selected samples. An evaluation of the correlation between the XRF reading and laboratory analysis was also completed as part of the screening effort using 26 samples. Based on the results, an XRF reading of 200 ppm was identified as the screening level required to be sufficiently certain that the lead concentration is less than 400 ppm. Additional screening for the potential presence of radioactive materials was conducted using a Geiger counter. The readings were considered indicative of background levels or naturally occurring radiation from the shale bedrock. This is consistent with findings of historic radiological evaluations conducted at the Site. Additional information is provided in Section 4 of the FSIR.
- ***Sampling and analysis of on-site monitoring wells on a semi-annual basis of a period of 1 year.*** Four monitoring wells (MW-1 through MW-4) were present at the Site at the start of the demolition program. One

well, MW-2, had been dry. Two wells, MW-1 and MW-4, were replaced (as MW-01R and MW-04R) following demolition as they were damaged. Samples were collected from three remaining wells in November 2010 and a second set of samples was collected in August 2011 from two of the wells as MW-04R was found to be damaged. Ground water sample results show that the wells each contain VOCs, particularly TCE and CDCE. Concentrations in the upgradient well MW-1 were below 1 ppb. Concentrations in the downgradient wells, MW-03 and MW-04R, were above the groundwater standard of 5 ppb. More information is provided in the FSIR and correspondence providing the revised ground water sampling and analysis results dated February 22, 2012.

ERP on City of Ithaca Parcel

As previously discussed, a portion of the original Ithaca Gun Company property was acquired by the City of Ithaca. The City of Ithaca Urban Renewal Agency subsequently entered this parcel into the NYSDEC Environmental Restoration Program (ERP) and was assigned a Site Number E755018. The City contracted Barton & Loguidice, PC (B&L) to complete investigation and remedial efforts associated with the ERP. In conjunction with this program, a *Site Investigation Work Plan* (B&L, 2011) dated November 2011 was prepared and approved by NYSDEC.

Investigation findings and IRM activities were documented in a *Site Investigation Report* (B&L, 2016). Groundwater in well MW-05, which was installed at the base of the western slope immediately east of the former boiler house, contained total VOCs at concentrations of approximately 2,700 ppb. The predominant compounds identified were TCE and CDCE. In comparison, samples from MW-03 contained total VOCs at approximately 300 ppb and MW-04R contained total VOCs between 100 and 600 ppb. Furthermore, wells MW-06 and MW-07 located near Lake Street to the west of the boiler house also contained low concentrations of total VOCs that ranged between 7 ppb and non-detect.

In soil, concentrations of lead and in some cases SVOCs (primarily polyaromatic hydrocarbons [PAHs]) and other metals exceeding the Restricted Residential Soil Clean-up Objectives (SCOs) were identified throughout the Site. As part of the ERP Interim Remedial Measure (IRM), lead-impacted soils were removed from the following locations:

- Former Walkway Area
- Western Accessway
- Raceway Area
- Island Area

Removal of lead-impacted soil also addressed the SVOCs and other metal concentrations exceeding Restricted Residential SCOs. Some soil exceeding the Restricted Residential SCOs remained in the vicinity of the walkway. Exposure to these materials was mitigated by placement of a soil cover system. The cover system consisted of a minimum of 20 inches of clean backfill, 4 inches of clean topsoil and an erosion control blanket/ vegetation. A demarcation layer was placed beneath the cover system to identify between impacted soils and the cover system. A Record of Decision (ROD) was issued for this Site by NYSDEC in September 2017 (NYSDEC, 2017).

3. REMEDIAL INVESTIGATION METHODS

This section discusses the methodologies employed to complete RI field tasks. The RI was completed between September 2016 and March 2018 to meet the objectives discussed in **Section 1.1** and implemented under the approved Remedial Investigation Work Plan (RIWP) (OBG, 2013) and further amended by NYSDEC in a letter dated January 13, 2014 (NYSDEC, 2014), and the *Additional RI Work Plan (*ARIWP*)* (OBG, 2017) provided in **Appendix B**. The RI field activities were completed in accordance with procedures provided in the Field

Sampling Activities Plan (FSAP), Quality Control Document (QCD), and the Health and Safety Plan (HASP) that were Appendices to the RIWP.

Prior to the initiation of intrusive field activities, an underground facilities protective organization (UFPO) request was submitted to Dig Safely New York (DSNY). Subsequent to the request, subsurface utilities were identified and marked prior to intrusive activities.

3.1 SOIL CHARACTERIZATION

Soil characterization was completed utilizing field screening and laboratory analysis of soil samples. **Figure 3-1** provides the investigation locations. A summary of screening and other analyses completed at each location is provided on **Table 3-1**.

3.1.1 Field Screening

Field screening of soils included utilization of an x-ray florescence (XRF) meter and photoionization detector (PID). Between September 14, 2016 and October 26, 2016, samples were collected and screened consistent with the XRF Screening Methodology as presented in Section 3.2 of the RIWP (OBG, 2013). PID screening was performed as outlined in the FSAP. Based on field observations and RIWP requirements, samples were submitted for laboratory analysis.

Surface soil XRF screening was completed at 173 locations across both the Eastern Parcel and the Western Parcel. Soil was screened in the Eastern Parcel at 90 locations (designated with X and Y location IDs) and Western Parcel at 35 locations (designated with Z location IDs) in an approximate 10 ft by 10 ft grid, where possible due to topography, as shown on **Figure 3-1**. Soil was also screened at 25 locations (designated with A, T, and U location IDs) across the Site where historic data was lacking. Soil was screened *in situ* by placing the window of the XRF instrument on the soil surface and recording the lead concentration.

On November 30, 2017, 23 additional soil screening locations, designated with Z, were completed along the sloped and terraced area on the northwest corner of the Western Parcel, as shown on **Figure 3-1**. These activities were conducted in accordance with the XRF Screening Methodology presented in Section 3.2 of the RIWP (OBG, 2013) and the ARIWP (OBG, 2017).

Soil from 38 borings were also screened with XRF. Soil was collected from a soil core and placed in a plastic zipper-close bag and homogenized. The bag was then placed on a flat surface and the material spread out to a thickness of approximately ½ inch. The XRF window was then placed directly on the plastic bag and a measurement recorded. If the sample interval was to be analyzed, the soil in the bag was emptied into a laboratory jar and placed on ice for delivery to the laboratory.

3.1.2 Soil Borings

Lead Screening Borings

Soil borings were completed to allow further evaluation of the vertical extent of lead-impacted soil where XRF readings exceeded 200 ppm lead in surface soil (as indicative of potential lead concentrations greater than 400 ppm). Twelve borings (SB-X-B5, SB-X-E5, SB-X-F4, SB-X-H6, SB-Y-A1, SB-Y-A2, SB-Y-C3, SB-Y-F1, SB-Z-A2, SB-Z-D6, SB-Z-E3, SB-Z-F6) were advanced for this purpose. Eight of these borings were completed on the Eastern parcel and four of the borings were completed on the Western Parcel. Boring logs are provided in **Appendix C**.

Soil samples were collected continuously from the ground surface to the top of bedrock using direct-push drilling methods in accordance with the FSAP. Soil samples were collected from the 0 to 6-inch, 6 to 12-inch, and 12 to 24-inch depth intervals at each location unless bedrock was encountered at shallower depths. As noted in **Section 3.1.1**, these samples were screened using XRF and a sample from each interval was submitted for laboratory analysis of lead as outlined in **Table 3-1**.

At depths greater than 24 inches, soil samples were collected at 2-ft intervals to the top of bedrock. Where XRF screening exceeded 200 ppm lead, a sample was submitted for laboratory analysis for lead using USEPA Method 6010C. Additionally, where fill was present, a sample of the fill from one boring (SB- Z-D6) located on the Western Parcel was collected and submitted for laboratory analysis of TCL VOCs, TCL SVOCs, TCL PCBs, TAL metals, mercury, and cyanide as outlined in **Table 3-1**.

Confirmation Sampling

A minimum of ten percent of the 2016 XRF screening samples were submitted for laboratory analysis of lead. The samples submitted for laboratory analysis are outlined in **Table 3-1**.

Western Parcel

As outlined in the RIWP, one soil boring (SB-01) was completed adjacent to the former boiler house smoke stack on the Western Parcel to evaluate the characteristics of unconsolidated material in this area. Soil samples were collected continuously from the ground surface to the top of bedrock using direct-push drilling methods in accordance with the FSAP. Soil samples were screened using XRF and samples that exceed 200 ppm were submitted for laboratory analysis for lead using USEPA Method 6010C. Additionally, soil samples were screened using a PID and PID responses were not observed. One soil sample exhibiting the highest XRF reading, SB-01 6 to 8 ft, was submitted for laboratory analysis of VOCs, SVOCs, PCBs and metals as outlined in **Table 3-1**.

Based on the detection of PCBs at a concentration of 62 mg/kg in the soil sample collected from 6 to 8 ft below grade at SB-01, additional borings were completed as outlined in the ARIWP. A total of 15 soil borings (SB-24 through SB-38) were completed in a grid centered around the SB-01 location to further evaluate the vertical and horizontal extent of PCBs in the soil. Boring SB-31 was placed next to the SB-01 location. As shown in **Figure 3-1** the sample grid around SB-01 has an approximate spacing of 10 feet in the north to south direction and 8 feet in the east to west direction along the gravel ramp between the property fence to the west and the former boiler house foundation to the east. Soil samples were collected continuously from the ground surface to the top of bedrock using direct-push drilling methods in accordance with the FSAP. The soil samples were composited for analysis in 2-ft intervals from the ground surface to the bedrock surface. Initially, every other interval at each location was submitted for analysis with the exception of SB-31. At this location, which is adjacent to SB-01, all intervals were submitted for analysis except for the final 0.7 foot interval. Pursuant to the results of the first set of samples, six additional samples were analyzed to further evaluate the potential extent of PCB-impacted material as presented in **Table 3-1**. Boring logs are provided in **Appendix C**.

In addition, as outlined in the ARIWP two shallow soil samples, coincident with the PCB delineation direct push locations in the Western parcel, were collected from a depth of 0 to 12 inches and analyzed for TCL VOCs plus TICs, TCL SVOCs plus TICs, TAL metals, mercury, cyanide, and pesticides, in addition to PCBs as outlined in **Table 3-1**. These samples were collected using hand tools (stainless steel shovel).

The basement foundation of the former boiler house is in the vicinity of SB-01 (**Figure 1-2 and Figure 3-1**). Although field observations indicated that this foundation was filled with concrete and brick generated during the boiler house demolition, five samples were collected from the fine-grained material present within the foundation from a depth of 0 to 1 ft bgs to assess whether PCBs or lead may be present as outlined in the ARIWP and presented in **Table 3-1**. Samples were collected using hand methods (stainless steel shovel). Sampling tools were washed in Alconox® and water between samples to limit cross- contamination.

Additional Eastern Parcel Borings

Twenty-two additional soil borings (SB-2 through SB-23) were completed across the Eastern Parcel to provide further evaluation of the volume of unconsolidated material and horizontal and vertical extent of lead in soil. Soil samples were collected continuously to the top of bedrock. Samples were also screened using an XRF scanner. This activity was outside of the scope identified in the RIWP and conducted to provide additional information for use to qualitatively assess the presence of lead and volume of unconsolidated materials. No laboratory analysis was performed.

As outlined in the ARIWP, additional soil samples were collected to assess the nature and extent of constituents in the unconsolidated materials. Specifically, six samples were collected from locations randomly distributed across the parcel from a depth of 0 to 12 inches and analyzed for PCBs, TCL VOCs plus TICs, TCL SVOCs plus TICs, TAL metals, mercury, cyanide, and pesticides. The samples were collected using hand methods (stainless steel shovel). Sampling tools were washed in Alconox® and water between samples to limit cross contamination.

3.2 GROUNDWATER CHARACTERIZATION

3.2.1 Bedrock Borings

Bedrock coring to facilitate well installation was completed at four locations (MW-08, MW-09, MW-10, and MW-11) in accordance with the procedures described in the FSAP. Bedrock boreholes at MW-08 and MW-09 were advanced to a depth of 71 ft and 70 ft below grade, respectively. This is approximately 20 ft below the bottom of the screened interval of MW-05. The bedrock borehole at MW-10 was advanced to a depth of 76 ft below grade, which is approximately 20 ft below the bottom of the screened interval of MW-4. MW-11 was advanced to a depth of 67.5 ft below grade, which is approximately 6 ft below the bottom of the screened interval of MW-05.

An 8-1/4 inch inside diameter hollow stem auger was advanced to the top of bedrock. A nominal 8-inch diameter socket was then drilled into the bedrock surface using a roller bit. A 6-inch diameter steel casing was then installed through the auger string and grouted in-place as the auger string was retracted. The grout was allowed to cure for a minimum of 12 hours prior to advancement of the bedrock borehole. Subsequent to curing of the grout, the boreholes were advanced at approximate 10-ft intervals using coring methods. Packer testing/sampling was then conducted as described in the below subsection.

3.2.2 Packer Sampling

The boreholes for monitoring wells (MW-08, MW-09, MW-10, and MW-11) as discussed in **Section 3.2.1** were advanced at approximate10-ft intervals. Following the advancement of each interval, if groundwater was encountered, packer sampling was conducted at MW-08, MW-09, and MW-10 consistent with the RIWP (**Table 3-2**). At MW-11 packer tests were only initiated to establish the depth of the water table at that location consistent with the ARIWP. A packer system consisting of a slotted drop pipe with an affixed upper inflatable packer was installed in the borehole. The packer interval was evacuated of one packer volume using a submersible pump. If the packer interval was purged dry, a groundwater sample was collected once sufficient volume recovered in the interval to fill the sample vials. If sufficient volume was not recovered in the packer interval after 30 minutes, a groundwater sample was not collected, the packer string was removed, and borehole advancement and packer sampling continued.

At MW-08, groundwater was encountered at approximately 14 ft below grade. Thus, seven packer intervals were evaluated from 8 ft below grade to 71 ft below grade (terminal depth). The 46.0 to 56.5 ft below grade packer interval was the only interval to produce water. A sample of the water from this interval was collected and submitted for analysis of VOCs as outlined in **Table 3-1**.

At MW-09, groundwater was encountered at approximately 49 ft below grade. Thus, two packer intervals were evaluated from 46.2 ft below grade to 70 ft below grade (terminal depth). The packer interval from 46.2 to 56.7 ft below grade packer was the only interval to produce water. A water sample from this interval was collected and submitted for analysis of VOCs as outlined in **Table 3-1**.

At MW-10, groundwater was encountered at approximately 21 ft below grade. Thus, four packer intervals were evaluated from 24 ft below grade to 76 ft below grade (terminal depth). A fifth interval (45-53ft below grade) was not tested as it overlapped with the adjacent screened interval of MW-4. The packer interval from 34 to 44.5 ft below grade was the only interval tested that produce water. A sample of the water was collected and submitted for analysis of VOCs as outlined in **Table 3-1**.

At MW-11, eight packer tests were conducted from 22 to 67.5 ft below grade as presented in **Table 3-2**. Three overlapping intervals produced water; 0-57.5 ft below grade, 42-67.5 ft below grade, and 42.5-52.5 ft below grade. The non-water producing intervals were therefore used to isolate possible water production zones. Intervals ranging from 47.5 to 67.5 ft below grade and intervals ranging from 22 to 42.5 ft below grade did not produce water indicating that water production from the three producing intervals originated from a single zone located between 42.5 to 47.5 ft bgs.

3.2.3 Bedrock Well Installation

Upon completion of packer sampling at MW-08, MW-09, MW-10, and MW-11, well screen intervals were selected to screen fractures identified in packer intervals that produced water (**Table 3-2**). At MW-08 and MW-09, wells screen intervals of 46 to 56 ft below grade were selected. At MW-10, a well screen interval of 32.5 to 42.5 ft below grade was selected. An optional second well was identified in the RIWP at MW-10, however, due to a lack of fractures that produced water, only one well was installed. At MW-11, a well screen interval of 42.5 to 52.5 ft below grade was selected.

Monitoring wells were constructed of 2-inch diameter PVC with 10 ft of 0.010-inch slotted screen. Monitoring wells were developed in accordance with the FSAP. Well construction details are presented in **Table 3-3**. Core logs are presented in **Appendix C**.

3.2.4 Monitoring Well Development

Newly installed monitoring wells; MW-08, MW-09, and MW-10 were developed by surging and purging with a submersible pump. MW-11 was developed by lowering and retrieving a disposable bailer. Groundwater parameters were recorded before, during, and after well development and are presented in **Appendix D**.

3.2.5 *In Situ* Hydraulic Conductivity Tests

Between December 6, 2018 and December 11, 2018 *in situ* hydraulic conductivity tests were completed on wells MW-05, MW-08, and MW-09. The tests were completed in accordance with the hydraulic conductivity testing procedures outlined in the FSAP. The test data were interpreted using the Bouwer & Rice solution and are presented in **Appendix E** and **Table 3-4**.

3.2.6 Groundwater Sampling

Three rounds of groundwater sampling were completed during the implementation of the RIWP and the ARIWP. The first round of sampling was completed between December 8, 2016 and December 9, 2016, the second round of groundwater sampling was completed between February 21, 2017 and February 22, 2017, and the third round was completed between January 10, 2018 and January 11, 2018.

Monitoring wells were sampled using bailing sampling techniques performed in accordance with the groundwater sampling procedures outlined in the FSAP. Water quality parameters were recorded on groundwater sampling logs. Groundwater sampling logs are provided in **Appendix F**.

Groundwater samples collected during the first sampling event were analyzed for VOCs only. Groundwater samples collected during the second sampling event were analyzed for VOCs and, at the request of NYSDEC (NYSDEC, 2014), a subset for dissolved gas and geochemical parameters (carbon dioxide, methane, ethane, ethene, sulfide, chloride, alkalinity, total organic carbon, sulfate, nitrate, nitrite, dissolved ferrous iron, total dissolved iron, and total dissolved manganese). Groundwater samples collected during the third sampling event were analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticide, TAL metals, mercury, and cyanide. A summary of the groundwater samples collected and analyses performed for all three groundwater sampling events is presented in **Table 3-1.**

Field measurements were also collected of pH, oxidation reduction potential, temperature, dissolved oxygen under pumping conditions in March 2017 to augment the natural attenuation evaluation data set (Section 5.3). Parameters were recorded on field logs which are included in **Appendix F**.

3.2.7 Groundwater Elevation Monitoring

Groundwater levels were measured at the beginning of all three RI groundwater sampling events on the following dates: December 8, 2016, February 21, 2017, and January 10, 2018. Groundwater elevations are presented in **Table 3-5** and on **Figures 4-2 thru 4-4**.

3.3 SAMPLE ANALYSIS

Samples collected during the above-identified investigations were analyzed in accordance with the procedures and protocols detailed in the QCD contained in the RIWP (OBG, 2013). As outlined in the QCD, Quality Control/Quality Assurance (QA/QC) samples consisting of a matrix spike (MS), matrix spike duplicate (MSD), equipment blank (EB), and field duplicate (FD) were collected at a frequency of 1 per 20 samples where data was required to be validated. Trip blanks also accompanied samples to be analyzed for VOCs. Samples were transported under standard chain-of-custody protocol to the laboratory for analysis. Laboratories provided NYS Analytical Services Protocol (ASP) Category B data packages. Copies of the analytical reports are provided in **Appendix G**.

Samples were analyzed by Test America (TA), Buffalo, New York, a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory (ELAP #10026) and Pace Analytical Services, LLC (Pace), Melville, New York, a NYSDOH ELAP-certified laboratory (ELAP #56367).

Table 3-1 provides a summary of the sample analysis completed on soil and groundwater samples collected during the RI.

3.4 DATA VALIDATION

Analytical laboratory data were received in electronic data deliverable (EDD) format. The data packages were validated and a *Data Usability Summary Report (*DUSR*)* was prepared by Vali-Data of Western New York Inc. in accordance with the requirements of DER-10. Data validation was performed in accordance with the RIWP QCD (**Appendix B**). The individual DUSRs are provided in **Appendix H**. Data validation was not performed on waste characterization sample results.

3.5 COMMUNITY AIR MONITORING PROGRAM

A community air monitoring program (CAMP) was conducted during the RI. The CAMP, consisting of VOC and dust monitoring at upwind and downwind locations, was implemented during drilling activities consistent with procedures presented in **Appendix B** of the approved RIWP (OBG, 2013a).

Air quality (dust and VOCs) was monitored at one upwind and one downwind location with respect to the excavation activities. Monitoring instrumentation was fitted with visual and auditory alarms. Instrumentation locations were selected based on the prevailing wind conditions at the time intrusive activities were being conducted and were adjusted based on the wind direction.

Instrument readings were within acceptable screening levels as outlined in the RIWP and VOC and dust monitoring results are presented in **Appendix I**.

3.6 SURVEY

Locations of soil borings and monitoring wells completed during the RI were surveyed by T.G. Miller P.C. Engineers and Surveyors (T.G. Miller). T.G. Miller is a State of New York licensed surveyor. Horizontal locations were surveyed to the North American Datum of 1983 (NAD83) New York Central State Plane feet. Vertical elevations were surveyed to the nearest 0.01 feet using the North American Vertical Datum of 1988 (NAVD88).

Survey data is presented in **Table 3-6** and **Appendix J**.

3.7 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation derived waste (IDW) was managed through March 24, 2018.

Investigation derived waste (IDW) produced during the RI included soil, bedrock cuttings, groundwater, and decontamination fluids. Each type of IDW was placed in the appropriate container, properly labeled, and staged on-site within the Eastern Parcel approximately 150 feet from the gate at the south end of the property. Samples of the contained water and soil were collected and analyzed for waste characterization parameters.

The IDW tracking log including the container type, characterization date, and disposal date is presented in **Appendix K.** Thirty 55-gallon drums of non-hazardous water and/or soil were transported off-site by SUN Environmental Corporation for disposal at Cycle Chem in Lewisberry, Pennsylvania. Waste manifests, profiles, and analytical results are provided in **Appendix K**.

4. SITE CHARACTERISTICS

The Site resides in a geographic region characterized by a humid, continental type climate. Per the Northeast Regional Climate Center at Cornell University in Ithaca, New York (http://www.nrcc.cornell.edu/wxstation/ithaca/normal.html), the average annual rainfall is 37 inches, with average snowfall of 64 inches. The average annual temperature is 47°F with the average January temperatures being 15°F to 31°F and average July temperatures being 58° to 80°F.

4.1 SURFACE WATER HYDROLOGY

4.1.1 Regional Surface Water Hydrology

The Site is located within the Oswego River basin which encompasses much of central New York. The Fall Creek and Inlet watersheds are located within this basin and near the study area. The Site lies within the Fall Creek watershed. Surface water in the watershed flows to Fall Creek. Fall Creek flows westward and discharges to Cayuga Lake where it flows northward and eventually discharges to Lake Ontario.

The *City of Ithaca Annual Drinking Water Quality Report for 2016 (City of Ithaca, 2016)* indicates that drinking water supplies are obtained from surface water within a reservoir on Six Mile Creek. Cornell University, within 0.5 miles to the east of the Site, receives its drinking water from Fall Creek *(City of Ithaca, 2016)* from an intake located over 1.5 miles upstream of the Site. Groundwater supply wells were not noted near the subject property (OBG, 2012).

4.1.2 Site Topography and Drainage

The Eastern Parcel lies at a higher elevation than the Western Parcel. The Eastern Parcel ground surface ranges from approximately 520 ft above mean sea level (amsl) at MW-09 to 561 ft above amsl at on the south side of the former Quonset Hut. The topography of the Eastern Parcel slopes in a north northwesterly direction toward Fall Creek. The Western Parcel is smaller and sits at a higher elevation near the parking lot on the south side and slopes north towards Fall Creek. The measured ground surface of the Western parcel is between 491 ft amsl to 494 ft amsl. Fall Creek is located approximately 120 ft below the adjoining land surface and flows westward to Cayuga Lake located approximately 1-mile northwest of the Site. No mapped federal or state wetlands are located on the Site.

An approximately 50 ft deep, east to west oriented, raceway is present between the Site and Fall Creek. Historically, the raceway allowed diverted water to pass through a turbine to generate electricity for the facility. The raceway was typically dry when observed during the RI field activities and does not appear to receive. flow from Fall Creek

In general, precipitation sheet flows along the surface to the north northwest into Fall Creek or percolates into overburden and bedrock. No catch basins or storm water management system infrastructure is present on the Site.

4.2 GEOLOGY AND HYDROGEOLOGY

4.2.1 Regional Geology and Hydrogeology

The City of Ithaca is in the Appalachian Plateau physiographic province, which is located between the Central Lowlands and New England Uplands physiographic provinces.

During the Mesozoic Era (*i.e.,* 195 to 65 mya) the underlying bedrock of the Finger Lakes region was eroded to a peneplane (a surface of little to no relief) and then uplifted prior to repeated episodes of glaciation. Ithaca is located at the end of Cayuga Lake. The Finger Lakes region exhibited a pre-glacial river system that was established in the peneplane and maintained during uplift of the region. Each of the north-south trending basins (*i.e.*, Cayuga, Seneca, Owasco, Skaneateles and Otisco) carried a north-flowing pre-glacial river which provided drainage for the area until the start of the Pleistocene Epoch (*i.e.*, 1.8 mya to 10,000 years ago) when glaciers began to reshape the region.

The advancement of glaciers during the Pleistocene Epoch scoured the north-south trending drainage channels to form Cayuga Lake and the other Finger Lakes and deposited a large blanket of glacial deposits across the flat areas lying to the north of the lakes. The current regional surficial deposits were largely the result of the retreat of the Late Wisconsin Laurentide ice sheet that started about 20,000 years ago.

Regional Surficial Geology

Regionally, the surficial geology consists of glaciolacustrine silts and clays with thin interbedded sands, glaciolacustrine sands, kame sands and gravels, overlying a basal till (Cadwell and Dineen, 1987). The basal till is a heterogeneous deposit consisting of clays, silts, sands and gravels that were deposited during the advancement of the Wisconsin glaciers. This basal till is exposed at the ground surface in the higher elevations to the south between Seneca Lake and Cayuga Lake. Overlying the till are glaciolacustrine deposits, kame deposits, and lacustrine sands which were deposited during the retreat of the Wisconsin glaciers in the area north of Seneca Lake and Cayuga Lake and northward to Lake Ontario, creating a broad glacial lake plain. On the northern side of this lake plain lies a series of elliptical-shaped hills called drumlins which rise in height to between 100 and 300 ft above the surrounding ground surface. The thickness of the surficial deposits varies from less than 5 ft in the higher elevations between Seneca and Cayuga Lakes to more than 300 ft in the drumlin fields to the north. (Crain, 1974)

The *United States Department of Agriculture (USDA) Web Soil Survey (USDA, 2014)* does not characterize the soils in the immediate vicinity of the Site.

Regional Bedrock Geology

Regionally, the area is underlain by a series of sedimentary bedrock formations described, in descending stratigraphic order, as the West Falls Group, Sonyea Group, Genesee Group and Hamilton Group (Rickard, L.V. and Fisher, D.W. 1971). The regional dip of the bedrock formations is approximately 25 ft per mile to the southwest. This dip, coupled with a gradual rise in topographic elevation to the south, results in successive exposure of younger formations from the north to the south (Mozola, 1951). The West River Shale (Genesee Group) is expected to underlie the Site (Rickard and Fisher, 1970). The Cashaqua Shale (Sonyea Group) and Beers Hill Shale (West Falls Group) are found south of the Site (Rickard, L.V. and Fisher, D.W., 1971).

The Genesee Group includes the Ithaca Formation and Renwick Formation. The Ithaca Formation is made up of several members including, in descending order, the Upper Cascadilla Member and Lower Cascadilla Member. The Cascadilla Members are made up of silty shales with few interbedded siltstones that coarsen upward. At the contact between the Renwick and the Ithaca Formation, the Ithaca Falls Limestone is observed. The Renwick Formation is made up of one undifferentiated member. The upper portion of the Renwick includes similar bedrock as the Cascadilla with distinct fauna zones. The lower portion of the Renwick is marked by a dark thin-bedded shale and silt shale with interbedded siltstone channels.

Regional Hydrogeology

Groundwater in the bedrock unit flows predominantly in horizontal bedding planes with some flow occurring along the local and regional vertical fractures. The availability of groundwater within unconsolidated surficial deposits will vary depending on the type of material present. Hydraulic conductivities of the basal till and lacustrine silt and clay deposits of the lake plain are generally very low while hydraulic conductivities of the sand and gravel materials that make up the lacustrine sand, outwash kame, and drumlin formations are generally much higher. Although more permeable sand layers are present within the lacustrine silt and clay unit, the ability of these layers to produce water over a longer period is limited by the recharge of precipitation through the lower permeability silt and clay materials (Crain, 1974).

4.2.2 Site Geology and Hydrogeology

Site Surficial Geology

The Site is underlain by a generally intermittent, thin mix of silt, sand and gravel which is a combination of native soil and gravel fill that was brought in to use as subbase for surface leveling for construction purposes. In some areas the fill is overlain by a geotextile which is covered with gravel to provide a walking surface or driveway. The thickness of these materials as observed from borings ranged from 0.5 ft to 11.5 ft thick in the Eastern Parcel and 4.9 to 15.5 ft thick in the Western Parcel. The material encountered in the Western Parcel borings appears to consist of fill from the ground surface to the bedrock with a thin layer of weathered bedrock found at some locations. Bedrock is exposed at several locations in the Eastern Parcel**. Figure 4-1** presents estimated fill thickness based on drilling logs and Site observations.

Site Bedrock Geology

Bedrock is exposed on the surface on the Eastern Parcel, along the steep slopes bordering the Site and within the gorge and nearby Ithaca Falls immediately north of the Site. The Ithaca Falls limestone is exposed in the cliff face above the lip of Ithaca Falls, which is immediately adjacent to the Eastern Parcel. The Renwick Formation directly underlies the Site. This unit is a medium gray thinly bedded, fossiliferous (brachiopod and crinoid), fine grained siltstone that transitions to a dark gray at approximately 60 ft below grade. This marks the Renwick facies. Horizontal fractures were frequently observed with residual clays along bedding fractures and less frequent high angle fractures. Based on rock quality designations (RQD) from MW-08, MW-09, MW-10, and MW-11 bedrock quality ranged from completely fractured to massive but was primarily moderately fractured. Bedrock quality generally increases with depth except for MW-08. However, the lower RQD values at depth at this location may have been due to a slow core rate in the final coring run at that location. In general, rock quality becomes massive just below the water bearing zone, while within and above the water bearing zone it is generally more fractured. A cross-section is provided as **Figure 4-2. Figure 4-3** depicts the location of the cross-section.

Site Hydrogeology

Groundwater was encountered in bedrock at the Site but not in the overburden. Groundwater in the bedrock appears to be limited to a single interval within the bedrock as demonstrated by the packer testing results (**Figure 4-2 and Table 3-2**). During packer testing, as discussed in **Section 3.2.2**, only one water producing interval was encountered at each new monitoring well installed during the RI. This interval was generally located at the base of a low rock quality zone and just a above more competent bedrock zone as indicated by RQD values in newly installed RI monitoring wells. As illustrated on Figure 4-2, well MW-06 (and MW-07 which is not shown) monitor a groundwater zone that is deeper than the water bearing zone identified on the Eastern and Western Parcels of the Site.

The groundwater-bearing intervals identified during packer testing were generally located between 34 and 57 feet bgs as shown in **Figure 4-2**. The top of this interval ranged from 42.5 to 46.2 ft bgs on the Eastern Parcel and was at 34 ft bgs on the Western Parcel. In contrast, the groundwater level measured within the existing and recently completed monitoring wells on the Eastern Parcel was as shallow as 13.75 ft at MW-8 and as deep as 50.94 ft bgs at MW-09 indicating that the potentiometric head is above the actual water bearing zone in some areas. This suggests that water in the fractures is partially confined and is being fed from higher elevations.

Groundwater elevations in the well representing the potentiometric surface within the bedrock range from 462.65 ft above mean sea level (amsl) to 513.35 amsl. Based on the groundwater elevations, the flow direction appears to be generally to the northwest into the valley as presented in **Figure 4-4**, **Figure 4-5**, and **Figure 4-6**. However, as groundwater occurrence appears to be limited to select fractures the localized flow pathway may vary.

In situ hydraulic conductivity testing of the bedrock monitoring wells yielded a range of estimates from 3.48 x 10^{-06} centimeters per second (cm/sec) (0.01 ft/day) at MW-08 to 8.25 x 10^{-05} cm/sec (0.23 ft/day) at MW-09.

These values for the bedrock are consistent with the range of values (2.3×10^{-05} to 9.1×10^{-05}) presented in the Environmental Restoration Project Report (B&L, 2016). Results are presented in **Table 3-4**.

5. NATURE AND EXTENT OF CONSTITUENTS

This section presents the nature and extent of impacts to soil, groundwater and soil vapor for the Site. Historical results collected during the FSIR are also discussed, as appropriate. Laboratory reports for soil and groundwater samples collected during the RI are provided in **Appendix G**.

5.1 DATA USABILITY

Data validation for RI samples was performed on sample delivery groups 480-110923, 480-113731, 480-113805, and 480-108477, 7036815, 7036852, and 7040282. Based on the validation report, the results are usable either as reported or with minor qualification. DUSRs document data validation and are presented in **Appendix H**.

5.2 NATURE AND EXTENT OF IMPACTS TO SOIL

RI Sample results and FSIR sample results, where appropriate, were compared to Soil Cleanup Objectives (SCOs) provided in 6 NYCRR Part 375 *Environmental Remediation Programs* (NYSDEC, 2006). Where applicable, Supplemental SCOs (NYSDEC Policy *CP-51/Soil Cleanup Guidance* [CP-51] dated October 2010) (NYSDEC, 2010) were also used. For comparison, SCOs are provided with the data summary tables. CP-51 does not provide Unrestricted SCO values. For those constituents included in CP-51, Residential SCOs were used as a conservative protection criterion.

Collectively, the criteria used for screening analytical results include:

- Part 375 Unrestricted Use Soil Cleanup Objectives (Unrestricted SCOs),
- Part 375 Restricted Use Soil Cleanup Objectives for Restricted-Residential and CP-51 Restricted Residential Supplemental Soil Cleanup Objectives (Restricted-Residential SCOs),
- Part 375 Restricted Use Soil Cleanup Objectives for the Protection of Groundwater and CP-51 Protection of Groundwater Supplemental Soil Cleanup Objectives (Protection of Groundwater SCOs),

USEPA SW-846 Method 6010C provides total chromium concentrations without differentiation between the trivalent and hexavalent species. Using a conservative approach, the more stringent SCO for hexavalent chromium was used.

5.2.1 XRF Screening and Correlation with SCO

The DER-10 SCO used to screen for lead is 400 mg/kg based on a Restricted-Residential potential use. To establish an XRF screening value that correlates to an SCO, 36 laboratory samples and corresponding XRF readings were compared to identify a correlation. As shown on the graph in **Figure 5-1**, an XRF value of 200 ppm or less would be most likely to correlate to an analytical result of less than 400 ppm. This is a similar result as identified during the Building Demolition in 2009 and documented in the FSIR (**Section 2.2.1**). Lower concentrations that would correlate with the Unrestricted SCO (63 mg/kg) could not be confidently identified because of the lack of lower concentrations in the data set. Similarly, the RI data showed a poor correlation with XRF values greater than 500 ppm. However, XRF values greater than 500 ppm resulted in an analytical result greater than the SCO thirteen out of fifteen times.

5.2.2 Soil Impacts

RI soil laboratory analytical results are presented in **Table 5-1, 5-2, 5-3, 5-4, and 5-5**. RI XRF lead screening results for soil samples are presented in **Table 5-6**. FSI and RI XRF results for lead at the surface are presented spatially in **Figure 5-2**. FSI and RI analytical results for lead are presented spatially in **Figure 5-3**. Results are discussed below.

Soil samples collected for analysis were generally collected from 0 to 0.5 ft, 0 to 1 ft, 0. 5 ft to 1 ft or 0 to 2 ft bgs. Several samples on the Western Parcel were also collected from deeper intervals. A total of 29 samples were collected from 1 ft or less. These samples will be considered to be surface soils for the purpose of this discussion.

Some of the samples were only analyzed for lead (FSI and RI) or PCBs (*A*RIWP). A total of 10 soil samples collected during the RI and *A*RIWP were also analyzed for additional target compound list (TCL) VOCs, SVOCs, PCBs, and TAL metals, mercury, and cyanide. Samples from eight of the samples were also analyzed for pesticides. Two of the samples, collected from SB-01 and SB-Z-D6, were not analyzed for pesticides. Six of the samples are located randomly across the Eastern Parcel at SB-44, SB-45, SB-46, SB-47, SB-48, and SB-49. Four samples were collected from the Western Parcel at SB-01, SB-Z-D6, SB-24, and SB-36. Soil samples collected for the larger suite of analysis were generally collected from 0 to 1 ft bgs. The sample from SB-01 was collected from 6 to 8 ft below grade and the sample from SB-Z-D6 was collected from 1 to 2 ft below grade. The sample analysis performed on these samples are listed in **Table 3-1** and the locations are represented specially in **Figure 3-1.** Results of the analyses are presented in **Tables 5-1 through 5-5.**

VOCs

Three VOCs - chloroform, TCE, and xylenes (total) - were detected below their corresponding SCOs in one of two locations, SB-01 and SB-24, on the Western Parcel (**Table 5-1**). No other VOCs were detected. SB-24 is one of the eight samples from the collected from the 0 to 1 ft interval and analyzed for VOCs. Samples were not analyzed for VOCs during the FSI.

SVOCs

Twenty SVOCs were detected in soil samples collected during the RI (**Table 5-2**). Seven SVOCs were detected above corresponding SCOs. These exceedances are limited to the following PAHs:

- benzo[a]anthracene
- benzo[a]pyrene
- benzo[b]fluoranthene
- benzo[k]fluoranthene
- chrysene
- dibenz[a,h]anthracene
- indeno[1,2,3-cd]pyrene.

One or more of these PAHs were detected at concentrations above Part 375 SCOs at a total of four samples of the ten samples analyzed for SVOCs. Three of the samples were located in the Western Parcel and one was located in the Eastern parcel. In the Western Parcel, the samples were located adjacent to the boiler room and smoke stack (SB-01), adjacent to the former boiler house foundation (SB-36), and adjacent to the fence at the northern end of the Western Parcel (SB-Z-D6). The sample from the Eastern Parcel was collected from the southeast corner of the Eastern Parcel (SB-49) near the former driveway for the facility. The samples from SB-36 and SB-49 were collected from the 0 to 1 ft interval.

Benzo[a]pyrene, benzo[b]fluoranthene, and indeno[1,2,3-cd]pyrene exceeded Restricted-Residential SCOs samples from each of the four locations that had exceedances. Benzo[a]anthracene exceeded the Restricted-Residential SCO at all locations with exceedances except SB-36. Dibenzo[a,h]Anthracene exceeded Restricted-Residential SCO in the two deeper samples with exceedances collected from the Western Parcel (SB-01 and SB-Z-D6), but not in the shallow samples from SP-36. Chrysene exceeded the Restricted Residential SCO at SB-01 and exceeded Unrestricted SCO at the remaining locations with exceedances. Benzo[k]fluoranthene exceeded Unrestricted SCO in three of the four samples with exceedances. The exception was SB-36, where benzo[k]fluoranthene was below the Unrestricted SCO.

Soil samples were not analyzed for SVOCs during the FSI.

Pesticides

A total of eight soil samples collected from the Eastern and Western Parcels were analyzed for pesticides. Each of these samples were collected from the 0 to 1 ft interval. Pesticides, 4.4 DDD, 4,4 DDE and 4,4 DDT exceeded the Unrestricted SCO in the sample from one location (SB-24) on the Western Parcel, and 4,4 DDT exceeded the Unrestricted SCO in samples from two locations (SB-45 and SB-49) on the Eastern Parcel. Pesticide concentrations did not exceed the Restricted Residential SCO in any of the samples analyzed.

Soil samples were not analyzed for pesticides during the FSI.

Inorganics

During the RI, metals analysis was conducted on 47 samples collected from the Eastern and Western Parcels. Of the 47 samples analyzed, 37 were analyzed for lead only, and 10 samples were analyzed for lead plus the other TAL metals, mercury, and cyanide. A total of 29 samples were collected from between the surface and 1 ft below grade. These data were augmented by samples collected during the FSI. Specifically, 13 samples were collected from the Eastern Parcel and three samples were collected from the Western Parcel. These samples were collected from the 0 to 1 ft interval and analyzed for lead. Laboratory (**Table 5-3**) results identified lead plus seven additional inorganic constituents at concentrations above one or more of the SCOs.

As described in **Section 3.1**, XRF screening was also completed to develop a general understanding of the distribution of elevated lead concentrations across the site. Based on comparison of XRF screening values against analytical data during the FSI, an XRF lead screening level of 200 mg/kg was identified as the value to use to evaluate potential soil concentrations less than 400 mg/kg, which is the Restricted Residential SCO. The XRF screening results will be discussed qualitatively below.

The following discussion of inorganic constituents at the site separates lead from the other inorganic constituents evaluated as lead is the predominant constituent of concern.

<u>Lead</u>

Eastern Parcel

Laboratory analytical results of lead for samples collected from the Eastern Parcel (**Figure 5-3, Table 5-3**) indicate lead exceeded the Unrestricted SCO and Restricted-Residential SCO in samples collected from across much of the parcel. XRF screening results (**Figure 5-2, Table 5-6**) similarly identified widespread potential exceedances of the SCOs in surface soil. Areas where XRF screening of the surface suggests that concentrations of lead will be below the Restricted-Residential SCO are limited to those areas with exposed bedrock or where more recent cover in the form of gravel material has been placed.

XRF screening results (**Table 5-6**) of deeper samples indicate that subsurface soil with lead concentrations potentially above the Restricted-Residential SCO generally correlates with the presence of overlying surface soil containing lead above the Restricted-Residential SCO and that the exceedances are generally limited to the top two feet with the exception of two locations. At location SB-12 and MW-09 which are located along the northwest boundary, XRF screening results suggest the presence of lead exceeding the Restricted Residential SCO at depth of up to 6 and 4 ft bgs, respectively.

Western Parcel

Analytical results of samples collected from the Western Parcel (**Figure 5-3, Table 5-3**) indicate lead exceeded the Unrestricted SCO and Restricted Residential SCO across much of the parcel. Similar to findings in the Eastern Parcel, XRF lead screening results (**Figure 5-2, Table 5-6**) confirmed the potential for widespread exceedances of the Restricted-Residential SCO in surface soil. Within the former boiler house foundation, concentrations of lead above the Restricted-Residential SCO appears to be limited to the near surface as the 0 to 2 ft samples that were analyzed contained concentrations below the Restricted-Residential SCO.

Of the 29 samples collected from between the surface and 1 ft below grade and analyzed for lead, 26 samples contained lead concentrations above the Unrestricted SCO and 12 samples contained lead above the Restricted-Residential SCO.

Analytical results indicate that lead was present in each of the subsurface soil samples analyzed at concentrations above the Unrestricted SCO with exception of one sample collected from SB-01 (1 to 2 ft bgs) (**Figure 5-3, Table 5-3**). Lead exceeded the Restricted Residential SCO at one sample from borings completed in four different locations: SB-01 (4-12 ft bgs), SB-Z-D6 (1-2 ft bgs), SB-Z-E3 (0.5-2 ft bgs), SB-Z-F6 (2-4 ft bgs). At location SB-Z-D6, lead concentrations exceeded Restricted Residential SCO in the shallow soil (0 to 0.5 ft) with lower concentrations in deeper samples that only exceeded the Unrestricted SCO. The opposite was identified at SB-01 where lead in the shallow sample (0 to 0.5) was greater than the Unrestricted SCO and concentrations in the next two intervals were below the Unrestricted SCO. However, lead was found to exceed the Restricted-Residential SCO in the deeper samples from this location down to bedrock at 12 ft bgs. The presence of lead above Unrestricted SCOs and in some cases, Restricted Residential SCOs at most depth intervals suggests that the material in this area and most of the Western Parcel likely consists of fill.

<u>TCL Inorganics</u>

Eastern Parcel

In the Eastern Parcel, soil collected from 0 to 1 ft bgs was also analyzed for TAL metals, mercury, and cyanide at six locations (SB-44 thru SB-49). Arsenic, cadmium, copper, lead, mercury, silver, and zinc were found at concentrations exceeding Unrestricted SCOs in one or more of five of the six samples while only arsenic, mercury, and lead exceeded the Restricted Residential SCOs in one of the six samples. Arsenic, mercury, and lead exceeded Restricted-Residential SCOs at SB-48 located in the southwest corner of the parcel (**Figure 5-3**).

Western Parcel

In the Western Parcel, soil samples from four locations (SB-01, SB-24, SB-36, and SB-39) were also analyzed for TAL metals, mercury, and cyanide. Arsenic, cadmium, copper, lead, mercury, nickel, selenium, silver, and zinc exceeded Unrestricted SCOs in one or more of the samples while arsenic, cadmium, lead, and mercury exceeded the Restricted Residential SCOs in two samples. Arsenic, lead, and mercury exceeded Restricted Residential SCOs at SB-01 (6 to 8 ft bgs) (**Table 5-3**). Arsenic and cadmium exceeded Restricted Residential SCOs while lead only exceeded the Unrestricted SCO at SB-24 (0 to 1 ft bgs). These locations are in the vicinity of the boiler house stack and foundation.

PCBs

PCB results for samples collected during the RI are summarized on **Table 5-4**.

In the Eastern Parcel, subsurface soil samples from six locations collected from the 0 to 1 ft interval were analyzed for PCBs. PCB concentrations exceeded the Unrestricted SCO at one of the locations (SB-49). None of these samples were no exceedances of Restricted-Residential SCOs.

In the Western Parcel, two initial soil samples were analyzed for PCBs. These samples were collected from SB-Z-D6 and SB-01. PCBs were not detected in SB-Z-D6 but exceeded the Restricted Residential SCO in the sample collected from SB-01. Specifically, PCB Aroclor 1254 was detected at 62 mg/kg in the sample collected from 6 to 8 ft below grade at SB-01.

Based on the detection of PCBs at SB-01, additional borings were completed as outlined in the ARIWP. A total of 15 soil borings (SB-24 through SB-38) were oriented in a grid centered around the SB-01 location to further evaluate the vertical and horizontal extent of PCBs in the soil. As shown in **Figure 3-1** the sample grid had an approximate spacing of 10 feet in the north to south direction and 8 feet in the east to west direction along the gravel ramp between the property fence to the west and the former boiler house foundation to the east. Select samples from each boring were analyzed as discussed in **Section 3.1.2**. In total, 55 additional samples were analyzed. Detected PCB concentrations ranged from 0.035 J mg/kg to 1.81 mg/kg. PCBs concentrations exceeded the Unrestricted SCO in at least one sample from each location with the exception of SB-27 and SB-38. Only three samples from two borings were found to contain PCBs greater than the Restricted-Residential SCO of 1 mg/kg, these borings (SB-30 and SB-33) were located west of SB-01. This suggests that the PCBs identified in the sample from 6 to 8 ft bgs in SB-01 is isolated and localized.

PCBs were detected in each of the five samples collected from 0 to 2 ft below grade at borings SB-39 through SB-43 within the former boiler house foundation. PCB concentrations at four of the locations were above the Unrestricted SCO and the concentration in the sample collected from SB-40 was 1.06 mg/kg which is slightly greater than the Restricted-Residential SCO of 1 mg/kg.

Summary of Soil Nature and Extent

Analytical results for the surface (0 to 1 ft) and subsurface soil obtained during the RI field activities compared to applicable SCOs are presented on **Tables 5-1 and 5-5**. As previously discussed, surface soil across the Site was also screened with XRF for lead and selected samples were submitted for laboratory analysis of lead. A smaller subset of subsurface soils were screened with XRF and collected for laboratory analysis of lead. Additional samples were also collected and submitted for laboratory analysis of TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticides, TAL metals, mercury, and cyanide.

Eastern Parcel

Laboratory sample results of surface soil and subsurface soil indicate that lead exceeds Restricted-Residential SCO within the parcel with localized areas below the Restricted-Residential SCO. Areas with concentrations of lead below the Restricted Residential SCO are generally related to locations of recently-placed crushed gravel material adjacent to the former Quonset hut, and near the parcel entrance from the road as well as areas where bedrock is present at the surface.

TCL/TAL analysis of samples collected from six locations at depths of 0 to 1 ft bgs on this parcel indicated that several SVOCs, metals, PCBs, and pesticides are present above Unrestricted SCOs in one or more of the samples. Only one sample, collected 0 to 1 ft interval at SB-49 located in the southwest corner of the parcel, contained concentrations SVOCs above the Restricted-Residential SCOs. Lead was not identified above Restricted-Residential SCOs at this location. As this sample is on the south end of the former driveway of the facility and near lake Street. The constituents identified may be associated with asphalt paving known to have been present in the past. The sample collected from 0 to 1 ft bgs at SB-48 contained arsenic, and mercury exceeding Restricted-Residential SCOs. Lead also exceeds Restricted-Residential SCOs in this sample.

Western Parcel

XRF screening results for lead in surface soil in the Western parcel indicate that lead concentrations potentially exceed Restricted Residential SCO in much of the surface soil in the parcel. Within the former boiler house foundation, concentrations of lead above the Restricted-Residential SCO appears to be limited to the near surface as the 0 to 2 ft samples that were analyzed contained concentrations below the Restricted-Residential SCO. The other area with surface soil screening data suggesting that lead is below the Restricted Residential SCOs is associated with the gravel access road.

Lead was detected in each subsurface sample analyzed in the laboratory and exceeded one or both Unrestricted and Restricted-Residential SCOs at several depths and most locations. Lead concentrations and SCO exceedances vary with depth suggesting that filling of the area occurred possibly using several sources of material or that the fill was reworked.

TCL/TAL analysis of samples collected from four locations on this parcel indicated that additional constituents are present. In the sample collected from 6 to 8 ft bgs from SB-0,1 located adjacent to the smoke stack, concentrations of several SVOCs, mercury, arsenic, and PCBs above Restricted Residential SCOs. At SB-24, collected at the center of the parcel, arsenic and cadmium also exceeded Restricted Residential SCOs. In two of the other three subsurface samples (SB-36, SB-Z-D6) collected from the northern side of this parcel, concentrations of several SVOCs also exceeded Restricted Residential SCOs. The samples from SB-24 and SB-36 were collected from the interval of 0 to 1 ft bgs.

The detailed sampling program conducted to delineate PCBs found at a concentration of 62 mg/kg in the soil sample collected from 6 to 8 ft below grade at SB-01 identified that only three samples from two borings contained PCB concentrations greater than the Restricted-Residential SCO of 1 mg/kg. These borings (SB30 and SB-33) were located west of SB-01 and the detected concentrations we less than 2 mg/kg indicating that the 62 mg/kg concentration detected at SB-01 is localized.

5.3 NATURE AND EXTENT OF THE IMPACTS TO GROUNDWATER

The following section summarizes the nature and extent of groundwater impacts identified during the RI. Detected constituents were compared to the Class GA Standards and Guidance Values (NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1, *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* [NYSDEC, 1998] [Class GA SGVs]).

Groundwater samples were collected from select water producing zones during drilling, two rounds of site-wide groundwater sampling, and one round of selected groundwater sampling as outlined below:

- One sample from each of three well locations during packer sampling (VOCs only) from water producing intervals
- One sample from nine locations during each of two rounds of sampling (VOCs only in the first round and VOCs and MNA parameters at selected wells during the second round)
- One sample from three locations during one round of sampling (TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticide, TAL metals, mercury, and cyanide)

Constituents detected that exceed Class GA SGV at one or more monitoring well locations during the RI are shown on **Figure 5-4.** RI and FSI analytical results are provided on **Table 5-7** thru **Table 5-12**.

Packer Tests

VOC exceedances of Class GA SGVs were observed in packer test groundwater samples from MW-08 and MW-09 on the Eastern Parcel and MW-10 on the Western Parcel. TCE and CDCE were the primary constituents detected above Class GA SGVs with concentrations ranging from 71 µg/l in MW-10 to 3,800 µg/l in MW-09 and 98 µg/l in MW-10 to 4,100 µg/l in MW-08, respectively. Lesser exceedances of benzene, chloroform and toluene, not considered Site-related COCs, were also observed in MW-10 as well as tetrachloroethene (PCE) in MW-09. Based on packer interval results, monitoring wells were installed and sampled during site-wide groundwater sampling events and are discussed below.

Groundwater Samples

VOCs

Eight site-related VOCs (TCA, DCA, DCE, CDCE, PCE, trans-1,2-Dichloroethene, TCE, and VC) exceeded Class GA SGVs in on-site and off-site wells during site-wide and select groundwater sampling events. Exceedances were present in the Eastern Parcel (MW-08 and MW-09), Western Parcel (MW-04 and MW-10) and the off-site wells immediately adjacent to the Site (MW-03 and MW-05). No VOCs were detected in upgradient well MW-01R or off-site downgradient well MW-06. CDCE and TCE were detected in cross-gradient well MW-11 at concentrations below Class GA SGVs. Chloroform, CDCE and TCE were also detected in downgradient well MW-07 at concentrations below Class GA SGVs. Analytical results are provided on **Table 5-7**.

The highest VOC concentrations, exceeding Class GA SGVs, were detected in wells located on the Eastern Parcel (MW-08 and MW-09) and nearby off-site well MW-05, located within the ERP Site along the western boundary of the Eastern Parcel. The range of concentrations in these wells were:

- PCE: ND to 360 µg/l (MW-09)

- TCE: 910 µg/l to 9,520 µg/l (MW-08)
- CDCE: 1,500 µg/l to 14,000 µg/l (MW-08)
- VC: ND to 530 µg/l (MW-08)

VOC concentrations in Wells MW-4 and MW-10 located on the Western Parcel and nearby off-site well MW-03 (located in the parking lot south of the Western Parcel) which are downgradient of the Eastern Parcel were lower with PCE below Class GA SGVs, and TCE, CDCE, and VC exceeding Class GA SGVs as follows:

- PCE: 1.7 µg/l to 3.4 µg/l
- TCE: 61 µg/l to 150 µg/l
- CDCE: 40 µg/l to 75 µg/l
- VC: ND to 2.2 µg/l

SVOCs

Groundwater samples from three selected wells (MW-08, MW-09, and MW-11) were analyzed for SVOCs. SVOCs did not exceeded Class GA SGVs in the samples collected. Analytical results are provided on **Table 5-8**.

Metals

Groundwater samples collected from wells MW-08, MW-09, and MW-11 were also analyzed for TAL Metals, mercury, and cyanide. Iron, manganese, and sodium were detected at concentrations exceeding Class GA SGVs in all three wells. Analytical results are provided on **Table 5-9**.

PCBs

In addition, the samples from wells MW-08, MW-09, and MW-11 were analyzed for PCBs. PCBs were not detected in any of the samples analyzed. Analytical results are provided on **Table 5-10**.

Pesticides

Groundwater samples from wells MW-08, MW-09, and MW-11 were analyzed for TCL pesticide*s.* Pesticides were not detected in any of the samples. Analytical results are provided on **Table 5-11**.

Monitored Natural Attenuation Evaluation

The potential for reduction in constituent concentrations via natural attenuation was evaluated at monitoring wells MW-01R, MW-03, MW-05, MW-07, MW-08, MW-09 and MW-10. **Table 5-12** summarizes concentrations of the natural attenuation parameters analyzed during the second round of groundwater sampling completed in February 2017. Using these data, Biodegradation Weighting Factors (BWFs) have been calculated per the approach defined in Screening Step 1 of the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (USEPA/600/R-98/128, September 1998)*. BWFs are presented in **Table 5-13**.

As outlined in the protocol, a BWF greater than 15 is suggestive of adequate evidence that biodegradation processes are sufficiently functional for reductive dechlorination to occur. BWFs calculated for the groundwater samples collected at the site ranged from 5 to 11 suggesting that reductive dechlorination is not likely to be functional at the site. However, the presence of daughter products is suggestive that degradation is occurring. One or more of the daughter products of PCE (TCE, CDCE, and VC) were detected in the wells where PCE was detected.

Summary of Groundwater Nature and Extent

Groundwater samples obtained during the RI (**Tables 5-7** thru **5-12**) identified VOCs exceeding Class GA SGVs. Although iron, manganese and sodium concentrations were detected above Class GA SGCVs, these constituents are considered to be naturally occurring and not related to historic site operations. No other constituents were identified in groundwater above Class GA SGVs. The following summarizes the VOCs detected in the groundwater:

- Eight site-related VOCs (TCA, DCA, DCE, CDCE, PCE, trans-1,2-dichloroethene, TCE, and VC) exceeded Class GA SGVs in five on-site wells (MW-04R, MW-05, MW-08, MW-09, and MW-10) and one off-site well (MW-03) during groundwater sampling events.
- Class GA SGV exceedances were dominated by TCE and CDCE.
- Benzene, toluene, and chloroform were detected slightly above Class GA SGVs in MW-10 during packer sampling. These constituents were not detected in MW-10 during the two subsequent sampling events. Benzene was also detected above Class GA SGVs at one well during the 2018 groundwater sampling event.
- Groundwater on the northern half of the Eastern parcel and in the Western parcel area (including MW-03) contains one or more VOCs at concentrations above the Class GA SGVs. Class GA SGV exceedances were not observed in wells located upgradient (MW-01R), downgradient (MW-06 and MW-07), cross gradient (MW-11) wells.
- Wells on the northern end of the Eastern Parcel and nearby MW-05 on the ERP Site contain the highest VOC concentrations. These concentrations are generally 1 to 2 orders of magnitude higher than concentrations observed in wells on the Western Parcel. The zone of impacted groundwater monitored by these wells is cut off horizontally by the steep topography. Wells, MW-06 and MW-07 located further downgradient and deeper than those on the Site Parcels contain very low or non-detect concentration of VOCs. This suggests that vertical migration to the lower water bearing zone monitored by these wells is limited.

5.4 NATURE AND EXTENT OF IMPACTS TO SOIL VAPOR

Soil vapor samples were collected during the FSI. As discussed in the FSIR, two soil vapor samples were collected in December 2010. A summary table of soil vapor results for the Site are provided in Table 1 of the FSIR Report that is provided in **Appendix A**. **Figure 3-1** presents the approximate location of soil vapor samples.

One soil vapor sample (SV-02) was collected from the Western Parcel near the stack of the boiler house and a second sample (SV-01) was collected from the southern side of the Site near Lake Street. The analytical results indicate that there are low concentrations of a variety of VOCs. Classes of VOCs identified include petroleum hydrocarbons (toluene, xylene, trimethylbenzene), chlorinated compounds (TCE, TCA) fluorocarbons (Freon) and trihalomethanes (dichlorodifluoromethane, trichlorofluoromethane, bromodichloromethane). Most the concentrations are below 10 $\mu g/m^3$ although sample SV1 contains concentrations of trihalomethanes and acetone greater than 100 $\mu g/m^3$. The presence of the trihalomethanes are most likely indicative of the public water supply as these compounds are common residuals present in chlorinated water.

The results did not suggest that VOCs were migrating via soil vapor at the boundary of the Eastern Parcel. However, as discussed in the ROD for the Ithaca Falls Overlook ERP (NYSDEC, 2017), VOCs are present in soil vapor to the west of the Site. NYSDEC has conducted soil-vapor investigation and mitigation efforts in connection with this occurrence.

6. CONCEPTUAL SITE MODEL

The Site is separated into two distinct parcels by the topography. The Eastern Parcel is 1.4 acres in size and is elevated approximately 40 feet above the smaller Western Parcel. The Eastern Parcel was the site of the former Ithaca Gun manufacturing operations and is a relatively flat bedrock terrace that is overlain by a thin veneer of material consisting of a mixture of soil, gravel, and other fine-grained fill material. The Western Parcel was formerly occupied by the boiler house for the manufacturing facility. This parcel is covered by 4.9 ft to 15.5 ft of soil and fill. The former boiler house foundation is filled with debris generated during demolition of the building.

In general, precipitation flows as surface runoff to the north northwest into Fall Creek or percolates into overburden and bedrock. No catch basins or storm water management system infrastructure is present on the Site.

Groundwater was observed within the bedrock, but not the overburden, at the Site. Packer testing conducted as part of the RI revealed that groundwater occurs within an approximate 14.5 ft thickness of bedrock that lies between 42.5 and 57 ft below grade on the Eastern Parcel. The water-bearing fractures on the Western Parcel are located around 34 to 55 ft below grade. At the three locations tested on the Eastern parcel, it appears that the water-bearing fractures are underlain by at least 13 to 15 ft of bedrock which did not produce water. The calculated hydraulic conductivity ranged from 3.48 x 10^{-06} cm/sec (0.01 ft/day to 8.25 x 10^{-05} cm/sec (0.23 ft/day) suggesting that the fractures produce very little water. Groundwater levels measured in the wells indicates that the water level representing the potentiometric head within the water bearing zone, is above the water-bearing zone in some of the locations suggesting that groundwater within the fractured zones is semi-confined. Groundwater elevations representing the potentiometric surface indicate that the groundwater flow direction is to the northwest and the valley area.

Surface soil was screened with an XRF to assess the distribution of lead that potentially exceeded the Restricted-Residential SCO of 400 mg/kg. The results of the screening and selected laboratory analyses indicated that most of the exposed soil contains lead above the SCO. The only areas where lead was not typically found to be above the SCO were those that were either exposed bedrock surface or recently covered to support construction activities.

The soil and older fill material at both parcels contains lead which in many areas is at a concentration exceeding the Restricted-Residential SCO. Arsenic, cadmium and mercury were also observed above the Restricted-Residential SCOs in some areas. These exceedances generally corresponded to a concentration of lead above the Restricted-Residential SCOs. Of the 10 samples analyzed for TCL/TAL constituents three samples contained several SVOCs in excess of the Restricted-Residential SCO.

The soil sample collected from SB-01 on the Western Parcel was found to contain PCBs at a concentration of 62 mg/kg. A detailed sampling effort was completed at and around this location that consisted of 15 soil borings (SB-24 through SB-38) and analysis of 57 soil samples to evaluate the vertical and horizontal extent of PCBs in the soil. Total PCB concentrations of the samples collected during this effort ranged between 0.035 J mg/kg to 1.81 mg/kg. Only three samples from two borings were found to contain Total PCBs greater than the Restricted-Residential SCO of 1 mg/kg, these borings (SB30 and SB-33) were located west of SB-01. The results of this sampling effort indicate that the 62 mg/kg concentration detected at SB-01 is limited in extent.

Groundwater collected from all but two of the on-site wells contains VOCs at concentrations exceeding the Class GA SGV. The primary compounds detected include PCE and its degradation byproducts TCE, CDCE and VC. The highest concentrations are observed in wells MW-08 and MW-09 located on the western edge of the Eastern Parcel. CVOCs were not observed above criteria in upgradient well MW-01R or the southernmost well on the Eastern Parcel, MW-11. Groundwater concentrations of chlorinated VOCs on the Western Parcel suggest that migration has occurred although the concentrations observed are up to three orders of magnitude lower. The distribution of CVOCs in groundwater indicates the presence of a plume originating on the Eastern Parcel with migration to the northwest in the direction of groundwater flow, and with higher concentrations bound within the water-bearing interval. To the north and west the steep topography limits the horizontal extent of the water bearing zone containing the highest concentrations to the Site. Off-Site wells to the northwest (MW-06 and MW-07) do not contain VOCs above criteria suggesting that vertical migration is also limited. The RI included the evaluation of the potential for reductive dichlorination of the CVOCs to occur. Although the numeric assessment suggested limited potential for reductive dichlorination to occur, the presence of degradation byproducts of PCE and TCE suggests that some form of degradation is occurring.

7. QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A Qualitative Human Health Exposure Assessment (QHHEA) was completed for the Site and is presented in this section. The QHHEA has been conducted in accordance with New York Environmental Conservation Law (ECL) §27-1415(2)(b) and Section 3.3(c)(4) and Appendix 3B of DER-10. As presented in DER-10, the purpose of the QHHEA is to evaluate and document the potential exposure routes and pathways, and to identify and characterize the potentially exposed populations currently and under reasonably anticipated future use of the Site. This QHHEA is apportioned into the following sub-sections:

- 7.1 Human Health COCs
- 7.2 Potential Site-Related Human Health COC Migration Pathways
- 7.3 Potentially Exposed Receptors and Exposure Pathways
- 7.4 QHHEA Summary

7.1 HUMAN HEALTH CONSTITUENTS OF CONCERN

The Site has been the subject of ongoing investigation and data collection efforts since 1995, as presented in **Section 2**. Consequently, analytical data for multiple media and constituents are available. Media for which quantitative data are available include soil, groundwater, and soil vapor. Several IRMs were implemented to address elevated concentrations of constituents associated with historical operations, as described in **Section 2.2.1**. Additional soil and groundwater characterization was conducted as part of this RI to address data gaps for the purpose of identifying impacted areas to be addressed as part of the Site's redevelopment.

These soil and groundwater data have been evaluated against relevant screening values as presented in **Section 5**. including:

- NYCRR Part 375 Soil Cleanup Objectives for Unrestricted and Restricted Residential Use
- Technical and Operational Guidance Series: Class GA Standards and Guidance Values

Detected constituents in each medium are designated as COCs for the QHHEA if they exceed screening criteria that correspond with current and reasonably anticipated future land use. Current land use at the Eastern and Western Parcels is vacant industrial lots that have remained idle since industrial operations ceased in the mid-1980s. The small single-story building and the Ithaca Gun boiler stack that are still present on the Western Parcel are also unused. As described in **Section 1**, much of the Site is slated to be redeveloped to support multi-tenant residential housing which is consistent with Restricted Residential SCOs.

Environmental media evaluated for potential impacts from historical Site operations and practices and potential human exposure include soil and groundwater. Additional details regarding the human health COCs identified in these media are presented below.

7.1.1 Soil

Soils evaluated for this QHHEA are segregated according to depth interval, and include surface soil and subsurface soil. Restricted Use-Residential SCOs were selected to identify human health COCs in soil and to evaluate the potential for human exposures to these soil COCs. **Tables 5-1** through **5-5** present the comparison of constituents in soil to the Restricted Residential SCOs.

Surface Soil

Surface soil collected from a depth of 0 to 2 inches is typically used in New York State for assessing the human exposure from soil contamination related to incidental ingestion, inhalation, or direct contact. For the purposes of the QHHEA, surface soil includes soil samples collected from a depth of 0 to 2 inches along with other surface or near surface soil collected from depths of up to 1-foot bgs. Surface soil represents the environmental medium that is likely to be encountered by individuals engaged in activities that result in only modest soil disturbance and not in activities resulting in purposeful excavation or subsurface work activities. Although Unrestricted Use SCOs (Part 375-6.8[a] were applied as a conservative measure in the discussion of the nature and extent of contaminant impacts at the Site (**Section 5.2.2**), this QHHEA utilizes the Restricted Residential SCOs given that the probable future use at the Site is multi-family residential housing and currently the Site could be visited by trespassers, a receptor group that potentially includes off-site residents.

A total of 27 samples were collected on the Eastern Parcel from intervals between 0 and 1 ft bgs during the RI and FSI and analyzed for lead. Of these samples, concentrations of lead from 15 locations exceeded the Restricted-Residential SCO. On the Western parcel a total of 10 samples from the 0 to 1 ft interval were analyzed for lead and seven exceeded the Restricted-Residential SCO. These exceedances ranged from 76.2 mg/kg at SB-01 to 2,690 mg/kg at SB-X-H6.

Only one sample, collected from SB-49 located in the southwest corner of the Eastern parcel, contained concentrations of SVOCs exceeding Restricted Residential SCOs. Lead was not identified above Restricted Residential SCOs at this location. As this sample is on the south end of the former driveway of the facility and near Lake Street the constituents identified may be associated with asphalt paving known to have been present in the past.

The sample collected from 0 to 1 ft bgs at SB-48 contained arsenic and mercury exceeding Restricted Residential SCOs. Lead also exceeds Restricted-Residential SCOs in this sample.

On the Western Parcel two samples collected from the 0 to 1 ft interval contained other constituents. The sample from SB-24, collected at the center of the Western Parcel, also contained arsenic, cadmium, and SVOCs above Restricted Residential SCOs and the sample from SB-36 contained SVOCs above the Restricted-Residential SCOs. These samples did not contain lead above the Restricted-Residential SCO.

Subsurface Soil

Subsurface soil samples have been collected from multiple depth intervals throughout the Site. Soil thickness at the site, as described in **Section 4.2.2**, ranges from 0 ft to 11.5 ft thick in the Eastern Parcel and 4.9 to 15.5 ft thick in the Western Parcel. For the purposes of this QHHEA, a subsurface soil sample is defined as a sample having a start depth of 1 foot bgs or greater. Subsurface soil within this interval can be encountered by human receptors during excavation and other subsurface work activities. The deepest soil sample collected during the RI was from the 14 to 15.5 foot bgs interval (SB-35) on the Western Parcel. It is possible that human exposures to soils at this depth could occur during construction and/or utility line work. Consequently, subsurface soil samples collected from 1 to 12 feet bgs were evaluated for the presence of potential human health COCs. **Tables 5-1** through **5-5** and **Figure 5-3** present the comparison of constituent concentrations in subsurface soil to the Restricted-Residential SCOs.

The following constituents were detected in subsurface soil RI samples above Restricted Residential SCOs:

Constituent	# Exceedances / # Samples	Maximum Concentration mg/kg	Location of Maximum Concentration
Arsenic	3/10	31.6	SB-01 (6-8’)
Lead	20/47	21,800	SB-01 (4-6’)
Benzo[a]anthracene	4/10	4.1	SB-01 (6-8’)
Benzo[a]pyrene	5/10	3.9	SB-01 (6-8’)
Benzo[b]fluoranthene	5/10	5	SB-01 (6-8’)

Constituent	# Exceedances / # Samples	Maximum Concentration mg/kg	Location of Maximum Concentration
Chrysene	1/10	4.6	SB-01 (6-8')
Dibenz[a,h]anthracene	3/10	0.79 J	SB-01 (6-8')
Indeno[1,2,3-cd]pyrene	5/10	2.5	SB-01 (6-8')
Total PCBs	4/68	62	SB-01 (6-8')

Only four VOCs, chloroform, o-Xylene, TCE, and total xylenes, were detected in subsurface soil samples. Each of these VOCs was detected in one of four samples at concentrations more than three orders of magnitude lower than their respective Restricted Residential SCOs (**Table 5-1**).

Of the human health COCs identified for surface and subsurface soils that exceeded Restricted-Residential SCOs, lead is the dominant COC associated with former operations and practices at the Site. Other constituents identified are the either co-located with lead or attributable to asphalt pavement at the surface or the materials used for filling. Therefore, lead is the only Site-related soil COC for human health and is the focus of the remaining sections that evaluate soil exposure in this QHHEA.

7.1.2 Groundwater

Groundwater was not encountered in the Site overburden. Although water levels measured within the wells at the ranges from approximately 14 to 51 feet bgs, the actual groundwater bearing bedrock zones are not encountered until between 35 and 57 feet bgs. (**Section 4.2.2**). Therefore, excavations completed at the site would not be expected to encounter groundwater unless they extend beyond 35 ft below grade. Groundwater collected during the first and second sampling events was analyzed for VOCs; select samples from the second round were also analyzed for dissolved gas and geochemical parameters; groundwater samples collected during the third round were analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticide, TAL metals, mercury, and cyanide.

Shallow groundwater is not present at the Site and groundwater occurs at depths that preclude direct contact exposure for human receptors (including subsurface workers). Additionally, as discussed in **Section 4.2**, groundwater beneath the Site is not known to be used as a drinking water supply, and the city of Ithaca and Cornell University obtain their drinking water from a distant off-site reservoir and creek, respectively. The use of an on-site well for potable water use is therefore unlikely and will not be considered further in this QHHEA. A screening of Site groundwater concentrations to Class GA SGVs for the protection of drinking water therefore not appropriate given that the future potable groundwater use pathway is incomplete. However, despite the absence of a complete groundwater exposure pathway, constituents detected in bedrock groundwater were compared to Class GA SGVs as a "worst-case" evaluation and to provide correlative information for related exposure pathways (e.g., vapor intrusion, see **Section 7.2.4**).

As indicated in **Table 5-7**, eleven VOCs (TCA, DCA, DCE, benzene, chloroform, CDCE, PCE, toluene, trans-1,2-dichloroethene, TCE, and VC) exceeded Class GA SGVs in on-site and/or off-site wells during site-wide groundwater sampling events or during packer sampling. Chloride, dissolved iron, and dissolved manganese also exceeded their respective Class GA SGVs in groundwater samples, as summarized below.

Constituent	# Exceedances / # Samples	Maximum Concentration µg/L	Location of Maximum Concentration
TCA	1/24	8.9	MW-08 (1/11/18)

Constituent	# Exceedances / # Samples	Maximum Concentration µg/L	Location of Maximum Concentration
DCA	3/24	131	MW-08 (1/11/18)
DCE	3/24	54.1	MW-08 (1/11/18)
Benzene	2/24	2.1	MW-10 (10/7/16)
Chloroform	1/24	12	MW-10 (10/7/16)
CDCE	17/24	14,000	MW-08 (12/8/16)
PCE	7/24	360	MW-09 (2/22/17)
Toluene	1/24	12	MW-10 (10/7/16)
Trans-1,2-Dichloroethene	2/24	64.9	MW-08 (1/11/18)
TCE	17/24	9,520	MW-08 (1/11/18)
VC	4/24	530	MW-08 (12/8/16)
Chloride	7/7	782,000	MW-07 (2/21/17)
Iron (dissolved)	10/10	65,100	MW-05 (2/21/17)
Manganese (dissolved)	7/10	1,780 JH	MW-09 (1/11/18)

Exceedances of Class GA SGVs occurred in the Eastern Parcel (MW-08 and MW-09), Western Parcel (MW-04 and MW-10) and in adjacent off-site wells (MW-03 and MW-05). The highest VOC concentrations were consistently detected in Eastern Parcel wells MW-08 and MW-09 and in off-site well MW-05 near the western periphery of the Eastern Parcel. **Tables 5-7** and **5-9**and **Figure 5-4** present the comparison of groundwater constituent concentrations to corresponding Class GA SGVs. The detected levels of chloride, iron, and manganese are relatively consistent throughout the Site, and likely reflect naturally occurring concentrations.

Of the human health COCs identified for groundwater, only the chlorinated VOCs are considered associated with former operations and practices at the Site. The inorganics identified are likely naturally occurring and the toluene is likely attributable to parking lots and urban runoff. Therefore, the chlorinated VOCs are the only Site-related soil COC for human health, and are the focus of the remaining sections of the QHHEA.

7.2 POTENTIAL SITE-RELATED HUMAN HEALTH COC MIGRATION PATHWAYS

The potential for migration of Site-related human health COCs in soil and groundwater depends on the physical, chemical, and biological characteristics at the Site and the chemical and physical attributes of the COCs. A discussion of potential migration pathways for human health COCs in soil and groundwater is presented below.

7.2.1 Surface Soil

Lead is the sole Site-related constituent in soil detected above Restricted Residential SCOs, as discussed in **Section 7.1.1**. Surface soil samples were collected from the 0 to 1 foot bgs depth interval in unpaved areas containing minimal vegetative cover. Lead in Site surface soil is subject to physical and chemical processes that influence its mobility, including changes in valence state, adsorption, and transport via percolation and overland runoff. Transport of lead at the Site is likely to be minimal given the flat topography across the majority of the Eastern and Western Parcels. In areas where vegetation does occur, the potential for migration is reduced.

Lead in surface soil may be transported in soil by wind erosion during dry, windy conditions. However, air monitoring and sampling completed to date has not detected any dust or lead. This monitoring and sampling was conducted during the demolition and drilling activities when dust transport would be most likely. Additionally, under periods of sufficient rainfall, lead in surface soils may be transported in stormwater and carried to areas of lower elevation. These areas include the northern and western portions of both the Eastern and Western Parcels, where downward sloping topography predominates.

7.2.2 Subsurface Soil

Subsurface soil as defined for the QHHEA ranges from 1 to 12 ft bgs, and was analyzed for VOCs, SVOCs, PCBs, and metals. Lead was the only Site-related COC for human health identified in subsurface soil, as discussed in **Section 7.1.1**. Migration of lead in subsurface soil by natural transport processes is likely to be minimal, as these soils are not subject to weathering or storm water runoff. In some subsurface soils, lead may bind to organic material and sulfides under reducing conditions within the soil matrix to form relatively insoluble complexes that limit transport and bioavailability. Additionally, lead was not detected in the groundwater samples suggesting that it has not migrated into the bedrock. Therefore, horizontal and vertical migration of lead in subsurface soil is expected to be limited.

Because the Site is slated for redevelopment as condominiums and apartments, excavation of subsurface (and surface) soils to support residential building construction will be necessary. This may result in the potential for short-term exposures to soil lead by humans, depending on where excavation/construction is to occur. As demonstrated during the previous demolition activities, these exposures can be mitigated by controlling dust generation during disturbances.

7.2.3 Groundwater

Site groundwater contains eight Site-related VOCs above Class GA SGVs in both the Eastern and Western Parcels, and in nearby off-site wells. Volatile and dissolved inorganic groundwater COCs will migrate downgradient with groundwater flow. Overburden groundwater is not present at the Site, and movement of deep groundwater at the Site generally follows fractures within the bedrock that likely have low transmissivity, as described in **Section 4.2.2**. Groundwater flows to the northwest, towards Fall Creek, however there is no evidence that Site-related groundwater discharges to the creek or other sensitive downgradient receptor where direct human contact could occur.

Transport of Site-related VOCs in groundwater can be affected by various processes that result in reduced concentrations, including volatilization, diffusion, sorption, and degradation. Attenuation of groundwater VOCs is evident based on substantially reduced concentrations of CDCE and TCE along the groundwater flow gradient. Inorganic constituents in groundwater are potentially subject to biologically and physically induced chemical reactions (e.g., oxidation/reduction), which can markedly affect their mobility. The chloride, iron, and manganese detected above Class GA SGVs are considered to be naturally occurring.

7.2.4 Soil Vapor

Volatile compounds in groundwater have the potential to migrate into the interstitial air spaces within soil. Where this occurs below buildings or structures, VOCs originating from groundwater could enter indoor air of an occupiable space and subsequently be inhaled. The potential for vapor intrusion to buildings is governed by a number of factors, including pressure differentials, COC concentration, building properties, presence and width of cracks in a building's foundation, and vadose zone soil temperature. Attenuation processes described above for groundwater can also mitigate soil vapor concentrations and potential indoor air concentrations when soil vapors discharge to a building.

Although Site-related human health VOCs were either not detected or at low levels, the two soil vapor samples collected near the former boiler stack and along Lake Street both contained 18 $\mu g/m^3$ of TCE (OBG 2011). NYSDOH does not currently have criteria for soil vapor for comparison. Site-related VOCs were detected above Class GA SGVs in some RI groundwater samples, however groundwater across the majority of the Site is within the bedrock only and occurs at considerable depths. Based on the pre-RI soil vapor and RI groundwater sample data, and because structures will be constructed on the Site under the current redevelopment plan, the vapor intrusion pathway is potentially complete.

7.3 POTENTIALLY EXPOSED RECEPTORS AND EXPOSURE PATHWAYS

This section identifies the potential exposure pathways through which there may be exposure to Site-related human health COCs. An exposure pathway analysis describes the transport of a COC from the affected medium to the exposed receptor. An exposure pathway links the potential sources, exposure media, and receptor populations to identify potential pathways of human exposure.

As defined in DER-10 (Appendix 3B), an exposure pathway has five elements:

- A source and mechanism of COC release to the environment
- An environmental transport medium (e.g., soil) for the COC and/or mechanism of transfer from one medium to another
- A point of contact with the impacted environmental medium (exposure point)
- An exposure route at the contact point (i.e., ingestion, inhalation, or dermal contact)
- A characterization of the receptor populations who may be exposed.

A pathway is considered to be complete if all five conditions listed above are satisfied for that pathway. If one or more of these conditions are not met, there is no physical means by which a receptor may be exposed to the COCs, and the pathway is considered incomplete.

Potentially complete soil exposure routes for current and future human receptors at the Site include direct contact with Site surface and subsurface soil. Inhalation of vapors in the indoor air of a future residential building is also possible as these vapors are potentially liberated from bedrock groundwater impacted by Site-related VOCs.

Under current and reasonably anticipated future land use scenarios, potential exposure pathways identified for this QHHEA include the following:

- Direct contact with potentially impacted surface and subsurface soil via incidental ingestion and dermal contact
- Inhalation of ambient air containing soil particulates originating from surface and subsurface soil
- Direct contact with potentially impacted bedrock groundwater via dermal contact
- Inhalation of ambient air containing bedrock groundwater-derived VOC vapors
- Inhalation of indoor air containing bedrock groundwater-derived VOC vapors

The demography of local populations and land use characteristics were considered in identifying the human receptor populations potentially exposed to impacted soil and groundwater at the Site. The potential exposure pathways associated with current and reasonably anticipated future receptors are discussed in the following sections.

A human health conceptual site model (HHCSM) was developed to present the linkages between Site-related COCs and potentially exposed receptor populations. The HHCSM is presented as **Figure 7-1**.

7.3.1 Current Receptors and Exposure Pathways

The current land use of the Site is vacant open lots. The non-use of the Site coupled with fencing that surrounds the Site and restricts human access limits the pool of potential human receptors reasonably anticipated to encounter impacted environmental media. Current human exposures would likely be restricted to lead in soil, and exposures would be incurred only by people not authorized for Site entry. Additionally, shallow groundwater does not occur at the Site and no known groundwater supply wells are present at or near the Site (OBG, 2013); therefore, direct exposure to groundwater under current conditions is unlikely.

Based upon the present-day characteristics of the Site, the following receptor groups are considered in a current human exposure scenario:

- Trespasser: A trespasser is a person that gains access to the Site without permission, and may be of adolescent or adult age. As described above, exposures to Site-related human health COCs are limited to lead in surface soil only, as trespassers are unlikely to dig to depths greater than one foot below the surface. The Site has limited impermeable surfaces and cover materials that would mitigate exposures to trespassers; exposures to surface soil lead would be reduced where these materials are present. The perimeter fencing extending around the entire Site likely limits possible exposures to soil by trespassers. Incidental ingestion of and dermal contact with surface soil and inhalation of ambient soil dust are possible exposure routes for this receptor group.

7.3.2 Future Receptors and Exposure Pathways

Reasonably anticipated future use of the Site includes multi-tenant residential housing. Future receptors therefore are represented by child and adult residents, maintenance workers, utility workers, and construction workers that may be exposed to lead in soil via incidental soil ingestion, dermal contact, and inhalation of fugitive soil dust. Given that the depth to the water bearing zone lies within the bedrock at depths greater than 35 ft bgs, exposure to subsurface workers (utility and construction workers) is unlikely and therefore, this pathway is incomplete.

Exposure pathways for the following receptor groups are complete or potentially complete under a future residential land use scenario:

- Resident: The probable future use of the Site is residential. Residential receptors will consist of persons of both child and adult age groups, and are expected to reside at the Site over the majority of a given year and potentially for many years. Relevant exposure routes for this receptor include incidental ingestion of and dermal contact with surface soil, inhalation of fugitive dust, and inhalation of groundwater-derived volatile COC vapors that may migrate into the indoor space of a residential building through cracks in the building foundation. The potential for soil vapor intrusion to impact future buildings will be further evaluated as plans for redevelopment progress. As for receptors potentially exposed to Site soil, potential exposures to surface soils for future residents would be restricted to lead since this metal is the only Site-related soil COC identified for human health concerns. However, the potential for exposure to lead in surface soil under probable future land use is eliminated or mitigated through the construction and placement of residential buildings, asphalt parking lots, and topsoil and vegetation for lawns and ornamental plantings. Indoor inhalation of VOC vapors is also a potentially complete exposure pathway for future residents based on the available soil vapor and groundwater data. However, given the depth to water and constraints to migration through limited vertical cracks in the bedrock a vapor barrier would eliminate this pathway.

- Maintenance worker: This adult-age receptor is anticipated to perform a variety of general service functions at the Site, including landscaping and general maintenance of Site grounds. Surface soil (incidental ingestion and dermal contact) and ambient air (inhalation) are possible exposure routes for this receptor given typical maintenance work activities. However, as described above for residents, the potential for exposure to lead in surface soil under probable future land use is eliminated or reduced through construction and application of impermeable surfaces or other cover materials that would be necessary for a residential setting.

- Construction worker: The construction worker is identified as a receptor for the QHHEA due to the potential for excavation or construction to occur at the Site in the future. These workers are of adult age, and may be exposed to surface and subsurface soil during excavation and construction activities. Incidental ingestion and dermal contact with soil, and inhalation lead in soil dust are relevant exposure routes for this receptor. Twelve feet is a reasonable maximum depth at which construction workers are likely to be exposed based on the depths of typical construction excavations. Groundwater occurs within bedrock at depths considerably greater than those potentially contacted directly by human receptor populations; therefore, direct contact with impacted groundwater is an incomplete exposure pathway for future construction workers.
- Utility worker: No utilities traverse the Site currently; however, it is possible that future construction could entail the installation of subsurface utility lines that would need to be inspected and periodically serviced by utility workers in the future. Future utility workers would be of adult age and may be exposed to surface and subsurface soil during servicing, maintenance, and/or reparation of utility lines. Relevant exposure routes for the future utility worker include incidental ingestion and dermal contact with soil, and inhalation of soil dust.

Facility contractors/subcontractors associated with the potential collection and handling of future environmental samples and with the potential management of impacted soil and groundwater are not considered in this QHHEA. Contractor/subcontractor activities are typically covered under a facility-specific HASP, which provides for the use of personal protective equipment (PPE) and includes preventative procedures for eliminating exposure and maximizing personal safety. Therefore, Site contractors/subcontractors are not considered a viable receptor population for the QHHEA.

A summary of the environmental media, exposure pathways, and potential human receptors relevant to the Facility Site QHHEA are presented in **Table 7-1** below.

Table 7-1 Human Exposure Pathway Analysis.

Environmental Media and Exposure Pathway	Potential Receptors	Human Exposure Assessment
Direct contact with surface soils (0-1 ft bgs) via incidental ingestion, dermal contact, inhalation of fugitive dust	- Future resident - Future utility worker - Future maintenance worker - Current trespasser - Future construction worker	- Current trespassers and future residents and maintenance workers may be exposed to lead in surface soils. Redevelopment activities at the Site will include erection of buildings and parking lots, as well as lawn plantings and gardens. These activities will have the effect of mitigating potential human exposures to surface soil. - During underground utility line inspection, servicing, and maintenance activities, future utility workers could come into contact with lead in surface soil through incidental ingestion, dermal contact, and inhalation of soil dust. - Future construction activities associated with redevelopment of the Site to support residential housing are presumed to occur on the Site, potentially exposing the construction worker to lead in surface soil.

Environmental Media and Exposure Pathway	Potential Receptors	Human Exposure Assessment
Direct contact with subsurface soils (1-12 ft bgs) via incidental ingestion, dermal contact, inhalation of fugitive dust	▪ Future utility worker ▪ Future construction worker	▪ During underground utility line inspection, servicing, and maintenance activities, future utility workers could come into contact with lead in subsurface soil through incidental ingestion, dermal contact, and inhalation of soil dust. ▪ Future construction workers may be exposed to subsurface soil during excavation/construction activities that may result in exposure to lead via incidental ingestion, dermal contact, and inhalation of soil dust.
Inhalation of groundwater-derived vapors in indoor air	▪ Future resident	▪ Pre-RI soil vapor data indicate that the vapor intrusion pathway could be complete under the proposed future residential use scenario. Future residents could inhale vapors that may enter the indoor living space from affected bedrock groundwater. The potential infiltration of VOCs to the interior space of a future Site building could be mitigated by a properly designed vapor barrier or other mitigation system.

7.4 QHHEA SUMMARY

The objective of this QHHEA was to evaluate potential human exposure to Site-related human health COCs under current and reasonably anticipated future use scenarios. The Site currently consists of inactive vacant lots containing primarily bare soils that are potentially available for exposure by human receptors; however, the entire Site is fenced, restricting human access to these soils. The Site is currently the subject of remedial investigation which has identified Site-related human health COCs in surface soil (lead), subsurface soil (lead), and bedrock groundwater (VOCs).

Trespassers represent the current receptor exposure scenarios for this QHHEA. Residents, maintenance workers, construction workers, and utility workers represent potential future receptors. Under current conditions, direct exposure to lead in soil by trespassers is possible for these receptors. Future residents and maintenance workers may potentially be exposed to lead in surface soil; future utility workers and construction workers are potentially exposed to lead in surface and subsurface soil. Residents may also be exposed indirectly to volatile COCs in groundwater through the vapor intrusion pathway, given the available RI groundwater data and pre-RI soil vapor data. A properly designed vapor barrier or other vapor mitigation system could be installed to eliminate potential infiltration of VOCs to the interior space of a future residential building. Additionally, redevelopment of the Site for residential that would entail the construction of one of more buildings and the installation of asphalt lots and landscaping/vegetative cover materials, would eliminate or reduce future soil exposures.

8. SUMMARY AND CONCLUSIONS

The RI for the Former Ithaca Gun Site (BCP Site No. C755019), located at 121-125 Lake Street in Ithaca, New York, has been conducted under the NYS BCP. The objective of this RI was to fill data gaps necessary to evaluate the nature and extent of contamination resulting from historic site operations. Data gaps included the identification of lead exceeding 400 ppm in shallow soils, and further evaluation of the extent of VOC-impacted groundwater within the underlying bedrock

RI activities at the Site included the evaluation of soil and groundwater and was supplemental to investigations of soil, groundwater, and soil vapor previously conducted at this Site. The RI was implemented under, and consistent with, the NYSDEC-approved work plan, the conditional approval letter, and the ARIWP. RI activities included, but were not limited to:

- collection of soil samples for laboratory analysis from 39 locations
- advancement of 22 soil borings to evaluate the vertical and horizontal extent of lead
- installation of 4 bedrock monitoring wells,
- collection and XRF screening of 301 soil samples,
- collection and laboratory analysis of 138 soil and 24 groundwater samples
- validation of analytical data.

8.1. SITE CHARACTERISTICS

The Site, located in a residential area with Ithaca Falls to the north, Cornell University to the east, Lake Street to the south, and City of Ithaca residential neighborhood to the west, is privately owned and zoned R-3a for residential use. The property was originally developed for industrial use in 1813 and the property and related structures were expanded and modified several times over the years of operation. The facility was used for the manufacture of Ithaca shotguns. Operations at the facility ceased around 1986. As discussed in **Section 2.2.1**, on-site structures including one main manufacturing building and several other outbuildings were demolished under the ESDRNY program. Work was completed in compliance with the *Demolition Work Plan* (DWP).

The property is terraced into two flat areas for use. The upper area or Eastern Parcel was the primary location of the manufacturing facility and the lower terrace or Western Parcel housed the boiler house and other support facilities. The manufacturing building occupied the majority of the flat surface of the upper terrace with the exception of a narrow access road on the eastern side. The Site is currently vacant with only a small single-story building, building foundations, and the Ithaca Gun boiler stack on the Western Parcel.

8.1.1 Site Geology

The Site is underlain by a generally thin mix of silt, sand and gravel which, based on analytical data is likely a mixture of fill and native material. Overburden thickness observed from borings ranged from 0.5 ft to 11.5 ft thick in the Eastern Parcel and 4.8 to 15.5 ft thick in the Western Parcel.

Bedrock is exposed on the surface at the Site and on the steeper slopes as well nearby Ithaca Falls immediately north of the Site. Horizontal fractures were frequently observed within the shallow bedrock with residual clays along bedding fractures and less frequent high angle fractures. Fracture frequency general decreases with depth.

8.1.2 Site Hydrogeology

Groundwater was encountered in bedrock at the Site, not in overburden. Investigations indicate that only one water bearing zone was encountered in the bedrock. The top of the water bearing zones ranged in depth from 34 ft to 57 ft bgs. Water levels measured in the wells on the Eastern Parcel ranged from 13.75 to 50.94 ft bgs and between 19.77 and 31.09 ft bgs on the Western Parcel. The water level or potentiometric head is above the top of the water bearing fracture in several locations suggesting that some of the fractures are semi-confined and being fed from higher elevations. The potentiometric surface generated by groundwater elevations in the wells indicates that groundwater flow is generally to the northwest toward the valley.

Hydraulic conductivity testing of the bedrock monitoring wells yielded a range of estimates from 3.48 x 10^{-06} centimeters per second (cm/sec) (0.01 ft/day) to 8.25 x 10^{-05} cm/sec (0.23 ft/day). Information obtained during groundwater sapling events is further evidence that the bedrock does not produce much water.

8.2. NATURE AND EXTENT OF SITE COCS

Visual inspection, field measurements, and laboratory analysis of soil and groundwater samples were used to characterize the nature and extent of COC impacts.

8.2.1 Soil

Site-related primary COCs in soil are primarily lead, with concentrations exceeding both Unrestricted and Restricted-Residential SCOs. Within the Easter Parcel, lead exceedances of the Restricted-Residential SCO are generally limited to the top 2 ft. XRF screening data suggest that lead impacted soil may be deeper in the northwest corner of this parcel. On the Western parcel, lead concentrations above the Unrestricted and Restricted-Residential SCOs are found at all depths with the exception of the backfill within the boiler house foundation where it appears that the near surface material may contain some lead. This suggests that the overburden in most of the Western Parcel consists at least in part of fill placed during the period of operation of the facility and the boiler house foundation was filled with recent material generated during demolition activities. within the foundation of the former boiler house.

In some locations, soil contained a few metals, pesticides, and SVOCs in addition to PCBs above their Unrestricted and Restricted-Residential SCOs as follows:

- One or more of three pesticide compounds were detected above Unrestricted SCOs in three locations. None of the detected concentrations were above Restricted-Residential SCOs.
- Of the 10 samples analyzed for SVOCs, concentrations of SVOCs exceeded Restricted-Residential SCOs in soil collected from three locations in the Western Parcel and at one location in the Eastern Parcel.
- Arsenic and mercury were found at one of six locations on the Eastern Parcel above the Restricted-Residential SCOs, these exceedances corresponded to a similar exceedance for lead. One or more of constituents arsenic, cadmium, and mercury were present in two of the four locations collected from the Western Parcel above Restricted-Residential SCOs. Only one of these locations corresponded to an exceedance for lead.
- PCBs were not identified above the Restricted-Residential SCO in the six samples from the Eastern Parcel that were analyzed. On the Western Parcel, PCB Aroclor 1254 was detected at 62 mg/kg in the sample collected from 6 to 8 ft below grade at SB-01. A detailed investigation consisting of completion of 15 borings and collection and analysis of 57 soil samples only three samples from 2 borings were found to contain Total PCBs greater than the Restricted-Residential SCO of 1 mg/kg (the concentrations were less than 2 mg/kg), these borings (SB30 and SB-33) were located west of SB-01. The results of this sampling effort indicate that the 62 mg/kg concentration detected at SB-01 is limited in extent. Additionally, the concentration of PCBs at SB-01 qualifies as a Toxic Substances Control Act (TSCA) waste under 40 CFR Part 761 and hazardous waste under 6 NYCRR Part 371.4 and will need to be managed accordingly.

8.2.2 Groundwater

Groundwater samples obtained pre-RI and during the RI (**Table 5-7; Figure 5-4**) identified VOCs exceeding Class GA SGVs.

- Eight site-related VOCs (TCA, DCA, DCE, CDCE, PCE, trans-1,2-Dichloroethene, TCE, and VC) exceeded Class GA SGVs in four on-site wells and two off-site wells

- Groundwater collected from all but two of the on-site wells contains VOCs at concentrations exceeding the Class GA SGV. The primary compounds detected include PCE and its degradation byproducts TCE, CDCE and VC. The highest concentrations are observed in wells MW-08 and MW-09 located on the western edge of the Eastern Parcel. CVOCs were not observed above criteria in upgradient well MW-01R or the southernmost well on the Eastern Parcel, MW-11 which suggests that the plume that originates on the Eastern Parcel is not migrating to the south. Class GA SGV exceedances were dominated by TCE and CDCE.
- Benzene, toluene, and chloroform were detected were detected slightly above Class GA SGVs in one location during packer sampling while benzene was detected slightly above Class GA SGVs in one other location during the 2018 groundwater sampling event. These are not considered to be directly related to former facility operations and are more likely representative of runoff from nearby roadways or parking areas.
- Class GA SGV exceedances were not observed in upgradient or downgradient (off-site) wells.

8.2.3 Soil Vapor

Soil vapor samples collected during the FSI identified low concentrations of VOCs in vapor.

- Low concentrations (most concentrations are below 10 $\mu g/m^3$) detected of petroleum hydrocarbons (toluene, xylene, trimethylbenzene), chlorinated compounds (TCE, TCA) fluorocarbons (Freon) and trihalomethanes (dichlorodifluoromethane, trichlorofluoromethane, bromodichloromethane).
- Trihalomethanes, likely a residual from public water supply, and acetone were detected greater than 100 $\mu g/m^3$ along Lake Street.
- Results did not suggest that VOCs were migrating via soil vapor in these areas.

8.3. FATE AND TRANSPORT OF SITE COCS

The principal transport pathways for COCs are:

- overburden groundwater dissolved COCs migration downgradient with groundwater flow;
- surface water erosional run-off; and
- fugitive dust.

8.3.1 Surface Soil

Lead tends to be stable in soil because it does not degrade or volatilize and tends not to readily dissolve unless exposed to acidic conditions. Lead does not readily migrate through soil unless disturbed. Transport of lead at the Site is likely to be minimal given the flat topography across the majority of the Eastern and Western Parcels. In areas where vegetation does occur, the potential for migration is reduced. Lead in surface soil may be transported in soil by wind erosion during dry, windy conditions. Additionally, under periods of sufficient rainfall, lead in surface soils may be transported in stormwater and carried to areas of lower elevation. These areas include the northern and western portions of both the Eastern and Western Parcels, where downward sloping topography predominates.

8.3.2 Subsurface Soil

Migration of lead in subsurface soil by natural transport processes is likely to be minimal, as these soils are not subject to weathering or storm water runoff. Lead tends to be stable in soil because it does not degrade or volatilize and tends not to readily dissolve unless exposed to acidic conditions. In some subsurface soils, lead may bind to organic material and sulfides under reducing conditions within the soil matrix to form relatively insoluble complexes that limit transport and bioavailability. Groundwater in proximity to affected soil occurs at depths below the soil interval where lead is known to exceed its SCO, suggesting that groundwater interaction with affected soil is unlikely. Therefore, horizontal and vertical migration of lead in subsurface soil is expected to be limited. During future redevelopment activities lead may migrate through the soil column due to reworking of Site soils.

8.3.3 Groundwater

Overburden groundwater is not present at the Site, and movement of deep groundwater at the Site generally follows fractures within the bedrock that likely have low transmissivity. Groundwater flows to the northwest, towards Fall Creek with no evidence that Site-related groundwater discharges to the creek. Transport of Site-related VOCs in groundwater can be affected by various processes that result in reduced concentrations, including volatilization, diffusion, sorption, and degradation. Attenuation of groundwater VOCs is evident based on the presence of daughter products of PCE (TCE, CDCE and VC) as well as substantially reduced concentrations of CDCE and TCE along the groundwater flow gradient.

8.3.4 Soil Vapor

VOCs will partition into soil vapor from soil and from groundwater. Site-related CVOCs are relatively volatile and can be expected to volatilize into and migrate with soil vapors. Soil vapor migration is primarily driven by vapor pressure gradients (advection) in the soil and by gaseous diffusion. Pressure gradients can develop due to natural processes, such as changes in barometric pressure, and anthropogenic processes such as negative pressure in a building due to the heating system. Soil vapors will migrate from a zone of higher pressure to a zone of lower pressure and from areas with higher concentrations to surrounding areas of lower concentrations. This can result in upward, lateral, and downward migration through the vadose zone.

Processes such as sorption, degradation, diffusion, and dispersion, and partitioning into soil water can affect the transport and fate of CVOCs in soil vapor. Sorption to soil matrix can retard the migration of CVOCs in a similar manner as sorption processes associated with groundwater. The naturally occurring carbon content of the soils will affect the degree of CVOC sorption. Abiotic and biological processes could act to degrade CVOCs in the subsurface. Dispersion processes can act to reduce CVOC concentrations in soil vapors and CVOC concentrations when soil vapors discharge to a building or atmosphere.

8.4 QHHEA

In summary, potential exposure pathways associated with human receptor scenarios include:

- Current trespassers and future construction worker that may be exposed to lead in Site surface soil through incidental ingestion and dermal contact
- Future resident that may be exposed to lead in Site surface soil through incidental ingestion, dermal contact, and inhalation of fugitive dust, and inhalation of groundwater derived vapors in indoor air
- Future utility worker and future construction worker that may be exposed to lead in Site surface soil through incidental ingestion, dermal contact, and inhalation of fugitive dust.

A properly designed vapor barrier or other vapor mitigation system could be installed to eliminate potential infiltration of VOCs to the interior space of a future residential building. Additionally, redevelopment of the Site for residential use would entail the construction of one of more buildings and the installation of asphalt lots and landscaping/vegetative cover materials, which would eliminate or reduce future exposures to lead in soil.

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Tables

TABLE 3-1 SAMPLE ANALYSIS AND SCREENING MATRIX

						Laboratory Analyses						Field Screening	
Location ID	Lab Sample ID	Parent Sample	Sample Date	Start Depth	End Depth	VOCs	SVOCs	Metals	PCBs	Pest.	MNA	XRF	Comments
Soil Samples													
SB-01	SB-1-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-01	SB-1-6-12-102416		10/24/2016	0.5	1			X*				X	
SB-01	SB-1-12-24-102416		10/24/2016	1	2			X*				X	
SB-01	SB-1-48-72-102416		10/24/2016	4	6			X*				X	
SB-01	SB-1-72-96-102416		10/24/2016	6	8	X	X	X**	X			X	
SB-01	SB-1-96-120-102416		10/24/2016	8	10			X*				X	
SB-01	SB-1-120-144-102416		10/24/2016	10	12			X*				X	
SB-24	SB-24-0-1F-112717		11/27/2017	0	1	X	X	X**	X	X			
SB-24	FD-02-112717	SB-24-0-1F-112717	11/27/2017	0	1	X	X	X**		X			
SB-24	SB-24-0-2F-112717		11/27/2017	0	2				X				
SB-24	SB-24-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-24	SB-24-4-6F-112717		11/27/2017	4	6				X				
SB-24	FD-03-112717	SB-24-4-6F-112717	11/27/2017	4	6				X				
SB-24	SB-24-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed
SB-24	SB-24-8-10F-112717		11/27/2017	8	10				X				
SB-25	SB-25-0-2F-112717		11/27/2017	0	2				X				
SB-25	SB-25-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-25	SB-25-4-6F-112717		11/27/2017	4	6				X				
SB-25	SB-25-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed
SB-25	SB-25-8-10F-112717		11/27/2017	8	10				X				
SB-25	SB-25-10-10.8F-112717		11/27/2017	10	10.8				X				Sample not analyzed
SB-26	SB-26-0-2F-112717		11/27/2017	0	2				X				
SB-26	SB-26-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-26	SB-26-4-6F-112717		11/27/2017	4	6				X				
SB-26	SB-26-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed
SB-26	SB-26-8-10.5F-112717		11/27/2017	8	10.5				X				
SB-27	SB-27-0-2F-112717		11/27/2017	0	2				X				
SB-27	SB-27-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-27	SB-27-4-5.5F-112717		11/27/2017	4	5.5				X				
SB-28	SB-28-0-2F-112717		11/27/2017	0	2				X				
SB-28	SB-28-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-28	FD-06-112717	SB-28-2-4F-112717	11/27/2017	2	4				X				Sample not analyzed
SB-28	SB-28-4-6F-112717		11/27/2017	4	6				X				
SB-28	SB-28-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed

Notes:
- Depth in feet below ground surface
- Start depth and end depth for groundwater represent packer interval or screen interval
- * Analyzed for lead only
- ** Total cyanide added to metals analysis
-"Sample not analyzed" - Sample not analyzed due to adjacent sample interval results.
- Table does not include sample locations that received only XRF analysis.
- MNA = monitoring natural attenuation
- PCB = polychlorinated biphenyl
- SVOC = semivolatile organic compound
- VOC = volatile organic compound
- XRF = X-ray fluorescence

TABLE 3-1 SAMPLE ANALYSIS AND SCREENING MATRIX

						Laboratory Analyses						Field Screening	
Location ID	Lab Sample ID	Parent Sample	Sample Date	Start Depth	End Depth	VOCs	SVOCs	Metals	PCBs	Pest.	MNA	XRF	Comments
SB-28	SB-28-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed
SB-28	SB-28-8-10F-112717		11/27/2017	8	10				X				
SB-28	SB-28-10-11F-112717		11/27/2017	10	11				X				Sample not analyzed
SB-29	SB-29-0-2F-112717		11/27/2017	0	2				X				
SB-29	SB-29-2-4F-112717		11/27/2017	2	4				X				Sample not analyzed
SB-29	SB-29-4-6F-112717		11/27/2017	4	6				X				
SB-29	SB-29-6-8F-112717		11/27/2017	6	8				X				Sample not analyzed
SB-29	SB-29-8-9F-112717		11/27/2017	8	9				X				
SB-30	SB-30-0-2F-112717		11/27/2017	0	2				X				
SB-30	SB-30-2-4F-112717		11/27/2017	2	4				X				
SB-30	SB-30-4-6F-112717		11/27/2017	4	6				X				
SB-30	SB-30-6-8F-112717		11/27/2017	6	8				X				
SB-30	SB-30-8-10F-112717		11/27/2017	8	10				X				
SB-30	FD-04-112717	SB-30-8-10F-112717	11/27/2017	8	10				X				
SB-30	SB-30-10-12F-112717		11/27/2017	10	12				X				Sample not analyzed
SB-31	SB-31-0-2F-112817		11/28/2017	0	2				X				
SB-31	SB-31-2-4F-112817		11/28/2017	2	4				X				
SB-31	SB-31-4-6F-112817		11/28/2017	4	6				X				
SB-31	SB-31-6-8F-112817		11/28/2017	6	8				X				
SB-31	SB-31-8-10F-112817		11/28/2017	8	10				X				
SB-31	SB-31-10-10.7F-112817		11/28/2017	10	10.7				X				Sample not analyzed
SB-32	SB-32-0-2F-112817		11/28/2017	0	2				X				
SB-32	SB-32-2-4F-112817		11/28/2017	2	4				X				
SB-32	SB-32-4-6F-112817		11/28/2017	4	6				X				
SB-32	SB-32-6-8F-112817		11/28/2017	6	8				X				
SB-32	SB-32-8-10F-112817		11/28/2017	8	10				X				
SB-33	SB-33-0-2F-112817		11/28/2017	0	2				X				
SB-33	SB-33-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-33	SB-33-4-6F-112817		11/28/2017	4	6				X				
SB-33	SB-33-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed
SB-33	SB-33-8-10F-112817		11/28/2017	8	10				X				
SB-33	SB-33-10-12F-112817		11/28/2017	10	12				X				Sample not analyzed
SB-33	SB-33-12-13.5F-112817		11/28/2017	12	13.5				X				
SB-34	SB-34-0-2F-112817		11/28/2017	0	2				X				
SB-34	SB-34-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-34	SB-34-4-6F-112817		11/28/2017	4	6				X				
SB-34	SB-34-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed

Notes:
- Depth in feet below ground surface
- Start depth and end depth for groundwater represent packer interval or screen interval
- * Analyzed for lead only
- ** Total cyanide added to metals analysis
-"Sample not analyzed" - Sample not analyzed due to adjacent sample interval results.
- Table does not include sample locations that received only XRF analysis.
- MNA = monitoring natural attenuation
- PCB = polychlorinated biphenyl
- SVOC = semivolatile organic compound
- VOC = volatile organic compound
- XRF = X-ray fluorescence

TABLE 3-1 SAMPLE ANALYSIS AND SCREENING MATRIX

						Laboratory Analyses					Field Screening		
Location ID	Lab Sample ID	Parent Sample	Sample Date	Start Depth	End Depth	VOCs	SVOCs	Metals	PCBs	Pest.	MNA	XRF	Comments
SB-34	FD-05-112817	SB-34-6-8F-112817	11/28/2017	6	8				X				Sample not analyzed
SB-34	SB-34-8-10F-112817		11/28/2017	8	10				X				
SB-34	SB-34-10-10.5F-112817		11/28/2017	10	10.5				X				Sample not analyzed
SB-35	SB-35-0-2F-112817		11/28/2017	0	2				X				
SB-35	SB-35-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-35	SB-35-4-6F-112817		11/28/2017	4	6				X				
SB-35	SB-35-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed
SB-35	SB-35-8-10F-112817		11/28/2017	8	10				X				
SB-35	SB-35-10-12F-112817		11/28/2017	10	12				X				Sample not analyzed
SB-35	SB-35-12-14F-112817		11/28/2017	12	14				X				
SB-35	SB-35-14-15.5F-112817		11/28/2017	14	15.5				X				Sample not analyzed
SB-36	SB-36-0-1F-112817		11/28/2017	0	1	X	X	X**		X			
SB-36	SB-36-0-2F-112817		11/28/2017	0	2				X				
SB-36	SB-36-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-36	SB-36-4-6F-112817		11/28/2017	4	6				X				
SB-36	SB-36-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed
SB-36	SB-36-8-10F-112817		11/28/2017	8	10				X				
SB-36	SB-36-10-12F-112817		11/28/2017	10	12				X				Sample not analyzed
SB-36	SB-36-12-12.5F-112817		11/28/2017	12	12.5				X				
SB-37	SB-37-0-2F-112817		11/28/2017	0	2				X				
SB-37	SB-37-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-37	SB-37-4-6F-112817		11/28/2017	4	6				X				
SB-37	SB-37-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed
SB-37	SB-37-8-10F-112817		11/28/2017	8	10				X				
SB-37	SB-37-10-12F-112817		11/28/2017	10	12				X				Sample not analyzed
SB-37	SB-37-12-14F-112817		11/28/2017	12	14				X				
SB-37	SB-37-14-15F-112817		11/28/2017	14	15				X				Sample not analyzed
SB-38	SB-38-0-2F-112817		11/28/2017	0	2				X				
SB-38	SB-38-2-4F-112817		11/28/2017	2	4				X				Sample not analyzed
SB-38	SB-38-4-6F-112817		11/28/2017	4	6				X				
SB-38	SB-38-6-8F-112817		11/28/2017	6	8				X				Sample not analyzed
SB-38	SB-38-8-10F-112817		11/28/2017	8	10				X				
SB-38	SB-38-10-12F-112817		11/28/2017	10	12				X				Sample not analyzed
SB-38	SB-38-12-14F-112817		11/28/2017	12	14				X				
SB-39	SB-39-0-2F-112717		11/27/2017	0	2			X*	X				
SB-39	FD-01-112717	SB-39-0-2F-112717	11/27/2017	0	2			X*	X				
SB-40	SB-40-0-2F-112717		11/27/2017	0	2			X*	X				

Notes:
- Depth in feet below ground surface
- Start depth and end depth for groundwater represent packer interval or screen interval
- * Analyzed for lead only
- ** Total cyanide added to metals analysis
-"Sample not analyzed" - Sample not analyzed due to adjacent sample interval results.
- Table does not include sample locations that received only XRF analysis.
- MNA = monitoring natural attenuation
- PCB = polychlorinated biphenyl
- SVOC = semivolatile organic compound
- VOC = volatile organic compound
- XRF = X-ray fluorescence

TABLE 3-1 SAMPLE ANALYSIS AND SCREENING MATRIX

						Laboratory Analyses					Field Screening		
Location ID	Lab Sample ID	Parent Sample	Sample Date	Start Depth	End Depth	VOCs	SVOCs	Metals	PCBs	Pest.	MNA	XRF	Comments
SB-41	SB-41-0-2F-112717		11/27/2017	0	2			X*	X				
SB-42	SB-42-0-2F-112817		11/27/2017	0	2			X*	X				
SB-43	SB-43-0-2F-112817		11/27/2017	0	2			X*	X				
SB-44	SB-44-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-45	SB-45-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-46	SB-46-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-47	SB-47-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-48	SB-48-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-49	SB-49-0-1F-112817		11/28/2017	0	1	X	X	X**	X	X			
SB-X-B5	SB-X-B5-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-X-E5	SB-X-E5-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-X-F4	SB-X-F4-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-X-F4	SB-X-F4-6-12-102516		10/25/2016	0.5	1			X*				X	
SB-X-F4	SB-X-F4-12-24-102516		10/25/2016	1	2			X*				X	
SB-X-H6	SB-X-H6-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-X-H6	SB-X-H6-6-12-102516		10/25/2016	0.5	1			X*				X	
SB-X-H6	SB-X-H6-12-24-102516		10/25/2016	1	2			X*				X	
SB-Y-A1	SB-Y-A1-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-Y-A2	SB-Y-A2-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-Y-C3	FD-2-102516	SB-Y-C3-0-6-102516	10/25/2016	0	0.5			X*				X	
SB-Y-C3	SB-Y-C3-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-Y-F1	SB-Y-F1-0-6-102516		10/25/2016	0	0.5			X*				X	
SB-Y-F1	SB-Y-F1-6-12-102516		10/25/2016	0.5	1			X*				X	
SB-Z-A2	SB-Z-A2-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-Z-A2	SB-Z-A2-6-12-102416		10/24/2016	0.5	1			X*				X	
SB-Z-A2	SB-Z-A2-12-24-102416		10/24/2016	1	2			X*				X	
SB-Z-D6	SB-Z-D6-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-Z-D6	SB-Z-D6-6-12-102416		10/24/2016	0.5	1			X*				X	
SB-Z-D6	FD-1-102416	SB-Z-D6-12-24-102416	10/24/2016	1	2	X	X	X**	X			X	
SB-Z-D6	SB-Z-D6-12-24-102416		10/24/2016	1	2	X	X	X**	X			X	
SB-Z-D6	SB-Z-D6-24-48-102416		10/24/2016	2	4			X*				X	
SB-Z-E3	SB-Z-E3-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-Z-E3	SB-Z-E3-6-12-102416		10/24/2016	0.5	1			X*				X	
SB-Z-E3	SB-Z-E3-12-24-102416		10/24/2016	1	2			X*				X	
SB-Z-F6	SB-Z-F6-0-6-102416		10/24/2016	0	0.5			X*				X	
SB-Z-F6	SB-Z-F6-6-12-102416		10/24/2016	0.5	1			X*				X	
SB-Z-F6	SB-Z-F6-12-24-102416		10/24/2016	1	2			X*				X	
SB-Z-F6	SB-Z-F6-24-48-102416		10/24/2016	2	4			X*				X	

Notes:
- Depth in feet below ground surface
- Start depth and end depth for groundwater represent packer interval or screen interval
- * Analyzed for lead only
- ** Total cyanide added to metals analysis
- Table does not include sample locations that received only XRF analysis.
- MNA = monitoring natural attenuation
- PCB = polychlorinated biphenyl
- SVOC = semivolatile organic compound
- XRF = X-ray fluorescence
- VOC = volatile organic compound

TABLE 3-1 SAMPLE ANALYSIS AND SCREENING MATRIX

						Laboratory Analyses					Field Screening		
Location ID	Lab Sample ID	Parent Sample	Sample Date	Start Depth	End Depth	VOCs	SVOCs	Metals	PCBs	Pest.	MNA	XRF	Comments
Groundwater Samples													
MW-01R	MW-1R-120816		12/8/2016	16.5	65	X							
MW-01R	MW-1R-022117		2/21/2017	16.5	65	X					X		
MW-03	MW-3-120916		12/9/2016	NA	NA	X							
MW-03	MW-3-022117		2/21/2017	NA	NA	X					X		
MW-04	MW-4-120916		12/9/2016	45	55	X							
MW-04	MW-4-022217		2/22/2017	45	55	X							
MW-04	FD-1-022217	MW-4-022217	2/22/2017	45	55	X							
MW-05	MW-5-120816		12/8/2016	40.5	50.5	X							
MW-05	MW-5-022117		2/21/2017	40.5	50.5	X					X		
MW-06	MW-6-120916		12/9/2016	31.5	41.5	X							
MW-06	MW-6-022217		2/21/2017	31.5	41.5	X							
MW-07	MW-7-120916		12/9/2016	40	50	X							
MW-07	MW-7-022117		2/21/2017	40	50	X					X		
MW-08	MW-8-46-56.5-092916		9/29/2016	46	56.5	X							Packer sample
MW-08	MW-8-120816		12/8/2016	46	56	X							
MW-08	FD-1-120816	MW-8-120816	12/8/2016	46	56	X							
MW-08	MW-8-022117		2/21/2017	46	56	X					X		
MW-08	FD-01-011118	MW-08-011118	1/11/2018	46	56	X	X	X**	X	X			
MW-08	MW-08-011118		1/11/2018	46	56	X	X	X**	X	X			
MW-09	MW-9-46.2-56.7-100516		10/5/2016	46.2	56.7	X							Packer sample
MW-09	MW-9-120816		12/8/2016	46	56	X							
MW-09	MW-9-022217		2/22/2017	46	56	X					X		
MW-09	MW-09-011118		1/11/2018	46	56	X	X	X**	X	X			
MW-10	MW-10-34-44.5-10716		10/7/2016	34	44.5	X							Packer sample
MW-10	MW-10-120916		12/9/2016	32.5	42.5	X							
MW-10	MW-10-022217		2/22/2017	32.5	42.5	X					X		
MW-11	MW-11-011118		1/11/2018	42.5	52.5	X	X	X**	X	X			

Notes:
- Depth in feet below ground surface
- Start depth and end depth for groundwater represent packer interval or screen interval
- * Analyzed for lead only
- ** Total cyanide added to metals analysis
- "Packer sample" - Sample interval was isolated through use of a packer. Sampling occurred during drilling. Refer to Table 3-2
- MNA = monitoring natural attenuation
- PCB = polychlorinated biphenyl
- SVOC = semivolatile organic compound
- VOC = volatile organic compound
- XRF = X-ray fluorescence

TABLE 3-2 CORING AND PACKER SUMMARY

Ground Elevation	Packer Interval (ft bgs)		Packer Interval (ft amsl)		Produce Water and Sampled Y/N
(ft amsl)	Top	Bottom	Top	Bottom	
MW-08					
525.23	8.0	17.5	517.23	507.73	N
	16.5	27.5	508.73	497.73	N
	27.0	37.5	498.23	487.73	N
	36.0	46.5	489.23	478.73	N
	46.0	56.5	479.23	468.73	Y
	56.0	66.5	469.23	458.73	N
	65.7	71.3	459.53	453.93	N
MW-09					
520.80	46.2	56.7	474.60	464.10	Y
	56.7	70.0	464.10	450.80	N
MW-10					
492.47	24.0	24.5	468.47	467.97	N
	34.0	44.5	458.47	447.97	Y
	53.5	64.5	438.97	427.97	N
	65.0	76.0	427.47	416.47	N
MW-11					
531.71	22.0	32.5	509.71	499.21	N
	32.5	42.5	499.21	489.21	N
	42.5	52.5	489.21	479.21	Y*
	52.5	57.5	479.21	474.21	N
	47.5	57.5	484.21	474.21	N
	57.5	67.5	474.21	464.21	N
	42.5	67.5	489.21	464.21	Y*
	52.5	67.5	479.21	464.21	N
	0.0	57.5	531.71	474.21	Y*

Notes:
ft amsl - feet above mean sea level
ft bgs - feet below ground surface
*- Not sampled

TABLE 3-3 WELL CONSTRUCTION SUMMARY

Well ID	Location		Well Diameter	Top of Casing Elevation	Measurement Point	Well Total Depth	Well Bottom Elevation	Ground Elevation	Bedrock Depth	Bedrock Elevation	Top of Screen	Bottom of Screen	Screen Type	Slot	Elevation Top Screen	Elevation Bottom Screen	Well Status	Installation Date	Phase of Work	Consultant That Installed Well
	Northing	Easting	(inches)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft bgs)	(ft bgs)			(ft amsl)	(ft amsl)				
MW-01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Missing	---	---	Unknown
MW-01R	893214.54	844675.72	3.875	549.71	Top of Steel	65.00	485.19	550.19	5.00	545.19	11.50	65.00	Open Bedrock	- - -	538.69	485.15	Existing	10/22/2010	---	OBG
MW-03	893311.24	844488.55	3.875	500.60	Top of Steel	30.05	470.55	500.60	---	---	---	---	Open Bedrock	---	---	---	Existing	---	---	---
MW-04	---	---	4	---	---	55.00	---	---	9.00	---	18.50	55.00	Open Bedrock	---	---	---	Abandoned	12/4/2001	VCP	SDS
MW-04R[1]	893428.10	844458.49	2	493.63	Top of PVC	55.00	436.90	491.90	10.00	481.90	45.00	55.00	PVC	0.010" PVC	446.90	436.90	Existing	10/22/2012	---	Barton & Loguidice
MW-05	893382.82	844536.16	2	520.36	Top of PVC	50.50	470.34	520.84	18.30	502.54	40.50	50.50	PVC	0.010" PVC	480.34	470.34	Existing	9/19/2012	ERP	Barton & Loguidice
MW-06	893581.72	844218.51	2	423.69	Top of PVC	41.50	382.63	424.13	20.00	404.13	31.50	41.50	PVC	0.010" PVC	392.63	382.63	Existing	9/19/2012	ERP	Barton & Loguidice
MW-07	893437.30	844213.20	2	432.38	Top of PVC	50.00	382.66	432.66	28.60	404.06	40.00	50.00	PVC	0.010" PVC	392.66	382.66	Existing	9/19/2012	ERP	Barton & Loguidice
MW-08	893300.15	844558.66	2	527.10	Top of PVC	56.00	469.23	525.23	2.80	522.43	46.00	56.00	PVC	0.010" PVC	479.23	469.23	Existing	10/9/2016	RI	OBG
MW-09	893390.10	844567.89	2	522.49	Top of PVC	56.00	464.80	520.80	0.00	520.80	46.00	56.00	PVC	0.010" PVC	474.80	464.80	Existing	10/9/2016	RI	OBG
MW-10	893421.49	844455.64	2	493.88	Top of PVC	42.50	449.97	492.47	8.00	484.47	32.50	42.50	PVC	0.010" PVC	459.97	449.97	Existing	10/9/2016	RI	OBG
MW-11	893078.14	844555.39	2	533.61	Top of PVC	52.50	479.21	531.71	5.00	526.71	42.50	52.50	PVC	0.010" PVC	489.21	479.21	Existing	12/7/2017	RI	OBG

Notes:

- - - : No Value

(1) Originally completed as open bedrock hole. Well reamed and constructed by Barton & Loguidice with 2-inch PVC and sand pack on 8/30/12.

ERP: Environmental Restoration Program

ft amsl: feet above mean sea level.

ft bgs: feet below ground surface.

Horizontal Datum: NAD83 New York Central State Plane Feet, Vertical Datum: NAVD88 (feet)

NYSDEC: New York State Department of Environmental Conservation

PVC: Polyvinyl Chloride

RI: Remedial Investigation

VCP = Voluntary Clean-up Program Investigation

TABLE 3-4 HYDRAULIC CONDUCTIVITY RESULTS SUMMARY

Well ID	Slug Test Type	Test ID	Number of Test	Number of Tests Analyzed	Analysis Method	Hydraulic Conductivity Value (cm/sec)	Hydraulic Conductivity Value (ft/day)	Aquifer Thickness (feet)	Transmissivity (ft^2/day)
MW-05	1.5 ft PVC Slug	MW-05_Test4_RH	4	1	Bouwer & Rice	1.84E-05	0.05	6.6	0.35
MW-08	5.25 ft PVC Slug	MW-08_Test1_FH	1	2	Bouwer & Rice	4.46E-06	0.01	10.0	0.13
MW-08	5.25 ft PVC Slug	MW-08_Test2_RH	2	2	Bouwer & Rice	3.48E-06	0.01	10.0	0.10
MW-09	2.5 ft PVC Slug	MW-09_Test2_RH	1	2	Bouwer & Rice	8.25E-05	0.23	6.8	1.59
MW-09	2.5 ft PVC Slug	MW-09_Test4_RH	2	2	Bouwer & Rice	8.25E-05	0.23	6.8	1.59

Notes:

cm/sec - centimeters per second.
ft/day - feet per day.
ft^2/day - square feet per day.

TABLE 3-5 GROUNDWATER ELEVATION MEASUREMENTS

Well ID	Location		Well Diameter	Top of Casing Elevation	Measurement Point (6)	Ground Elevation	Bedrock Depth	Bedrock Elevation	Water Bearing Zone	Elevation Top Screen	Elevation Bottom Screen	December 8, 2016		February 20, 2017		January 10, 2018	
	Northing	Easting	(inches)	(ft amsl)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	DTW (ft btoc)	Elevation (ft amsl)	DTW (ft btoc)	Elevation (ft amsl)	DTW (ft btoc)	Elevation (ft amsl)
MW-01R	---	---	3.875	549.71	Top of Steel	550.19	5.00	545.19	---	538.69	485.19	41.48	508.23	38.59	511.12	41.32	508.39
MW-03	893311.24	844488.55	3.875	500.60	Top of Steel	500.60	---	---	---	---	---	10.45	490.15	10.20	490.40	10.66	489.94
MW-04R	893428.10	844458.49	2	493.63	Top of PVC	491.90	8.00	483.90	---	446.90	436.90	19.77	473.86	20.78	472.85	30.98	462.65
MW-05	893382.82	844536.16	2	520.36	Top of PVC	520.84	18.30	502.54	---	480.34	470.34	43.34	477.02	42.92	477.44	43.55	476.81
MW-06	893581.72	844218.51	2	423.69	Top of PVC	424.13	20.00	404.13	---	392.63	382.63	28.42	395.27	27.77	395.92	30.92	392.77
MW-07	893437.30	844213.20	2	432.38	Top of PVC	432.66	28.60	404.06	---	392.66	382.66	37.95	394.43	37.85	394.53	39.82	392.56
MW-08	893300.15	844558.66	2	527.10	Top of PVC	525.23	2.80	522.43	46.0-56.5	479.23	469.23	16.81	510.29	13.75	513.35	20.5	506.60
MW-09	893390.10	844567.89	2	522.49	Top of PVC	520.80	0.00	520.80	46.2-56.7	474.80	464.80	50.79	471.70	50.94	471.55	50.59	471.90
MW-10	893421.49	844455.64	2	493.88	Top of PVC	492.47	8.00	484.47	34.0-44.5	459.97	449.97	29.9	463.98	20.61	473.27	31.09	462.79
MW-11	893078.14	844555.39	2	533.61	Top of PVC	531.71	5.00	526.71	42.5-47.5	489.21	479.21	---	---	---	---	30.7	502.91

Notes:

- - - : No Value

ft bgs: feet below ground surface.

ft btoc: feet below top of casing.

Horizontal Datum: NAD83 New York West State Plane Feet, Vertical Datum: NAVD88 (feet)

PVC: Polyvinyl Chloride

TABLE 3-6 SURVEY DATA SUMMARY

Well ID	Location		Top of Casing Elevation	Measurement Point	Ground Elevation	Survey Date
	Northing	Easting	(ft amsl)		(ft amsl)	
MW-01R	893214.54	844675.72	549.71	Top of PVC	550.19	12/11/2017
MW-04	893428.10	844458.32	493.63	Top of PVC	491.95	12/11/2017
MW-08	893300.15	844558.66	527.10	Top of PVC	525.23	12/8/2016
MW-09	893390.10	844567.89	522.49	Top of PVC	520.80	12/8/2016
MW-10	893421.49	844455.64	493.88	Top of PVC	492.47	12/8/2016
MW-11	893078.14	844555.39	533.61	Top of PVC	531.71	12/11/2017
SB-1	893387.45	844452.81	---	---	494.23	12/8/2016
SB-24	893421.93	844461.22	---	---	491.67	12/11/2017
SB-25	893422.98	844453.21	---	---	492.24	12/11/2017
SB-26	893412.40	844452.02	---	---	492.11	12/11/2017
SB-27	893411.85	844459.47	---	---	491.67	12/11/2017
SB-28	893402.14	844450.77	---	---	492.50	12/11/2017
SB-29	893401.50	844458.29	---	---	492.23	12/11/2017
SB-30	893392.49	844449.79	---	---	494.19	12/11/2017
SB-31	893391.58	844453.48	---	---	493.99	12/11/2017
SB-32	893391.15	844458.08	---	---	493.56	12/11/2017
SB-33	893383.13	844449.68	---	---	495.23	12/11/2017
SB-34	893380.65	844457.55	---	---	495.18	12/11/2017
SB-35	893372.73	844448.82	---	---	496.68	12/11/2017
SB-36	893371.29	844457.51	---	---	496.30	12/11/2017
SB-37	893361.97	844448.35	---	---	498.47	12/11/2017
SB-38	893360.75	844456.50	---	---	498.42	12/11/2017
SB-39	893389.66	844490.34	---	---	499.50	12/11/2017
SB-40	893392.63	844481.54	---	---	498.94	12/11/2017
SB-41	893375.42	844483.36	---	---	498.35	12/11/2017
SB-42	893364.84	844491.96	---	---	498.15	12/11/2017
SB-43	893364.78	844483.74	---	---	497.71	12/11/2017
SB-44	893424.51	844553.87	---	---	517.32	12/11/2017
SB-45	893386.92	844679.14	---	---	545.56	12/11/2017
SB-46	893267.63	844634.47	---	---	530.77	12/11/2017
SB-47	893275.40	844551.30	---	---	525.42	12/11/2017

Notes:

- - - : No Value

ft amsl: feet above mean sea level.

Horizontal Datum: NAD83 New York Central State Plane Feet, Vertical Datum: NAVD88 (feet)

PVC: Polyvinyl Chloride

TABLE 3-6 SURVEY DATA SUMMARY

Well ID	Location		Top of Casing Elevation	Measurement Point	Ground Elevation	Survey Date
	Northing	Easting	(ft amsl)		(ft amsl)	
SB-48	893143.04	844562.90	---	---	530.55	12/11/2017
SB-49	893093.15	844642.59	---	---	544.15	12/11/2017
SB-X-B5	893457.04	844730.95	---	---	544.83	12/8/2016
SB-X-E5	893451.18	844705.04	---	---	545.09	12/8/2016
SB-X-F4	893451.25	844691.54	---	---	544.25	12/8/2016
SB-X-H6	893429.85	844679.71	---	---	544.28	12/8/2016
SB-Y-A1	893421.42	844742.66	---	---	547.30	12/8/2016
SB-Y-A2	893403.53	844739.51	---	---	561.50	12/8/2016
SB-Y-C3	893397.68	844719.78	---	---	548.62	12/8/2016
SB-Y-F1	893407.72	844693.17	---	---	544.97	12/8/2016
SB-Z-A2	893420.81	844449.54	---	---	491.78	12/8/2016
SB-Z-D6	893454.99	844476.88	---	---	491.69	12/8/2016
SB-Z-E3	893426.92	844486.93	---	---	491.53	12/8/2016
SB-Z-F6	893454.29	844496.01	---	---	492.16	12/8/2016
Z-Z5 G	893402.03	844442.61	---	---	490.63	12/11/2017
Z-Z6 G	893411.57	844442.15	---	---	490.45	12/11/2017
Z-Z7 G	893420.51	844441.12	---	---	490.30	12/11/2017
Z-Z8 G	893433.68	844441.49	---	---	489.69	12/11/2017
Z-Z9 G	893449.76	844445.75	---	---	486.90	12/11/2017
Z-Z10 G	893453.94	844457.37	---	---	488.23	12/11/2017
Z-Z11 G	893457.97	844464.67	---	---	488.61	12/11/2017
Z-Z12 G	893459.69	844472.21	---	---	489.48	12/11/2017
Z-Z13 G	893462.89	844469.87	---	---	486.38	12/11/2017
Z-Z14 G	893481.76	844487.97	---	---	474.53	12/11/2017
Z-Z15 G	893473.56	844488.64	---	---	480.71	12/11/2017
Z-Z16 G	893473.12	844474.84	---	---	474.31	12/11/2017
Z-Z17 G	893472.42	844464.94	---	---	471.46	12/11/2017
Z-Z18 G	893470.32	844452.06	---	---	474.79	12/11/2017
Z-Z19 G	893470.08	844440.54	---	---	473.14	12/11/2017
Z-Z20 G	893480.08	844438.96	---	---	472.67	12/11/2017
Z-Z21 G	893455.84	844445.78	---	---	481.22	12/11/2017

Notes:

- - - : No Value

ft amsl: feet above mean sea level.

Horizontal Datum: NAD83 New York Central State Plane Feet, Vertical Datum: NAVD88 (feet)

PVC: Polyvinyl Chloride

TABLE 5-1 SOIL VOLATILE ORGANIC COMPOUND RESULTS SUMMARY

Location ID:				SB-01	SB-24	SB-24	SB-36	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49	SB-Z-D6	SB-Z-D6
Start Depth (ft bgs):				6	0	0	0	0	0	0	0	0	0	1	1
End Depth (ft bgs):				8	1	1	1	1	1	1	1	1	1	2	2
Sample ID:				1-72-96-102416-20161(	SB-24-0-1F-112717	FD-02-112717	SB-36-01F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-Z-D6-12-24-102416	FD-1-102416-20161024
Sample Type Code:				N	N	FD	N	N	N	N	N	N	N	N	FD
Sample Date:				10/24/2016	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]												
1,1,1,2-Tetrachloroethane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,1,1-Trichloroethane	0.68	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,1,2,2-Tetrachloroethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
1,1,2-Trichloroethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,1-Dichloroethane	0.27	26	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,1-Dichloroethene	0.33	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,1-Dichloropropene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,2,3-Trichlorobenzene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,2,3-Trichloropropane	NC		NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,2,4,5-TETRAMETHYLBENZENE	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,2,4-Trichlorobenzene	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
1,2,4-Trimethylbenzene	3.6	52	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
1,2-Dibromoethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,2-Dichlorobenzene	1.1	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
1,2-Dichloroethane	0.02	3.1	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,2-Dichloropropane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
1,3,5-Trimethylbenzene	8.4	52	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,3-Dichlorobenzene	2.4	49	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
1,3-Dichloropropane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
1,4-Dichlorobenzene	1.8	13	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
2,2-Dichloropropane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
2-Butanone	0.12	100	NC	0.025 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.03 UJ	0.029 U
2-Hexanone	NC	NC	NC	0.025 U	---	---	---	---	---	---	---	---	---	0.03 UJ	0.029 U
4-Isopropyltoluene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
4-Methyl-2-Pentanone	NC	NC	NC	0.025 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.03 UJ	0.029 U
Acetone	0.05	100	NC	0.025 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.03 UT	0.029 U
Benzene	0.06	4.8	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Bromobenzene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Bromochloromethane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Bromodichloromethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Bromoform	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Bromomethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Carbon disulfide	NC	NC	NC	0.0051 U	---	---	---	---	---	---	---	---	---	0.006 U	0.0058 U
Carbon Tetrachloride	0.76	2.4	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Chlorobenzene	1.1	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Chlorodifluoromethane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Chloroethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Chloroform	0.37	49	NC	0.00039 J	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Chloromethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
cis-1,2-Dichloroethene	0.25	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Cis-1,3-Dichloropropene	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UJ	0.0058 U
Cyclohexane	NC	NC	NC	0.0051 U	---	---	---	---	---	---	---	---	---	0.006 U	0.0058 U
Dibromochloromethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Dibromomethane	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Dichlorodifluoromethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U

Notes:

All units in milligrams per kilogram (mg/kg)

- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375

- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51

NC - No criteria exists

Sample Type Code: N - Normal, FD - Field Duplicate

ft bgs - feet below ground surface

U - Not Detected at the Detection Limit shown, T - Quality control parameter exceeded laboratory limits, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound

--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance*, Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance*, Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-1 SOIL VOLATILE ORGANIC COMPOUND RESULTS SUMMARY

Location ID:				SB-01	SB-24	SB-24	SB-36	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49	SB-Z-D6	SB-Z-D6
Start Depth (ft bgs):				6	0	0	0	0	0	0	0	0	0	1	1
End Depth (ft bgs):				8	1	1	1	1	1	1	1	1	1	2	2
Sample ID:				1-72-96-102416-20161	SB-24-0-1F-112717	FD-02-112717	SB-36-01F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-Z-D6-12-24-102416	FD-1-102416-20161024
Sample Type Code:				N	N	FD	N	N	N	N	N	N	N	N	FD
Sample Date:				10/24/2016	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]												
Ethane, 1,1,2-trichloro-1,2,2-trifluoro	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Ethylbenzene	1	41	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Hexachlorobutadiene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Isopropylbenzene	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
m,p-Xylene	NC	NC	NC	---	0.0045 U	0.005 U	0.0045 U	0.0044 U	0.0042 U	0.005 U	0.0043 U	0.0045 U	0.0046 U	---	---
Methyl Acetate	NC	NC	NC	0.025 U	---	---	---	---	---	---	---	---	---	0.03 UJ	0.029 U
Methylcyclohexane	NC	NC	NC	0.0051 U	---	---	---	---	---	---	---	---	---	0.006 U	0.0058 U
Methylene Chloride	0.05	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
MTBE	0.93	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Naphthalene	12	100	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
n-Butylbenzene	12	100	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
n-Propylbenzene	3.9	100	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
o-Chlorotoluene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
o-Xylene	NC	NC	NC	---	0.0022 U	0.0028	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
p-Chlorotoluene	NC	NC	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
sec-Butylbenzene	11	100	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Styrene	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UT	0.0058 U
Tert-Butylbenzene	5.9	100	NC	---	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	---	---
Tetrachloroethene	1.3	19	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Toluene	0.7	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
trans-1,2-Dichloroethene	0.19	100	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Trans-1,3-Dichloropropene	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 UT	0.0058 U
Trichloroethene	0.47	21	NC	0.0052	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Trichlorofluoromethane	NC	NC	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Vinyl Chloride	0.02	0.9	NC	0.0051 U	0.0022 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0025 U	0.0021 U	0.0023 U	0.0023 U	0.006 U	0.0058 U
Xylenes (total)	0.26	100	NC	0.01 U	0.0057	0.0071	0.0045 U	0.0044 U	0.0042 U	0.005 U	0.0043 U	0.0045 U	0.0046 U	0.012 UT	0.012 U
Total TICS				0.019	---	---	---	---	---	---	---	---	---	0.0426	0.04

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, T - Quality control parameter exceeded laboratory limits, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound
TICs - Tentatively Identified Compounds
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

TABLE 5-2 SOIL SEMI-VOLATILE ORGANIC COMPOUND RESULTS SUMMARY

			Location ID:	SB-01	SB-24	SB-24	SB-36	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49	SB-Z-D6	SB-Z-D6
			Start Depth (ft bgs):	6	0	0	0	0	0	0	0	0	0	1	1
			End Depth (ft bgs):	8	1	1	1	1	1	1	1	1	1	2	2
			Sample ID:	SB-1-72-96-102416-20161024	SB-24-0-1F-112717	FD-02-112717	SB-36-01F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-Z-D6-12-24-102416	FD-1-102416
			Sample Type Code:	N	N	FD	N	N	N	N	N	N	N	N	FD
			Sample Date:	10/24/2016	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted1	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]												
1,1'-Biphenyl	NC	NC	NC	1.8 U	---	---	---	---	---	---	---	---	---	2 U	2 U
1,2,4-Trichlorobenzene	NC	NC	NC	---	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	---	---
1,2-Dichlorobenzene	1.1	100	NC	---	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	---	---
1,3-Dichlorobenzene	2.4	49	NC	---	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	---	---
1,4-Dichlorobenzene	1.8	13	NC	---	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	---	---
2,4,5-Trichlorophenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
2,4,6-Trichlorophenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
2,4-Dichlorophenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
2,4-Dimethylphenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
2,4-Dinitrophenol	NC	NC	NC	18 U	0.774 U	0.822 U	0.756 U	0.714 U	0.749 U	0.785 U	0.701 U	0.776 U	0.745 U	20 R	19 U
2,4-Dinitrotoluene	NC	NC	NC	1.8 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	2 U	2 U
2,6-Dinitrotoluene	NC	NC		1.8 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	2 U	2 U
2-Chloronaphthalene	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
2-Chlorophenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
2-Methylnaphthalene	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
2-Methylphenol	0.33	100	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
2-Nitroaniline	NC	NC	NC	3.5 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	3.9 UJ	3.9 U
2-Nitrophenol	NC	NC	NC	1.8 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	2 U	2 U
3- AND 4- METHYLPHENOL (TOTAL)	NC	NC	NC	---	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	---	---
3&4-Methylphenol	0.33	100	NC	3.5 U	---	---	---	---	---	---	---	---	---	3.9 U	3.9 U
3,3-Dichlorobenzidine	NC	NC	NC	3.5 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	3.9 U	3.9 U
3-Nitroaniline	NC	NC	NC	3.5 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	3.9 UJ	3.9 U
4,6-Dinitro-2-methylphenol	NC	NC	NC	3.5 U	0.774 U	0.822 U	0.756 U	0.714 U	0.749 U	0.785 U	0.701 U	0.776 U	0.745 U	3.9 U	3.9 U
4-Bromophenyl-phenylether	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
4-Chloro-3-methylphenol	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
4-Chloroaniline	NC	NC	NC	1.8 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	2 UT	2 U
4-Chlorophenyl-phenylether	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
4-Nitroaniline	NC	NC	NC	3.5 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	3.9 U	3.9 U
4-Nitrophenol	NC	NC	NC	3.5 U	0.774 U	0.822 U	0.756 U	0.714 U	0.749 U	0.785 U	0.701 U	0.776 U	0.745 U	3.9 UJ	3.9 U
Acenaphthene	20	100	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.107	2 U	2 U
Acenaphthylene	100	100	NC	0.86 J	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.273	2 UJ	2 U
Acetophenone	NC	NC	NC	1.8 U	---	---	---	---	---	---	---	---	---	2 U	2 U
Anthracene	100	100	NC	1 J	0.0774 U	0.0822 U	0.11	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.442	2 UJ	0.57 J
Atrazine	NC	NC	NC	1.8 U	---	---	---	---	---	---	---	---	---	2 UJ	2 U
Benzaldehyde	NC	NC	NC	1.8 U	---	---	---	---	---	---	---	---	---	2 U	2 U
Benzo[a]anthracene	1	1	NC	4.1	0.319	0.321	0.772	0.189	0.197	0.248	0.0701 U	0.33	1.55	2.3 J	3.5
Benzo[a]pyrene	1	1	NC	3.9	0.361	0.374	1.25	0.174	0.217	0.252	0.0701 U	0.316	1.74	2.5 J	3.5
Benzo[b]fluoranthene	1	1	NC	5	0.581	0.579	1.72	0.236	0.287	0.332	0.0708	0.399	2.69	3.3 J	4.8
Benzo[g,h,i]perylene	100	100	NC	3.3	0.599	0.539	1.56	0.163	0.237	0.213	0.0701 U	0.238	0.775	2.2 J	2.9
Benzo[k]fluoranthene	0.8	3.9	NC	2.1	0.223	0.214	0.787	0.0992	0.138	0.132	0.0701 U	0.197	1.13	1.2 J	1.6 J
Bis(2-Chloroethoxy)methane	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Bis(2-Chloroethyl)Ether	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Bis(2-Chloroisopropyl)ether	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Bis(2-Ethylhexyl)phthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0816	2 UJ	2 U
Butylbenzylphthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Caprolactam	NC	NC	NC	1.8 U	---	---	---	---	---	---	---	---	---	2 UJ	2 U
Carbazole	NC	NC	NC	0.55 J	0.0774 U	0.0822 U	0.165	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.195	0.33 J	0.45 J

Notes:
All Units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, T - Quality control parameter exceeded laboratory limits, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound
TICs - Tentatively Identified Compounds
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

TABLE 5-2 SOIL SEMI-VOLATILE ORGANIC COMPOUND RESULTS SUMMARY

			Location ID:	SB-01	SB-24	SB-24	SB-36	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49	SB-Z-D6	SB-Z-D6
			Start Depth (ft bgs):	6	0	0	0	0	0	0	0	0	0	1	1
			End Depth (ft bgs):	8	1	1	1	1	1	1	1	1	1	2	2
			Sample ID:	SB-1-72-96-102416-20161024	SB-24-0-1F-112717	FD-02-112717	SB-36-01F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-Z-D6-12-24-102416	FD-1-102416
			Sample Type Code:	N	N	FD	N	N	N	N	N	N	N	N	FD
			Sample Date:	10/24/2016	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted1	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]												
Chrysene	1	3.9	NC	4.6	0.383	0.438	1.08	0.202	0.215	0.302	0.0701 U	0.383	1.53	2.9 J	3.5
Dibenzo[a,h]Anthracene	0.33	0.33	NC	0.79 J	0.0774 U	0.0822 U	0.325	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.247	0.45 J	0.68 J
Dibenzofuran	7	59	NC	0.31 J	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0809	2 UJ	2 U
Diethylphthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Dimethylphthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Di-n-butylphthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.078	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Di-n-octylphthalate	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Fluoranthene	100	100	NC	8.8	0.719	0.752	1.67	0.365	0.332	0.427	0.117	0.676	2.57	5.6 T	7
Fluorene	30	100	NC	0.38 J	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.123	2 UJ	2 U
Hexachlorobenzene	0.33	1.2	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UT	2 U
Hexachlorobutadiene	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Hexachlorocyclopentadiene	NC	NC	NC	1.8 U	0.381 U	0.405 U	0.372 U	0.352 U	0.369 U	0.387 U	0.345 U	0.382 U	0.367 U	2 U	2 U
Hexachloroethane	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Indeno[1,2,3-cd]pyrene	0.5	0.5	NC	2.5	0.333	0.311	1.46	0.155	0.208	0.208	0.0701 U	0.246	0.818	1.6 J	2.3
Isophorone	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UJ	2 U
Naphthalene	12	100	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Nitrobenzene	NC	NC	15	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
N-Nitroso-Di-N-Propylamine	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
N-Nitrosodiphenylamine	NC	NC	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 UT	2 U
Pentachlorophenol	0.8	6.7	NC	3.5 U	0.774 U	0.822 U	0.756 U	0.714 U	0.749 U	0.785 U	0.701 U	0.776 U	0.745 U	3.9 U	3.9 U
Phenanthrene	100	100	NC	5.7	0.344	0.419	0.545	0.203	0.143	0.159	0.0748	0.43	1.47	2.4 J	3.3
Phenol	0.33	100	NC	1.8 U	0.0774 U	0.0822 U	0.0756 U	0.0714 U	0.0749 U	0.0785 U	0.0701 U	0.0776 U	0.0745 U	2 U	2 U
Pyrene	100	100	NC	8.5	0.674	0.721	1.41	0.315	0.299	0.435	0.0993	0.579	2.8	4.9 T	6.4
Total TICS	NC	NC	NC	30.4	38.979	33.601	22.104	16.26	14.105	14.556	16.376	16.3	16.074	1.9	4.7

Notes:

All Units in milligrams per kilogram (mg/kg)

- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375

- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51

NC - No criteria exists

Sample Type Code: N - Normal, FD - Field Duplicate

ft bgs - feet below ground surface

U - Not Detected at the Detection Limit shown, T - Quality control parameter exceeded laboratory limits, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound

TICs - Tentatively Identified Compounds

--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-01	SB-01	SB-01	SB-01	SB-01	SB-01	SB-01	SB-24
			Start Depth (ft bgs):	0	0.5	1	4	6	8	10	0
			End Depth (ft bgs):	0.5	1	2	6	8	10	12	1
			Sample ID:	SB-1-0-6-102416	SB-1-6-12-102416	SB-1-12-24-102416	SB-1-48-72-102416	SB-1-72-96-102416	SB-1-96-120-102416	SB-1-120-144-102416	FD-02-112717
			Sample Type Code:	N	N	N	N	N	N	N	FD
			Sample Date:	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	11/27/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	---	---	---	---	11,200	---	---	6,560
Antimony	NC	NC	NC	---	---	---	---	115 JL	---	---	3.9 U
Arsenic	13	16	NC	---	---	---	---	31.6 J	---	---	22.8
Barium	350	400	NC	---	---	---	---	95.8	---	---	63.7
Beryllium	7.2	72	NC	---	---	---	---	0.61	---	---	0.43
Cadmium	2.5	4.3	NC	---	---	---	---	1.4	---	---	3.6
Calcium	NC	NC	NC	---	---	---	---	11,500	---	---	27,800
Chromium	30	180	NC	---	---	---	---	27.6	---	---	66.1
Cobalt	NC	NC	NC	---	---	---	---	12.9	---	---	8.1
Copper	50	270	NC	---	---	---	---	221	---	---	52.3
Cyanide (Amenable)	27	27	NC	---	---	---	---	1 U	---	---	1.1 U
Iron	NC	NC	NC	---	---	---	---	51,700	---	---	52,400
Lead	63	400	NC	76.5	15.3	10.8	21,800	10,700	3,210 JH	978 JH	267
Magnesium	NC	NC	NC	---	---	---	---	4,330	---	---	4,270
Manganese	1,600	2,000	NC	---	---	---	---	512	---	---	424
Mercury	0.18	0.81	NC	---	---	---	---	1	---	---	0.18
Nickel	30	310	NC	---	---	---	---	40	---	---	20.7
Potassium	NC	NC	NC	---	---	---	---	1,310	---	---	1,050
Selenium	3.9	180	NC	---	---	---	---	4.2 UJ	---	---	14.1
Silver	2	180	NC	---	---	---	---	5.7	---	---	11.2
Sodium	NC	NC	NC	---	---	---	---	285	---	---	322 U
Thallium	NC	NC	NC	---	---	---	---	6.3 U	---	---	0.64 U
Vanadium	NC	NC	NC	---	---	---	---	22.2	---	---	16.7
Zinc	109	10,000	NC	---	---	---	---	883	---	---	259

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51

NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-24	SB-36	SB-39	SB-39	SB-40	SB-41	SB-42	SB-43
			Start Depth (ft bgs):	0	0	0	0	0	0	0	0
			End Depth (ft bgs):	1	1	2	2	2	2	2	2
			Sample ID:	SB-24-0-1F-112717	SB-36-01F-112817	FD-01-112717	SB-39-0-2F-112717	SB-40-0-2F-112717	SB-41-0-2F-112717	SB-42-0-2F-112817	SB-43-0-2F-112817
			Sample Type Code:	N	N	FD	N	N	N	N	N
			Sample Date:	11/27/2017	11/28/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	6,400	8,550	---	---	---	---	---	---
Antimony	NC	NC	NC	3.6 U	3.6 U	---	---	---	---	---	---
Arsenic	13	16	NC	25.6	8.2	---	---	---	---	---	---
Barium	350	400	NC	61.5	86.7	---	---	---	---	---	---
Beryllium	7.2	72	NC	0.44	0.32	---	---	---	---	---	---
Cadmium	2.5	4.3	NC	4.3	1.7	---	---	---	---	---	---
Calcium	NC	NC	NC	20,700	41,600	---	---	116,000	---	---	---
Chromium	30	180	NC	68.8	24.8	---	---	---	---	---	---
Cobalt	NC	NC	NC	8.4	7.6	---	---	---	---	---	---
Copper	50	270	NC	57.9	23.9	---	---	---	---	---	---
Cyanide (Amenable)	27	27	NC	0.92 U	0.98 U	---	---	---	---	---	---
Iron	NC	NC	NC	61,100	20,000	---	---	---	---	---	---
Lead	63	400	NC	259	186	118	122	195	76.2	107	233
Magnesium	NC	NC	NC	4,040	10,500	---	---	---	---	---	---
Manganese	1,600	2,000	NC	431	487	---	---	---	---	---	---
Mercury	0.18	0.81	NC	0.22	0.25	---	---	---	---	---	---
Nickel	30	310	NC	22.8	17.2	---	---	---	---	---	---
Potassium	NC	NC	NC	1,200	857	---	---	---	---	---	---
Selenium	3.9	180	NC	13.4	0.9	---	---	---	---	---	---
Silver	2	180	NC	13.4	5	---	---	---	---	---	---
Sodium	NC	NC	NC	303 U	303 U	---	---	---	---	---	---
Thallium	NC	NC	NC	0.61 U	0.61 U	---	---	---	---	---	---
Vanadium	NC	NC	NC	13.7	11.6	---	---	---	---	---	---
Zinc	109	10,000	NC	328	149	---	---	---	---	---	---

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37

NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49	SB-X-B5	SB-X-E5
			Start Depth (ft bgs):	0	0	0	0	0	0	0	0
			End Depth (ft bgs):	1	1	1	1	1	1	0.5	0.5
			Sample ID:	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-X-B5-0-6-102416	SB-X-E5-0-6-102516
			Sample Type Code:	N	N	N	N	N	N	N	N
			Sample Date:	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/25/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	3,120	16,300	11,400	2,930	6,330	3,950	---	---
Antimony	NC	NC	NC	3 U	3.4 U	3.6 U	3.3 U	3.5 U	3.6 U	---	---
Arsenic	13	16	NC	3.8	10.5	10.9	3.2	16.9	5.3	---	---
Barium	350	400	NC	138	32.5	47.1	324	46.6	155	---	---
Beryllium	7.2	72	NC	0.25 U	0.55	0.44	0.28 U	0.36	0.3 U	---	---
Cadmium	2.5	4.3	NC	3.1	1.8	1.8	0.55	2.6	0.88	---	---
Calcium	NC	NC	NC	275,000	3,310	17,100	231,000	13,000	129,000	---	---
Chromium	30	180	NC	9.1	35.6	29.1	12.2	29.3	13	---	---
Cobalt	NC	NC	NC	2.5	12.6	8.9	2.8 U	8.7	4.5	---	---
Copper	50	270	NC	6	21.8	21.7	4.8	155	17.2	---	---
Cyanide (Amenable)	27	27	NC	1.1 U	0.89 U	1 U	0.91 U	0.97 U	0.97 U	---	---
Iron	NC	NC	NC	5,870	30,800	28,700	5,400	39,900	10,300	---	---
Lead	63	400	NC	33.5	33.4	58.4	13.5	844	95	573 JH	352 JH
Magnesium	NC	NC	NC	37,500	5,140	6,200	53,300	4,310	4,440	---	---
Manganese	1,600	2,000	NC	130	413	467	119	310	521	---	---
Mercury	0.18	0.81	NC	0.051 U	0.071	0.049 U	0.04 U	1.2	0.067	---	---
Nickel	30	310	NC	5.9	26.2	23.1	5.6	19.5	11.3	---	---
Potassium	NC	NC	NC	1,410	847	867	1,610	943	770	---	---
Selenium	3.9	180	NC	0.5 U	0.81	0.6 U	0.55 U	1.2	0.6 U	---	---
Silver	2	180	NC	1.4	6.6	6.2	1.2	9.2	2.6	---	---
Sodium	NC	NC	NC	249 U	280 U	301 U	277 U	292 U	298 U	---	---
Thallium	NC	NC	NC	0.5 U	0.56 U	0.6 U	0.55 U	0.58 U	0.6 U	---	---
Vanadium	NC	NC	NC	6.5	18.3	15	7.3	13	11.6	---	---
Zinc	109	10,000	NC	537	68	70.2	23.7	136	83.5	---	---

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-X-F4	SB-X-F4	SB-X-F4	SB-X-H6	SB-X-H6	SB-X-H6	SB-Y-A1	SB-Y-A2
			Start Depth (ft bgs):	0	0.5	1	0	0.5	1	0	0
			End Depth (ft bgs):	0.5	1	2	0.5	1	2	0.5	0.5
			Sample ID:	SB-X-F4-0-6-102516	SB-X-F4-6-12-102516	SB-X-F4-12-24-102516	SB-X-H6-0-6-102516	SB-X-H6-6-12-102516	SB-X-H6-12-24-102516	SB-Y-A1-0-6-102516	SB-Y-A2-0-6-102516
			Sample Type Code:	N	N	N	N	N	N	N	N
			Sample Date:	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	---	---	---	---	---	---	---	---
Antimony	NC	NC	NC	---	---	---	---	---	---	---	---
Arsenic	13	16	NC	---	---	---	---	---	---	---	---
Barium	350	400	NC	---	---	---	---	---	---	---	---
Beryllium	7.2	72	NC	---	---	---	---	---	---	---	---
Cadmium	2.5	4.3	NC	---	---	---	---	---	---	---	---
Calcium	NC	NC	NC	---	---	---	---	---	---	---	---
Chromium	30	180	NC	---	---	---	---	---	---	---	---
Cobalt	NC	NC	NC	---	---	---	---	---	---	---	---
Copper	50	270	NC	---	---	---	---	---	---	---	---
Cyanide (Amenable)	27	27	NC	---	---	---	---	---	---	---	---
Iron	NC	NC	NC	---	---	---	---	---	---	---	---
Lead	63	400	NC	989 JH	130 JH	21.1 JH	2,690 JH	2,690 JH	1,320 JH	742 JH	177 JH
Magnesium	NC	NC	NC	---	---	---	---	---	---	---	---
Manganese	1,600	2,000	NC	---	---	---	---	---	---	---	---
Mercury	0.18	0.81	NC	---	---	---	---	---	---	---	---
Nickel	30	310	NC	---	---	---	---	---	---	---	---
Potassium	NC	NC	NC	---	---	---	---	---	---	---	---
Selenium	3.9	180	NC	---	---	---	---	---	---	---	---
Silver	2	180	NC	---	---	---	---	---	---	---	---
Sodium	NC	NC	NC	---	---	---	---	---	---	---	---
Thallium	NC	NC	NC	---	---	---	---	---	---	---	---
Vanadium	NC	NC	NC	---	---	---	---	---	---	---	---
Zinc	109	10,000	NC	---	---	---	---	---	---	---	---

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-Y-C3	SB-Y-C3	SB-Y-F1	SB-Y-F1	SB-Z-A2	SB-Z-A2	SB-Z-A2	SB-Z-D6
			Start Depth (ft bgs):	0	0	0	0.5	0	0.5	1	0
			End Depth (ft bgs):	0.5	0.5	0.5	1	0.5	1	2	0.5
			Sample ID:	FD-2-102516	SB-Y-C3-0-6-102516	SB-Y-F1-0-6-102516	SB-Y-F1-6-12-102516	SB-Z-A2-0-6-102416	SB-Z-A2-6-12-102416	SB-Z-A2-12-24-102416	SB-Z-D6-0-6-102416
			Sample Type Code:	FD	N	N	N	N	N	N	N
			Sample Date:	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	---	---	---	---	---	---	---	---
Antimony	NC	NC	NC	---	---	---	---	---	---	---	---
Arsenic	13	16	NC	---	---	---	---	---	---	---	---
Barium	350	400	NC	---	---	---	---	---	---	---	---
Beryllium	7.2	72	NC	---	---	---	---	---	---	---	---
Cadmium	2.5	4.3	NC	---	---	---	---	---	---	---	---
Calcium	NC	NC	NC	---	---	---	---	---	---	---	---
Chromium	30	180	NC	---	---	---	---	---	---	---	---
Cobalt	NC	NC	NC	---	---	---	---	---	---	---	---
Copper	50	270	NC	---	---	---	---	---	---	---	---
Cyanide (Amenable)	27	27	NC	---	---	---	---	---	---	---	---
Iron	NC	NC	NC	---	---	---	---	---	---	---	---
Lead	63	400	NC	211	231 JH	303 JH	33.3 JH	438	410	202	943
Magnesium	NC	NC	NC	---	---	---	---	---	---	---	---
Manganese	1,600	2,000	NC	---	---	---	---	---	---	---	---
Mercury	0.18	0.81	NC	---	---	---	---	---	---	---	---
Nickel	30	310	NC	---	---	---	---	---	---	---	---
Potassium	NC	NC	NC	---	---	---	---	---	---	---	---
Selenium	3.9	180	NC	---	---	---	---	---	---	---	---
Silver	2	180	NC	---	---	---	---	---	---	---	---
Sodium	NC	NC	NC	---	---	---	---	---	---	---	---
Thallium	NC	NC	NC	---	---	---	---	---	---	---	---
Vanadium	NC	NC	NC	---	---	---	---	---	---	---	---
Zinc	109	10,000	NC	---	---	---	---	---	---	---	---

Notes:

All units in milligrams per kilogram (mg/kg)

- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375

- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37

NC - No criteria exists

Sample Type Code: N - Normal, FD - Field Duplicate

ft bgs - feet below ground surface

U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect

--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-Z-D6	SB-Z-D6	SB-Z-D6	SB-Z-D6	SB-Z-E3	SB-Z-E3	SB-Z-E3	SB-Z-F6
			Start Depth (ft bgs):	0.5	1	1	2	0	0.5	1	0
			End Depth (ft bgs):	1	2	2	4	0.5	1	2	0.5
			Sample ID:	SB-Z-D6-6-12-102416	SB-Z-D6-12-24-102416	FD-1-102416-20161024	SB-Z-D6-24-48-102416	SB-Z-E3-0-6-102416	SB-Z-E3-6-12-102416	SB-Z-E3-12-24-102416	SB-Z-F6-0-6-102416
			Sample Type Code:	N	N	FD	N	N	N	N	N
			Sample Date:	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]								
Aluminum	NC	NC	NC	---	8,600 J	14,100	---	---	---	---	---
Antimony	NC	NC	NC	---	1 JL	17 JL	---	---	---	---	---
Arsenic	13	16	NC	---	6.2 J	10.3 JL	---	---	---	---	---
Barium	350	400	NC	---	85.2 J	91.1	---	---	---	---	---
Beryllium	7.2	72	NC	---	0.39	0.56 JL	---	---	---	---	---
Cadmium	2.5	4.3	NC	---	0.31	0.3 JL	---	---	---	---	---
Calcium	NC	NC	NC	---	4,230 J	4,530 JH	---	---	---	---	---
Chromium	30	180	NC	---	16.1 J	21.4 JH	---	---	---	---	---
Cobalt	NC	NC	NC	---	8.7 J	12.2	---	---	---	---	---
Copper	50	270	NC	---	18.2 J	32.2 J	---	---	---	---	---
Cyanide (Amenable)	27	27	NC	---	0.6 J	1.2 U	---	---	---	---	---
Iron	NC	NC	NC	---	19,100 J	27,000 JH	---	---	---	---	---
Lead	63	400	NC	338	370 J	2,040 J	164	928	1,000	525	1,360
Magnesium	NC	NC	NC	---	2,640 J	4,500 JH	---	---	---	---	---
Manganese	1,600	2,000	NC	---	214 J	299 JH	---	---	---	---	---
Mercury	0.18	0.81	NC	---	0.27 J	0.4	---	---	---	---	---
Nickel	30	310	NC	---	20.4 J	28.8 JH	---	---	---	---	---
Potassium	NC	NC	NC	---	1,040 J	1,260	---	---	---	---	---
Selenium	3.9	180	NC	---	4.7 U	5.2 UJ	---	---	---	---	---
Silver	2	180	NC	---	0.7 U	0.36 JL	---	---	---	---	---
Sodium	NC	NC	NC	---	57.3 J	84.6 JL	---	---	---	---	---
Thallium	NC	NC	NC	---	7 U	7.8 U	---	---	---	---	---
Vanadium	NC	NC	NC	---	30.8 J	24 J	---	---	---	---	---
Zinc	109	10,000	NC	---	127 J	197	---	---	---	---	---

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37

NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-3 SOIL INORGANIC RESULTS SUMMARY

			Location ID:	SB-Z-F6	SB-Z-F6	SB-Z-F6
			Start Depth (ft bgs):	0.5	1	2
			End Depth (ft bgs):	1	2	4
			Sample ID:	SB-Z-F6-6-12-102416	SB-Z-F6-12-24-102416	SB-Z-F6-24-48-102416
			Sample Type Code:	N	N	N
			Sample Date:	10/24/2016	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]			
Aluminum	NC	NC	NC	---	---	---
Antimony	NC	NC	NC	---	---	---
Arsenic	13	16	NC	---	---	---
Barium	350	400	NC	---	---	---
Beryllium	7.2	72	NC	---	---	---
Cadmium	2.5	4.3	NC	---	---	---
Calcium	NC	NC	NC	---	---	---
Chromium	30	180	NC	---	---	---
Cobalt	NC	NC	NC	---	---	---
Copper	50	270	NC	---	---	---
Cyanide (Amenable)	27	27	NC	---	---	---
Iron	NC	NC	NC	---	---	---
Lead	63	400	NC	245	118	1,470
Magnesium	NC	NC	NC	---	---	---
Manganese	1,600	2,000	NC	---	---	---
Mercury	0.18	0.81	NC	---	---	---
Nickel	30	310	NC	---	---	---
Potassium	NC	NC	NC	---	---	---
Selenium	3.9	180	NC	---	---	---
Silver	2	180	NC	---	---	---
Sodium	NC	NC	NC	---	---	---
Thallium	NC	NC	NC	---	---	---
Vanadium	NC	NC	NC	---	---	---
Zinc	109	10,000	NC	---	---	---

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 37

NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, JH - Estimated value, biased high, JL - Estimated value, biased low, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 1
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted R
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection o

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-01	SB-24	SB-24	SB-24	SB-24	SB-25	SB-25	SB-25	SB-26	SB-26	SB-26
			Start Depth (ft bgs):	6	0	4	4	8	0	4	8	0	4	8
			End Depth (ft bgs):	8	2	6	6	10	2	6	10	2	6	10.5
			Sample ID:	SB-1-72-96-102416-20161024	SB-24-0-2F-112717	SB-24-4-6F-112717	FD-03-112717	SB-24-8-10F-112717	SB-25-0-2F-112717	SB-25-4-6F-112717	SB-25-8-10F-112717	SB-26-0-2F-112717	SB-26-4-6F-112717	SB-26-8-10.5F-112717
			Sample Type Code:	N	N	N	FD	N	N	N	N	N	N	N
			Sample Date:	10/24/2016	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	5.4 UJ	0.0392 U	0.0364 U	0.0358 U	0.0355 U	0.0371 U	0.0349 U	0.0392 U	0.0362 U	0.0357 U	0.0359 U
Aroclor-1221	NC	NC	NC	5.4 U	0.0797 U	0.0739 U	0.0726 U	0.072 U	0.0752 U	0.0709 U	0.0796 U	0.0735 U	0.0724 U	0.0729 U
Aroclor-1232	NC	NC	NC	5.4 UJ	0.0392 U	0.0364 U	0.0358 U	0.0355 U	0.0371 U	0.0349 U	0.0392 U	0.0362 U	0.0357 U	0.0359 U
Aroclor-1242	NC	NC	NC	5.4 U	0.0392 U	0.0364 U	0.0358 U	0.0355 U	0.0371 U	0.0349 U	0.0392 U	0.0362 U	0.0357 U	0.0359 U
Aroclor-1248	NC	NC	NC	5.4 UJ	0.0392 U	0.0364 U	0.0358 U	0.0355 U	0.0371 U	0.0349 U	0.0392 U	0.0362 U	0.0357 U	0.0359 U
Aroclor-1254	NC	NC	NC	62	0.236	0.0364 U	0.0358 U	0.0355 U	0.603	0.0349 U	0.0392 U	0.597	0.0403	0.0359 U
Aroclor-1260	NC	NC	NC	5.4 UJ	0.176	0.0364 U	0.0358 U	0.0355 U	0.0371 U	0.0349 U	0.0392 U	0.0362 U	0.0357 U	0.0359 U
Total PCBs	0.1	1	NC	62	0.412	0.0364 U	0.0358 U	0.0355 U	0.603	0.0349 U	0.0392 U	0.597	0.0403	0.0359 U

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-27	SB-27	SB-28	SB-28	SB-28	SB-29	SB-29	SB-29	SB-30	SB-30	SB-30
			Start Depth (ft bgs):	0	4	0	4	8	0	4	8	0	2	4
			End Depth (ft bgs):	2	5.5	2	6	10	2	6	9	2	4	6
			Sample ID:	SB-27-0-2F-112717	SB-27-4-5.5F-112717	SB-28-0-2F-112717	SB-28-4-6F-112717	SB-28-8-10F-112717	SB-29-0-2F-112717	SB-29-4-6F-112717	SB-29-8-9F-112717	SB-30-0-2F-112717	SB-30-2-4F-112717	SB-30-4-6F-112717
			Sample Type Code:	N	N	N	N	N	N	N	N	N	N	N
			Sample Date:	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	0.0348 U	0.0356 U	0.0413 U	0.0614 U	0.0374 U	0.0346 U	0.035 U	0.0384 U	0.0354 U	0.0362 U	0.0354 U
Aroclor-1221	NC	NC	NC	0.0707 U	0.0723 U	0.0839 U	0.125 U	0.0759 U	0.0703 U	0.071 U	0.0779 U	0.0719 U	0.0735 U	0.0718 U
Aroclor-1232	NC	NC	NC	0.0348 U	0.0356 U	0.0413 U	0.0614 U	0.0374 U	0.0346 U	0.035 U	0.0384 U	0.0354 U	0.0362 U	0.0354 U
Aroclor-1242	NC	NC	NC	0.0348 U	0.0356 U	0.0413 U	0.0614 U	0.0374 U	0.0346 U	0.035 U	0.0384 U	0.0354 U	0.0362 U	0.0354 U
Aroclor-1248	NC	NC	NC	0.0348 U	0.0356 U	0.0413 U	0.0614 U	0.0374 U	0.0346 U	0.035 U	0.0384 U	0.0354 U	0.0362 U	0.0354 U
Aroclor-1254	NC	NC	NC	0.0351	0.0356 U	0.225	0.111	0.0374 U	0.102	0.035 U	0.0384 U	0.0354 U	0.35 J	1.81
Aroclor-1260	NC	NC	NC	0.0348 U	0.0356 U	0.0413 U	0.0614 U	0.0374 U	0.0346 U	0.035 U	0.0384 U	0.0354 U	0.0362 U	0.0354 U
Total PCBs	0.1	1	NC	0.0351	0.0356 U	0.225	0.111	0.0374 U	0.102	0.035 U	0.0384 U	0.0354 U	0.35	1.81

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-30	SB-30	SB-30	SB-31	SB-31	SB-31	SB-31	SB-31	SB-32	SB-32	SB-32
			Start Depth (ft bgs):	6	8	8	0	2	4	6	8	0	2	4
			End Depth (ft bgs):	8	10	10	2	4	6	8	10	2	4	6
			Sample ID:	SB-30-6-8F-112717	SB-30-8-10F-112717	FD-04-112717	SB-31-0-2F-112817	SB-31-2-4F-112817	SB-31-4-6F-112817	SB-31-6-8F-112817	SB-31-8-10F-112817	SB-32-0-2F-112817	SB-32-2-4F-112817	SB-32-4-6F-112817
			Sample Type Code:	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date:	11/27/2017	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	0.0367 U	0.0349 U	0.0351 U	0.0351 U	0.0368 U	0.0359 U	0.0349 U	0.0345 U	0.0352 U	0.037 U	0.0352 U
Aroclor-1221	NC	NC	NC	0.0745 U	0.0708 U	0.0713 U	0.0712 U	0.0748 U	0.0729 U	0.0708 U	0.0701 U	0.0715 U	0.075 U	0.0715 U
Aroclor-1232	NC	NC	NC	0.0367 U	0.0349 U	0.0351 U	0.0351 U	0.0368 U	0.0359 U	0.0349 U	0.0345 U	0.0352 U	0.037 U	0.0352 U
Aroclor-1242	NC	NC	NC	0.0367 U	0.0349 U	0.0351 U	0.0351 U	0.0368 U	0.0359 U	0.0349 U	0.0345 U	0.0352 U	0.037 U	0.0352 U
Aroclor-1248	NC	NC	NC	0.0367 U	0.0349 U	0.0351 U	0.0351 U	0.0368 U	0.0359 U	0.0349 U	0.0345 U	0.0352 U	0.037 U	0.0352 U
Aroclor-1254	NC	NC	NC	0.072 J	0.037	0.0665	0.0351 UJ	0.263 J	0.0516	0.0349 U	0.0345 U	0.0352 U	0.561 J	0.0352 U
Aroclor-1260	NC	NC	NC	0.0367 U	0.0349 U	0.0351 U	0.0351 U	0.0368 U	0.0359 U	0.0349 U	0.0345 U	0.0352 U	0.037 U	0.0352 U
Total PCBs	0.1	1	NC	0.072	0.037	0.0665	0.0351 U	0.263	0.0516	0.0349 U	0.0345 U	0.0352 U	0.561	0.0352 U

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-32	SB-32	SB-33	SB-33	SB-33	SB-33	SB-34	SB-34	SB-34	SB-35	SB-35
			Start Depth (ft bgs):	6	8	0	4	8	12	0	4	8	0	4
			End Depth (ft bgs):	8	10	2	6	10	13.5	2	6	10	2	6
			Sample ID:	SB-32-6-8F-112817	SB-32-8-10F-112817	SB-33-0-2F-112817	SB-33-4-6F-112817	SB-33-8-10F-112817	SB-33-12-13.5F-112817	SB-34-0-2F-112817	SB-34-4-6F-112817	SB-34-8-10F-112817	SB-35-0-2F-112817	SB-35-4-6F-112817
			Sample Type Code:	N	N	N	N	N	N	N	N	N	N	N
			Sample Date:	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	0.188 U	0.0347 U	0.0348 U	0.0355 U	0.0364 U	0.0357 U	0.0367 U	0.0355 U
Aroclor-1221	NC	NC	NC	0.0709 U	0.0716 U	0.0707 U	0.381 U	0.0704 U	0.0706 U	0.0721 U	0.0739 U	0.0725 U	0.0745 U	0.0721 U
Aroclor-1232	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	0.188 U	0.0347 U	0.0348 U	0.0355 U	0.0364 U	0.0357 U	0.0367 U	0.0355 U
Aroclor-1242	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	0.188 U	0.0347 U	0.0348 U	0.0355 U	0.0364 U	0.0357 U	0.0367 U	0.0355 U
Aroclor-1248	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	0.188 U	0.0347 U	0.0348 U	0.0355 U	0.0364 U	0.0357 U	0.0367 U	0.0355 U
Aroclor-1254	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	1.56	1.34	0.0348 U	0.0355 U	0.106	0.0357 U	0.0367 U	0.121
Aroclor-1260	NC	NC	NC	0.0349 U	0.0353 U	0.0348 U	0.188 U	0.0347 U	0.0348 U	0.0355 U	0.0364 U	0.0357 U	0.0367 U	0.0355 U
Total PCBs	0.1	1	NC	0.0349 U	0.0353 U	0.0348 U	1.56	1.34	0.0348 U	0.0355 U	0.106	0.0357 U	0.0367 U	0.121

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-35	SB-35	SB-36	SB-36	SB-36	SB-36	SB-37	SB-37	SB-37	SB-37	SB-38
			Start Depth (ft bgs):	8	12	0	4	8	12	0	4	8	12	0
			End Depth (ft bgs):	10	14	2	6	10	12.5	2	6	10	14	2
			Sample ID:	SB-35-8-10F-112817	SB-35-12-14F-112817	SB-36-0-2F-112817	SB-36-4-6F-112817	SB-36-8-10F-112817	SB-36-12-12.5-112817	SB-37-0-2F-112817	SB-37-4-6F-112817	SB-37-8-10F-112817	SB-37-12-14F-112817	SB-38-0-2F-112817
			Sample Type Code:	N	N	N	N	N	N	N	N	N	N	N
			Sample Date:	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	0.0353 U	0.0353 U	0.0351 U	0.0366 U	0.035 U	0.0362 U	0.0362 U	0.0356 U	0.0373 U	0.036 U	0.0369 U
Aroclor-1221	NC	NC	NC	0.0717 U	0.0717 U	0.0713 U	0.0742 U	0.0711 U	0.0735 U	0.0735 U	0.0723 U	0.0757 U	0.0732 U	0.0748 U
Aroclor-1232	NC	NC	NC	0.0353 U	0.0353 U	0.0351 U	0.0366 U	0.035 U	0.0362 U	0.0362 U	0.0356 U	0.0373 U	0.036 U	0.0369 U
Aroclor-1242	NC	NC	NC	0.0353 U	0.0353 U	0.0351 U	0.0366 U	0.035 U	0.0362 U	0.0362 U	0.0356 U	0.0373 U	0.036 U	0.0369 U
Aroclor-1248	NC	NC	NC	0.0353 U	0.0353 U	0.0351 U	0.0366 U	0.035 U	0.0362 U	0.0362 U	0.0356 U	0.0373 U	0.036 U	0.0369 U
Aroclor-1254	NC	NC	NC	0.0353 U	0.0353 U	0.052	0.0926	0.124	0.0485	0.0462	0.0356 U	0.169	0.0378	0.0369 U
Aroclor-1260	NC	NC	NC	0.0353 U	0.0353 U	0.0351 U	0.0366 U	0.035 U	0.0587	0.0362 U	0.0356 U	0.0373 U	0.036 U	0.0369 U
Total PCBs	0.1	1	NC	0.0353 U	0.0353 U	0.052	0.0926	0.124	0.0485	0.0462	0.0356 U	0.169	0.0378	0.0369 U

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance*, Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance*, Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-38	SB-38	SB-38	SB-39	SB-39	SB-40	SB-41	SB-42	SB-43	SB-44	SB-45
			Start Depth (ft bgs):	4	8	12	0	0	0	0	0	0	0	0
			End Depth (ft bgs):	6	10	14	2	2	2	2	2	2	1	1
			Sample ID:	SB-38-4-6F-112817	SB-38-8-10F-112817	SB-38-12-14F-112817	SB-39-0-2F-112717	FD-01-112717	SB-40-0-2F-112717	SB-41-0-2F-112717	SB-42-0-2F-112817	SB-43-0-2F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817
			Sample Type Code:	N	N	N	N	FD	N	N	N	N	N	N
			Sample Date:	11/28/2017	11/28/2017	11/28/2017	11/27/2017	11/27/2017	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]											
Aroclor-1016	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.0394 U	0.0427 U	0.196 U	0.0376 U	0.0398 U	0.0387 U	0.0352 U	0.0369 U
Aroclor-1221	NC	NC	NC	0.0738 U	0.0738 U	0.0734 U	0.0801 U	0.0866 U	0.398 U	0.0764 U	0.0809 U	0.0785 U	0.0714 U	0.0749 U
Aroclor-1232	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.0394 U	0.0427 U	0.196 U	0.0376 U	0.0398 U	0.0387 U	0.0352 U	0.0369 U
Aroclor-1242	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.0394 U	0.0427 U	0.196 U	0.0376 U	0.0398 U	0.0387 U	0.0352 U	0.0369 U
Aroclor-1248	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.0394 U	0.0427 U	0.196 U	0.0376 U	0.0398 U	0.0387 U	0.0352 U	0.0369 U
Aroclor-1254	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.114	0.161	1.06	0.134	0.14	0.436	0.0352 U	0.0544
Aroclor-1260	NC	NC	NC	0.0363 U	0.0363 U	0.0361 U	0.0394 U	0.0427 U	2.02	0.0376 U	0.0398 U	0.0387 U	0.0352 U	0.0369 U
Total PCBs	0.1	1	NC	0.0363 U	0.0363 U	0.0361 U	0.114	0.161	1.06	0.134	0.14	0.436	0.0352 U	0.0544

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-4 SOIL POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

			Location ID:	SB-46	SB-47	SB-48	SB-49	SB-Z-D6	SB-Z-D6
			Start Depth (ft bgs):	0	0	0	0	1	1
			End Depth (ft bgs):	1	1	1	1	2	2
			Sample ID:	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817	SB-Z-D6-12-24-102416-20161024	FD-1-102416-20161024
			Sample Type Code:	N	N	N	N	N	FD
			Sample Date:	11/28/2017	11/28/2017	11/28/2017	11/28/2017	10/24/2016	10/24/2016
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]						
Aroclor-1016	NC	NC	NC	0.0387 U	0.0345 U	0.0382 U	0.0367 U	0.22 UJ	0.26 UJ
Aroclor-1221	NC	NC	NC	0.0785 U	0.0701 U	0.0776 U	0.0745 U	0.22 U	0.26 U
Aroclor-1232	NC	NC	NC	0.0387 U	0.0345 U	0.0382 U	0.0367 U	0.22 UJ	0.26 UJ
Aroclor-1242	NC	NC	NC	0.0387 U	0.0345 U	0.0382 U	0.0367 U	0.22 U	0.26 U
Aroclor-1248	NC	NC	NC	0.0387 U	0.0345 U	0.0382 U	0.0367 U	0.22 UJ	0.26 UJ
Aroclor-1254	NC	NC	NC	0.0387 U	0.0345 U	0.0565	0.123	0.22 U	0.26 U
Aroclor-1260	NC	NC	NC	0.0387 U	0.0345 U	0.0382 U	0.0367 U	0.22 UJ	0.26 UJ
Total PCBs	0.1	1	NC	0.0387 U	0.0345 U	0.0565	0.123	0.22 UJ	0.26 UJ

All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR -
- Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect
--- Not Analyzed

[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.

[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.

[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010.

[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.

[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010.

TABLE 5-5 SOIL PESTICIDE RESULTS SUMMARY

			Location ID:	SB-24	SB-24	SB-36	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49
			Start Depth (ft bgs):	0	0	0	0	0	0	0	0	0
			End Depth (ft bgs):	1	1	1	1	1	1	1	1	1
			Sample ID:	SB-24-0-1F-112717	FD-02-112717	SB-36-01F-112817	SB-44-0-1F-112817	SB-45-0-1F-112817	SB-46-0-1F-112817	SB-47-0-1F-112817	SB-48-0-1F-112817	SB-49-0-1F-112817
			Sample Type Code:	N	FD	N	N	N	N	N	N	N
			Sample Date:	11/27/2017	11/27/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017	11/28/2017
CHEMICAL_NAME	Part375 Unrestricted[1]	Part375 Restricted-Residential[2]	CP-51 Restricted-Residential[3]									
4-4-DDD	0.0033	13	NC	0.0038 U	0.0041	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
4-4-DDE	0.0033	8.9	NC	0.0046	0.0043	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
4-4-DDT	0.0033	7.9	NC	0.013	0.036	0.0037 U	0.0035 U	0.0076	0.0038 U	0.0034 U	0.0038 U	0.004
a-BHC	0.02	0.48	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Aldrin	0.005	0.097	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
alpha-Chlordane	0.094	4.2	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
b-BHC	0.036	0.36	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
d-BHC	0.04	100	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Dieldrin	0.005	0.2	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Endosulfan I	2.4	24	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Endosulfan II	2.4	24	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Endosulfan Sulfate	2.4	24	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Endrin	0.014	11	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Endrin Aldehyde	NC	NC	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Endrin Ketone	NC	NC	NC	0.0038 U	0.004 U	0.0037 U	0.0035 U	0.0037 U	0.0038 U	0.0034 U	0.0038 U	0.0037 U
Heptachlor	0.042	2.1	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Heptachlor Epoxide	NC	NC	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Lindane	0.1	1.3	NC	0.002 U	0.0021 U	0.0019	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U
Methoxychlor	NC	NC	NC	0.0196 U	0.0209 U	0.0192 U	0.0179 U	0.019 U	0.0197 U	0.0177 U	0.0196 U	0.0188 U
Toxaphene	NC	NC	NC	0.196 U	0.209 U	0.192 U	0.179 U	0.19 U	0.197 U	0.177 U	0.196 U	0.188 U
y-Chlordane	NC	NC	NC	0.002 U	0.0021 U	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.0018 U	0.002 U	0.0019 U

Notes:
All units in milligrams per kilogram (mg/kg)
- Exceeds Unrestricted Soil Cleanup Objectives presented in 6 NYCRR Part 375
- Exceeds Restricted-Residential Soil Cleanup Objectives presented in 6 NYCRR Part 375 or CP-51
NC - No criteria exists
Sample Type Code: N - Normal, FD - Field Duplicate
ft bgs - feet below ground surface
U - Not Detected at the Detection Limit shown
--- Not Analyzed
[1] 6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 14, 2006.
[2] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Restricted-Residential, December 14, 2006.
[3] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Restricted Residential, October 21, 2010
[4] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Protection of Groundwater, December 14, 2006.
[5] CP-51, *Soil Cleanup Guidance* , Table 1: Supplemental Soil Cleanup Objectives, Protection of Groundwater, October 21, 2010

TABLE 5-6 X-RAY FLUORESCENCE SOIL LEAD RESULTS SUMMARY

Location ID	Date	Time	Depth (ft bgs)	Lead Reading (ppm)	+/-	PARCEL	NOTES
MW-08	10/26/2016	1045	0-2	**1,451**	29	East	
		1045	2-2.8	93	6		
MW-09	10/26/2016	1050	0-2	**871**	20	East	Well moved after soil sample was collected.
		1050	2-4	**510**	17		
MW-10	10/26/2016	1052	0-2	43	4	West	
		1053	2-3	**525**	13		top
		1054	3-4	168	8		bottom
		1055	4-5	**307**	9		top
		1056	5-6	**251**	10		bottom
		1057	6-8	**216**	8		
		1058	8-9	103	6		top
		1058	9-10	51	6		bottom
		1058	10-10.1	170	9		
SB-01	10/24/2016	1617	0-0.5	71	3	West	S
		1618	0.5-1	8	1.9		S
		1619	1-2	8	2		S
		1628	2-4	100	4		NS
		1632	4-6	**1,788**	3		S
		1641	6-8	**5,642**	67		S
		1644	8-10	**2,562**	31		S
		1650	10-12	**612**	10		S; Dust 4 µg/m^3; PID 0.0 ppm
SB-02	10/25/2016	1241	~1	51	3	East	Fill
		1254	0-4	29	2		PID 0.0ppm
SB-03	10/25/2016	1312	0-1	53	3	East	Fill; PID 0.0ppm
		1312	1-2	**729**	14		Fill
		1315	2-4	23	2		
		1317	4-8	11	3		
		1321	8-8.5	19	3		
SB-04	10/25/2016	1338	0-1	**359**	12	East	Fill; PID 0.0ppm
		1338	1-2	ND	ND		
		1338	2-3	ND	ND		Bedrock
		1338	3-4	12	4		Refusal
SB-05	10/25/2016	1400	0-1	184	7	East	Fill; PID 0.0 ppm
		1400	1-2	**586**	14		
		1400	2-3	ND	ND		
		1400	3-4	ND	ND		Refusal
		1400	4-8	15	3		Bedrock at 8'
SB-06	10/25/2016	1411	0-1	49	4	East	Fill
		1411	1-2	13	3		Fill
		1411	2-3	ND	ND		Fill
		1411	3-4	12	3		Fill
		1411	4-5	15	3		Fill
		1411	5-6	ND	ND		Refusal at 6.5'
SB-07	10/25/2016	1429	0-1	**414**	12	East	Fill
		1429	1-2	38	4		Fill
		1429	2-3	9	3		Fill
		1429	3-4	22	3		Fill
		1429	4-5	10	3		Fill
		1429	5-6	20	3		Fill
SB-08	10/25/2016	1448	0-1	**1,047**	22	East	Fill, PID 0.0 PPM
		1448	1-1.2	ND			
SB-09	10/25/2016	1459	0-1	**778**	16	East	Fill, PID 0.0 PPM
		1459	1-2	**501**	12		
SB-10	10/25/2016	1515	0-1	**243**	75	East	Fill, PID 0.0 PPM
		1515	1-2	157	7		
		1515	2-2.2	12	3		
SB-11	10/25/2016	1535	0-1	**384**	9	East	Fill, PID 0.0 PPM
		1535	1-2	**443**	11		
SB-12	10/25/2016	1552	0-2	**556**	15	East	Fill, PID 0.0 PPM
		1552	2-4	**6,932**	121		Fill, PID 0.0 PPM
		1552	4-6	**652**	14		Fill, PID 0.0 PPM
		1600	6-8	12	2		Fill, PID 0.0 PPM
		1600	8-10	17	3		Fill, PID 0.0 PPM
		1606	10-11.5	15	3		Fill, PID 0.0 PPM
SB-13	10/25/2016	1620	0-2	**642**	15	East	Fill, PID 0.0 PPM
		1620	2-3.5	17	3		
SB-14	10/25/2016	1630	0-1.5	**1,615**	31	East	Fill, PID 0.0 PPM
		1630	1.5-2	17	3		
SB-15	10/26/2016	844	0-1	**558**	14	East	Fill, PID 0.0 PPM
		845	1-2	**835**	16		Refusal at 2.5'
SB-16	10/26/2016	902	0-1	**531**	12	East	PID 0.0 ppm
		903	1-1.5	27	3		
SB-17	10/26/2016	911	0-0.5	18	3	East	Ref @ 0.5', PID 0.0 ppm
SB-18	10/26/2016	920	0-0.5	67	4	East	PID 0.0 ppm
		921	0.5-2	8	2		
SB-19	10/26/2016	937	0-0.5	**606**	12	East	Fill, PID 0.0 PPM
		938	0.5-1	**297**	9		
SB-20	10/26/2016	950	0-1	**422**	12	East	Fill, PID 0.0 PPM
		951	1-2	**775**	17		Refusal @ 3'
SB-21	10/26/2016	959	0-1	56	5	East	Fill, PID 0.0 PPM
		1000	1-2	**5,800**	96		Fill
		1001	2-3	11	3		Fill
		1001	3-4	11	3		
		1004	4-5	13	3		
		1005	5-6	75	5		
SB-22	10/26/2016	1017	0-4	85	5	East	Fill, PID 0.0 PPM
		1019	4-5	59	4		Fill, PID 0.0 PPM
		1020	5-6.5	15	3		Fill, PID 0.0 PPM
SB-23	10/26/2016	1033	0-4	89	5	East	Fill, PID 0.0 PPM
		1034	4-4.5	39	4		
SB-X-B5	10/24/2016	1635	0-0.5	**754**	13	East	S
SB-X-E5	10/25/2016	922	0-0.5	**250**	8		
SB-X-F4		951	0-0.5	**1,533**	21		
		953	0.5-1	142	5		
		954	1-2	7	2		
SB-X-H6		1012	0-0.5	**1,099**	16		
		1014	0.5-1	**1,241**	18		
		1015	1-2	**1,847**	30		
		1031	2-4	150	5		
SB-Y-A1	10/25/2016	1132	0-0.5	**436**	7	East	
SB-Y-A2		1133	0-0.5	**213**	5		
SB-Y-C3		1134	0-0.5	**252**	5		
SB-Y-F1		1044	0-0.5	162	5		
		1045	0.5-1	16	2		
		1046	1-2	18	2		
SB-Z-A2	10/24/2016	1206	0-0.5	**253**	5	West	S
		1207	0.5-1	**806**	13		S
		1208	1-2	**638**	10		S
		1217	2-4	180	5		NS
		1220	4-6	63	3		NS
		1234	6-8	89	4		NS
		1252	8-10.5	60	4		NS; Dust 3 µg/m^3; PID 0.0 ppm
SB-Z-D6	10/24/2016	1316	0-0.5	**611**	1	West	S
		1318	0.5-1	110	4		S
		1319	1-2	**1957/332**	3.8		; Returned to location for additional soil to collect additional sample
		1326	2-4	151	5		S
		1335	4-6	41	3		NS; Dust 5 µg/m^3; PID 0.0 ppm
		1340	6-8	44	3		NS
SB-Z-E3	10/24/2016	1453	1-2	**475**	10	West	S
		1445	2-4	110	2		NS
		1500	4-5	68	4		NS; Dust 3 µg/m^3; PID 0.0 ppm
		1452	0.5-1	**378**	9		S
		1451	0-0.5	**471**	9		S; Field Duplicates Collected
SB-Z-F6	10/24/2016	1404	0-0.5	**1,458**	17	West	S
		1405	0.5-1	**723**	14		S
		1406	1-2	144	4		S
		1413	2-4	**1,675**	21		NS
		1425	4-4.75	10	2		NS

Notes:
(highlighted) = exceeds Part 375 Restricted-Residential Soil Cleanup Objective for lead (400 mg/kg) screening level of 200 mg/kg as described in Section 3.1 of RIR.

TABLE 5-6 X-RAY FLUORESCENCE SOIL LEAD RESULTS SUMMARY

Location ID	Date	Time	Depth (ft bgs)	Lead Reading (ppm)	+/-	PARCEL	NOTES
A-1		1441		ND	ND		
A-2		1443		232	113		
A-3	9/15/2016	1445	Surface	175	86	East	
A-4		1446		111	70		
A-5		1447		238	93		
T-1		1408		ND	ND		
T-2		1409		76	32		
T-3		1410		ND	ND		
T-4	9/15/2016	1411	Surface	206	84	East	
T-5		1412		187	85		
T-6		1413		ND	ND		
T-7		1414		238	98		
T-8		1415		353	117		
U-1		1358		ND	ND		
U-2		1359		3,370	354		
U-3		1400		146	85		
U-4	9/15/2016	1401	Surface	383	143	East	
U-5		1402		187	102		
U-6		1403		189	92		
U-7		1404		770	154		
U-8		1405		552	143		
X-A1		1210		ND	ND		
X-A2		1213		499	149		
X-A3		1216		286	107		
X-A4		1325		539	137		
X-A5		1327		666	145		
X-A6		1329		164	94		
X-B1		1217		ND	ND		
X-B2		1219		214	82		
X-B3		1220	Surface	499	153		
X-B2.5		1221		202	92		
X-B4		1330		298	119		
X-B5		1331		2,859	358		
X-B6		1333		ND	ND		
X-C1		1223		ND	ND		
X-C2		1224		302	111		
X-C3		1225		271	107		
X-C4		1334		ND	ND		
X-C5		1336	0.2	164	89		Just below surface gravel, ND 1 foot below
X-D1		1227		ND	ND		
X-D2		1228		384	168		
X-D3		1229		ND	ND		
X-D4		1340		ND	ND		
X-D5		1342		558	144		
X-D6		1343		ND	ND		
X-E1		1230		ND	ND		
X-E2		1231		870	163		
X-E3		1233		822	173		
X-E4		1344		121	66		
X-E5		1345		2,693	329		
X-E6		1347		ND	ND		
X-F1		1234		ND	ND		
X-F2		1235		224	105		
X-F3	9/14/2016	1237		872	176	East	
X-F4		1348		429	117		
X-F5		1349		6,919	538		
X-F6		1351		ND	ND		
X-G1		1240		ND	ND		
X-G2		1244		1,112	226		
X-G3		1245		1,639	279		
X-G4		1250		535	145		
X-G5		1353		257	94		
X-G6		1356	Surface	225	119		
X-G7		1358		ND	ND		
X-H1		1252		ND	ND		
X-H2		1254		858	191		
X-H3		1255		871	136		
X-H4		1359		553	150		
X-H5		1402		1,020	219		
X-H6		1403		1,304	213		
X-H7		1405		ND	ND		
X-I1		1256		ND	ND		
X-I2		1257		969	192		
X-I3		1258		2,121	253		
X-I4		1407		278	89		
X-I5		1408		337	101		
X-I6		1409		738	155		
X-I7		1410		304	101		
X-J1		1300		ND	ND		
X-J2		1301		176	89		
X-J3		1302		252	87		
X-J4		1302		470	135		
X-J5		1303		146	59		
X-K1		1304		ND	ND		
X-K2		1305		ND	ND		
X-K3		1306		260	109		
Y-A1		1444		440	122		
Y-A2		1509		226	104		
Y-A3		1507		ND	98		
Y-A4		1642		191	75		
Y-B1		1446		ND	ND		
Y-B2		1448		ND	ND		
Y-B3				NS			Too steep to access safely
Y-B4		1512		ND	ND		
Y-B5		1504		ND	ND		
Y-C1		1450		92	55		
Y-C2		1525		ND	ND		
Y-C3		1526		205	95		
Y-C4	9/14/2016	1513	Surface	ND	ND	East	
Y-C5		1503		ND	ND		
Y-D1		1523		ND	ND		
Y-D2		1527		ND	ND		
Y-D3		1514		130	74		
Y-D4		1501		ND	ND		
Y-E1		1521		ND	ND		
Y-E2		1528		ND	ND		
Y-E3		1515		108	64		
Y-E4		1500		ND	ND		
Y-F1		1519		233	102		
Y-F2		1518		ND	ND		
Y-F3		1516		ND	ND		
Y-F4		1459		ND	ND		
Z-A1		1005		ND	ND		
Z-A2		1006		210	83		
Z-A3		1007		202	88		
Z-A4		1008		348	117		
Z-B1		1009		ND	ND		
Z-B2	9/15/2016	1010	Surface	ND	ND	West	
Z-B3		1010		145	87		
Z-B4		1011		918	210		
Z-B5		1008		367	110		
Z-C1		1012		ND	ND		
Z-C2		1013		485	126		

Notes:
(yellow highlight) = exceeds Part 375 Restricted-Residential Soil Cleanup Objective for lead (400 mg/kg) screening level of 200 mg/kg as described in Section 3.1 of RIR.

TABLE 5-6 X-RAY FLUORESCENCE SOIL LEAD RESULTS SUMMARY

Location ID	Date	Time	Depth (ft bgs)	Lead Reading (ppm)	+/-	PARCEL	NOTES
Z-C3	9/15/2016	1014	Surface	713	186	West	
Z-C4		1015		678	132		
Z-C5		1016		840	163		
Z-D1		1016		105	65		
Z-D2		1017		541	148		
Z-D3		1018		987	164		
Z-D4		1019		237	88		
Z-D5		1020		493	166		
Z-D5.5		1505	1	427	131		~ 1 foot into berm
Z-D6		1020	Surface	1,623	231		
Z-E1		1022		101	67		
Z-E2		1023		134	70		
Z-E3		1024		367	122		
Z-E4		1024		152	75		
Z-E5		1025		427	126		
Z-E6		1027		490	147		
Z-E7		1028		956	165		
Z-F1		1029		116	68		
Z-F2		1030		124	80		
Z-F3		1030		448	130		
Z-F4		1031		494	120		
Z-F5		1031		173	85		
Z-F6		1032		3,994	348		
Z-F7		1032		214	91		
Z-Z01	11/30/2017	910	Surface	91	5	West	
Z-Z02		911		33	4		
Z-Z03		913		39	4		
Z-Z04		914		43	4		
Z-Z05		918		32	3		
Z-Z06		919		45	4		
Z-Z07		921		39	4		
Z-Z08		923		42	5		
Z-Z09		925		63	5		
Z-Z10		927		434	12		
Z-Z11		930		557	15		
Z-Z12		932		284	9		
Z-Z13		934		350	10		
Z-Z14		938		378	13		
Z-Z15		940		244	11		
Z-Z16		942		689	19		
Z-Z17		944		143	8		
Z-Z18		945		335	14		
Z-Z19		947		144	7		
Z-Z20		949		57	6		
Z-Z21		951		155	9		
Z-Z22		1020		477	15		
Z-Z23		1022		59	7		

Notes:
(highlighted) = exceeds Part 375 Restricted-Residential Soil Cleanup Objective for lead (400 mg/kg) screening level of 200 mg/kg as described in Section 3.1 of RIR.

TABLE 5-7 GROUNDWATER VOALTILE ORGANIC COMPOUND RESULTS SUMMARY

		Location ID:	MW-01R	MW-01R	MW-01R	MW-01R	MW-01R	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-04R	MW-04R	MW-04R	MW-04R	MW-04R	MW-05	MW-05	MW-06	MW-06	MW-07
		Start Depth (ft bgs):	16.5	16.5	16.5	16.5	16.5	na	na	na	na	na	na	45	45	45	45	45	40.5	40.5	31.5	31.5	40
		End Depth (ft bgs):	65	65	65	65	65	na	na	na	na	0	0	55	55	55	55	55	50.5	50.5	41.5	41.5	50
		Sample ID:	MW-01-113010	MW-01-080911	MW-01-080911	MW-1R-120816	MW-1R-022117	na	na	MW-3-113010	MW-3-080911	MW-3-120916	MW-3-022117	MW-4-113010	FD-113010	MW-4-120916	MW-4-022217	FD-1-022217	MW-5-120816	MW-5-022117	MW-6-120916	MW-6-022217	MW-7-120916
		Sample Type Code:	N	N	FD	N	N	N	N	N	N	N	N	N	FD	N	N	FD	N	N	N	N	N
		Sample Date:	11/30/2010	8/9/2011	8/9/2011	12/8/2016	2/21/2017	2001	2007	11/30/2010	1/1/2011	12/9/2016	2/21/2017	11/30/2010	11/30/2010	12/9/2016	2/22/2017	2/22/2017	12/8/2016	2/21/2017	12/9/2016	2/22/2017	12/9/2016
Parameter	CAS_RN	Action Level[1]																					
1,1,1,2-Tetrachloroethane	630-20-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	71-55-6	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	1	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	5	ND	ND	ND	1 U	1 U	2	ND	0.7 J	1.8 J	5 U	5 U	0.6 J	0.6 J	1 U	1 U	2 U	200 U	13 J	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	11 J	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	87-61-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,3-Trichloropropane	96-18-4	0.04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,4,5-TETRAMETHYLBENZENE	95-93-2	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	120-82-1	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene	95-63-6	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	96-12-8	0.04	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	0.0006	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,2-Dichlorobenzene	95-50-1	3	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,2-Dichloroethane	107-06-2	0.6	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	1	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,3-Dichlorobenzene	541-73-1	3	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,3-Dichloropropane	142-28-9	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,4-Dichlorobenzene	106-46-7	3	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
1,4-Diethylbenzene	105-05-5	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2,2-Dichloropropane	594-20-7	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Butanone	78-93-3	50	---	---	---	10 U	10 U	---	---	---	---	50 U	50 U	---	---	10 U	10 U	20 U	2000 U	200 U	10 U	10 U	10 U
2-Hexanone	591-78-6	50	---	---	---	5 U	5 U	---	---	---	---	25 U	25 U	---	---	5 U	5 U	10 U	1000 U	100 U	5 U	5 U	5 U
4-Isopropyltoluene	99-87-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-Pentanone	108-10-1	NC	---	---	---	5 U	5 U	---	---	---	---	25 U	25 U	---	---	5 U	5 U	10 U	1000 U	100 U	5 U	5 U	5 U
Acetone	67-64-1	50	1.31 J	1.25 J	ND	10 U	10 U	---	---	13 J	ND	50 U	50 U	10.6 J	9.25 J	10 U	10 U	20 U	2000 U	200 U	10 U	10 U	10 U
Benzene	71-43-2	1	0.15 J	0.12 J	0.16 J	1 U	1 U	---	ND	ND	ND	5 U	5 U	ND	ND	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Bromobenzene	108-86-1	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromochloromethane	74-97-5	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromodichloromethane	75-27-4	50	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Bromoform	75-25-2	50	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Bromomethane	74-83-9	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Carbon disulfide	75-15-0	60	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 UJ	1 U	1 U	1 U
Carbon Tetrachloride	56-23-5	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Chlorodifluoromethane	75-45-6	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloroethane	75-00-3	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 UJ	1 U	1 U	1 U
Chloroform	67-66-3	7	0.43 J	0.38 J	0.36 J	1 U	1 U	---	ND	0.55 J	ND	5 U	5 U	ND	ND	1 U	1 U	2 U	200 U	20 U	1 U	1 U	0.44 J
Chloromethane	74-87-3	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	5	ND	ND	ND	1 U	1 U	120	17	20	50.8	44	40	74.2	73.2	65	67	65	5700	1500 J	1 U	1 U	1 U
Cis-1,3-Dichloropropene	10061-01-5	0.4	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Cyclohexane	110-82-7	NC	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	50	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Dibromomethane	74-95-3	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dichlorodifluoromethane	75-71-8	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 UJ	2 UJ	200 U	20 U	1 U	1 UJ	1 U
Ethane, 1,1,2-trichloro-1,2,2-trifluoro	76-13-1	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Ethanol	64-17-5	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	100-41-4	5	ND	0.11 J	ND	1 U	1 U	---	---	ND	ND	5 U	5 U	ND	ND	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Isopropylbenzene	98-82-8	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
m,p-Xylene	179601-23-1	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methyl Acetate	79-20-9	NC	---	---	---	2.5 U	2.5 U	---	---	---	---	13 U	13 U	---	---	2.5 U	2.5 U	5 U	500 U	50 U	2.5 U	2.5 U	2.5 U
Methylcyclohexane	108-87-2	NC	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Methylene Chloride	75-09-2	5	ND	0.22 J	ND	1 U	1 U	---	---	ND	3 J	5 U	5 U	3.15 J	1.55 J	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
MTBE	1634-04-4	10	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Naphthalene	91-20-3	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butylbenzene	104-51-8	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Propylbenzene	103-65-1	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Chlorotoluene	95-49-8	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Xylene	95-47-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
p-Chlorotoluene	106-43-4	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
sec-Butylbenzene	135-98-8	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Styrene	100-42-5	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Tert-Butylbenzene	98-06-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Tetrachloroethene	127-18-4	5	ND	ND	ND	1 U	1 U	6	ND	1.7 J	3.2 J	5 U	5 U	4.9	4.75	1.7	3.4	3.1	200 U	37	1 U	1 U	1 U
Toluene	108-88-3	5	ND	0.73	---	1 U	1 U	---	---	ND	ND	5 U	5 U	ND	ND	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	5	ND	ND	ND	1 U	1 U	4	ND	0.7	ND	5 U	5 U	0.65 J	0.5 J	1.1	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	10061-02-6	0.4	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
TRANS-1,4-DICHLOROBUTENE	110-57-6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Trichloroethene	79-01-6	5	0.17 J	0.22 J	0.26 J	1 U	1 U	320	152	194	443	130	150	181	180	61	92	98	910	1100 J	1 U	1 U	1.5 J
Trichlorofluoromethane	75-69-4	5	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	1 U	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Vinyl Chloride	75-01-4	2	---	---	---	1 U	1 U	---	---	---	---	5 U	5 U	---	---	2.2	1 U	2 U	200 U	20 U	1 U	1 U	1 U
Xylenes (total)	1330-20-7	5	ND	ND	0.52 J	2 U	2 U	---	---	ND	ND	10 U	10 U	ND	ND	2 U	2 U	4 U	400 U	40 U	2 U	2 U	2 U
Tentatively Identifiable Compounds																							
C10H16 isomer	UNKVOA1	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dibromofluoromethane	1868-53-7	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	9.5 JN	---	---	---	---	9.7 JN	---	9.6 JN
unknown	TIC33	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Unknown alkane	UNKVOA2	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Unknown-2	TIC02	NC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:
--- = No result
[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.
Exceeds Action Level
NC - No criteria
Sample Type Code: N = Normal, FD = Field Duplicate
U - Not Detected at the Detection Limit shown, J - Estimated value, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound
Units are in µg/l
Pre-2016 data was collected Pre-Remedial Investigation and data transcribed from Focused Site Investigation Report (March 2011)

TABLE 5-7 GROUNDWATER VOALTILE ORGANIC COMPOUND RESULTS SUMMARY

				Packer Test						Packer Test				Packer Test			
		Location ID:	MW-07	MW-08	MW-08	MW-08	MW-08	MW-08	MW-08	MW-09	MW-09	MW-09	MW-09	MW-10	MW-10	MW-10	MW-11
		Start Depth (ft bgs):	40	46	46	46	46	46	46	46.2	46	46	46	34	32.5	32.5	0
		End Depth (ft bgs):	50	56.5	56	56	56	56	56	56.7	56	56	56	44.5	42.5	42.5	0
		Sample ID:	MW-7-022117	MW-8-46-56.5-092916	MW-8-120816	FD-1-120816	MW-8-022117	MW-08-011118	FD-01-011118	MW-9-46.2-56.7-10051	MW-9-120816	MW-9-022217	MW-09-011118	MW-10-34-44.5-10716	MW-10-120916	MW-10-022217	MW-11-011118
		Sample Type Code:	N	N	N	FD	N	N	FD	N	N	N	N	N	N	N	N
		Sample Date:	2/21/2017	9/30/2016	12/8/2016	12/8/2016	2/21/2017	1/11/2018	1/11/2018	10/5/2016	12/8/2016	2/22/2017	1/11/2018	10/7/2016	12/9/2016	2/22/2017	1/11/2018
Parameter	CAS_RN	Action Level[1]															
1,1,1,2-Tetrachloroethane	630-20-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,1,1-Trichloroethane	71-55-6	5	1 U	100 U	200 U	400 U	200 U	8.6	8.9	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	1	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	5	1 U	100 U	200 U	400 U	200 U	131	128	100 U	100 U	100 U	11.6	1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	5	1 U	100 U	200 U	400 U	200 U	54.1	53.1	100 U	100 U	100 U	12.7	0.34 J	1 U	0.29 J	1 U
1,1-Dichloropropene	563-58-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,2,3-Trichlorobenzene	87-61-6	5	---	---	---	---	---	1 UJ	1 UJ	---	---	---	1 UJ	---	---	---	1 UJ
1,2,3-Trichloropropane	96-18-4	0.04	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,2,4,5-TETRAMETHYLBENZENE	95-93-2	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,2,4-Trichlorobenzene	120-82-1	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,2,4-Trimethylbenzene	95-63-6	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	96-12-8	0.04	1 U	100 U	200 U	400 U	200 U	---	---	100 U	100 U	100 U	---	1 U	1 U	1 U	---
1,2-Dibromoethane	106-93-4	0.0006	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	95-50-1	3	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	107-06-2	0.6	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	1	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,3-Dichlorobenzene	541-73-1	3	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	142-28-9	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
1,4-Dichlorobenzene	106-46-7	3	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
1,4-Diethylbenzene	105-05-5	NC	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
2,2-Dichloropropane	594-20-7	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
2-Butanone	78-93-3	50	10 U	1000 U	2000 U	4000 U	2000 U	5 UJ	5 UJ	1000 U	1000 U	1000 U	5 UJ	10 U	10 U	10 U	5 UJ
2-Hexanone	591-78-6	50	5 U	500 U	1000 U	2000 U	1000 U	5 U	5 U	500 U	500 U	500 U	5 U	5 U	5 U	5 U	5 U
4-Isopropyltoluene	99-87-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
4-Methyl-2-Pentanone	108-10-1	NC	5 U	500 U	1000 U	2000 U	1000 U	5 U	5 U	500 U	500 U	500 U	5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	50	10 U	1000 U	2000 U	4000 U	2000 U	5 U	5 U	1000 U	1000 U	1000 U	5 U	6.4 J	10 U	10 U	5 U
Benzene	71-43-2	1	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1.1	2.1	1 U	1 U	1 U
Bromobenzene	108-86-1	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Bromochloromethane	74-97-5	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Bromodichloromethane	75-27-4	50	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	3.5	1 U	1 U	1 U
Bromoform	75-25-2	50	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	75-15-0	60	1 U	100 U	200 U	400 U	200 UJ	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	56-23-5	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Chlorodifluoromethane	75-45-6	NC	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Chloroethane	75-00-3	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Chloroform	67-66-3	7	1.3	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	12	1 U	1 U	1 U
Chloromethane	74-87-3	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	5	0.95 J	4100	14000	14000	7000	11600	11200	3000	3300	2700	3260	98	56	75 J	1.3
Cis-1,3-Dichloropropene	10061-01-5	0.4	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane	110-82-7	NC	1 U	100 U	200 U	400 U	200 U	---	---	100 U	100 U	100 U	---	1 U	1 U	1 U	---
Dibromochloromethane	124-48-1	50	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	0.81 J	1 U	1 U	1 U
Dibromomethane	74-95-3	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Dichlorodifluoromethane	75-71-8	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 UJ	1 U	1 U	1 U	1 UJ	1 U
Ethane, 1,1,2-trichloro-1,2,2-trifluoro	76-13-1	5	1 U	100 U	200 U	400 U	200 U	---	---	100 U	100 U	100 U	---	1 U	1 U	1 U	---
Ethanol	64-17-5	NC	---	---	---	---	---	250 UJ	250 UJ	---	---	---	250 UJ	---	---	---	250 UJ
Ethylbenzene	100-41-4	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Isopropylbenzene	98-82-8	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	179601-23-1	NC	---	---	---	---	---	2 U	2 U	---	---	---	2 U	---	---	---	2 U
Methyl Acetate	79-20-9	NC	2.5 U	250 U	500 U	1000 U	500 U	---	---	250 U	250 U	250 U	---	2.5 U	2.5 U	2.5 U	---
Methylcyclohexane	108-87-2	NC	1 U	100 U	200 U	400 U	200 U	---	---	100 U	100 U	100 U	---	1 U	1 U	1 U	---
Methylene Chloride	75-09-2	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
MTBE	1634-04-4	10	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	91-20-3	10	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 UJ
n-Butylbenzene	104-51-8	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
n-Propylbenzene	103-65-1	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
o-Chlorotoluene	95-49-8	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
o-Xylene	95-47-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
p-Chlorotoluene	106-43-4	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
sec-Butylbenzene	135-98-8	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Styrene	100-42-5	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Tert-Butylbenzene	98-06-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Tetrachloroethene	127-18-4	5	1 U	100 U	200 U	400 U	81 J	47.3	50	200	330	360	28.7	1.8	3.3	3.3	1 U
Toluene	108-88-3	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	12	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	5	1 U	100 U	200 U	400 U	200 U	64.9	61.3	100 U	100 U	100 U	21	1.2	1 U	1 U	1 U
Trans-1,3-Dichloropropene	10061-02-6	0.4	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,4-DICHLOROBUTENE	110-57-6	5	---	---	---	---	---	1 U	1 U	---	---	---	1 U	---	---	---	1 U
Trichloroethene	79-01-6	5	4.1	1100	4600	4700	9100	9520	9090	3800	2400	3400	910	71	80	90	1.6
Trichlorofluoromethane	75-69-4	5	1 U	100 U	200 U	400 U	200 U	1 U	1 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	75-01-4	2	1 U	100 U	530	400 U	200 U	241	237	100 U	100 U	100 U	11.9	1 U	1 U	1 U	1 U
Xylenes (total)	1330-20-7	5	2 U	200 U	400 U	800 U	400 U	2 U	2 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	2 U
Tentatively Identifiable Compounds																	
C10H16 isomer	UNKVOA1	NC	---	---	1900 J	---	---	---	---	---	---	---	---	6.2 J	---	---	---
Dibromofluoromethane	1868-53-7	NC	---	---	---	---	---	---	---	---	---	---	---	9.9 JN	---	---	---
unknown	TIC33	NC	---	---	---	---	---	7.7 J	7.7 J	---	---	---	---	---	---	---	---
Unknown alkane	UNKVOA2	NC	---	---	---	---	---	---	---	---	---	---	---	2.8 J	---	---	---
Unknown-2	TIC02	NC	---	---	---	---	---	---	---	---	---	---	6.5 J	---	---	---	---

Notes:
--- = No result
[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.
Exceedes Action Level
NC - No criteria
Sample Type Code: N = Normal, FD = Field Duplicate
U - Not Detected at the Detection Limit shown, J - Estimated value, UJ - Approximate Non-detect, JN - Presumptive evidence of a compound
Units are in µg/l
Pre-2016 data was collected Pre-Remedial Investigation and data transcribed from Focused Site Investigation Report (March 2011)

TABLE 5-8 GROUNDWATER SEMI-VOLATILE ORGANIC COMPOUND RESULTS SUMMARY

	Location ID:	MW-08	MW-08	MW-09	MW-11
	Start Depth (ft bgs):	46	46	46	0
	End Depth (ft bgs):	56	56	56	0
	Sample ID:	MW-08-011118	FD-01-011118	MW-09-011118	MW-11-011118
	Sample Type Code:	N	FD	N	N
	Sample Date:	1/11/2018	1/11/2018	1/11/2018	1/11/2018
Parameter	Action Level[1]				
1,1'-Biphenyl	5	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	5	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	3	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	3	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	3	5 U	5 U	5 U	5 U
2,3,4,6-Tetrachlorophenol	NC	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	1	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	NC	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	50	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	10	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	5	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5	5 U	5 U	5 U	5 U
2-Chloronaphthalene	10	5 U	5 U	5 U	5 U
2-Chlorophenol	1	5 U	5 U	5 U	5 U
2-Methylnaphthalene	NC	5 U	5 U	5 U	5 U
2-Methylphenol	1	5 U	5 U	5 U	5 UJ
2-Nitroaniline	5	5 U	5 U	5 U	5 U
2-Nitrophenol	1	5 U	5 U	5 U	5 U
3- AND 4- METHYLPHENOL (TOTAL)	NC	5 U	5 U	5 U	5 U
3,3-Dichlorobenzidine	5	5 U	5 U	5 U	5 U
3-Nitroaniline	5	5 U	5 U	5 U	5 U
4,6-Dinitro-2-methylphenol	1	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	NC	5 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	1	5 U	5 U	5 U	5 U
4-Chloroaniline	5	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	NC	5 U	5 U	5 U	5 U
4-Nitroaniline	5	5 U	5 U	5 U	5 U
4-Nitrophenol	1	10 U	10 U	10 U	10 U
Acenaphthene	NC	5 U	5 U	5 U	5 U
Acenaphthylene	NC	5 U	5 U	5 U	5 U
Acetophenone	NC	5 U	5 U	5 U	5 UJ
Anthracene	50	5 U	5 U	5 U	5 U
Atrazine	7.5	5 U	5 U	5 U	5 U
Benzaldehyde	NC	5 U	5 U	5 U	5 UJ
Benzo[a]anthracene	0.002	5 U	5 U	5 U	5 U
Benzo[a]pyrene	0	5 U	5 U	5 U	5 U
Benzo[b]fluoranthene	0.002	5 U	5 U	5 U	5 U
Benzo[g,h,i]perylene	NC	5 U	5 U	5 U	5 U
Benzo[k]fluoranthene	0.002	5 U	5 U	5 U	5 U
Bis(2-Chloroethoxy)methane	5	5 U	5 U	5 U	5 U
Bis(2-Chloroethyl)Ether	1	5 U	5 U	5 U	5 UJ
Bis(2-Chloroisopropyl)ether	5	5 U	5 U	5 U	5 UJ
Bis(2-Ethylhexyl)phthalate	5	5 U	5 U	5 U	5 U
Butylbenzylphthalate	50	5 U	5 U	5 U	5 U
Caprolactam	NC	5 U	5 U	56.9	98.6 J
Carbazole	NC	5 U	5 U	5 U	5 U
Chrysene	0.002	5 U	5 U	5 U	5 U
Dibenzo[a,h]Anthracene	NC	5 U	5 U	5 U	5 U
Dibenzofuran	NC	5 U	5 U	5 U	5 U
Diethylphthalate	50	5 U	5 U	5 U	5 U
Dimethylphthalate	50	5 U	5 U	5 U	5 U
Di-n-butylphthalate	50	5 U	5 U	5 U	5 U
Di-n-octylphthalate	50	5 U	5 U	5 U	5 U
Fluoranthene	50	5 U	5 U	5 U	5 U
Fluorene	50	5 U	5 U	5 U	5 U
Hexachlorobenzene	0.04	5 U	5 U	5 U	5 U
Hexachlorobutadiene	0.5	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	5	5 UJ	5 UJ	5 UJ	5 UJ
Hexachloroethane	5	5 U	5 U	5 U	5 UJ
Indeno[1,2,3-cd]pyrene	0.002	5 U	5 U	5 U	5 U
Isophorone	50	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U
Nitrobenzene	0.4	5 U	5 U	5 U	5 U
N-Nitroso-Di-N-Propylamine	NC	5 U	5 U	5 U	5 UJ
N-Nitrosodiphenylamine	50	5 U	5 U	5 U	5 U
Pentachlorophenol	NC	10 U	10 U	10 U	10 U
Phenanthrene	50	5 U	5 U	5 U	5 U
Phenol	NC	5 U	5 U	5 U	5 U
Pyrene	50	5 U	5 U	5 U	5 U

Notes:
--- = No result
[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.
Exceedes Action Level
NC - No criteria
Sample Type Code: N = Normal, FD = Field Duplicate
U - Not Detected at the Detection Limit shown, J - Estimated value, UJ - Approximate Non-detect
Units are in µg/l

TABLE 5-9 GROUNDWATER METAL RESULTS SUMMARY

	Location ID:	MW-01R	MW-03	MW-05	MW-07	MW-08	MW-08	MW-08	MW-09	MW-09	MW-10	MW-11
	Start Depth (ft bgs):	16.5	0	40.5	40	46	46	46	46	46	32.5	0
	End Depth (ft bgs):	65	0	50.5	50	56	56	56	56	56	42.5	0
	Sample ID:	MW-1R-022117	MW-3-022117	MW-5-022117	MW-7-022117	MW-8-022117	MW-08-011118	FD-01-011118	MW-9-022217	MW-09-011118	MW-10-022217	MW-11-011118
	Sample Type Code:	N	N	N	N	N	N	FD	N	N	N	N
	Sample Date:	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017	1/11/2018	1/11/2018	2/22/2017	1/11/2018	2/22/2017	1/11/2018
Parameter	Action Level[1]											
Aluminum	NC	---	---	---	---	---	200 U	200 U	---	10,500	---	20,600
Antimony	3	---	---	---	---	---	60 U	60 U	---	60 U	---	60 U
Arsenic	25	---	---	---	---	---	10 U	10 U	---	10 U	---	10 U
Barium	1,000	---	---	---	---	---	200 U	200 U	---	316	---	346 J
Beryllium	3	---	---	---	---	---	5 U	5 U	---	5 U	---	5 U
Cadmium	5	---	---	---	---	---	2.5 U	2.5 U	---	2.5 U	---	2.5 U
Calcium	NC	---	---	---	---	---	135,000 JH	139,000 JH	---	156,000 JH	---	206,000 JH
Chromium	50	---	---	---	---	---	10 U	10 U	---	17.3	---	33
Cobalt	NC	---	---	---	---	---	50 U	50 U	---	50 U	---	50 U
Copper	200	---	---	---	---	---	25 U	25 U	---	25 U	---	25 U
Cyanide (Amenable)	200	---	---	---	---	---	10 U	10 U	---	10 U	---	10 U
Iron	300	7,800	27,100	65,100	2,000	1,800	379 JH	388 JH	8,100	11,800 JH	18,000	28,400 JH
Lead	25	---	---	---	---	---	17.8	16.6	---	13.5	---	11.3 J
Magnesium	35,000	---	---	---	---	---	22,600 JH	23,400 JH	---	30700 JH	---	27,300 JH
Manganese	300	260	510	900	110	1,000	1,070 JH	1,100 JH	1,500	1,780 JH	270	824 JH
Mercury	0.7	---	---	---	---	---	0.2 U	0.2 U	---	0.2 U	---	0.2 U
Nickel	100	---	---	---	---	---	40 U	40 U	---	40 U	---	40 UJ
Potassium	NC	---	---	---	---	---	7,210	7,510	---	6,140	---	12,600
Selenium	10	---	---	---	---	---	10 U	10 U	---	10 U	---	10 U
Silver	50	---	---	---	---	---	10 U	10 U	---	10 U	---	10 U
Sodium	20,000	---	---	---	---	---	312000 JH	317,000 JH	---	272000 JH	---	159,000 JH
Thallium	0.5	---	---	---	---	---	10 U	10 U	---	10 U	---	10 U
Vanadium	NC	---	---	---	---	---	50 U	50 U	---	50 U	---	50 U
Zinc	2,000	---	---	---	---	---	20 U	20 U	---	65.1	---	80.2 J

Notes:

--- = No result

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.

Exceedes Action Level

NC - No criteria

Sample Type Code: N = Normal, FD = Field Duplicate

U - Not Detected at the Detection Limit shown, J - Estimated value, JH Estimated high value

B - Blank Contamination, BJ - Estimated Value Detected in Blank

Units are in µg/l

TABLE 5-10 GROUNDWATER POLYCHLORINATED BIPHENYL COMPOUND RESULTS SUMMARY

	Location ID:	MW-08	MW-08	MW-09	MW-11
	Start Depth (ft bgs):	46	46	46	0
	End Depth (ft bgs):	56	56	56	0
	Sample ID:	MW-08-011118	FD-01-011118	MW-09-011118	MW-11-011118
	Sample Type Code:	N	FD	N	N
	Sample Date:	1/11/2018	1/11/2018	1/11/2018	1/11/2018
Parameter	Action Level[1]				
Aroclor-1016	0.09	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1221	0.09	2 UJ	2 UJ	2 UJ	2 UJ
Aroclor-1232	0.09	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1242	0.09	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1248	0.09	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1254	0.09	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1260	0.09	1 UJ	1 UJ	1 UJ	1 UJ

Notes:

--- = No result

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.

Exceedes Action Level

NC - No criteria

Sample Type Code: N = Normal, FD = Field Duplicate

UJ - Approximate Not Detected at the Detection Limit shown

Units are in µg/l

TABLE 5-11 GROUNDWATER PESTICIDE RESULTS SUMMARY

	Location ID:	MW-08	MW-08	MW-09	MW-11
	Start Depth (ft bgs):	46	46	46	0
	End Depth (ft bgs):	56	56	56	0
	Sample ID:	MW-08-011118	FD-01-011118	MW-09-011118	MW-11-011118
	Sample Type Code:	N	FD	N	N
	Sample Date:	1/11/2018	1/11/2018	1/11/2018	1/11/2018
Parameter	Action Level[1]				
4-4-DDD	0.3	0.1 U	0.1 U	0.1 U	0.1 U
4-4-DDE	0.2	0.1 U	0.1 U	0.1 U	0.1 U
4-4-DDT	0.2	0.1 U	0.1 U	0.1 U	0.1 U
a-BHC	0.01	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0	0.05 U	0.05 U	0.05 U	0.05 U
alpha-Chlordane	NC	0.05 U	0.05 U	0.05 U	0.05 U
b-BHC	0.04	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
d-BHC	0.04	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.004	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	NC	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan II	NC	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan Sulfate	NC	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	0	0.1 U	0.1 U	0.1 U	0.1 U
Endrin Aldehyde	5	0.1 U	0.1 U	0.1 U	0.1 U
Endrin Ketone	5	0.1 U	0.1 U	0.1 U	0.1 U
Heptachlor	0.04	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.03	0.05 U	0.05 U	0.05 U	0.05 U
Lindane	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	35	0.5 U	0.5 U	0.5 U	0.5 U
Toxaphene	0.06	5 U	5 U	5 U	5 U
y-Chlordane	NC	0.05 U	0.05 U	0.05 U	0.05 U

Notes:

--- = No result

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.

Exceedes Action Level

NC - No criteria

Sample Type Code: N = Normal, FD = Field Duplicate

U - Not Detected at the Detection Limit shown, UJ - Approximate Non-detect

Units are in µg/l

TABLE 5-12 GROUNDWATER MONITORED NATURAL ATTENUATION RESULTS SUMMARY

	Location ID:	MW-01R	MW-03	MW-05	MW-07	MW-08	MW-09	MW-10
	Start Depth (ft bgs):	16.5	0	40.5	40	46	46	32.5
	End Depth (ft bgs):	65	0	50.5	50	56	56	42.5
	Sample ID:	MW-1R-022117	MW-3-022117	MW-5-022117	MW-7-022117	MW-8-022117	MW-9-022217	MW-10-022217
	Sample Type Code:	N	N	N	N	N	N	N
	Sample Date:	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/22/2017	2/22/2017
Parameter	Action Level[1]							
Alkalinity, Total As CaCO3	NC	270,000	205,000	225,000	289,000	239,000	244,000	187,000
Carbon Dioxide	NC	43,000	14,000	27,000	35,000	8,100	29,000	22,000
Chloride	250,000	718,000	570,000	450,000	782,000	588,000	319,000	594,000
Ethane	NC	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U
Ethylene	NC	7 U	7 U	7 U	7 U	7 U	7 U	7 U
Iron	300	7,800	27,100	65,100	2,000	1,800	8,100	18,000
Manganese	300	260	510	900	110	1,000	1,500	270
Methane	NC	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Nitrate (as N)	10,000	4,200	3,200	50 U	4,000	50 U	2,500	1,800
Nitrite (as N)	1,000	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Nitrogen, Nitrate + Nitrite	NC	4,200	3,200	50 U	4,000	50 U	2,500	1,800
Sulfate	250,000	51,500	75,200	84,800	107,000	60,300	114,000	63,700
Sulfide	NC	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Total Organic Carbon	NC	590 J	3,000	3,400	2,800	2,300	2,000	3,800

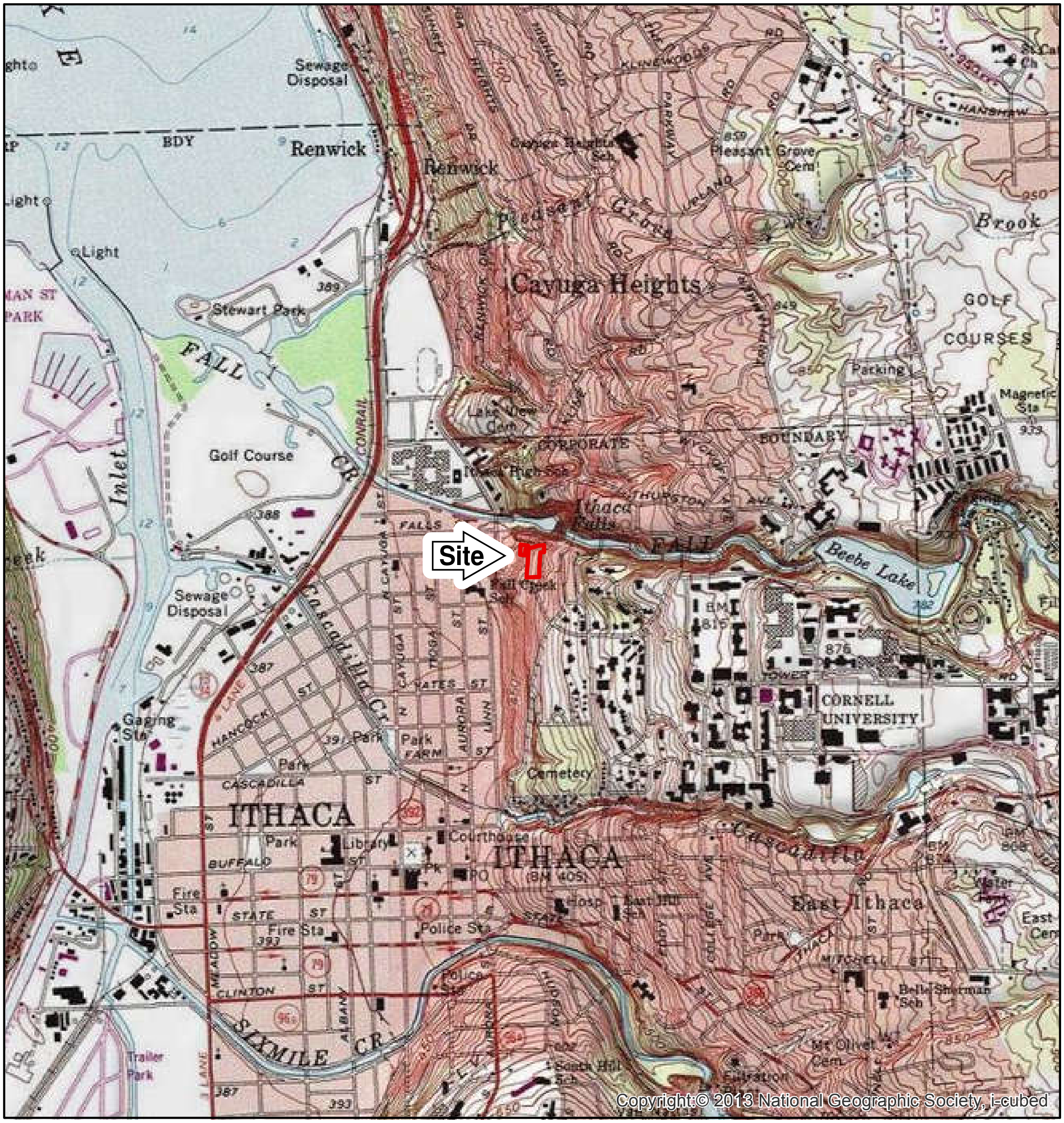
Notes:
--- = No result
[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.
NC - No criteria
Sample Type Code: N = Normal, FD = Field Duplicate
U - Not Detected at the Detection Limit shown, J - Estimated value, UJ - Approximate Non-detect,
Units are in µg/l

TABLE 5-13 NATURAL ATTENUATION SCORING

								Ethene/Ethane												VOCs												
																				Chloroethane		DCA		DCE		TCE		VC			
Well I.D.	Sampling Event	Date	Alk	CO2	CL	D.O.	Ethene	Ethane	Fe II	Methane	Nitrate	Ph	ORP	Sulfate	Sulfide	Temp	TOC	BTEX	DP of VC or DCA?	score	DP of TCA?	score	DP of TCE?	score	DP of PCE?	score	DP of DCE?	score	Biodegradation Weighting Factors	Evidence of MNA
MW-01R	Rnd 2	02/21/17	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	no	0	no	0	no	0	no	0	no	0	5	Inadequate Evidence
MW-03	Rnd 2	02/21/17	1	1	1	-3	0	0	0	0	0	0	1	0	0	0	1	2	no	0	no	0	no	0	yes	2	no	0	6	Limited Evidence
MW-05	Rnd 2	02/21/17	1	1	1	-3	0	0	0	0	2	0	0	0	0	0	1	2	no	0	yes	2	yes	2	yes	2	no	0	11	Limited Evidence
MW-07	Rnd 2	02/21/17	1	1	1	-3	0	0	0	0	0	0	1	0	0	0	1	2	no	0	no	0	no	0	yes	2	no	0	6	Limited Evidence
MW-08	Rnd 2	02/21/17	1	1	1	0	0	0	0	0	2	-2	1	0	0	0	1	2	no	0	no	0	no	0	yes	2	no	0	9	Limited Evidence
MW-09	Rnd 2	02/21/17	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	2	no	0	no	0	no	0	yes	2	no	0	8	Limited Evidence
MW-10	Rnd 2	02/21/17	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	2	no	0	no	0	yes	0	yes	2	no	0	9	Limited Evidence

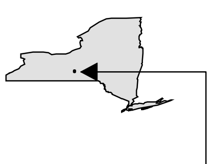
Notes:
(1) Biodegradation Potential was based on scores obtained following Screening Step 1 of the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (USEPA/600/R-98/128, September 1998)

Figures



ADAPTED FROM: (ITHACA WEST AND ITHACA EAST) USGS QUADRANGLE

FORMER ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK



MAP LOCATION

N

SITE LOCATION

0 1,000 2,000 4,000
Feet

1:24,000

17546\63923
MAY 2018

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 05/04/18 8:14:02 AM newtonjm

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FIGURE 1-2

LEGEND

- FENCE
- BCP PARCEL BOUNDARY
- PARCEL CONVEYED TO CITY OF ITHACA
- CURRENT STRUCTURE
- CURRENT BUILDING
- FORMER STRUCTURE (REMOVED)
- FORMER BUILDING (REMOVED)

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

SITE LAYOUT

0 30 60 120
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 07/30/18 1:55:08 PM newtonjm

I:\Ithaca-Falls.17546\63923.Ithaca-Gun-Ri-I\Docs\DWG\MXD\RI\SITE LAYOUT.mxd

LEGEND

- MONITORING WELL
- SURFACE SOIL WITH XRF LEAD SCREENING (2010)
- SURFACE SOIL WITH XRF LEAD SCREENING AND ANALYTICAL (2010)
- SOIL BORING WITH ANALYTICAL (2017)
- SOIL BORING WITH XRF LEAD SCREENING (2016)
- SOIL BORING WITH XRF LEAD SCREENING AND ANALYTICAL (2016)
- SURFACE SOIL WITH XRF LEAD SCREENING (2016)
- SURFACE SOIL WITH XRF LEAD SCREENING AND ANALYTICAL (2016)
- SOIL VAPOR POINT
- FENCE
- PROPERTY BOUNDARY

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

FORMER ITHACA GUN FACTORY SITE ITHACA, NEW YORK

SAMPLE LOCATIONS

0 10 20 40
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 3-2

N

LEGEND

- MONITORING WELL
- RI SOIL SAMPLE
- FSI SOIL SAMPLE
- PROPERTY BOUNDARY
- FENCE

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

SAMPLING LOCATIONS WITH LABORATORY RESULTS

0 20 40 80
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

N

LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE LOCATION OF EXPOSED BEDROCK
- FENCE
- WESTERN PARCEL MODELED OVERBURDEN AREA
- BCP PARCEL BOUNDARY

APPROXIMATE OVERBURDEN THICKNESS

- 1 FOOT CONTOUR
- 5 FOOT CONTOUR

MW-08 — LOCATION ID
2.8 — OVERBURDEN THICKNESS

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

ESTIMATED VOLUME OF OVERBURDEN

0 20 40 80
Feet

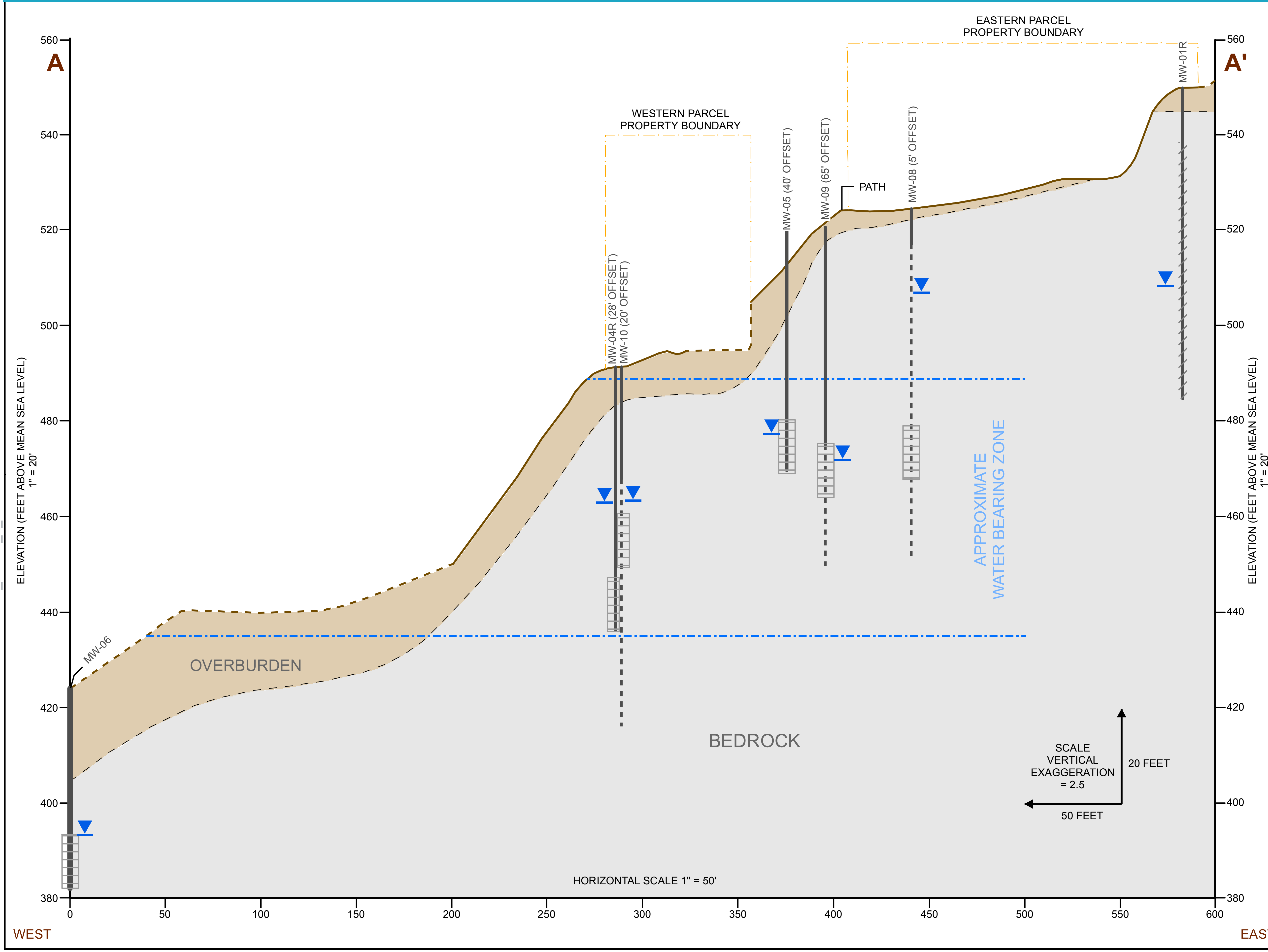
17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 06/07/18 11:44:25 AM newtonjm

I:\Ithaca-Falls.17546\63923.Ithaca-Gun-Ri-I\Docs\DWG\MXD\RI\ESTIMATED VOLUME OF OVERBURDEN.mxd

FIGURE 4-2



LEGEND

- POTENTIOMETRIC WATER LEVEL (1/10/2018)
- MONITORING WELL
- PACKER INTERVAL RANGE
- APPROXIMATE SURFACE
- SURFACE
- APPROXIMATE BEDROCK SURFACE
- APPROXIMATE WATER BEARING ZONE
- OPEN BEDROCK SCREEN
- PVC SCREEN
- BEDROCK
- OVERBURDEN

NOTE:
APPROXIMATE WATER BEARING ZONE LIMITS BASED ON PACKER TEST RESULTS.

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

CROSS SECTION
A - A'

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

N

LEGEND

- MONITORING WELL
- BCP PARCEL BOUNDARY
- CROSS SECTION A-A'
- FENCE

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

CROSS SECTION LOCATION

0 30 60 120
Feet

17546\63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 06/08/18 10:48:44 AM newtonjm

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N

LEGEND

- MONITORING WELL
- FENCE
- BCP PARCEL BOUNDARY
- PARCEL CONVEYED TO CITY OF ITHACA

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT
- GROUNDWATER FLOW POTENTIAL

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

GROUNDWATER ELEVATIONS
(DECEMBER 8, 2016)

0 30 60 120
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

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LEGEND

- MONITORING WELL
- FENCE
- BCP PARCEL BOUNDARY
- PARCEL CONVEYED TO CITY OF ITHACA

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT
- GROUNDWATER FLOW POTENTIAL

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

GROUNDWATER ELEVATIONS (FEBRUARY 20, 2017)

0 30 60 120
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 06/08/18 10:23:35 AM newtonjm

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FIGURE 4-6

N

LEGEND

- MONITORING WELL
- FENCE
- BCP PARCEL BOUNDARY
- PARCEL CONVEYED TO CITY OF ITHACA

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT
- GROUNDWATER FLOW POTENTIAL

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

GROUNDWATER ELEVATIONS (JANUARY 10, 2018)

0 30 60 120
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

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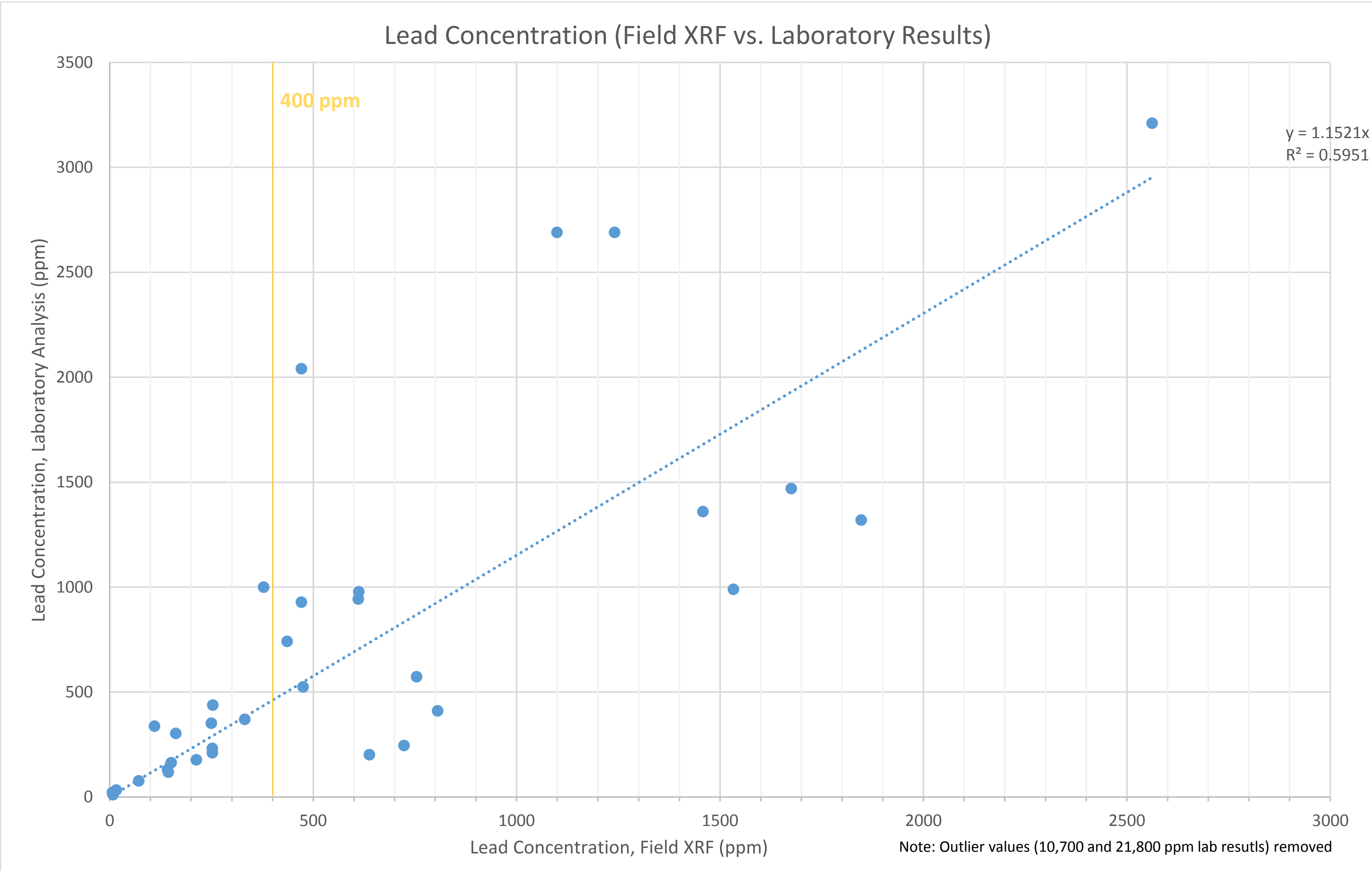
Figure 5-1

Former Ithaca Gun Factory Site
Remedial Investigation
Ithaca, New York
Site No. C755019



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N

LEGEND

XRF SCAN (LEAD IN PPM, UPPER 2 INCHES OF OVERBURDEN)

- ND - 200
- 200 - 500
- 500 - 1,000
- 1,000 AND GREATER
- FSIR SAMPLE
- FENCE
- PROPERTY BOUNDARY

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

NOTE:
FSIR (2011) AND RIR (2016 and 2017) XRF RESULTS COMBINED.
FSIR = FOCUSED SITE INVESTIGATION REPORT (MARCH 2011).
RIR = REMEDIAL INVESTIGATION REPORT.

FORMER ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

SURFACE SOIL XRF SCREENING RESULTS

0 10 20 40
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

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FIGURE 5-3

N

LEGEND

- RI SOIL SAMPLE
- FSI SOIL SAMPLE
- PROPERTY BOUNDARY
- FENCE

GROUND SURFACE CONTOURS

- 2 FOOT
- 10 FOOT

LOCATION ID — SB-Z-A2
0'-6' - 438 — EXCEEDS NYS PART375 RESTRICTED RESIDENTIAL SCOs
6'-12' - 410
12'-24' - 202 — EXCEEDS NYS PART375 UNRESTRICTED SCOs
SAMPLE DEPTH INTERVAL
RESULT (PPM)

NOTES:
SCO = Soil Cleanup Objective
NYS Part 375 = 6 NYCRR Part 375, December 14, 2006
Unrestricted SCO for lead = 63 PPM
Restricted-Residential SCO for lead = 400 PPM

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

SOIL SAMPLING LABORATORY RESULTS FOR LEAD

0 20 40 80
Feet

17546.63923
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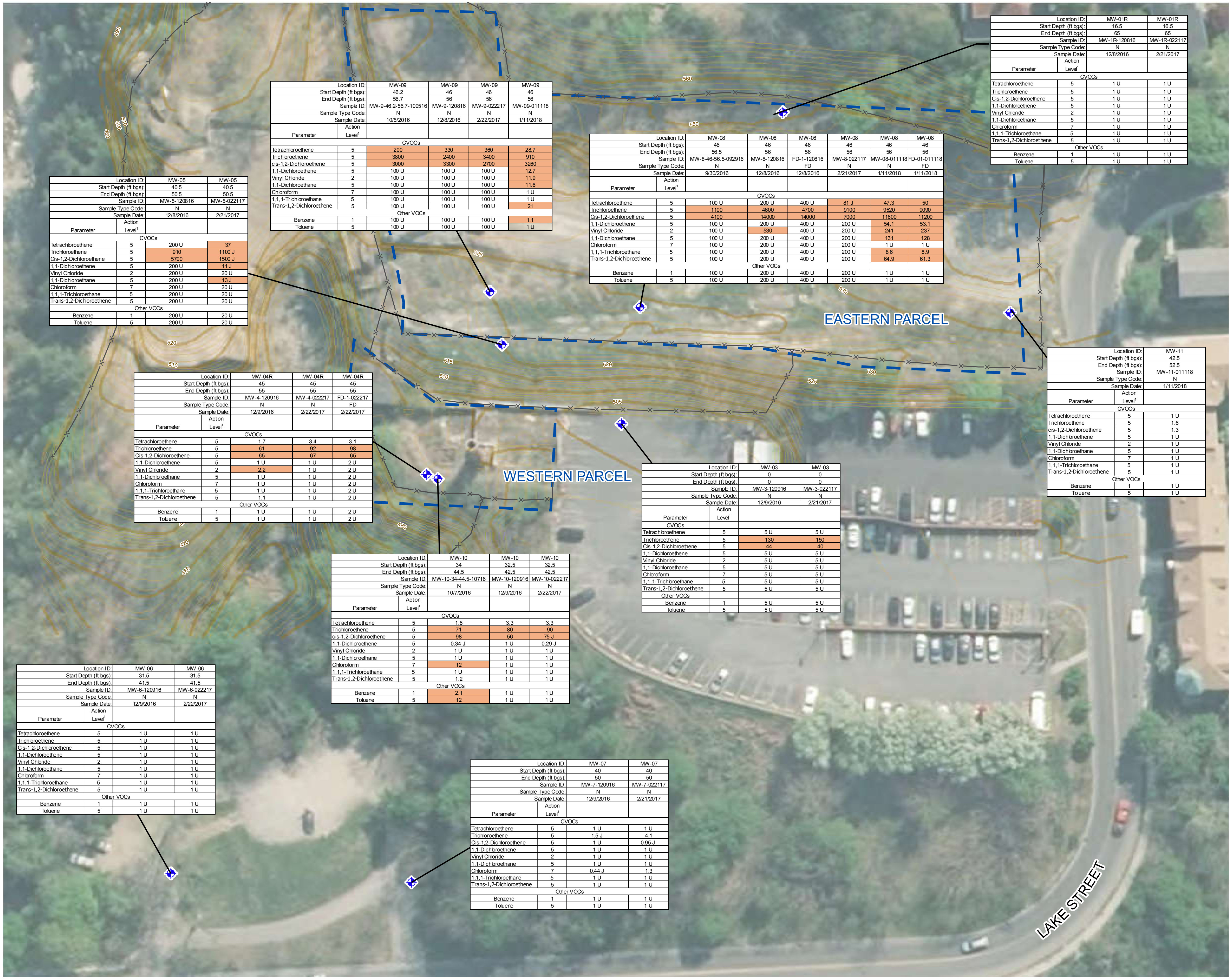
FIGURE 5-4



Location ID:		MW-01R	MW-01R
Start Depth (ft bgs):		16.5	16.5
End Depth (ft bgs):		65	65
Sample ID:		MW-1R-120816	MW-1R-022117
Sample Type Code:		N	N
Sample Date:		12/8/2016	2/21/2017
Parameter	Action Level[1]		
CVOCs			
Tetrachloroethene	5	1 U	1 U
Trichloroethene	5	1 U	1 U
Cis-1,2-Dichloroethene	5	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U
Vinyl Chloride	2	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U
Chloroform	7	1 U	1 U
1,1,1-Trichloroethane	5	1 U	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U
Other VOCs			
Benzene	1	1 U	1 U
Toluene	5	1 U	1 U

Location ID:		MW-09	MW-09	MW-09	MW-09
Start Depth (ft bgs):		46.2	46	46	46
End Depth (ft bgs):		56.7	56	56	56
Sample ID:		MW-9-46.2-56.7-100516	MW-9-120816	MW-9-022217	MW-09-011118
Sample Type Code:		N	N	N	N
Sample Date:		10/5/2016	12/8/2016	2/22/2017	1/11/2018
Parameter	Action Level[1]				
CVOCs					
Tetrachloroethene	5	200	330	360	28.7
Trichloroethene	5	3800	2400	3400	910
cis-1,2-Dichloroethene	5	3000	3300	2700	3260
1,1-Dichloroethene	5	100 U	100 U	100 U	12.7
Vinyl Chloride	2	100 U	100 U	100 U	11.9
1,1-Dichloroethane	5	100 U	100 U	100 U	11.6
Chloroform	7	100 U	100 U	100 U	1 U
1,1,1-Trichloroethane	5	100 U	100 U	100 U	1 U
Trans-1,2-Dichloroethene	5	100 U	100 U	100 U	21
Other VOCs					
Benzene	1	100 U	100 U	100 U	1.1
Toluene	5	100 U	100 U	100 U	1 U

Location ID:		MW-05	MW-05
Start Depth (ft bgs):		40.5	40.5
End Depth (ft bgs):		50.5	50.5
Sample ID:		MW-5-120816	MW-5-022117
Sample Type Code:		N	N
Sample Date:		12/8/2016	2/21/2017
Parameter	Action Level[1]		
CVOCs			
Tetrachloroethene	5	200 U	37
Trichloroethene	5	910	1100 J
Cis-1,2-Dichloroethene	5	5700	1500 J
1,1-Dichloroethene	5	200 U	11 J
Vinyl Chloride	2	200 U	20 U
1,1-Dichloroethane	5	200 U	13 J
Chloroform	7	200 U	20 U
1,1,1-Trichloroethane	5	200 U	20 U
Trans-1,2-Dichloroethene	5	200 U	20 U
Other VOCs			
Benzene	1	200 U	20 U
Toluene	5	200 U	20 U

Location ID:		MW-08	MW-08	MW-08	MW-08	MW-08	MW-08
Start Depth (ft bgs):		46	46	46	46	46	46
End Depth (ft bgs):		56.5	56	56	56	56	56
Sample ID:		MW-8-46-56.5-092916	MW-8-120816	FD-1-120816	MW-8-022117	MW-08-011118	FD-01-011118
Sample Type Code:		N	N	FD	N	N	FD
Sample Date:		9/30/2016	12/8/2016	12/8/2016	2/21/2017	1/11/2018	1/11/2018
Parameter	Action Level[1]						
CVOCs							
Tetrachloroethene	5	100 U	200 U	400 U	81 J	47.3	50
Trichloroethene	5	1100	4600	4700	9100	9520	9090
Cis-1,2-Dichloroethene	5	4100	14000	14000	7000	11600	11200
1,1-Dichloroethene	5	100 U	200 U	400 U	200 U	54.1	53.1
Vinyl Chloride	2	100 U	530	400 U	200 U	241	237
1,1-Dichloroethane	5	100 U	200 U	400 U	200 U	131	128
Chloroform	7	100 U	200 U	400 U	200 U	1 U	1 U
1,1,1-Trichloroethane	5	100 U	200 U	400 U	200 U	8.6	8.9
Trans-1,2-Dichloroethene	5	100 U	200 U	400 U	200 U	64.9	61.3
Other VOCs							
Benzene	1	100 U	200 U	400 U	200 U	1 U	1 U
Toluene	5	100 U	200 U	400 U	200 U	1 U	1 U

Location ID:		MW-11
Start Depth (ft bgs):		42.5
End Depth (ft bgs):		52.5
Sample ID:		MW-11-011118
Sample Type Code:		N
Sample Date:		1/11/2018
Parameter	Action Level[1]	
CVOCs		
Tetrachloroethene	5	1 U
Trichloroethene	5	1.6
cis-1,2-Dichloroethene	5	1.3
1,1-Dichloroethene	5	1 U
Vinyl Chloride	2	1 U
1,1-Dichloroethane	5	1 U
Chloroform	7	1 U
1,1,1-Trichloroethane	5	1 U
Trans-1,2-Dichloroethene	5	1 U
Other VOCs		
Benzene	1	1 U
Toluene	5	1 U

Location ID:		MW-04R	MW-04R	MW-04R
Start Depth (ft bgs):		45	45	45
End Depth (ft bgs):		55	55	55
Sample ID:		MW-4-120916	MW-4-022217	FD-1-022217
Sample Type Code:		N	N	FD
Sample Date:		12/9/2016	2/22/2017	2/22/2017
Parameter	Action Level[1]			
CVOCs				
Tetrachloroethene	5	1.7	3.4	3.1
Trichloroethene	5	61	92	98
Cis-1,2-Dichloroethene	5	65	67	65
1,1-Dichloroethene	5	1 U	1 U	2 U
Vinyl Chloride	2	2.2	1 U	2 U
1,1-Dichloroethane	5	1 U	1 U	2 U
Chloroform	7	1 U	1 U	2 U
1,1,1-Trichloroethane	5	1 U	1 U	2 U
Trans-1,2-Dichloroethene	5	1.1	1 U	2 U
Other VOCs				
Benzene	1	1 U	1 U	2 U
Toluene	5	1 U	1 U	2 U

Location ID:		MW-03	MW-03
Start Depth (ft bgs):		0	0
End Depth (ft bgs):		0	0
Sample ID:		MW-3-120916	MW-3-022117
Sample Type Code:		N	N
Sample Date:		12/9/2016	2/21/2017
Parameter	Action Level[1]		
CVOCs			
Tetrachloroethene	5	5 U	5 U
Trichloroethene	5	130	150
Cis-1,2-Dichloroethene	5	44	40
1,1-Dichloroethene	5	5 U	5 U
Vinyl Chloride	2	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U
Chloroform	7	5 U	5 U
1,1,1-Trichloroethane	5	5 U	5 U
Trans-1,2-Dichloroethene	5	5 U	5 U
Other VOCs			
Benzene	1	5 U	5 U
Toluene	5	5 U	5 U

Location ID:		MW-10	MW-10	MW-10
Start Depth (ft bgs):		34	32.5	32.5
End Depth (ft bgs):		44.5	42.5	42.5
Sample ID:		MW-10-34-44.5-10716	MW-10-120916	MW-10-022217
Sample Type Code:		N	N	N
Sample Date:		10/7/2016	12/9/2016	2/22/2017
Parameter	Action Level[1]			
CVOCs				
Tetrachloroethene	5	1.8	3.3	3.3
Trichloroethene	5	71	80	90
cis-1,2-Dichloroethene	5	98	56	75 J
1,1-Dichloroethene	5	0.34 J	1 U	0.29 J
Vinyl Chloride	2	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U
Chloroform	7	12	1 U	1 U
1,1,1-Trichloroethane	5	1 U	1 U	1 U
Trans-1,2-Dichloroethene	5	1.2	1 U	1 U
Other VOCs				
Benzene	1	2.1	1 U	1 U
Toluene	5	12	1 U	1 U

Location ID:		MW-06	MW-06
Start Depth (ft bgs):		31.5	31.5
End Depth (ft bgs):		41.5	41.5
Sample ID:		MW-6-120916	MW-6-022217
Sample Type Code:		N	N
Sample Date:		12/9/2016	2/22/2017
Parameter	Action Level[1]		
CVOCs			
Tetrachloroethene	5	1 U	1 U
Trichloroethene	5	1 U	1 U
Cis-1,2-Dichloroethene	5	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U
Vinyl Chloride	2	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U
Chloroform	7	1 U	1 U
1,1,1-Trichloroethane	5	1 U	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U
Other VOCs			
Benzene	1	1 U	1 U
Toluene	5	1 U	1 U

Location ID:		MW-07	MW-07
Start Depth (ft bgs):		40	40
End Depth (ft bgs):		50	50
Sample ID:		MW-7-120916	MW-7-022117
Sample Type Code:		N	N
Sample Date:		12/9/2016	2/21/2017
Parameter	Action Level[1]		
CVOCs			
Tetrachloroethene	5	1 U	1 U
Trichloroethene	5	1.5 J	4.1
Cis-1,2-Dichloroethene	5	1 U	0.95 J
1,1-Dichloroethene	5	1 U	1 U
Vinyl Chloride	2	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U
Chloroform	7	0.44 J	1.3
1,1,1-Trichloroethane	5	1 U	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U
Other VOCs			
Benzene	1	1 U	1 U
Toluene	5	1 U	1 U

N

LEGEND

MONITORING WELL

BCP PARCEL BOUNDARY

FENCE

GROUND SURFACE CONTOURS

2 FOOT

10 FOOT

NOTES:
[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 2004.
CVOC = Chlorinated Volatile Organic Compound
End Depth = Bottom of Screen
ft bgs = feet below ground surface
Sample Type Code: N = Normal, FD = Field Duplicate
Start Depth = Top of Screen
U - Not Detected at the Detection Limit shown
J - Estimated value
Units are in µg/l
VOC = Volatile Organic Compound

FORMER
ITHACA GUN FACTORY SITE
REMEDIAL INVESTIGATION
ITHACA, NEW YORK

VOC ANALYTICAL RESULTS GROUNDWATER

0 30 60 120
Feet

17546.63923
JUNE 2018

O'BRIEN & GERE ENGINEERS, INC.

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Figure 7-1
Human Health Conceptual Site Model
Former Ithaca Gun Factory Site
Ithaca, New York

Chemical Source	Migration Pathways	Exposure/ Transport Media
Historic Operations	Filling and Surface Grading	Surface Soil (0-1 foot bgs)
		Leaching ↓
		Subsurface Soil (1-12 feet bgs)
		Volatilization ↑
	Infiltration Percolation	Bedrock Groundwater

Exposure/ Transport Media	Exposure Routes	Child Resident Future 0 -18 years old	Adult Resident Future >18 years old	Utility Worker Future >18 years old	Construction Worker Future >18 years old	Maintenance Worker Future >18 years old	Child Trespasser Current / Future 12-18 years old	Adult Trespasser Current / Future >18 years old
Surface Soil (0-1 foot bgs)	Incidental Ingestion	●	●	●	●	●	●	●
	Dermal Contact	●	●	●	●	●	●	●
	Inhalation of Vapors	◊	◊	◊	◊	◊	◊	◊
	Inhalation of Particulates	●	●	●	●	●	●	●
Subsurface Soil (1-12 feet bgs)	Incidental Ingestion	◊	◊	●	●	◊	◊	◊
	Dermal Contact	◊	◊	●	●	◊	◊	◊
	Inhalation of Vapors	◊	◊	◊	◊	◊	◊	◊
	Inhalation of Particulates	◊	◊	●	●	◊	◊	◊
Bedrock Groundwater	Incidental Ingestion	◊	◊	◊	◊	◊	◊	◊
	Dermal Contact	◊	◊	◊	◊	◊	◊	◊
	Ambient Inhalation of Vapors	◊	◊	◊	◊	◊	◊	◊
	Indoor Inhalation of Vapors	●	●	◊	◊	◊	◊	◊

Notes:
● : Potentially complete exposure pathway.
◊ : Incomplete exposure pathway.