September 11, 2025

Attn: Joshua M. Vaccaro
Division of Environmental Conservation
New York State Department of Environmental Conservation
700 Delaware Avenue
Buffalo, NY 14209 USA

Subject:
Remedial Investigation Work Plan for Operable Unit 03
Essex-Hope Superfund Site - Site No. 907015
126 Hopkins Avenue
Jamestown, Chautauqua County, New York

Dear Mr. Vaccaro,

As stated in the letter dated September 5, 2024, the *Supplemental Investigation Work Plan for OU-03* was expanded into a *Remedial Investigation Work Plan for OU-03*. This letter transmits the *Remedial Investigation (RI) Work Plan for Operable Unit 03* that Jacobs prepared, on behalf of Dow, for the Essex-Hope State Superfund site (site). In accordance with the 2023 Consent Order, the OU-03 RI Work Plan is focused on investigating the horizontal and vertical extent of contamination migrating from the site.

Should you have questions, please reach out to Jacobs' site manager (Brian Carling) at the following phone number or email address listed below.

Sincerely,

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Remedial Investigation Work Plan for Operable Unit 03

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2025 Remedial Investigation Work Plan, Essex-Hope Site, Jamestown, NY, OU-03

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Essex-Hope Specialty Products, Inc.
The Dow Chemical Company

Essex-Hope Site, Jamestown, NY
September 2025

2025 Remedial Investigation Work Plan, Essex-Hope Site, Jamestown, NY, OU-03

Client Name: Essex-Hope Specialty Products, Inc.

Project Name: Essex-Hope Site, Jamestown, NY

Client Reference: The Dow Chemical Company

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
AS	air sparging
AST	aboveground storage tank
BEHP	bis(2-ethylhexyl) phthalate
bgs	below ground surface
BPU	Board of Public Utilities
CAMP	Community Air Monitoring Plan
CBTEX	cumene, benzene, toluene, ethylbenzene, and xylenes
CFR	Code of Federal Regulations
COC	constituent of concern
CPM	Custom Production Manufacturing, Inc.
CSM	conceptual site model
CVOC	chlorinated volatile organic compound
DCE	dichloroethane
DER-10	*Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010)
DPT	direct-push technology
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
Essex	Essex Specialty Products, LLC
FS	feasibility study
FWRIA	Fish and Wildlife Resources Impact Analysis
H&H Metal	H&H Metal Specialty
Hope	Hope's Windows
ID	identification
ISCO	in situ chemical oxidation
ISTT	in situ thermal treatment

J	estimated
JMF	Johnson Machine & Fibre Products
mg/kg	milligram(s) per kilogram
MIP	membrane interface probe
NA	natural attenuation
NAPL	nonaqueous phase liquid
NOAA	National Oceanic and Atmospheric Administration
NPLS	North Parking Lot Sump
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSSF	New York State Superfund Program
OU	operable unit
PCB	polychlorinated biphenyl
PDI	predesign investigation
PID	photoionization detector
PM	Project Manager
ppm	part(s) per million
RAO	remedial action objective
RI	remedial investigation
RL	Remediation Leader
ROD	Record of Decision
Rollform	Rollform of Jamestown, Inc.
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
Site	Essex-Hope State Superfund Site
SM	Site Manager
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TCE	trichloroethene

TMB	trimethylbenzene
TOV	total organic vapor
USFWS	U.S. Fish and Wildlife Services
USGS	United States Geological Survey
UST	underground storage tank
VI	vapor intrusion
VOC	volatile organic compound
WBZ	water-bearing zone
WP	work plan

1. Introduction

This Remedial Investigation Work Plan (WP) was prepared on behalf of Essex Specialty Products, LLC (Essex), a former subsidiary of the Dow Chemical Company (Dow). The Essex-Hope State Superfund Site (Site), Operable Unit (OU) – 01, is bound as follows:

- By Hopkins Avenue to the north
- By an alley to the west
- By Blackstone Avenue to the south
- By a building and parking lot to the east

The Site has been further subdivided into three OUs (Figure 1):

- OU-01 is onsite.
- OU-02 is associated with a vapor mitigation system that operated at a residence located at 159 Hopkins Avenue, and was demolished in 2020. This OU is now closed.
- OU-03 is offsite.

In addition to prior investigation work, a predesign investigation (PDI) took place at the Site in 2022. The PDI was documented in the *Essex-Hope Site, Jamestown, New York, Predesign Investigation Report* submitted to the New York Department of Environmental Conservation (NYSDEC) on April 14, 2023 (Jacobs 2023). The PDI concluded there were data gaps related to soil and groundwater characterization at the offsite area (which was subsequently designated as OU-03). This WP discusses tasks associated with a proposed supplemental remedial investigation (RI) to address data gaps at Offsite Area OU-03.

This WP is organized into the following sections:

- Section 1 - Introduction
- Section 2 - Background
- Section 3 - Remedial Investigation
- Section 4 - Qualitative Exposure Assessments
- Section 5 - Schedule and Reporting
- Section 6 - References

2. Background

Both Essex and Hope's Windows (Hope) formerly owned and operated a facility at 125 Blackstone Avenue in Jamestown, New York. In 1990, Dow conducted an RI and feasibility study (FS) of the Site (O'Brien & Gere 1992, 1994). The RI/FS was in accordance with a consent order and took place under the oversight of NYSDEC and the New York State Department of Health (NYSDOH). The RI/FS found that volatile organic compounds (VOCs) were present in soil and groundwater at concentrations exceeding the NYSDEC Groundwater Quality Standards.

The following VOCs were detected in soil:

- Trichloroethene (TCE)
- Xylenes

The following VOCs were detected in groundwater:

- Ethylbenzene
- Toluene
- Xylenes
- TCE
- Vinyl chloride

The RI/FS proposed recommendations to reduce the risks posed by impacts at the Site (O'Brien & Gere 1992, 1994).

In 1994, a Record of Decision (ROD) was issued that prescribed the implementation of remedial actions at the Site, which included operating a groundwater pump-and-treat system (NYSDEC 1994). In September 2023, an Amended ROD was issued for OU-01, revising the onsite remedies as follows (NYSDEC 2023a):

- In situ thermal treatment (ISTT) with vapor extraction/treatment in an area with chlorinated VOC impacts
- In situ chemical oxidation (ISCO) in an area with petroleum-related constituent impacts,
- Groundwater monitoring to assess the effectiveness of the remedies
- Natural attenuation (NA) via long-term monitoring
- A Declaration of Covenants and Restrictions, restricting groundwater use and limiting the use of the property to industrial use
- An asphalt cover system to enhance surface water runoff and inhibit the infiltration of precipitation
- A Site Management Plan to maintain institutional controls and engineering controls at the Site
- An evaluation of soil vapor intrusion into existing and future onsite structures following any changes in building use, occupancy, or the construction of a new structure

The Site is listed under the New York State Superfund Program (NYSSF) (Site Number 907015) and is managed by the NYSDEC. The Site is currently divided into the following OUs:

- OU-01 is generally referred to as the onsite area and includes approximately 4.7 acres that have been remediated. The Essex facility was at 125 Blackstone Avenue. The addresses listed for the current Essex-Hope Site are 120 (or 126) Hopkins Avenue and 147 Blackstone Avenue. While the OU-01 boundary defined by the Amended ROD (NYSDEC 2023a) includes properties west (presently owned by United Alloys R&D and Hope's Windows, Inc.), the investigation and remediation of OU-01 are

limited to the property presently owned by United Industries, Inc., at 126 Hopkins Avenue and 147 Blackstone Avenue.

- OU-02 was at 159 Hopkins Avenue, the location of a former residence that was demolished in 2020. Vapor mitigation work took place at this location, and this OU is now closed.
- OU-03 represents the offsite area downgradient of OU-01, where OU-01-related contamination has been identified.

Figure 1 shows the extent of OU-01. The extent of contamination at OU-03 has not been fully defined; therefore, the area outlined for OU-03 represents the current investigation area, as represented by tax parcel boundaries (parcel owners are labeled on Figure 1). The OU-03 boundary is subject to revision based on the findings of this investigation.

The Amended ROD indicated that OU-03 requires further investigation, which will be addressed under a separate ROD (NYSDEC 2023a). This RI WP is being submitted in accordance with the NYSDEC Order on Consent and Administrative Settlement, signed September 11, 2023, which requires the submittal of an RI/FS work plan to further investigate the horizontal and vertical extent of contamination migrating from OU-01 to OU-03 (NYSDEC 2023b). A separate WP will be submitted for the FS after the RI report is approved. The RI and subsequent FS will be completed for OU-03 in accordance with the following RI requirements, per 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, Environmental Remediation Programs. Section 375-1.8(e)(1):

- "*Delineation of the aerial and vertical extent of the contamination at, and emanating from all media at the Site and the nature of that contamination*
- *Characterization of the surface and subsurface characteristics of the site, including topography, surface drainage, stratigraphy, depth to groundwater, and any aquifers that have been impacted or have the potential to be impacted*
- *Identification of the sources of contamination, the migration pathways and actual or potential receptors of contaminants*
- *Evaluation of actual and potential threats to public health and the environment*
- *Production of data of sufficient quantity and quality to support the necessity for, and the proposed extent of, remediation and to support the evaluation of proposed alternatives*"

NYSDEC's *Technical Guidance for Site Investigation and Remediation (DER-10)* (DER-10) provides additional guidance regarding RIs (NYSDEC 2010a).

2.1 Site History

Historically, the Site supported two distinct operations:

1. The southern portion of OU-01, along Blackstone Avenue, was historically occupied by Jamestown Finishes, which produced coatings and finishes.
2. The northern portion of OU-01, along Hopkins Avenue, was historically occupied by Hope and was used to manufacture steel and aluminum windows. Custom Production Manufacturing, Inc. (CPM) also owned the OU-01 portion of the Site, and operated a metal manufacturing business before the Site was sold to United Industries, Inc.

Historical operations at the Site resulted in impacts to soil and groundwater. Historically, the following primary constituents of concern (COCs) were identified at the Site:

- Chlorinated volatile organic compounds (CVOCs)
  - TCE
  - cis-1,2-dichloroethene (DCE)
  - trans-1,2-DCE
  - Vinyl chloride
  - 1,1-DCE
- Ketones
  - Acetone
  - 2-butanone (also known as methyl ethyl ketone)
- Petroleum-related compounds
  - Cumene, benzene, toluene, ethylbenzene, and xylenes (CBTEX)
  - 1,2,4-Trimethylbenzene (TMB)
  - 1,3,5-TMB
- Bis(2-ethylhexyl) phthalate (BEHP)
- Polychlorinated biphenyls (PCBs)

The 2023 ROD Amendment indicated that semivolatile organic compounds (SVOCs) (BEHP) and PCBs are no longer considered COCs at OU-01.

The historical use of the southern portion of the OU-01 resulted in contamination associated with petroleum-related constituents and, to a lesser extent, CVOCs. The southern portion of OU-01 was previously divided into the following subareas to describe historical use and associated COCs:

- West Building
- Former Aboveground Storage Tank/Underground Storage Tank (AST/UST) Area
- Former UST Area

The historical use of the northern portion of OU-01 resulted in contamination primarily associated with PCBs and CVOCs. The northern portion of OU-01 was previously divided into the following subareas to describe historical use and associated COCs:

- Former North Parking Lot Sump (NPLS) Area
- Plant 5 Building

Figure 1 shows the OUs and associated subareas. The NYSDEC Environmental Site Remediation Database houses records and documents further describe the Site background and history (NYSDEC 2024).

2.2 Performance Criteria

Qualitative and quantitative remedial action objectives (RAOs) for the Site are based on the 1994 ROD and the NYSDEC Standards, Criteria, and Guidance (SCGs) as required by the 2023 Amended ROD for OU-01.

The 1994 ROD identified the following qualitative RAOs for soil and groundwater:

- Eliminate the potential for direct human or animal contact with contaminated soil.
- Mitigate the impacts of contaminated groundwater to the environment.
- Mitigate, to the extent practicable, the migration of COCs from onsite areas to groundwater.
- Provide for attainment of RAOs for groundwater and soil quality.

The 2023 Amended ROD for OU-01 updated the 1994 qualitative RAOs for OU-01, as follows:

- For groundwater:
  - Prevent the ingestion of groundwater with COC levels exceeding drinking water standards.
  - Prevent contact with, or the inhalation of, volatiles from contaminated groundwater.
  - Restore the groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
  - Remove the source of groundwater contamination.
- For soil:
  - Prevent ingestion/direct contact with contaminated soil.
  - Prevent the inhalation of, or exposure from, contaminants volatilizing from contaminants in soils.
  - Prevent the migration of COCs that would result in groundwater contamination.
- For soil vapor:
  - Mitigate impacts to public health resulting from the potential for soil vapor intrusion into existing or future buildings at the Site.

The 1994 ROD identified quantitative RAOs to evaluate how effective the remediation was. The 2023 Amended ROD for OU-01 did not list quantitative RAOs, but indicated they should be set in accordance with New York SCGs.

This OU-03 RI compares sampling results with unrestricted use soil SCOs and ambient water quality standards and guidance values; they may also be compared to restricted use SCGs in accordance with NYSDEC's DER-10 (NYSDEC 2010a). If appropriate, RAOs for OU-03 will be proposed in the RI report. Applicable SCGs for the OU-03 RI include:

- For soils, the RI will apply unrestricted use Soil Cleanup Objectives (SCOs) in Table 375-6.8(a) of NYCRR 6 Part 375, as well as guidance values in NYSDEC's *CP-51 / Soil Cleanup Guidance (CP-51)* (NYSDEC 2010b). Restricted use SCOs for residential, nonresidential, commercial, and industrial protection of public health, protection of ecological resources, and protection of groundwater SCOs in Table 375-6.8(b) of NYCRR 6 Part 375 and in CP-51 may also be considered for comparison purposes. Although not yet finalized, 2024 proposed revisions to Table 375-6.8(a) and Table 375-6.8(b) SCOs may also be considered.
- For groundwater, the RI will apply water quality standards in 6 NYCRR Part 703 and NYSDEC's Division of Water (2023c) *Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC 1998, as amended in 1999, 2000, 2004, and 2023).

Table 1 lists the quantitative RAOs and SCGs for OU-03.

2.3 Previous Investigations

Since the 1990s, multiple investigations have taken place at the Site to assess environmental conditions. Table 2 summarizes those Site investigations and evaluations. Figure 2 shows soil and groundwater monitoring locations, Figure 3 depicts membrane interface probe (MIP) locations, Figure 4 shows and offsite soil vapor and air monitoring locations. Appendices A and B provide soil and groundwater data collected since 2016, respectively. Appendix C provides offsite soil vapor and air monitoring data collected since 2017. Appendix D provides PDI documents associated with the MIP investigation interpretation.

2.3.1 Site Investigations

The following sections discuss several Site investigations since 2016, which have focused on refining the conceptual Site model (CSM) through the following activities;

- Delineating groundwater plumes
- Refining the understanding of the nature, magnitude, and location of contaminant sources
- Improving understanding of the geology and hydrogeology
- Providing data to assess and select potential remedial alternatives or enhancements to the current remedial actions

2.3.1.1 2016

In 2016, a data gap investigation took place to conduct the following activities (CH2M 2017):

- Investigate soil conditions.
- Delineate contaminant plume extents.
- Evaluate potential replacement of RW-6D to improve extraction system performance.
- Evaluate groundwater geochemical conditions.
- Conduct a high-resolution characterization of geology, hydrogeology, and contaminant distribution of potential source areas near and under Plant 5.

The investigation found elevated CVOC concentrations northeast of RW-6D, which prohibited the complete delineation of the downgradient extent of the deep CVOC plume. Vadose zone soil contained concentrations of CVOCs exceeding RAOs, most notably in the NPLS Area. Additionally, two separate areas were identified with CBTEX concentrations greater than the RAOs: the West Building and the eastern former UST Area.

The results of a grain-size analysis near RW-6D indicated the deep water-bearing zone (WBZ) aquifer was composed predominantly of silt and would require a very small screen slot that would not be conducive to reasonable flow rates. As a result, RW-6D was not replaced, and continued to operate as one of the two deep pumping wells until the system was shut down in 2023.

A MIP with a hydraulic profiling tool found the silty clay separating the shallow and deep WBZs varied in thickness and depth, with the thinnest clay in the NPLS Area and easternmost former UST Area, and notably more conductive clay on the northern side of the Plant 5 Building. The MIP results also indicated the greatest contaminant responses were in the confining clay and upper portions of the deep WBZ; they declined with depth within the deep WBZ. The results did not find evidence of deep nonaqueous phase liquid (NAPL) impacts at the bottom of the deep WBZ.

The results of this investigation are documented in the *2016 Data Gap Investigation Report for the Essex-Hope Site in Jamestown, New York (*CH2M 2017).

2.3.1.2 2017

In 2017, impacted vadose zone soils and groundwater exceeding the RAOs were delineated as part of another investigation (CH2M 2018). Vadose zone soil impacts were delineated in the NPLS Area and former AST/UST Area. The CVOC groundwater plume in the deep WBZ was delineated in the downgradient direction, through the installation of sentinel wells, and groundwater COC concentrations were less than the RAOs. Notably, NAPL was observed in a piezometer screened in the deep WBZ under the Plant 5 Building (PZ-4D). The NAPL was analyzed and found to be primarily petroleum hydrocarbons, with approximately 5% TCE. Based on the elevated VOC concentrations in saturated soils and the NAPL in PZ-4D, it was determined that residual or undiscovered free-phase NAPL (or both) could be present under

portions of the Plant 5 Building. If so, they could be acting as a persistent source of dissolved-phase CVOCs to the deep WBZ plume. Additional analytical data (magnetic susceptibility, total oxidant demand, and Quantarray-Chlor) were collected during this investigation to assess potential remedial alternatives.

The results of this investigation are documented in the *2017 Data Gap Investigation Report for the Essex-Hope Site in Jamestown, New York* (CH2M 2018).

2.3.1.3 2019

The objective of the 2019 supplemental Investigation was to characterize the onsite constituent source areas with sufficient resolution to evaluate remedial alternatives (Jacobs 2020a). One portion of the investigation focused on characterizing the CVOC contamination in the shallow and deep WBZs in the northern portion of OU-01, around the Plant 5 Building. The second portion of the investigation focused on further characterizing the petroleum constituent contamination in the shallow WBZ in the former UST Area.

The vertical distribution of VOC contamination was consistent across the Plant 5 Building area. No soil samples collected from the shallow sand and gravel unit exhibited total VOC concentrations greater than 1 milligram per kilogram (mg/kg), except for one sample location. The greatest VOC concentrations in saturated soils were detected in the shallow silty clay confining unit and the upper portions of the deep silt (upper deep WBZ), consistent with previous investigation findings. The 2019 results, together with previous MIP results (CH2M 2017), indicated the greatest concentrations of VOCs were in the silty clay and the upper portions of the silt unit (upper deep WBZ) at depths of approximately 18 to 35 feet below ground surface (bgs).

The results of the 2019 investigation suggested elevated VOCs are spatially distributed in both the silty clay and underlying upper portions of the deep WBZ, hydraulically downgradient (to the northeast) of an onsite source area near the NPLS and western portion of the Plant 5 Building area. The investigation determined that elevated soil concentrations in the former NPLS Area and the western portion of the Plant 5 Building were potentially responsible for the persistent elevated groundwater concentrations in the deep WBZ both onsite and offsite, despite pump-and-treat operations. Based on the magnitude of the concentrations observed in the silty clay layer, it was also determined that this unit could be acting as a continuing source of contamination (back diffusion) to the shallow WBZ.

The results of this investigation are documented in the *Essex-Hope Site, Jamestown, New York Supplemental Investigation Report* (Jacobs 2020a).

2.3.1.4 2022

The 2019 investigation resulted in a better understanding of the plume extents; however, data gaps were identified in the areas south and northeast of the Plant 5 Building footprint, and additional data were needed to support the design of a thermal treatment system at OU-01. As a result, an additional investigation took place in 2022 to further delineate the extent of CVOCs in the shallow and deep WBZ soils. The investigation focused on the former NPLS Area and the Plant 5 Building area, which is considered the OU-01 source area, as well as OU-03 areas north and northeast of the Plant 5 Building area (Jacobs 2023).

An evaluation of the 2022 investigation results included a review of field, analytical, and MIP data, as well as data from previous investigations. The key findings of this evaluation are summarized as follows:

- The previous interpretation of geology was generally confirmed, except the southern portion of the former NPLS Area and the West Building, where soil logging indicated the absence of the shallow silty clay in select drilling locations.

- Hydraulic conductivity is about 1 order of magnitude greater in the shallow WBZ than in the deep WBZ, with the intervening low-permeability silty clay exhibiting hydraulic conductivities 2 to 3 orders of magnitude less than in the shallow WBZ.

OU-01:

- The greatest CVOCs impacts extend from the former sump location in the former NPLS Area to the northeast under the Plant 5 Building. The plume migrates from shallow depths near the former sump, where the shallow silty clay is thin or absent, and downward through the upper portion of the deep WBZ toward the northeast. The bulk of the contamination is in the upper portion of the deep WBZ.
- An estimated 4,935 pounds of total CVOCs (3,716 pounds of TCE) are present in the OU-01 thermal target treatment zone.
- The lateral extent of CVOCs in soil and groundwater are sufficiently characterized.

OU-03:

- Elevated dissolved-phase and soil concentrations are present offsite, primarily in the upper portion of the deep WBZ.
- An estimated 2,909 pounds of total CVOCs (1,532 pounds of TCE) are present outside the thermal target treatment zone, the bulk of which is under and north of Hopkins Avenue in OU-03.
- A data gap exists in the downgradient extent of the shallow WBZ plume, near the Viking Property Development LLC property.
- The deep WBZ CVOC groundwater plume extends east-northeast toward the Viking Property Development LLC property.

The results of this investigation are provided in the *Essex-Hope Site, Jamestown, New York, Predesign Investigation Report* (Jacobs 2023).

2.3.2 Vapor Intrusion Investigations

Investigations have been completed to assess the potential for vapor intrusion (VI) in both onsite (CH2M 2016b) and offsite (CH2M 2017, Jacobs 2019a, Jacobs 2020b, Jacobs 2021) areas. The following sections summarize the investigations for each area.

2.3.2.1 Onsite

The onsite investigation (CH2M 2016b) was designed to collect data to determine whether indoor or subsurface sources (or both) were contributing to previously observed elevated indoor air VOC concentrations. The data were also used to assess the potential for VOCs in groundwater and soil to migrate into the Plant 5 Building which was owned by Custom Production Manufacturing Inc. (CPM). This investigation focused on the Plant 5 Building; however, a HAPSITE indoor air survey was performed in the West Building to confirm the results of a previous study completed by URS Corporation. The investigation was not intended to directly evaluate human health risk but to help identify the primary contributors to historically elevated TCE concentrations observed in indoor air.

The results of the onsite investigation suggested indoor air concentrations of TCE at the Plant 5 Building were controlled primarily by the TCE-containing products that were used and stored in the building for industrial processes. It was determined that industrial hygiene values should be applied to current exposures, because the building was active. Short-term indoor air concentrations of TCE exceeded the NYSDOH indoor air screening level at that time, but were far less than Occupational Safety and Health Administration and National Institute for Occupational Safety and Health exposure limits. The onsite investigation reached the following conclusions:

- Exposure could be best minimized through good industrial hygiene practices.
- Active mitigation was not warranted, because it would have little effect on indoor concentrations while the building was still actively used for industrial purposes and while TCE-containing products were being used and stored.

CPM no longer occupies the Plant 5 Building; it is being used for the OU-01 thermal remedy system.

2.3.2.2 Offsite Investigations

An offsite VI investigation was conducted from November through December 2018, based on the proximity of the following businesses relative to the existing TCE groundwater plume:

- H&H Metal Specialty (H&H Metal)
- Johnson Machine & Fibre Products (JMF)
- Rollform of Jamestown, Inc. (Rollform)

Rollform denied property access; therefore, the proposed samples at that business were not collected. Subslab vapor samples were collected at H&H Metal and JMF. Exterior soil vapor samples were collected throughout the offsite TCE plume footprint, and the preferential pathway was assessed (sanitary and storm sewer evaluation) as part of initial investigation activities.

The results indicated the presence of the following parameters in subslab soil vapor samples at H&H Metal and JMF:

- cis-1,2-DCE
- Tetrachloroethene (PCE)
- TCE

The samples from JMF exceeded the NYSDOH subslab vapor concentration criteria (NYSDOH 2006, 2017). While CVOCs were detected in samples from the sanitary and storm sewers, concentrations were relatively low, and it was concluded that this potential pathway was not likely to cause exceedances of applicable screening levels in indoor air. The 2018 investigation are documented in the *Interim Offsite Vapor Intrusion Investigation Report* (Jacobs 2019a).

Based on these results, further evaluation was recommended, and an addendum to the work plan was submitted to NYSDEC on July 8, 2019 (Jacobs 2019b). The addendum included indoor and outdoor air sampling; however, during the November 2019 investigation, it was noted that the H&H Metal building was not occupied and was unsafe. As a result, the H&H Metal building was not sampled during this event and no further sampling was recommended until there was a change in ownership or the building became occupied and safe for sampling.

Subslab soil vapor was resampled in 2019 at JMF, as were the soil vapor probes throughout the TCE groundwater plume extent. The sampling results confirmed the 2018 sampling results. Although TCE and cis-1,2-DCE concentrations in subslab soil vapor exceeded the NYSDOH SSC at JMF, concentrations were less than EPA subslab vapor intrusion screening levels, and no further VI sampling was recommended for the JMF building (Jacobs 2020b).

The Rollform business owner denied access to the property for sampling; therefore, no sampling occurred at this property during offsite investigations. Because it is farther from the plume than JMF, Jacobs concluded there was likely similar, or less, potential for VI to be a concern at Rollform (Jacobs 2020b).

During summer 2020, the former H&H Metals building was occupied by Service Master Restoration and Cleaning. Based on this occupancy, VI was investigated in February 2021. The results indicated the potential for a complete VI pathway from the shallow groundwater plume. TCE and cis-1,2-DCE

concentrations in subslab vapor and indoor air in portions of the southern and central areas of the former H&H Metals building exceeded NYSDOH criteria. This investigation is documented in the *Offsite Vapor Intrusion Investigation Report* (Jacobs 2021).

In June 2021, Jacobs conducted an enhanced VI assessment at the former H&H Metals building, with the following goals (Jacobs 2022):

- Further investigate potential VI pathways by performing an enhanced building survey to document pit and trench layouts, concrete floor slab conditions, and building construction details.
- Collect air samples from each pit to determine whether they served as entry points for VI.
- Perform predesign VI diagnostic testing in case a subslab depressurization system was needed.

The investigation led to the following findings and proposed actions:

- The three pits act as potential entry points for VI and should be filled with gravel and covered with a new concrete floor.
- Larger cracks in the floors of the central and southern areas of the building should be sealed with crack sealant to address VI by advection. Smaller cracks in the concrete floor should be sealed with a penetrating sealant to prevent VI by diffusion through the floor. The diffusive pathways in very small cracks in portions of the concrete that are stained/soiled from historical building operations are already blocked.
- The concrete-lined trenches did not appear to be entry points for VI but did appear to have some cracks and penetrations, similar to the concrete floors. The trenches contain utility conduits that currently serve the building and cannot be filled with concrete. The trenches should be cleaned to expose cracks and joints, and should be properly sealed, similar to the floors.
- Potential entry points for VI were not identified in the northern portion of the building. Thus, engineering control activities are not warranted for this area of the building.
- Predesign information for the design of a subslab depressurization VI mitigation system (if deemed necessary) was obtained from the diagnostic testing.

A work plan was submitted to NYSDEC, dated April 2022 (Jacobs 2022). It discussed the proposed implementation of engineering controls for H&H Metals. However, the property owner later restricted property access, so the intended remedies could not be implemented. This work plan will be implemented when the property owner grants access, assuming the building is safe for sampling.

2.4 Remedial Background

Remedial actions have taken place at the Site since the early 1990s, in response to the 1994 ROD. The Site remedial systems were designed and constructed to address impacted groundwater and soil. The 1994 ROD selected a remedy that included groundwater extraction and treatment, air sparging (AS) and soil vapor extraction (SVE), excavation, and an asphalt cap. The pump-and-treat system treatment system remained operational until 2023. To date, the following remedial activities have occurred at the Site:

- Onsite OU-01 CVOCs in groundwater
  - Pump-and-treat system (shallow and deep WBZs) (Radian Engineering 1998)
  - SVE and AS (shallow WBZ) (Radian Engineering 1998)
  - Pilot test of zero valent iron injections (shallow and deep WBZs) (URS 2001, 2003)
  - ISCO injections (deep WBZ) (URS 2012)

- Offsite OU-02
  - Subslab depressurization system, installed in 2008 (offsite residence on Hopkins Avenue near the shallow CVOC plume)
    - The system was operational until 2018 when the property was abandoned; the residence was demolished in 2020 and this OU is considered closed.
- Offsite OU-03 CVOC plume
  - Pump-and-treat system (shallow and deep WBZs)
- Petroleum-related compounds in shallow groundwater in the UST Area and West Building
  - Pump-and-treat system (UST Area) (Radian Engineering 1998)
  - SVE and AS (UST Area) (Radian Engineering 1998)
  - Removal of USTs and excavation of soils (UST Area) (URS 2003)
  - ISCO injections (UST Area) (URS 2012)
- Vadose zone soil
  - Interim remedial measure, consisting of soil excavation, in 1992 in response to a release of bis(2-ethylhexyl) phthalate
    - Contaminated soil was removed except for a small area below a tank containment structure (O'Brien & Gere 1992).
    - The ROD indicated no further action was warranted for this release.
  - Excavation of soils within portion of the NPLS Area to remove soils with PCB concentrations exceeding the RAOs stipulated in the 1994 ROD (NYSDEC 1994)
    - Documented in a *Basis of Design Report* (Dow Environmental 1995) and *Remedial Action Construction Close-out Report* (Radian Engineering 1998)
  - SVE wells (NPLS Area and AST Area) (Radian Engineering 1998)
  - Capping to prevent direct contact and minimize leaching of COCs to groundwater (NPLS and AST areas) (Radian Engineering 1998)

Institutional controls were registered in February 2014 with the Chautauqua County Clerk and consisted of a *Declaration of Covenants and Restrictions* (Essex 2014). The *Declaration of Covenants and Restrictions* applies to OU-01 (except the Hope Plant 1 area) and includes the following provisions:

- Prohibits the use of the property for any purpose other than industrial use without a written waiver by NYSDEC
- Prohibits the construction, use, or occupancy of OU-01 that results in disturbance or excavation that threatens the integrity of engineering controls or results in unacceptable human exposure to contaminated soils without written approval from NYSDEC
- Prohibits disturbing, removing, or interfering with installation, use, operation, and maintenance of engineering controls required for the remedy without a written waiver from NYSDEC
- Prohibits the use of groundwater beneath OU-01 without necessary water quality treatment for drinking water or industrial purposes
- Requires the property owner to periodically certify the institutional and engineering controls put in place are unchanged

- Requires the property owner to continue in full force and effect any institutional controls required for the remedy and maintain such controls
- Instructs that the *Declaration of Covenants and Restrictions* will run with the land and be binding upon all future owners of the property
- Instructs that any deed of conveyance for the property will recite that the conveyance is subject to the *Declaration of Covenants and Restrictions*

In 2023, NYSDEC issued an Amended ROD for OU-01 (NYSDEC 2023) which listed groundwater use restrictions, institutional and engineering controls requirement, and the deed of conveyance for the property requirement similar to those outlined in the1994 ROD. The Amended ROD includes the following remedies:

- ISTT with vapor extraction and treatment in the area of the NPLS Area and below the Plant 5 Building
  - The ISTT system has been constructed and currently is in testing phase.
- Injection of chemical oxidants in the petroleum-impacted areas
  - This will be implemented following ISTT.
- Groundwater monitoring to assess the effectiveness of the remedy and NA via long-term monitoring (ongoing)
- An evaluation of soil vapor intrusion into existing and future onsite structures following any changes in building use, occupancy, or the construction of a new structure
  - This evaluation will take place if necessary.

2.5 Conceptual Site Model

2.5.1 Climate

Jamestown, New York, is characterized by a humid continental climate, with distinct seasons and notable variations in temperature and precipitation throughout the year. This includes warm summers and cold, snowy winters. Data from a 10-year period collected by the National Oceanic and Atmospheric Administration (NOAA) indicate average year-round temperatures range from approximately 28 to 68 degrees Fahrenheit, with typical highs of approximately 80 degrees Fahrenheit during the summer months and average lows in the 20s during the winter months. The average annual precipitation is typically between 45 and 50 inches, and the average annual snowfall is approximately 77 inches (NOAA 2024).

2.5.2 Land Use

Land use is primarily light industrial in the area (Figure 5). The Site is in an industrialized area, with numerous metal working shops and other manufacturing facilities occupying nearby properties (Figure 1). The Site and nearby areas are zoned as “M-manufacturing” within the East End Industrial Corridor Sub-District. The East End Industrial Corridor Sub-District consists primarily of manufacturing facilities, and future plans call for continued use of this area for primarily industrial purposes (City of Jamestown Code, Chapter 300-0402 A[4] [City of Jamestown 2004]).

The property north of OU-01, beyond Hopkins Avenue, is an undeveloped field previously occupied by Hope Windows Plant 6, which was demolished several decades ago. To the east and northeast, toward the Chadakoin River, there are several commercial properties or metalworking shops (ServePro [formerly H&H

Metal], JMF, and Rollform), as well as several residences along Bigelow Avenue and to the east on Hopkins Avenue. There are several manufacturing and commercial businesses south and southeast of the Site, including Jamestown Metal Products, Jamestown Mattress. United Alloys and Blackstone Advanced Technologies (sheet metal fabrication) are west and southwest of the OU-01 investigation and remediation area, respectively. Hope Plants 1 and 3 are west and northwest of the OU-01 investigation and remediation area, respectively. No change is expected to the existing environmental covenant or easements, which include stipulations that OU-01 use remain industrial.

The following databases were reviewed for a half-mile radius from the Site to identify contaminated sites, sites that use or manage hazardous materials, and spill sites in the area:

- NYSDEC Remediation Site Database (Figure 6)
  - The Site (Essex-Hope, Identification [ID] 907105) is listed within the database as an NYSSF site.
  - The J and S Auto Supply site (ID 907012) is a NYSSF site at 1084 East Second Street, west (upgradient) and across the Chadakoin River from the Site. In 1984, ten 55-gallon drums containing waste degreasing sludge with methylene chloride and TCE were buried in the basement of a demolished house. In 1989, trenches were excavated within and just outside the buried basement; one excavation found evidence of contamination. In September 1994, NYSDEC collected groundwater and soil samples and did not find contamination. The J and S Auto Supply site is classified as requiring no further action at this time.
- The NYSDEC Spill Incidents database can be searched by city and street name; geographic coordinates or map depictions are not provided. Streets near the Site were searched using the databases listed in Appendix E, and locations were approximated by the street name and number (if provided) to determine their proximity to the Site (Figure 6).
  - Four listings were found for the OU-01 investigation area, all with a status of closed:
    - An unknown release reported on September 24,1990, with a spill name of EI LILLY (ESSEX CHEMICAL) and the address of Hopkins Avenue (Spill Number 9006906); the spill was reported as closed on October 9, 1990
    - A 13-gallon spill of butanol to soil due to equipment failure that was reported on May 6, 1992, with a spill name of LILLY INDUSTRIES and an address of 125 Blackstone Avenue (Spill Number 9201470); the spill was reported as closed on July 13,1992
    - An unknown spill to an unknown resource reported on July 24,1992, with a spill name of LILLY INDUSTRIES and an address of 125 Blackstone Avenue (Spill Number 9204735); the spill was reported as closed on August 4, 1992
    - A spill of 17-gallons of almond dip organosol spilled to surface water and reported on April 19, 1991, with a spill name of LILLY COATING and an address of 125 Blackstone Avenue (Spill Number 9100810); the spill was reported as closed on April 22, 1991
  - Five listings were found in the area of OU-03, all with a status of closed:
    - A 60-gallon spill to soil of diesel due to equipment failure that was reported on June 24, 2002, with a spill name TRUCK LP#PX8218 and an address of 135 Hopkins Avenue (Spill Number 0275163); the spill was reported closed on August 8, 2003
    - A 40-gallon spill of cutting oils to soil reported on August 13, 1996, with a spill name of JOHNSON MACHINE and an address of 142 Hopkins Street (Spill Number 9606157); the spill was reported as closed on October 29, 1996

        - A spill of an unknown quantity of unknown petroleum to surface water reported on September 20, 1993, with a spill name of H & H Metal Company and an address of Hopkins and Bigelow (Spill Number 9307513); the spill was reported as closed on October 1, 1993
        - A release of an unknown quantity of petroleum to groundwater due to tank failure that was reported on July 15, 1991, with a spill name of ROLLFORM #2 and an address of 181 Blackstone Avenue (Spill Number 9104026); the spill was reported as closed on January 21, 1992
        - A release of "unknown non-petro/non-haz material" to groundwater reported on June 26, 2004, with a spill name of Chadakoin River and an address of Hopkins Avenue (Spill Number 0403303); the spill was reported as closed on June 26, 2004
            - The exact location of this spill along Hopkins Avenue could not be determined using available information, but may have been in or near the OU-03 area.
    - Two sites were found for the 84 Hopkins Street property west of the NPLS Area:
        - A 150-gallon sulfuric acid spill to soil reported on August 17,1993, with a spill name of Interstate Chemical Co. and an address of 84 Hopkins Avenue (Spill Number 9306084); the spill was reported as closed on November 3, 1993
        - A 10-gallon spill of oxidizers to an unknown resource, listed as abandoned drums, with a spill name of Hope Windows and an address of 84 Hopkins Street (Spill Number 1002737); the spill was reported as closed on June 15, 2010
    - One spill site within the 0.5-mile search radius did not have a record of closure. On August 21, 2019, the ROBO MART site, with an address of 1301 East 2nd Street, was reported to have an unknown material released due to equipment failure (Spill Number 1905354). The ROBO MART site is north of the Chadakoin River and cross-gradient to downgradient from the Site and is not likely to have affected the Site or to have been affected by the Site.
    - Fifty-seven other Spill sites were found within the 0.5-mile search radius, all with a status of closed. Appendix E provides details about those sites. Many of the reported releases were generally small quantities (less than 50 gallons) of petroleum products released to soil. No listings specifically indicated the release of chlorinated solvents, although several listings indicated the release of water oil/used oil, cutting oil, or an unknown hazardous material, and where the release of chlorinated solvents cannot be ruled out with the information available.
- Jacobs searched EPA's Cleanup in My Community map database (EPA 2025) for Superfund and non-Superfund sites; there was one listing within 0.5 miles of the Site (Figure 6).
    - The Allen Street Development site (EPA ID NYN000204315) is listed in the Superfund Enterprise Management System database as a non-National Priority List site. The site address is 1061 Allen Street, which is approximately 500 feet south of the Site in an upgradient to cross-gradient location. In 2023, EPA requested additional funding to remove friable asbestos and other hazardous substances following a fire in November 2022 (EPA 2023). The funding request indicated the location was the former location of Crawford Furniture and contained drums of coatings, finishes, solvents, and hazardous waste. The building was in a state of collapse before the fire. Asbestos-containing material was found. Before the fire, the City of Jamestown had requested EPA evaluate the site for a potential *Comprehensive Environmental Response, Compensation, and Liability Act* removal action, and the property owner had removed some of the containers. According to a fact sheet, the EPA removed contaminants in September 2024 and the City of Jamestown acquired the property that year (EPA 2024). A November 2022 *Final Removal Assessment Sampling Report* (Weston 2022) documented the results of eight surficial soil samples collected at the site before the fire. While SVOCs, pesticides, PCBs, metals, and dioxins were detected, none of the results

exceeded EPA Removal Management Levels for Industrial Soil, and there were no detections of VOCs. No documentation of deeper soil or groundwater sampling was found.

- EPA *Resource Conservation and Recovery Act* sites were also reviewed (Figure 6):
  - Fifty-one facilities were identified in the database, with 47 being classified as very-small-quantity generators, small-quantity generators, or the generator type was not specified. Hope at 84 Hopkins Avenue, Essex Specialty Products LLC at 125 Blackstone Avenue (OU-01), Industrial Metal Finishing Inc at 1070 Allen Street (south of the Site), and Industrial Metal Finishing Inc. at 29 Stafford Street were identified as large-quantity generators.
  - No sites were identified as being in the *Resource Conservation and Recovery Act* Corrective Action program.

2.5.3 Topography

Jamestown, New York, is characterized by a landscape that exhibits moderate relief with rolling hills and valleys shaped by glacial activity. A review of the United States Geological Survey (USGS) 7.5 Minute Topographic Map (Figure 7) indicates a range of elevations (approximately 1300 to 1700 feet above mean sea level) contributing to the presence of relatively flat areas and more pronounced inclines. The Site lies within the Chadakoin River valley. The Site topography is relatively flat, with surface elevations of around 1280 feet, and with a slight slope toward the Chadakoin River to the northeast.

2.5.4 Utilities, Infrastructure, and Water Supply

Jacobs searched the Jamestown Board of Public Utilities (BPU) website on January 15, 2025 (Jamestown BPU 2025) and identified both overhead and subsurface utilities in the area (Figure 8). Subsurface utilities are predominantly sewer and water mains along roadways. Infrastructure in the area consists predominantly of buildings and facilities associated with industrial activities. As discussed in Section 2.3.2.2, an investigation took place to evaluate whether storm and sanitary sewers at OU-03 may serve as preferential pathways for vapor migration; it concluded that this potential pathway was unlikely to cause exceedances of applicable screening levels in indoor air (Jacobs 2019a, b).

The Site is serviced by the following utilities:

- Potable water
- Sanitary sewer
- Electric
- Telephone/Internet
- Natural gas

The Jamestown BPU supplies drinking water for the City of Jamestown and the adjacent Village of Falconer. The system's groundwater is drawn from 8 wells in the Cassadaga Aquifer (about 2 miles northeast of the Site) and 4 wells in the Conewango aquifer (about 5 miles east of the Site). Drinking water is regularly tested to meet federal and NYSDOH drinking water standards (Jamestown BPU 2025). Jamestown does not have restrictions on installing groundwater wells; however, the Chautauqua County Sanitary Code indicates (Chautauqua County Department of Health and Human Services 2022):

- New construction of dwellings or other structures requiring potable water must connect to the municipal public water system for potable water use, if such a supply is available and accessible.
- The Chautauqua County Public Health Director can require a property to connect to the municipal public water system if the individual water supply does not meet 10 NYCRR Part 75 requirements.

Regulation 10 NYCRR Part 75 includes water quality standards for coliform bacteria, lead, nitrates, nitrites, turbidity, and arsenic. It allows Chautauqua County health department officials to require that individual onsite water supply systems be tested for "such additional contaminants as such official determines are necessary or appropriate to protect human health." Article III, Section 2, of the Chautauqua County Sanitary Code requires certification by the Public Health Director as part of most property transfers. If the water supply serving the dwelling cannot be certified, then the dwelling or structure shall be connected to the municipal public water system (Chautauqua County Department of Health and Human Services 2022).

Parcels in the area immediately surrounding the Site are reportedly supplied by Jamestown BPU, and no supply wells have been identified (O'Brien & Gere 1994). According to interviews with Hope employees, historically there was a well near Plant 3 that went dry (Hallquist 1991; McFarlene 1991). One employee also indicated there was a flowing artesian well near the Chadakoin River, although the exact location of this well is unclear from the interview (Hallquist 1991). A 1966 map shows 16 wells within approximately 0.5 mile of the Site (reproduced on Figure 9A). Most of these wells were drilled 70 to 140 feet bgs (deeper than the deep WBZ) and encountered a thick sequence of silts and clay, underlain by a lens of sand and gravel (Crain 1966). None of these wells were mapped within the OU-01 or OU-03 areas, and most of the wells appear to be located downgradient or cross-gradient of the Site.

In June 2025, Jacobs reviewed the New York State Water Well database (which contains information for wells drilled after 2000) (NYSDEC 2025). One water well (Well Number CU02620) was identified within a 0.5-mile radius around the Site (Figure 9b). This well is listed as a domestic well, installed to a depth of 140 feet, and appears to be cross-gradient from the Site.

During the RI, additional records will be searched for indications of historical or current water wells, and if needed, a door-to-door survey will take place.

2.5.5 Wetlands

In December 2024, Jacobs searched the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory, and identified riverine wetlands associated with the Chadakoin River near the Site, but outside the current investigation areas (USFWS 2025) (Figure10).

2.5.6 Surface Water

The Chadakoin River is north of the Site; the closest portions of the river are northwest and northeast of the OUs. The northeastern portion of the river is downgradient of the OU-03 investigation area (Figure 1). The Chadakoin River is classified as a Class "C" waterbody (NYCRR Chapter X, Subchapter B, Article 1, Part 800.8, Table V). That classification indicates the best usage of the surface water is fishing, and the waters "shall be suitable for fish, shellfish and wildlife propagation and survival," as well as primary and secondary contact recreation (NYSDEC 2014). Flow is from Chautauqua Lake and is regulated by a dam upstream of the Site; the river flows through a developed area with numerous industrial facilities.

2.5.7 Geology

The Site lies within the Chadakoin River valley. A surficial geology map for the Jamestown area indicates near-surface deposits consisting of lacustrine sands at the Site, with mixed deposits mapped to the south. The mixed deposits are described as primarily glacial till, interspersed with sand and gravel and lacustrine silts and clays. A USGS cross-section about 2 miles downvalley indicates near-surface lake sand, underlain by about 50 feet of lacustrine silt and clay and another 100 feet of lacustrine silt and sand (Anderson et al. 1982).

At the Site, the subsurface geological and hydrogeological features have been characterized into four units, described as follows in descending order from grade:

- A shallow sand and gravel layer generally ranges from 10 to 15 feet thick. Grain-size analysis indicates the unit contains on average 46% gravel, 39% sand, and 16% fines (predominantly silt), and was mostly classified as silty sands with gravel to gravel with silt and sand. This unit is referred to as the shallow WBZ.
- A shallow silty clay layer is generally encountered around 15 feet bgs. The shallow silty clay deposits are generally 5 to 10 feet thick, but the thickness and depth can vary considerably, and the clay layer is absent or less than 2 feet thick in some areas. More permeable lenses of silt and fine sand are present in the silty clay in some locations. Grain-size analysis indicates the unit is 99% fines, evenly divided between silt (53%) and clay (47%). Where present, the shallow silty clay serves as a leaky aquitard separating the shallow and deep aquifers.
- A deep silt to silt with sand unit is generally encountered around 20 feet bgs and ranges from 13 to 31.5 feet thick. Based on grain-size analysis, this unit averages 78% silt, 12% sand, and 10% clay. This unit is generally more clay rich at shallow depths and siltier at depth. This unit is referred to as the deep WBZ.
- A deep silty clay has been determined to represent the lower confining layer. The deep silty clay typically is encountered between 37 and 47 feet bgs, and averages 92% fine-grained materials (roughly evenly divided between silt and clay), 6% sand, and 2% gravel. One deep well at the Site encountered the deep silty clay to a depth of 95 feet bgs, with very fine to coarse sand encountered from 95 to 100 feet bgs.

Figure 11 presents a cross-sectional representation of the Site geology. This figure also shows the soil isoconcentration boundaries for total CVOCs (further discussed in Section 2.5.9), relative to the geologic units.

2.5.8 Hydrogeology

An aquifer is present within the valley fill deposits of the Chadakoin valley and the Cassadaga Creek and Conewango Creek valleys to the east. The greatest thicknesses (more than 100 feet) and yields (more than 1,000 gallons per minute) are east of the Site, where the lacustrine silt and clays confine the coarse sands and gravels that comprise the aquifer. The City of Jamestown obtains its water from two well fields with artesian conditions about 2 miles northeast (Cassadaga well field) and 5 miles east of the Site (Conewango well field). At the Cassadaga well field, the coarse sand and gravel is about 15 to 20 feet thick and is overlain by about 120 feet of lacustrine silt and clay. A regional potentiometric map from the 1960s indicates a cone of depression north of the Site, with groundwater flow to the north at the Site toward the Chadakoin River, but an overall regional groundwater flow direction to the east (Anderson 1982).

Two primary WBZs have been identified at the Site (the shallow WBZ and the deep WBZ). The potentiometric surface for each WBZ, with both pumping and non-pumping conditions, is provided on Figure 12 (shallow WBZ) and Figure 13 (deep WBZ). Pumping conditions are based on groundwater elevations measured June 15, 2022 (shallow WBZ) or October 3, 2022 (deep WBZ), before the pump-and-treat system shut down. Non-pumping conditions are based on measurements collected September 10, 2024.

2.5.8.1 Shallow Water-bearing Zone

A water table (unconfined) aquifer is present in the shallow sand and gravel unit (shallow WBZ), with typical saturated thicknesses of 5 to 10 feet.

Shallow groundwater at the Site typically flows northeast, toward the Chadakoin River, and is generally consistent during pumping (outside the zone of capture) and non-pumping conditions. Exceptions to the northeastern gradient include the area north of Hopkins Avenue and an area southeast of the Plant 5 Building. In the area north of Hopkins Avenue, groundwater flow trends in a more easterly direction which may be the result of influence by utility corridors within Hopkins Avenue. An area of localized radial flow is observed southeast of the Plant 5 Building, where persistent localized mounding has been observed.

A 1995 pumping test indicated an average hydraulic conductivity of 9.1 feet per day (Dow Environmental Inc. 1995). Based on the September 2024 potentiometric surface (Figure 12), the non-pumping hydraulic gradient is 0.011 foot per foot. Assuming an effective porosity of 20%, the groundwater velocity is approximately 183 feet per year.

2.5.8.2 Deep Water-bearing Zone

A confined or semiconfined aquifer is present in the deep silt unit (deep WBZ). Where the overlying shallow silty clay layer is thin or absent, there may be a hydraulic connection to the shallow WBZ.

Similar to the shallow WBZ, groundwater in the deep WBZ flows northeast under non-pumping conditions.

Based on pumping tests in 1991 (O'Brien & Gere 1992) and 1995 (Dow Environmental Inc. 1995), the average hydraulic conductivity is 1.6 feet per day. Based on the September 2024 potentiometric surface (Figure 13), the non-pumping hydraulic gradient is approximately 0.009 foot per foot. Assuming an effective porosity of 20%, the average groundwater velocity is approximately 26.3 feet per year. While the silt unit is water-bearing, its low permeability and fine grain size (and the overlying and underlying silty clay units) are consistent with the thick sequences of lacustrine silts and clays that serve as a confining unit for the more productive aquifer present in deeper sand and gravels.

2.5.9 Nature and Extent

The primary COCs in Site soil and groundwater are CVOCs and petroleum-related constituents (primarily CBTEX, 1,2,4-TMB, and 1,3,5-TMB). Petroleum-related constituents are mostly limited to the OU-01 area, while CVOC impacts are present in OU-01 and OU-03. Most of the CVOC contaminant mass is present in saturated soil and groundwater.

Groundwater, soil, and offsite soil vapor and air monitoring data collected between 2016 and 2024 are provided in Appendices A, B, and C, respectively. Soil and groundwater exceedances were updated to reflect the lesser of the 1994 RAOs or the criteria based on the SCGs, as required in the Amended ROD for OU-01. Figure 14 through 17 (soil concentrations) and Figures 18 and 19 (groundwater isoconcentrations) reflect those criteria. The following sections summarize the nature and extent of COCs in soil and groundwater. Section 2.3.3 detailed the most recent VI soil vapor and air monitoring from 2021; therefore, it is not discussed herein this section.

2.5.9.1 Soil

The current CSM, derived from data collected during previous investigations, indicates CVOCs likely entered the subsurface in the NPLS Area, primarily through a sump set at the base of the shallow sand and gravel unit. Some of the CVOCs migrated downward through the shallow silty clay (confining bed), which is thin in this area, and migrated northeasterly, to OU-03, along upper portion of the deep silt to silt with sand unit (the Deep WBZ). Based on the CSM, CVOCs detected in the unsaturated soils in the OU-03 area would be attributable to non-Site-related releases. The following points summarize the soil data collected to date from OU-03, for each lithologic zone:

- Shallow Sand and Gravel: There have been no exceedances of unrestricted soil SCOs, except for acetone (a common laboratory contaminant), in either the unsaturated or saturated portions of the shallow sand and gravel unit in OU-03 (Figure 14).
- Shallow Silty Clay: Past analysis of saturated soil samples from the shallow silty clay (which separates the shallow sand and gravel unit [shallow WBZ] from the deep silt unit [deep WBZ]) has indicated that cis-1,2-DCE and TCE concentrations are greater than their respective SCOs at several OU-03 sampling locations (Figure 15).
- Deep Silt: The greatest saturated soil concentrations in OU-03, which includes CVOC exceedances (primarily TCE and cis-1,2-DCE) of their respective unrestricted SCOs, are present in the upper portions (generally 25 to 35 feet bgs) of the saturated deep silt (deep WBZ), with lesser concentrations in the deeper portions of this unit (Figure 16).
- Deep Silty Clay: Only one sample location in the deep silty clay unit, on the northern side of the Plant 5 Building, had exceedances of the unrestricted SCO for vinyl chloride; on the northern side of Hopkins Avenue, there were no exceedances (Figure 17).

The vertical and lateral extent of saturated soil exceedances generally align with the areas and depths of greatest groundwater concentrations in OU-03, and are the primary focus of delineation efforts. The lateral extents of saturated soil exceedances are expected to be similar in footprint to the deep WBZ groundwater plume and will be confirmed during the RI outlined in this WP.

2.5.9.2 Groundwater

This section summarizes the groundwater plumes in the shallow and deep WBZs, based on data collected from 2016 through 2024.

The following primary groundwater plumes are associated with the shallow WBZ:

- A CVOC plume extends from the former NPLS Area northeast to OU-3, roughly parallel to Hopkins Avenue (Figure 18). The groundwater isoconcentration figure indicates the greatest total CVOC concentrations in this plume are along and adjacent to Hopkins Avenue, and the plume extends downgradient to monitoring well MW-108S. The plume extents are inferred to the northwest (west of MW-14S), east (east of MW-108S), and south (south of MW-18 and MW-25S).
- A petroleum constituent plume in the eastern Former UST Area of OU-01. The COCs are predominantly CBTEX and 1,2,4-TMB. Wells installed on OU-03, downgradient of the petroleum constituent plume, delineate the petroleum constituent plume extents.

In the deep WBZ (Figure 19), a plume consisting predominantly of CVOCs extends from the NPLS Area under the Plant 5 Building and northeast to OU-03. NAPL containing CVOCs has historically been observed in wells under the Plant 5 Building. Sentinel wells (MW-109D, MW-120D, and MW-121D) were installed northeast of the OU-01, to delineate this CVOC plume and monitor for potential downgradient migration. VOCs were not detected in these wells in 2024. The plume conditions and extent of elevated concentrations east of MW-106D and south of MW-109D are not well-characterized.

2.6 Investigation Objectives

The ongoing OU-03 investigation work focuses on delineating the offsite nature and extent of contamination migrating from OU-01. The following data gaps related to CVOC contamination in the OU-03 area were identified based on the 2022 PDI (Jacobs 2023):

- The downgradient (northeastern) extent of the impacts in the groundwater of the shallow and deep WBZs and the saturated soils of the shallow silty clay and deep WBZ.

- The cross-gradient (western) extent of the impacts in the groundwater of the shallow and deep WBZs and the saturated soils of the shallow silty clay and deep WBZ north of the NPLS Area
- The cross-gradient (southern) extent of impacts in the groundwater of the shallow and deep WBZs and the saturated soils of the shallow silty clay and deep WBZ in the area east of the Plant 5 Building and south of Hopkins Avenue

Substantial investigation work has been completed at OU-03 to define and characterize the nature and extent of impacted media. Per the guidance for RIs outlined in 3.1 (c) of DER-10, the objectives of the OU-03 RI outlined in this WP are as follows:

- Refine the understanding of the surface and subsurface characteristics of OU-03, including topography, geology, and hydrogeology.
- Collect data to address data gaps in order to delineate the nature and extent of contamination.
- Identify the source or sources of OU-03 contamination, migration pathways, and actual or potential receptors of contaminants.
- Gather information to support a Fish and Wildlife Resource Impact Analysis (FWRIA) (Part 1) and qualitative public health evaluation.

Table 3 lists the data quality objectives related to these objectives. The OU-03 investigation has been, and will continue to be, phased to fill data gaps, which will define the horizontal and vertical extent of impacts and position the project for a successful FS.

3. Remedial Investigation

To supplement existing OU-03 data, this WP proposes the following investigation activities:

- Soil sampling at 12 locations (DPT-90 through DPT-97, MW-108D, MW-125D, MW-126D, and MW-135D) to further delineate the extent of horizontal and vertical impacts in saturated soil
  - Locations DPT-90 through DPT-93, DPT-96, DPT-97, MW-108D, and MW-125D are intended to fill the data gap regarding the downgradient (northeastern) extent of soil impacts in the shallow silty clay and deep WBZ.
  - Locations DPT-94 and DPT-95 are intended to fill the data gap regarding the southeastern extent of soil impacts in the shallow silty clay and deep WBZ.
  - Location MW-126D is intended to fill the data gap regarding the cross-gradient (western) extent of soil impacts in the shallow silty clay and deep WBZ.
  - Location MW-135D is intended to fill the data gap regarding the cross-gradient (southeastern) extent of impacts in the shallow silty clay and deep WBZ east of the Plant 5 Building and south of Hopkins Avenue.
- Soil sampling at four contingent locations (DPT-98 through DPT-101) to further delineate the extent of impacts in saturated soil, if needed
- Monitoring well installation and subsequent groundwater sampling to further delineate the extent of impacts in shallow and deep WBZs
  - Within the shallow WBZ, install one new downgradient well (MW-125S) east of MW-108S, and three new side-gradient monitoring wells (MW-126S [northwest of the NPLS Area], MW-134S [south of Hopkins Avenue and MW-25S], MW-135S [south of Hopkins Avenue and near former monitoring well VP-6S]).
    - MW-125S is intended to fill the data gap regarding the downgradient extent of shallow WBZ groundwater impacts near the Chadakoin River.
    - MW-126S is intended to fill the data gap regarding the cross-gradient (western) extent of shallow WBZ groundwater impacts west of MW-14S.
    - MW-134S and MW-135S are intended to fill the data gap regarding the cross-gradient (southern) extent of shallow WBZ groundwater impacts south of MW-25S and MW-18. MW-135S will also serve as a sentinel (downgradient) well for groundwater petroleum component impacts in the shallow WBZ in the eastern Former UST Area.
    - While dashed contours are shown near DPT-12 (Figure 18), the TCE groundwater concentration at this location was 6.0 J micrograms per liter (µg/L) in 2017 (where J means estimated), only slightly greater than the NYSDEC groundwater criteria of 5 µg/L. Given the low TCE concentration at DPT-12 and that TCE concentrations at nearby monitoring well MW-104S appear to be from a separate, non-Site source (based on southeastern groundwater flow of the shallow aquifer north of Hopkins Avenue), this area was not identified as a data gap, and an additional monitoring well is not proposed for this area.
  - Within the deep WBZ, install two new downgradient monitoring wells (MW-108D and MW-125D) east-northeast of MW-106D and south of MW-109D, and two new side-gradient monitoring wells (MW-126D [northwest of the NPLS Area] and MW-135D [south of Hopkins Avenue, near former monitoring well VP-6D]) (Figure 19).

- MW-108D is intended to delineate the downgradient extent of deep WBZ groundwater impacts near the Chadakoin River.
- MW-125D is intended to provide additional data downgradient of MW-106D and upgradient of MW-108D in the deep WBZ.
- MW-126D is intended to fill the data gap in the cross-gradient extent in the deep WBZ groundwater west of MW-14D and MW119D.
- MW-135D is intended to fill the data gap in the cross-gradient extent of the deep WBZ groundwater impacts south of MW-122D and replace deep monitoring well VP-6D, which is no longer viable.

Figure 2 depicts proposed sampling locations. Table 4 summarizes proposed soil boring locations, sample depths, and sampling rationales, Tables 5 summarizes proposed monitoring well locations, sampling objectives, and sampling rationales. Table 6 indicates the groundwater level monitoring locations. The following sections discuss the investigation activities.

The completion of the proposed locations is contingent on the following:

- Receiving access to the properties where the proposed borings and wells are to be located
- Avoiding utilities, buildings, and other obstructions

RI activities will comply with DER-10 guidance (NYSDEC 2010).

3.1 Health and Safety Plan

Appendix F provides the Site-specific Health and Safety Plan, developed in 2025. That plan identifies potential task-specific hazards and selects appropriate health and safety protective measures addressing accident prevention, personal protection, and emergency response procedures for the proposed field activities.

3.2 Community Air Monitoring Plan

The Community Air Monitoring Plan (CAMP) is relatively limited because of the generally small scale of the proposed investigation activities. The CAMP was developed for use during intrusive field activities at the Site, as a measure of protection for the downwind community. During the work, methods for monitoring total organic vapors (TOVs) and particulates, and if necessary, controls to limit CVOCs and particulates, will be implemented.

TOV and particulate concentrations upwind and downwind at the perimeter of the work area will be monitored using a dedicated handheld photoionization detector (PID) and dust monitors. TOVs will be monitored continuously at the downwind perimeter of the work area, and will be monitored periodically upwind of the work area to establish background concentrations. The PID will calculate 15-minute running averages, which will be used to compare concentrations with the action levels specified here.

The following actions will be taken if the TOV vapors, as measured by the PID, exceed the background (upwind) concentrations at the downwind perimeter of the work area or exclusion zone:

- If downwind concentrations exceed upwind concentrations by 5 parts per million (ppm) on average for a 15-minute interval, work activities will be temporarily halted, and monitoring will continue. If the TOV concentrations readily decrease to less than 5 ppm greater than background concentrations, work activities can resume with continued monitoring.
- If downwind concentrations persist at levels greater than 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors will be identified, corrective actions will be

taken to abate emissions, and monitoring will continue. Work activities can resume when the TOV level 200 feet downwind or half the distance to the nearest potential receptor or structure, whichever is closer, is less than 5 ppm over background for the 15-minute average.

- If downwind concentrations persist at levels greater than 25 ppm above background, work activities will be shut down and corrective actions will be taken. Corrective actions could include suspending advancement into the subsurface, allowing time for passive ventilation, relocating a boring, and rapidly containerizing soil cuttings.

Particulate concentrations (as PM-10) will be monitored continuously at upwind and downwind perimeter locations using dust monitors. The equipment will be able to integrate readings over a period of 15 minutes to calculate a running average, so the average can be compared with the action levels specified here.

- If the downwind PM-10 level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background for the 15-minute period, or if visible dust is observed leaving the work area, dust suppression techniques will be employed. Work may continue with dust suppression techniques, provided downwind particulate concentrations do not exceed 150 $\mu g/m^3$ above background and no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, the downwind PM-10 concentrations are greater than 150 $\mu g/m^3$ above background, work will be stopped, and activities will be initiated. Work can resume, provided dust suppression and other controls successfully reduce downwind PM-10 concentrations to within 150 $\mu g/m^3$ of background and successfully prevent visible dust migration.

If action levels requiring work stoppage are exceeded, the NYSDEC Project Manager and NYSDOH will be notified immediately. The notification will include the observed results, mitigation actions and the effectiveness of such actions, and any planned modifications to the work plan, if necessary, to prevent a recurrence of the exceedance.

3.3 Utility Clearance

Before intrusive field activities begin, subsurface utilities will be located and marked by contacting the UDig New York 811 One-Call utility locate service, as well as a third-party locate company with ground-penetrating radar or a similar scanning device. Once subsurface utility locating has been completed, field staff will use soft digging techniques (e.g., (probe, hand auger, or air-knife) to a minimum depth of 5 feet bgs.

3.4 Soil Sampling

The soil sampling will focus on delineating saturated soils in the shallow silty clay and deep silty sand units, to delineate to unrestricted SCOs, which, for the CVOCs, are the protection of groundwater quality SCOs. Soils in the shallow sand and gravel unit will be field-screened and will only be sampled if field-screening indicates impacts. The reason for this is that impacts have not been detected in shallow soil, and the CSM supports that impacts originated from the NPLS at the depth of the upper silty clay. As such, shallow impacts would not be associated with impacts from the Essex-Hope Site.

Soil samples will be collected continuously from 12 proposed locations in OU-03 (DPT-90 through DPT-97, MW-108D, MW-125D, MW-126D, and MW-135D) (Figure 2). In addition, soil samples may be collected from four proposed stepout locations (DPT-98 through DPT-101), if determined to be necessary. These are contingency locations, and soil samples will be collected if the soil impacts are not bound (as defined by protection of groundwater SCOs) by the samples collected from DPT-90 through DPT-95.

Locations DPT-90 through DPT-91 (and DPT-98 through DPT-101) will be drilled using direct-push technology (DPT) drilling methods, and soils cores will be collected continuously using a 2-inch-diameter MacroCore sampler and a clean, disposable acetate liner. Soil samples from MW-108D, MW-125D, MW-126D, and MW-135D will be collected during installation of the monitoring wells (refer to Section 3.6). Where the borings will be completed as monitoring wells (MW-108D, MW-125D, MW-126D, and MW-135D), the borings will be drilled using hollow-stem auger or sonic drilling methods. For hollow-stem auger sampling, continuous split-spoon samples will be collected. For sonic sampling, continuous samples from the core barrel will be extruded into sample bags. In all cases, cores will be logged and field-screened using a PID in 12-inch increments.

Each soil boring in the investigation area will be advanced to at least the top of the deep silty clay interface. Before advancing each boring through the shallow silty clay layer that separates the shallow and deep WBZs, soil samples will be screened using a PID, and will be visually evaluated for the presence of NAPL. Although unexpected, if soil borings exhibit the presence of NAPL or significant contamination, they may be terminated above the shallow silty clay layer, so as not to introduce contamination into the deeper WBZ; for proposed well locations, a surface casing will be set and allowed to cure before the boring is advanced to the deep WBZ.

Per Table 4, up to six soil samples will be collected from each boring for laboratory analysis:

- One soil sample will be collected from vadose zone soils if field-screening via PID indicates potential impacts. Note, shallow soil impacts have not been encountered and are not consistent with the CSM.
- One soil sample will be collected within the most impacted zone of the shallow WBZ, within 10 to 12 feet bgs within a saturated zone.
- One soil sample will be collected from the upper silty clay (approximately 15 to 20 feet bgs, but potentially deeper to the northeast), from the middle or the interval with the highest PID reading.
- One soil sample will be collected within the most impacted zone, which has generally been the top of the deep WBZ fine sand and silt (generally 22 to 28 feet bgs, but potentially deeper to the northeast), from the upper 3 feet or the interval with the highest PID reading.
- One soil sample will be collected from deeper in the deep WBZ fine sand and silt, approximately 10 feet below the shallower deep WBZ sample.
- One additional deep soil sample (generally from 35 to 40 feet bgs) will be collected based on field conditions (such as PID readings, soil staining, or other observations) to confirm the lower vertical extent of contamination is adequately delineated.

Table 4 provides specific target depths, based on nearby stratigraphy, the estimated soil concentrations for the area, and previous MIP results (Jacobs 2023). Field personnel may adjust the sample depths based on field observations (such as staining, sheens, PID readings, and geologic unit observations).

Samples from within each geologic zone will be selected for laboratory analysis based on the PID readings (that is, samples will be selected to include the interval with the greatest PID reading in the geological zone) or other evidence of impacts such as staining or NAPL presence. Samples will be collected using TerraCore or equivalent samplers. The samples will be submitted to a New York-accredited environmental laboratory, Pace Analytical Laboratory, for analysis following U.S. Environmental Protection Agency (EPA) Method SW8260D for VOCs (EPA 2006).

After sampling, soil boring locations will be backfilled to grade with bentonite or a bentonite slurry, and the surface will be restored with like materials.

3.5 Groundwater Monitoring

The following sections provide the approach for the OU-03 groundwater monitoring.

3.5.1 Monitoring Well Installation

Eight new groundwater monitoring wells will be installed in OU-03:

- MW-125S, MW-126S, MW-134S, and MW-135S will be installed within the shallow WBZ to further delineate the extent of the CVOC plume in the shallow WBZ (Figure 18). MW-126S will be installed to delineate the western extent, MW-125S will be installed to delineate the northeastern extent, and MW-134S and MW-135S will be installed to delineate the southern extent. The estimated well depths are 15 feet bgs for MW-125S and 20 feet bgs for MW-126S, MW-134S, and MW-135S; actual depths will vary based on the geology.
- MW-108D, MW-125D, MW-126D, and MW-135D will be installed within the deep WBZ to further delineate the extent of the CVOC plume in the deep WBZ (Figure 19).
  - MW-108D and MW-125D will be installed to delineate the northeastern extent.
  - MW-126D will be installed to delineate the western extent.
  - MW-135D will be installed to delineate the southern extent.

  The estimated total depths are 45 feet bgs for MW-108D, MW-125D, and MW-135D; and 50 feet bgs for MW-126D; actual depths will vary based on the geology.

For the shallow WBZ wells, the screened intervals will target the water table. For the deep WBZ wells, the screened interval will generally target the upper portion of the deep WBZ, where CVOC concentrations and PID readings are generally the greatest. Screened intervals may be adjusted if field indicators, such as staining or PID readings, indicate the planned screen interval will not intercept the zone of greatest impacts. Table 5 includes location rationales, anticipated total boring depths, and anticipated well screen intervals.

Monitoring wells will be installed using hollow-stem auger or sonic drilling techniques. If the boring is advanced deeper than the selected well screen interval, the bottom of the borehole will be backfilled with bentonite to a depth about 2 feet below the well screen bottom. The wells will be constructed using 2-inch-diameter, Schedule 40 polyvinyl chloride with a 10-foot, 0.010-inch slotted screen. The well screens will be sand packed using 20/40 sieve size sand pack, to a depth that corresponds to 2 feet above the top of the well screens. At a minimum, a 2-foot bentonite seal will be placed on top of the sand pack in the annuluses of the boreholes. If necessary, the bentonite seal will be hydrated with potable water. The remaining borehole annular space will be filled with a bentonite-cement grout seal using a side-discharge tremie pipe. The bentonite-cement grout seal will extend from the top of the bentonite seal to within 2 feet of the ground surface. Wells that penetrate the shallow silty clay (which is not present in all locations) will be grouted or sealed with bentonite across the silty clay to prevent contaminant migration to deeper intervals. The wells will be completed with a lockable, steel, flush mount road cover rated for vehicle traffic, and placed in a 2-foot-by-2-foot concrete pad.

3.5.2 Well Development

Well development will commence at least 48 hours after well construction is complete. Each well will be developed through surging and overpumping with a submersible pump. Development will continue until relatively clear, sediment-free formation water is produced (ideally with a turbidity of less than 50 nephelometric turbidity units), and pH, specific conductance, temperature, and turbidity measurements have stabilized.

3.5.3 Groundwater Sampling

Groundwater samples will be collected from newly installed monitoring wells using low-flow sampling techniques and will be submitted for laboratory analysis of VOCs by EPA Method 8260D (EPA 2006). Groundwater sampling will commence at least 7 days after well development is complete. The following procedures will apply to the sampling:

- A peristaltic pump will be hooked up to dedicated polyethylene tubing within each well. The tubing will be lowered to the depth of the well screen before purging begins.
- Water will be extracted at a flow rate between 0.1 and 0.5 liter per minute.
- Water quality parameters (including temperature, pH, specific conductivity, oxygen-reduction potential, dissolved oxygen, and turbidity) will be recorded during purging.
- When parameters have stabilized (+/- 0.1 units for pH; +/- 10 millivolts for oxygen-reduction potential; +/- 10% for specific conductivity, dissolved oxygen, and turbidity), or when three well casing volumes of water have been extracted, the sample will be collected in laboratory-supplied containers.

In coordination with the groundwater sampling, depth to water levels will be measured from the four new monitoring wells and the existing OU-03 monitoring wells (Table 6).

If possible, the sampling event will be coordinated with post-ISTT sampling or a Sitewide sampling event. Select existing OU-03 monitoring wells may be added to the event to provide a more comprehensive data set.

3.6 Surveying

Following their installation, a New York-licensed surveyor will survey the completed soil borings and monitoring wells. The horizontal and vertical locations for the monitoring wells ground surface, steel flush mount lid, and top of polyvinyl chloride well riser will be surveyed. Coordinates will be in the New York State Plane Coordinate System, with the horizontal and vertical datum(s) in North American Datum of 1983 (latest adjustment) for horizontal and the North American Vertical Datum of 1988 for vertical. The survey will have relative accuracy tolerances of +/-0.10-foot for the horizontal and +/-0.03-foot for the vertical on all hard surfaces, and +/-0.10-foot for the vertical on soft or natural ground surfaces.

3.7 Quality Assurance/Quality Control

The quality assurance and quality control requirements are designed so the environmental data collected during this investigation will be of the appropriate quality to achieve the defined objectives. Appendix G provides the Quality Assurance Project Plan, which includes specific protocols for sampling, sample handling and storage, chain-of-custody protocols, laboratory analyses, data handling, and data evaluation and assessment.

3.8 Decontamination

This section summarizes decontamination procedures:

- Before field activities begin, a decontamination pad (or pads) will be constructed to provide an area to power wash/steam clean downhole or other contaminated equipment. The decontamination pad will be constructed to capture soil and fluids during the decontamination process so the decontamination

process does not impact the ground surface and so that investigation-derived waste generated by the decontamination process can be containerized in drums or tanks.

- All downhole equipment (core barrels, casings, cutter heads, drive rods, tip holders, split-spoon samples, auger flights, hand augers, etc.) will undergo a thorough decontamination between soil boring locations to ensure no cross-contamination occurs. Steam cleaning is the preferred method of decontamination. Downhole equipment used for sampling, such as split-spoon samplers, will be decontaminated between each sample.
- If steam cleaning is not possible, the following process will be used to decontaminate drilling equipment: remove all visible particulate matter, rinse equipment with potable water, and then wash it with high-pressure hot-water and phosphate-free detergent (such as Alconox or Liquinox) wash. Rinse the equipment with potable water and provide a final rinse with distilled water.
- If hand augers are used, they will be decontaminated as follows: remove all visible particulate matter, rinse the equipment with potable water rinse, and then wash it with Liquinox. Rinse the auger with potable water and provide a final rinse with distilled water.

3.9 Waste Management

The anticipated waste streams to be generated during this RI include:

- Soil cuttings
- Decontamination water
- Development water
- Groundwater purge water
- Personal protective equipment

Waste related to these streams will be characterized and classified according to Title 40 Code of Federal Regulations (CFR) Part 262.11 and NYCRR 371. Waste will be managed and disposed of according to EPA, NYSDEC, Essex, federal, state, and local regulations and requirements. Waste containers will be managed per the substantive requirements of 6 NYCRR 373 and 40 CFR 265 Subpart I. 6 NYCRR 373-1.1(d)(iii)(a), which prohibits staging more than 8,800 gallons of liquid waste in each storage area. Waste generated during this event will be staged within a secure area.

3.9.1 Hazardous Waste Status

The Site is a large-quantity generator of hazardous waste, and hazardous waste will be managed according to the applicable regulatory guidelines. The generated waste is anticipated to be listed hazardous waste.

3.9.2 Classification

The waste will be classified following the process in CFR Title 40, Part 262.11 (40 CFR 262.11) and 6 NYCRR 371. If waste is from a listed source, it will be classified based on generator knowledge. If generator knowledge is not sufficient to classify the waste, additional data will be reviewed or collected to complete the classification.

3.9.3 Staging and Anticipated Volumes

Waste will be staged within a designated 90-day secure area within OU-01. Waste will be transported to this area following the end of each work shift. If the waste is ignitable, it will be stored 50 feet away from the property boundary. Reactive and incompatible wastes are not anticipated. The estimated volume of

waste that is anticipated to be generated during the RI includes 3 cubic yards of soil and 2,000 gallons of liquid.

It is anticipated that waste will be stored in containers. Because fewer than 8,800 gallons of liquid will be stored, secondary containment is not required by regulation.

3.9.4 Shipping, Transportation, and Documentation

Before containers are shipped, they will be marked and labeled as required by 49 CFR. Hazardous waste will be transported by a hazardous waste transporter. All shipments will be accompanied by a hazardous waste manifest, and a land disposal restriction certification will accompany the first shipment of a waste stream to a disposal facility. A return copy of the hazardous waste manifest will be retained to document the waste disposal.

4. Qualitative Exposure Assessments

Qualitative exposure assessments for human health and fish and wildlife will be completed during the RI.

4.1 Previous Receptor Evaluations

The 1994 ROD included a discussion of human health and ecological exposure pathways; however, the potential receptors and exposure pathways are discussed in this section to highlight recent changes in property use, to show changes due to remedies and institutional controls, and to support the update to the CSM. This summary does not constitute a formal human health or ecological risk assessment.

The ROD identified the most significant human exposure pathways as:

- Future offsite groundwater use by offsite residents
- Inhalation of volatilized residues from onsite source areas by offsite residents
- Air emissions of VOCs affecting onsite workers

The ROD also summarized the results of an ecological assessment. The ecological assessment found that habitat potentially of value to wildlife near the Site included a thin band of stream bank vegetation along the Chadakoin River and aquatic habitat in the Chadakoin River. The only significant potential environmental pathway identified was the migration of impacted groundwater to the Chadakoin River. Three surface water samples from the Chadakoin River in 1993 did not contain detectable concentrations of VOCs (O'Brien & Gere Engineers, Inc. 1993).

4.2 Qualitative Human Health Exposure Assessment

During the RI, a qualitative exposure assessment will be completed for human health, in accordance with Appendix 3B of the DER-10. The purposes are as follows:

- Identify the areas and chemicals of concern.
- Evaluate actual or potential exposure pathways.
- Characterize potentially exposed receptor types (such as residents).
- Identify how potential exposure routes might be eliminated or mitigated.

Based on existing information, this section provides an initial summary of the OU-03 populations, reasonably anticipated future land use, reasonably anticipated future groundwater use, and current and reasonably foreseeable exposure pathways.

4.2.1 Nature and Size of Current Population

The current population within OU-03 that may be exposed to contaminants migrating from OU-01 includes indoor workers at industrial buildings within the VOC plume in groundwater. The buildings are on the following properties:

- Former H&H Metals property (now owned by Viking Property Development LLC and occupied by Service Master Restoration and Cleaning)
- Former Jamestown Plastics property (now owned by Rollform)
- Rollform property

One additional industrial building (JMF) is within the groundwater plume, but is currently vacant and has no current population.

4.2.2 Reasonably Anticipated Future Land Use

The likely future land use of OU-03 is continued industrial/commercial use, consistent with current uses and zoning for "M-manufacturing."

4.2.3 Reasonably Anticipated Future Groundwater Use

It is reasonably anticipated that groundwater will not be used in the future for potable or irrigation purposes, based on the availability of a public water supply. While the City of Jamestown does not have restrictions on the use of groundwater for irrigation or potable uses, the Chautauqua County Sanitary Code requires new construction to connect to the municipal water supply (Chautauqua County Department of Health and Human Services 2022). The County Public Health Director can also require an existing individual water supply to connect to the municipal public water system if the system does not meet 10 NYCRR Part 75 Requirements (Minimum Standards for Individual Onsite Water Supply Systems). 10 NYCRR Part 75 allows the Public Health Director to require testing for individual water supplies, including for contaminants the director determines necessary or appropriate to protect human health. The County Public Health Director must certify the individual water supply during most property transfers, and if the system cannot be certified by the Public Health Director, the dwelling or structure must be connected to the municipal public water system. Based on the availability of a municipal public water system and these restrictions, and the fact that there are no known water supply wells in OU-03, it is unlikely that there will be future potable groundwater use. However, there are no legal restrictions on the installation of a well for irrigation or nonpotable groundwater use.

4.2.4 Potential Offsite Exposure Pathways

The following sections describe potential current and reasonably foreseeable human exposure pathways at OU-03, based on the current understanding of the nature and extent of contamination at OU-03. The potential offsite exposure pathways evaluation will be updated, as necessary, after characterization of the nature and extent of contamination is completed during the RI.

4.2.4.1 Soil

There are no exceedances of unrestricted SCOs in unsaturated soils in the shallow sand and gravel unit, except for acetone. Detections in unsaturated soils in OU-03 are unrelated to Site sources, but are related to a separate non-Site-related source. Therefore, there are no Site-related soil exposure pathways in OU-03.

4.2.4.2 Groundwater

There are no known current groundwater uses (no wells have been identified) in the OU-03 area and the area is served by a public water supply; therefore, no current groundwater exposure pathways were identified.

The depth to first encountered groundwater is less than 10 feet bgs; therefore, future construction workers could be exposed to groundwater in excavations (to 10 feet bgs) via dermal contact or the inhalation of vapors during construction activities. Other future groundwater exposure scenarios (potable use) are not expected in the reasonably foreseeable future.

4.2.4.3 Vapor Intrusion

Current commercial or industrial workers in existing buildings within the shallow groundwater plume could be exposed to vapors in indoor air that have migrated from shallow groundwater. The buildings are on former H&H Metals (currently Service Master Restoration and Cleaning), former Jamestown Plastics (owned by Rollform), and Rollform property.

- Former H&H Metals (currently Service Master Restoration and Cleaning) – The 2021 VI evaluation indicated the potential for a complete VI pathway in the southern portion of the building; however, access has not been granted to implement mitigation measures (Jacobs 2022). Therefore, there may be a current indoor air exposure pathway for workers in the building. The evaluation will be based on indoor air data collected in 2021, unless access is granted by the property owner to implement planned mitigation measures and post-mitigation indoor air data is collected (under a separate work plan).
- Former Jamestown Plastics (owned by Rollform) – Based on the location of the building within 100 feet of the groundwater plume and results of the 2018 and 2019 exterior soil vapor sampling (Jacobs 2019a, 2020b), there may be a current indoor air exposure pathway for workers in the building. The evaluation will be based on exterior soil vapor samples collected within 100 feet of the building in 2018 and 2019.
- Rollform - Based on the location of the building within 100 feet of the groundwater plume and results of the 2018 and 2019 exterior soil vapor sampling (Jacobs 2019a, 2020b), there may be a current indoor air exposure pathway for workers in the building. Historically, Rollform did not grant access to conduct a VI investigation at their property. The evaluation will be based on exterior soil vapor samples collected from within 100 feet of the building in 2018 and 2019.

Future commercial or industrial workers in buildings above the shallow groundwater plume could be exposed to vapors in indoor air that have migrated from shallow groundwater. Therefore, there may be a future indoor air exposure pathway for workers in the following existing and new buildings:

- Former H&H Metals (currently Service Master Restoration and Cleaning) - There may be a future indoor air exposure pathway for workers in the building. The evaluation will be based on subslab vapor data collected in 2021, unless the property owner grants access to implement planned mitigation measures and post-mitigation indoor air data is collected (under a separate work plan).
- Former Jamestown Plastics (owned by Rollform) - There may be a future indoor air exposure pathway for workers in the building. The evaluation will be based on exterior soil vapor samples collected from within 100 feet of the building in 2018 and 2019.
- Rollform - There may be a future indoor air exposure pathway for workers in the building. The evaluation will be based on exterior soil vapor samples collected from within 100 feet of the building in 2018 and 2019.
- JMF –Although this building is currently vacant, there may be a future indoor air exposure pathway for future workers in the building. The evaluation will be based on subslab vapor data collected in 2018 and 2019.
- Newly constructed building in OU-03 – If a new building is constructed within the OU-03 shallow groundwater plume in the future, there may be a future indoor air exposure pathway for workers in the building. The evaluation will be based on exterior soil vapor samples collected from within OU-03 in 2018 and 2019.

4.2.4.4 Surface Water and Sediment

The only surface water body near OU-03 is the Chadakoin River. The Chadakoin River is classified as a Class C Surface Water (NYCRR Chapter X, Subchapter B, Article 1, Part 800.8, Table V). This classification indicates the best usage of the surface water is fishing, and the waters must be suitable for fish, shellfish, and wildlife propagation and survival, as well as primary and secondary contact recreation. Therefore, there may be current or future direct contact and fish or shellfish exposure pathways to surface water, sediment, and fish or shellfish for recreational users of the Chadakoin River. The evaluation will be based on groundwater data collected from the area adjacent to the Chadakoin River during the OU-03 RI.

4.3 Fish and Wildlife Resources

A FWRIA Part 1 (Resource Characterization) will be completed during the RI, per Subsection 3.10.1 of the DER-10 guidance. The FWRIA will describe the ecological resources present and identify complete transport and exposure pathways. If constituent concentrations in groundwater wells adjacent to the Chadakoin River exceed aquatic life surface water quality chronic criteria, and the plume appears to be discharging to the stream, an addendum to the RIFS WP will be prepared, describing the proposed ecological evaluation of the river. The FWRIA Part 1 will be submitted to NYSDEC and will include a determination of whether a FWRIA Part 2 (Ecological Impact Assessment) is required. If a FWRIA Part 2 is required, a separate work plan will be submitted.

4.4 Environmental Justice

NYSDEC has identified the census tract (301) in which the Site lies as a potential environmental justice area. There were 3,413 people reported living in the census tract (as of the 2020 census), with 39.5% of the population having income below the federal poverty level. Designation as a potential environmental justice area may require additional measures during the environmental permit process, per Commissioner Policy 29, Environmental Justice and Permitting (NYSDEC 2003). This policy applies to permits related to state pollution discharge elimination system permits, air pollution control, solid waste management, industrial hazardous waste management, and siting of industrial hazardous waste facilities. However, the policy does not apply to minor permit modifications, renewals, registrations, or general permits.

5. Schedule and Reporting

The planning and implementation of this scope of work will begin with NYSDEC's approval of this WP. After the WP is approved, it is aniticipated to take approximately 12 weeks to begin field work. This schedule is subject to the availability and scheduling of subcontractors, weather conditions, and coordination with property owners and tenants. NYSDEC will be updated on the schedule and progress in a timely manner and will be notified 10 calendar days before field work begins.

When investigation activities are complete, the results of this investigation, along with relevant data from past investigations, will be evaluated. The results of the RI will be documented in a comprehensive RI report for OU-03, per DER-10 Section 3.14, and will be submitted to NYSDEC electronically.

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Tables

Table 1. Remedial Action Objectives and Standards, Criteria, and Guidance

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

Parameter	Soil			Groundwater	
	Remedial Action Objective from 1994 Record of Decision (ppm)	2023 Amended Record of Decision Applicable SCG for OU-01 (Protection of Groundwater SCO) (ppm)	Unrestricted Use SCOs (ppm)	Remedial Action Objective from 1994 Record of Decision (ppb)	2023 Amended Record of Decision Applicable SCG for OU-01 (µg/L)
Total VOCs	10	N/A	N/A	N/A	N/A
1,1,1,2-Tetrachloroethane	1	NC	NC	5[a,b]	5[b]
1,1,1-Trichloroethane	1	0.68	0.68	5[a,b]	5[b]
1,1,2,2-Tetrachloroethane	1	0.6 [0.4][c]	0.6 [0.4][c]	5[a,b]	5[b]
1,1,2-Trichloroethane	1	NC	NC	1[a]	1
1,1-Dichloroethane	1	0.27	0.27	5[a,b]	5[b]
1,1-Dichloroethene	1	0.33	0.33 [0.24]	5[a,b]	5[b]
1,1-Dichloropropene	1	NC	NC	5[a,b]	5[b]
1,2,3-Trichlorobenzene	1	NC	NC	5[a,b]	5[b]
1,2,3-Trichloropropane	1	0.34 [0.002][c]	NC	0.04[a]	0.04
1,2,4-Trichlorobenzene	1	3.4 [8.3][c]	NC	5[a,b]	5[b]
1,2,4-Trimethylbenzene	1	3.6 [5.9]	3.6 [5.9]	5[a,b]	5[b]
1,2-Dibromo-3-chloropropane	1	NC	NC	0.04[a]	0.04
1,2-Dibromoethane	1	NC	NC	0.0006[a]	0.0006
1,2-Dichlorobenzene	1	1.1	1.1	3[a]	3
1,2-Dichloroethane	1	0.02	0.02	0.6[a]	0.6
1,2-Dichloroethene, cis-	1	0.25 [0.19]	0.25 [0.19]	5[a,b]	5[b]
1,2-Dichloroethene, trans-	1	0.19	0.19	5	5[b]
1,2-Dichloroethene, Total	1	NC	NC	NC	NC
1,2-Dichloropropane	1	NC	NC	1[a]	1
1,3,5-Trimethylbenzene	1	8.4 [3.1]	8.4 [3.1]	5[a,b]	5[b]
1,3-Dichlorobenzene	1	2.4 [2.6]	2.4 [2.6]	3[a]	3
1,3-Dichloropropane	1	0.3 [1.5][c]	NC	5[a,b]	5[b]
1,3-Dichloropropene, cis-	1	NC	NC	0.4[a,f]	0.4[f]
1,3-Dichloropropene, trans-	1	NC	NC	0.4[a,f]	0.4[f]

Table 1. Remedial Action Objectives and Standards, Criteria, and Guidance

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

Parameter	Soil			Groundwater	
	Remedial Action Objective from 1994 Record of Decision (ppm)	2023 Amended Record of Decision Applicable SCG for OU-01 (Protection of Groundwater SCO) (ppm)	Unrestricted Use SCOs (ppm)	Remedial Action Objective from 1994 Record of Decision (ppb)	2023 Amended Record of Decision Applicable SCG for OU-01 (µg/L)
1,4-Dichlorobenzene	1	1.8	1.8	3[a]	3
1,4-Dioxane	1	0.1	0.1	0.35[a,d]	0.35[d]
2,2-Dichloropropane	1	NC	NC	5[a,b]	5[b]
2-Butanone (Methyl Ethyl Ketone)	1	0.12 [0.10]	0.12 [0.10]	50[d]	50[d]
2-Chlorotoluene	1	NC	NC	5[a,b]	5[b]
2-Hexanone	1	NC	NC	50[d]	50[d]
4-Chlorotoluene	1	NC	NC	5[a,b]	5[b]
Acetone	1	0.05 [0.03]	0.05 [0.03]	50	50
Benzene	1	0.06	0.06	1[a]	1
Bromobenzene	1	NC	NC	5[a,b]	5[b]
Bromochloromethane	1	NC	NC	5[a,b]	5[b]
Bromodichloromethane	1	NC	NC	50[d]	50[d]
Bromoform	1	NC	NC	50[d]	50[d]
Bromomethane	1	NC	NC	5[a,b]	5[b]
Butylbenzene, n-	1	12 [18]	12 [18]	5[a,b]	5[b]
Butylbenzene, sec-	1	11 [25]	11 [25]	5[a,b]	5[b]
Butylbenzene, t-	1	5.9 [11]	5.9 [11]	5[a,b]	5[b]
Carbon Disulfide	1	2.7 [3.3][c]	2.7 [3.3][c]	60[a,d]	60[d]
Carbon tetrachloride	1	0.76	0.76	5[a]	5
Chlorobenzene	1	1.1	1.1	5[a,b]	5[b]
Chloroethane	1	1.9 [0.08][c]	NC	5[a,b]	5[b]
Chloroform	1	0.37	0.37	7[a]	7
Chloromethane (Methyl Chloride)	1	NC	NC	5[a,b]	5[b]
Dibromochloromethane	1	NC	NC	50[d]	50[d]
Dibromomethane (Methylene Bromide)	1	NC	NC	5[a,b]	5[b]

Table 1. Remedial Action Objectives and Standards, Criteria, and Guidance
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Parameter	Soil			Groundwater	
	Remedial Action Objective from 1994 Record of Decision (ppm)	2023 Amended Record of Decision Applicable SCG for OU-01 (Protection of Groundwater SCO) (ppm)	Unrestricted Use SCOs (ppm)	Remedial Action Objective from 1994 Record of Decision (ppb)	2023 Amended Record of Decision Applicable SCG for OU-01 (µg/L)
Dichlorodifluoromethane	1	NC	NC	5[a,b]	5[b]
Ethylbenzene	1	1	1	5	5[b]
Hexachlorobutadiene	1	NC	NC	0.5[a]	0.5
Isopropylbenzene	1	2.3 [5.1][c]	2.3 [5.1][c]	5[a,b]	5[b]
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone	1	1 [0.8][c]	NC	NC[e]	NC[e]
Methyl tert-butyl Ether	1	0.93 [0.1]	0.93 [0.1]	10[d]	10[d]
Methylene Chloride	1	0.05	0.05	5[a,b]	5[b]
Naphthalene	1	12	12	NC	10[d]
n-propylbenzene	1	3.9 [5]	3.9 [5]	5[a,b]	5[b]
p-Isopropyltoluene (4-Isopropyltoluene)	1	10 [5.6][c]	NC	5[a,b]	5[b]
Styrene	1	NC	NC	5[a,b]	5[b]
Tetrachloroethene	1	1.3	1.3	5[a,b]	5[b]
Toluene	1	0.7	0.7	5	5[b]
Trichloroethene	1	0.47	0.47	5	5[b]
Trichlorofluoromethane	1	NC	NC	5[a,b]	5[b]
Vinyl acetate	1	NC	NC	NC[e]	NC[e]
Vinyl Chloride	1	0.02 [0.03]	0.02	5	2
Xylene, m,p-	1	NC	NC	5[a,b]	5[b]
Xylene, o-	1	NC	NC	5[a,b]	5[b]
Xylenes, Total	1	1.6 [1.2]	0.26	5	5[b]

Table 1. Remedial Action Objectives and Standards, Criteria, and Guidance

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

Notes:

[a] RAO not directly listed in 1994 ROD; obtained from most recent NYSDEC Ambient Groundwater Quality Standards listed in Table 1 of 6 NYCRR Part 703.5

[b] Listed as a principal organic contaminant in 6 NYCRR Part 703.5 Table 1 Ambient Water Quality Standards, which has a standard of 5 µg/L if compound not listed elsewhere in Table 1

[c] Supplemental Soil Cleanup Objective listed in Table 1 of CP-51 (NYSDEC 2010a); these are not promulgated standards

[d] Guidance value in TOGS 1.1.1, June 1998, April 2000. or February 2023 Addendum

[e] Per TOGS 1.1.1 (1998), not regulated by the Principal Organic Contaminant Groundwater Standard of 5 ug/L, and no standard or guidance value is available

[f] Applies to sum of cis- and trans- isomers

Amended ROD RAOs apply only to OU-01. Updates to the RAOs for OU-03 may be developed in the future as part of planned investigations and potential ROD update

Analytes listed are those in 1994 ROD, or that have been detected in recent soil and groundwater samples in either OU-01 or OU-03

Values in brackets are proposed revised SCOs contained in proposed 2024 revisions to Part 375 and CP-51, which have not yet been promulgated or adopted

Unrestricted Use SCOs from 6 NYCRR Part 375-6.8(a) criteria and Table 1 of CP-51 Soil Cleanup Guidance Values

Restricted Use SCOs from 6 NYCRR Part 375-6.8(b) criteria and Table 1 of CP-51 Soil Cleanup Guidance Values

Groundwater criteria and guidance values from 6 NYCRR Part 703.5 Table Ambient Water Quality Standards and TOGS 1.1.1 (June 1998, April 2000 Addendum, June 2004 Addendum, February 2023 Addendum)

µg/L = micrograms per liter

N/A = not applicable

NC = no promulgated criteria or guidance value

NYCRR = New York Codes, Rules, and Regulations

NYSDEC = New York State Department of Environmental Conservation

ppb = part(s) per billion

ppm = part(s) per million

RAO = remedial action objective

ROD = record of decision

SCG = standard, criteria, and guidance

SCO = soil cleanup objective

SVOC = semivolatile organic compound

VOC = volatile organic compound

Table 2. Summary of Site Investigations and Evaluations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Year	Investigation Name	Description	Consultant
1993	Phase I Remedial Investigation	• Characterization of distribution of volatile organic compounds (VOCs) in groundwater to evaluate potential remedial options	O'Brien & Gere Engineers
1994	Phase II Remedial Investigation/Feasibility Study	• Presentation of remedial investigation results and evaluation of potential remedial actions that may be implemented to satisfy the remedial action objectives for the Site	O'Brien & Gere Engineers
1995	Basis of Design	• Presentation of the physical, chemical, and regulatory basis for the design of remedial actions	Dow Environmental
1998	Remedial Action Closeout Report	• Description of the implementation of the various remedial systems at the site	Radian Engineering
2000	Supplemental Investigations for SMAART Evaluations	• Assessment of remedial alternatives, including natural attenuation, in the former Aboveground Storage Tank/Underground Storage Tank (UST) Area, and a zero-valent iron permeable reactive wall in the North Parking Lot Sump (NPLS) Area	Radian International
2001	Plant 5 East Area and UST Area Investigations Report	• Investigation of the former UST Area to determine if additional source existed • Investigation of the source and extent of vinyl chloride on the east side of the Plant 5 Building	URS Corporation
2004	UST Area and Groundwater Vinyl Chloride Investigations	• Investigation of VOCs contamination extent in the former UST Area and vinyl chloride in the area east of the Plant 5 Building	URS Corporation
2006	UST Area and Offsite Groundwater Investigations	• Delineation of the southern VOC contamination extent in the former UST Area • Determination of VOC contamination extent in groundwater north and east of the Site	URS Corporation
2008	Soil Vapor Sampling at 159 Hopkins Avenue	• Investigation of soil vapor conditions near a residence underlain by a trichloroethene plume identified by the 2006 offsite groundwater investigation	URS Corporation
2014	Draft West Area Site Investigation	• Delineation of CBTEX plume west of the former UST Area under the West Building	URS Corporation
2015	Soil Vapor Intrusion Data Summary Report	• Assessment of vapor intrusion (VI) at former Plant 5 Building and West Building	URS Corporation
2016	Vapor Intrusion Investigation (HAPSITE)	• Assessment of potential for VI against potential indoor sources in the Plant 5 Building	CH2M HILL Engineers, Inc.
2016	Data Gap Investigation	• Membrane Interface Probe (MIP) investigation at OU-01 and OU-03 • Assessment of current remedial system performance • Collection of soil and groundwater data to support potential future remedial activities	CH2M HILL Engineers, Inc.
2017	159 Hopkins Avenue Mitigation System – Effectiveness Evaluation	• Collect additional data and observations to confirm the effectiveness of the subslab depressurization system at the residence	CH2M HILL Engineers, Inc.
2017	Data Gap Investigation	• Installation of additional monitoring wells to delineate the deep water-bearing zone plume • Collection of soil and groundwater data for evaluation of potential future remedial activities	CH2M HILL Engineers, Inc.
2018	Offsite Vapor Intrusion Investigation	• Collect external soil vapor and subslab vapor samples within the vicinity of the VOC plume to determine if vapor intrusion pathways with the potential of impacting downgradient receptors are present	Jacobs Engineering Group Inc.
2019	Supplemental Investigation	• Collect additional soil and groundwater data for developing and evaluating additional remedial actions to supplement the current remedial operations. This investigation was focused on two areas of onsite contamination: •Plant 5 Building/NPLS Areas •Former UST/West Building Areas	Jacobs Engineering Group Inc.
2019	Offsite Vapor Intrusion Investigation	• Obtain additional data to supplement the winter 2018 investigation to determine if VI associated with the chlorinated VOC groundwater plume from the Site impacts downgradient receptors	Jacobs Engineering Group Inc.
2021	Offsite Vapor Intrusion Investigation (conducted during February 2021)	• Offsite building (H&H Metals) VI investigation triggered by building re-occupancy, and consisted of building survey, subslab vapor sampling, and indoor and outdoor air sampling	Jacobs Engineering Group Inc.

Table 2. Summary of Site Investigations and Evaluations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Year	Investigation Name	Description	Consultant
2021	Offsite Vapor Intrusion Investigation (conducted during June/July 2021)	• Collection of additional VI investigation data at offsite building (H&H Metals), which consisted of an enhanced building survey, air samples from building floor pits and trench, soil samples from utility trench, and VI mitigation system diagnostic testing	Jacobs Engineering Group Inc.
2022	Pre-Design Investigation (Conducted during April, August, and October 2022)	• Further characterization of the nature and extent of chlorinated VOC impacts to soil and groundwater in the NPLS, Plant 5 Building, and offsite areas, including MIP investigation, soil, and groundwater sampling	Jacobs Engineering Group Inc.
2023	Focused Feasibility Study for OU-01 (Finalized in August 2023)	• Evaluated remedial alternatives to the existing onsite (OU-01) remedy	Jacobs Engineering Group Inc.
2023	In Situ Thermal Treatment Remedial Design (Submitted in November 2023)	• Remedial design for OU-01 in situ thermal treatment system	Jacobs Engineering Group Inc.

Notes:

CBTEX = cumene (isopropylbenzene), benzene, toluene, ethylbenzene, and xylenes

HAPSITE = Hazardous Air Pollutants on Site (field portable gas chromatograph mass spectrometer)

SMAART = Systematic Application of Advanced Remedial Technologies

Table 3. Data Quality Objectives
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

DQO No.	Step 1: Statement of Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Boundaries of the Study	Step 5: Develop the Decision Rule(s)	Step 6: Specify Tolerable Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
1	The understanding of OU-3 and physical characteristics, including OU-3 geology and hydrogeology, needs to be refined.	Identify OU-3 and physical characteristics such as geology, hydrogeology, and land use that may affect COC migration and exposure pathways.	▪ Historical geology and hydrogeology data from previous investigations ▪ Land use and groundwater use information identified during previous investigations ▪ 3-D model of lithology ▪ NYSDEC and EPA contaminant site databases ▪ NYSDEC water well database ▪ City and County zoning and ordinances	The evaluation will focus on OU-03, however conditions in the upgradient source area (OU-01) will be considered to evaluate migration pathways.	If the OU-03 geology and hydrogeology indicate that a migration pathway is complete, then the migration pathway will be incorporated into the conceptual site model, evaluation of COC nature and extent, and qualitative exposure assessments.	Soil data will be logged using USCS methodology and screened with a calibrated PID. Depths to water will be measured to the nearest hundredth foot and water levels calculated using surveyed top-of-casing elevations (measured to nearest hundredth foot).	Soil borings will be logged for geology and field-screened with a PID. Groundwater elevations will be measured to evaluate groundwater flow patterns. The Site 3-D lithologic model will be updated with new information. Additional research will be conducted as necessary to evaluate groundwater use and land use characteristics.
2	The nature and extent of COCs in unsaturated soils and in the saturated shallow sand and gravel have been defined, but there are data gaps associated with the nature and extent of COCs in deeper saturated soil in the shallow silty clay and the deep silt.	Delineate vertical and horizontal extents of COCs in the shallow silty clay and deep silt.	▪ Historical soil COC data from previous investigations ▪ Soil COC data collected during this remedial investigation ▪ Soil COC data collected during ISTT performance monitoring (OU-01) to evaluate upgradient source removal effectiveness ▪ Soil SCGs ▪ 3-D model of soil COC concentrations	The evaluation will focus on OU-03; however, conditions in the upgradient source area (OU-01) will be considered. Vertical boundary is deep silty clay, which previous investigations have found to not have significant COC concentrations.	If soil COC concentrations are less than unrestricted use SCO in deepest sample, then vertical soil delineation in that location will be considered complete. If soil concentrations in all samples from a location are less than unrestricted use (or groundwater protection) SCO and location defines the edge of exceedances, then lateral delineation will be considered complete. Otherwise, additional stepout sampling (if feasible based on site access and utility conflicts) will be performed to complete lateral delineation.	Laboratory analytical data will be of the quantity and quality necessary to provide technically sound and defensible assessments with respect to the project objectives. Laboratory detection limits will be suitable to detect COCs at concentrations at or less than unrestricted soil SCOs.	Soil borings will be advanced in areas with data gaps (Table 4) and soil samples submitted for VOC analysis by a certified laboratory.
3	There are data gaps in the nature and extent of COCs in groundwater in both the shallow and deep WBZs and whether the shallow groundwater plume is discharging to the Chadakoin River.	Delineate horizontal extents of COCs in the Shallow WBZ and Deep WBZ and evaluate potential for groundwater plume to discharge to the Chadakoin River at concentrations of concern.	▪ Historical groundwater COC data from previous investigations ▪ Groundwater data collected during this RI and historical synoptic events ▪ Groundwater data collected during ISTT (OU-01) performance monitoring, Periodic Review Report sampling in both OU-01 and OU-03 ▪ Groundwater SCGs	The evaluation will focus on OU-03 and groundwater adjacent to the Chadakoin River; however, conditions in the upgradient source area (OU-01) will be considered	If groundwater COC concentrations are less than groundwater SCGs at a location and the location that defines the edge of exceedances, then lateral delineation will be considered complete. Otherwise, additional stepout(s), (if feasible based on site access and utility conflicts) will be performed to complete lateral delineation. If COC concentrations in groundwater wells adjacent to the Chadakoin River exceed ambient surface water quality criteria for	Laboratory analytical data will be of the quantity and quality necessary to provide technically sound and defensible assessments with respect to the project objectives. Laboratory detection limits will be suitable to detect COCs at concentrations at or less than groundwater SCGs.	Groundwater levels will be used to create potentiometric surface maps for both the shallow and deep WBZs and evaluate groundwater flow directions and gradients. Groundwater samples will be collected at new and existing monitoring wells and analyzed for COCs. Groundwater plume maps from groundwater sampling at new and existing monitoring wells will be created. Separate maps will be

Table 3. Data Quality Objectives
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

DQO No.	Step 1: Statement of Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Boundaries of the Study	Step 5: Develop the Decision Rule(s)	Step 6: Specify Tolerable Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
			▪ Groundwater flow directions		Class C surface water (6 NYCCR Part 703) and the plume appears to be discharging to the stream based on groundwater flow gradient and direction, then an addendum to the RI WP will be prepared detailing proposed sampling of river media.		created for the Deep and Shallow WBZs.
4	The Potential Receptors and Exposure Pathways for human health need to be identified to understand the potential for human exposures to OU-03 contamination.	▪ Complete a Qualitative Human Health Exposure Assessment	▪ OU-03 physical characteristics and land use ▪ Historical groundwater, soil, soil vapor, and indoor air COC data ▪ Soil and groundwater data collected during this RI ▪ Groundwater flow direction ▪ Data collected during Periodic Review Report sampling in OU-03 ▪ Soil vapor and indoor air data that may be collected separately from the RI at H&H Metals, if access is granted, in accordance with the existing VI Work Plan ▪ NYSDOH Soil Vapor/Indoor Air Decision Matrices ▪ NYSDEC Human Health Qualitative Exposure Assessment guidance in NYSDEC DER-10	The evaluation will focus on OU-03.	If requested by NYSDEC, based on the Qualitative Exposure Assessment results, a quantitative risk assessment will be completed. If additional data are needed to support the quantitative risk assessment, an RI work plan addendum will be prepared. The scope of the quantitative risk assessment would be described in the RI work plan addendum.	Laboratory analytical data will be of the quantity and quality necessary to provide technically sound and defensible assessments with respect to the project objectives.	OU-03 physical characteristics, current and expected land use, and results of previous VI investigations will be considered during development of the qualitative exposure assessment. Groundwater samples will be collected at new and existing monitoring wells and analyzed for COCs. Groundwater plume maps from groundwater sampling at new and existing monitoring wells. Separate maps will be created for the Deep and Shallow WBZs. Maps of soil concentrations and depths. Groundwater concentrations in the shallow WBZ collected from wells adjacent to the Chadakoin River with consideration of potential attenuation and dilution between the groundwater sample location and surface water. Historic subslab soil vapor, and indoor air data from existing buildings and historical soil vapor data from areas without building will be considered. If collected at H&H Metals, new subslab soil vapor and/or indoor air data will be considered.

Table 3. Data Quality Objectives
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

DQO No.	Step 1: Statement of Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Boundaries of the Study	Step 5: Develop the Decision Rule(s)	Step 6: Specify Tolerable Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
5	The Potential Receptors and Exposure Pathways for fish and wildlife resources need to be identified to understand potential risks to fish and wildlife associated with OU-03 contamination.	Complete Qualitative Exposure Assessment for Potential Fish and Wildlife Resources	OU-03 physical characteristics, land use, habitat, and ecological resources identified from database searches, and historical site knowledge.	The evaluation will focus on OU-03 and the Chadakoin River.	A Part 1 Evaluation will be completed first. If results of Part 1 FWRIA indicate a Part 2 FWRIA is warranted, a work plan will be submitted detailing the proposed Part 2 FWRIA work. If COC concentrations in groundwater wells adjacent to the Chadakoin River exceed ecological surface water quality criteria (identify) and the plume appears to be discharging to the stream, then an addendum to the RI WP will be prepared detailing proposed ecological evaluation of the river.	Laboratory analytical data will be of the quantity and quality necessary to provide technically sound and defensible assessments with respect to the project objectives. Laboratory detection limits will be suitable to detect COCs at concentrations at or less than soil, groundwater, and surface water ecological based SCGs.	Groundwater levels will be used to create potentiometric surface maps for both the shallow and deep WBZs and evaluate groundwater flow directions and gradients. Maps of shallow soil concentrations and depths screened against relevant ecological screening values. Groundwater concentrations in the shallow WBZ collected from wells adjacent to the Chadakoin River will be conservatively compared to the aquatic life (chronic) criteria in 6 NYCRR Part 703, although consideration of potential attenuation and dilution between the groundwater sample location and surface water will be considered.

Table 4. Proposed OU-03 Soil Borings
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Location Identification	Anticipated Total Boring Depth[a] (feet bgs)	Geologic Zone	Anticipated Sample Depth Range (feet bgs)	Sample Identification	VOCs (SW8260C)	Location Sampling Objective
Proposed Soil Borings						
DPT-090	48	Shallow Silty Clay	18-23	DPT-090-dd-YYYYMMDD	x	Delineate deeper impacts to the northeast, near MW-120D. At DPT-66 to the southwest, shallow silty clay was < SCOs; greatest concentrations in silt at 29-30 and 33-34 feet bgs, 35-36 feet bgs sample > SCOs, 47-48 feet bgs sample was < SCOs
		Deep Silt	26-28	DPT-090-dd-YYYYMMDD	x	
		Deep Silt	30-35	DPT-090-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-090-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	46-48	DPT-090-dd-YYYYMMDD	x[e]	
DPT-091	48	Shallow Silty Clay	18-23	DPT-091-dd-YYYYMMDD	x	Delineate deeper impacts northeast of DPT-66. DPT-66 to the southwest, shallow silty clay was < SCOs; greatest concentrations in silt at 29-30 and 33-34 feet bgs, 35-36 feet bgs sample > SCOs, 47-48 feet bgs sample was < SCOs
		Deep Silt	26-28	DPT-091-dd-YYYYMMDD	x	
		Deep Silt	30-35	DPT-091-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-091-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	46-48	DPT-091-dd-YYYYMMDD	x[e]	
DPT-092	48	Shallow Silty Clay	20-25	DPT-092-dd-YYYYMMDD	x	Delineate northeastern area near MW-106S/D. DPT-68 to the east had shallow silty clay at 28-29 feet bgs > SCOs; in deep silt, 32-33 feet bgs sample was > SCOs, 35-36 feet bgs sample < SCOs
		Deep Silt	26-30	DPT-092-dd-YYYYMMDD	x	
		Deep Silt	30-35	DPT-092-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-092-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-48	DPT-092-dd-YYYYMMDD	x[e]	
DPT-093	48	Shallow Silty Clay	24-29	DPT-093-dd-YYYYMMDD	x	Delineate east of MW-22D/DPT-68. DPT-68 to the east had shallow silty clay at 28-29 feet bgs and > SCOs; in deep silt, 32-33 feet bgs sample was > SCOs, 35-36 feet bgs sample < SCOs
		Deep Silt	29-34	DPT-093-dd-YYYYMMDD	x	
		Deep Silt	34-39	DPT-093-dd-YYYYMMDD	x	
		Deep Silt	40-45	DPT-093-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	46-48	DPT-093-dd-YYYYMMDD	x[e]	
DPT-094	45	Shallow Silty Clay	18-23	DPT-094-dd-YYYYMMDD	x	Delineate expected southeastern extent of deeper impacts at Jamestown Plastics. DPT-39 to the west had shallow silty clay at 18-20 feet bgs < SCOs; 20-22 feet bgs in deep silt was also < SCOs, but no data deeper
		Deep Silt	26-28	DPT-094-dd-YYYYMMDD	x	
		Deep Silt	32-35	DPT-094-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-094-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-45	DPT-094-dd-YYYYMMDD	x[e]	

Table 4. Proposed OU-03 Soil Borings
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Location Identification	Anticipated Total Boring Depth[a] (feet bgs)	Geologic Zone	Anticipated Sample Depth Range (feet bgs)	Sample Identification	VOCs (SW8260C)	Location Sampling Objective
DPT-095	45	Shallow Silty Clay	18-23	DPT-095-dd-YYYYMMDD	x	Characterize deeper impacts near Bigelow and Hopkins Streets (based on MW-122D groundwater impacts, may be exceedances). DPT-39 to west had shallow silty clay at 18-20 feet bgs < SCOs; 20-22 feet bgs in silt was also < SCOs, but no data deeper
		Deep Silt	26-28	DPT-095-dd-YYYYMMDD	x	
		Deep Silt	32-35	DPT-095-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-095-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-45	DPT-095-dd-YYYYMMDD	x[e]	
DPT-096	45	Shallow Silty Clay	18-23	DPT-096-dd-YYYYMMDD	x	Delineate northwestern deeper impacts northwest of DPT-12 and DPT-66 and DPT-69. At DPT-66/69, shallow silty clay 22-23 feet bgs < SCOs; in silt, highest concentrations at 28-34 feet bgs, and < SCOs around 38-39 feet bgs and deeper
		Deep Silt	25-30	DPT-096-dd-YYYYMMDD	x	
		Deep Silt	30-35	DPT-096-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-096-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-45	DPT-096-dd-YYYYMMDD	x[e]	
DPT-097	45	Shallow Silty Clay	18-23	DPT-097-dd-YYYYMMDD	x	Delineate northwestern deeper impacts northwest of MW-16D and DPT-71. DPT-71 shallow silty clay sample was at 21-22 feet bgs and < SCOs; in fine silty sand, greatest concentration at 29-30 feet bgs (>SCOs), 30-31 feet bgs > SCOs, < SCOs at 39-40 and 43-44 feet bgs
		Deep Silt	26-30	DPT-097-dd-YYYYMMDD	x	
		Deep Silt	31-35	DPT-097-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-097-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-45	DPT-097-dd-YYYYMMDD	x[e]	
MW-108D	40	Shallow Silty Clay	18-23	MW-108D-dd-YYYYMMDD	x	Delineate eastern extent of deeper impacts near Viking Property Development LLC.
		Deep Silt	25-30	MW-108D-dd-YYYYMMDD	x	
		Deep Silt	31-35	MW-108D-dd-YYYYMMDD	x	
		Deep Silt	36-40	MW-108D-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	40-45	MW-108D-dd-YYYYMMDD	x[e]	
MW125D	45	Shallow Silty Clay	18-23	MW125D-dd-YYYYMMDD	x	Delineate eastern extent of deeper impacts.
		Deep Silt	25-30	MW125D-dd-YYYYMMDD	x	
		Deep Silt	31-35	MW125D-dd-YYYYMMDD	x	
		Deep Silt	36-40	MW125D-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	40-45	MW125D-dd-YYYYMMDD	x[e]	

Table 4. Proposed OU-03 Soil Borings
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Location Identification	Anticipated Total Boring Depth[a] (feet bgs)	Geologic Zone	Anticipated Sample Depth Range (feet bgs)	Sample Identification	VOCs (SW8260C)	Location Sampling Objective
MW126D	50	Shallow Silty Clay	10-14	MW126D-dd-YYYYMMDD	x	Delineate western extent of deeper saturated soil impacts (west of MW-14S/14D and DPT-28). DPT-28 shallow silty clay at11-13 feet bgs > SCOs; in fine silty sand at 14-16 feet bgs > SCOs, no deeper data
		Deep Silt	15-20	MW126D-dd-YYYYMMDD	x	
		Deep Silt	20-25	MW126D-dd-YYYYMMDD	x	
		Deep Silt	25-35	MW126D-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	40-50	MW126D-dd-YYYYMMDD	x[e]	
MW-135D	45	Shallow Silty Clay	18-23	MW-135D-dd-YYYYMMDD	x	Delineate southeastern extent of impacts offsite east of PZ-6D/6S.
		Deep Silt	26-28	MW-135D-dd-YYYYMMDD	x	
		Deep Silt	32-35	MW-135D-dd-YYYYMMDD	x	
		Deep Silt	36-40	MW-135D-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	43-45	MW-135D-dd-YYYYMMDD	x[e]	
Proposed Soil Borings - Step Out						
DPT-098	48	Shallow Silty Clay	18-23	DPT-098-dd-YYYYMMDD	x[b]	Delineate northeastern extent near MW-105S, if DPT-090 or DPT-091 have SCO exceedances.
		Deep Silt	26-28	DPT-098-dd-YYYYMMDD	x[b]	
		Deep Silt	30-35	DPT-098-dd-YYYYMMDD	x[b]	
		Deep Silt	36-40	DPT-098-dd-YYYYMMDD	x[b,d]	
		Bottom of Deep Silt	46-48	DPT-098-dd-YYYYMMDD	x[b,e]	
DPT-99	48	Shallow Silty Clay	18-23	DPT-091-dd-YYYYMMDD	x	Delineate east of Bigelow Street if DPT-91 or DPT-92 have exceedances.
		Deep Silt	26-28	DPT-091-dd-YYYYMMDD	x	
		Deep Silt	30-35	DPT-091-dd-YYYYMMDD	x	
		Deep Silt	36-40	DPT-091-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	46-48	DPT-091-dd-YYYYMMDD	x[e]	
DPT-100	48	Shallow Silty Clay	24-29	DPT-093-dd-YYYYMMDD	x	Delineate east of Bigelow Street if DPT-92, DPT-093, or DPT-99 have exceedances.
		Deep Silt	29-34	DPT-093-dd-YYYYMMDD	x	
		Deep Silt	34-39	DPT-093-dd-YYYYMMDD	x	
		Deep Silt	40-45	DPT-093-dd-YYYYMMDD	x[d]	
		Bottom of Deep Silt	46-48	DPT-093-dd-YYYYMMDD	x[e]	

Table 4. Proposed OU-03 Soil Borings
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Location Identification	Anticipated Total Boring Depth[a] (feet bgs)	Geologic Zone	Anticipated Sample Depth Range (feet bgs)	Sample Identification	VOCs (SW8260C)	Location Sampling Objective
DPT-101	48	Shallow Silty Clay	18-23	DPT-101-dd-YYYYMMDD	x[b]	Delineate east of Bigelow Street if DPT-98 or DPT-99 have SCO exceedances.
		Deep Silt	26-28	DPT-101-dd-YYYYMMDD	x[b]	
		Deep Silt	30-35	DPT-101-dd-YYYYMMDD	x[b]	
		Deep Silt	36-40	DPT-101-dd-YYYYMMDD	x[b,d]	
		Bottom of Deep Silt	46-48	DPT-101-dd-YYYYMMDD	x[b,e]	

Notes:

[a] Total boring depth will be based on depth to deep silty clay, the estimated depths in this column are based on nearby borings but are approximate. Sample depths are also approximate and will be determined in the field based on sampling objective, observed geology, and PID readings. Goals are generally to obtain a sample from the shallow silty clay, the top of the deep silt unit (where impacts are generally highest), several samples within the deep silt, and at the bottom of the deep silt just above the deep silty clay. Within each interval, select the portion of the core with the greatest PID readings.

[b] Put sample on hold at lab, pending results from nearby borings

[c] Collect sample only if PID or staining indicates impacts in vadose zone

[d] If deep silty clay < 40 feet bgs, target silt just above silty clay

[e] Collect this sample only if deep silty clay > 40 feet bgs

"dd" indicates sample depth interval in feet

"YYYYMMDD" indicates sample collection date

< = less than

> = greater than

bgs = below ground surface

DPT = direct push technology

mg/kg = milligram(s) per kilogram

NE = northeast

PID = photoionization detection

SCO = soil cleanup objective

VOC = volatile organic compounds

Table 5. Proposed OU-03 Groundwater Monitoring Wells
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Monitoring Well Identification	Anticipated Total Boring Depth[a] (feet bgs)	Anticipated Well Screen Interval (feet bgs)	Location Sampling Objective
MW-108D	45	28-38	Delineate deep plume northeast of MW-106D - Closest Monitoring Well MW-109D is screened 28-38 feet bgs.
MW-125S	15	5-15	Delineate shallow plume northeast of MW-108S - Nearby Monitoring Well MW-109S is screened 7-12 feet bgs but often dry because bottom of sand and gravel unit is shallow, and nearby Monitoring Well MW-108S is screened 7-17 feet bgs
MW-125D	45	28-38	Delineate deep plume northeast of MW-106D - Closest Monitoring Well MW-109D is screened 28-38 feet bgs.
MW-126D	50	25-35	Delineate deep plume northwest of MW-14D/MW-119D- Closest Monitoring Well MW-14D is screened 40-50 feet bgs (lesser groundwater concentrations) and MW-119D is screened 22-32 feet bgs (greater groundwater concentrations). Target 25-35 feet bgs screen, but adjust based on soil PID readings.
MW-126S	20	8-18	Delineate shallow plume northwest of MW-14S - Closest Monitoring Well MW-14S is screened 10-20 feet bgs.
MW-134S	20	7-17	Delineate southern extent of shallow CVOC plume south of MW-25S, which is screened from 7-17 feet bgs
MW-135S	20	8-18	Delineate shallow CVOC plume southern side-gradient extent south of MW-18 (screened 5-15 feet bgs). Also will serve as sentinel well for shallow petroleum component impacts from eastern former UST area. Replaces VP-6S (18-24 feet bgs screen) which is no longer viable.
MW-135D	45	30-40	Delineate deep CVOC plume southeastern side-gradient extent. Replaces VP-6D (screened 29.5-39.5 feet bgs) which is no longer viable.

Notes:

[a] Total boring depth will be based on geology, PID readings, and field observations. The estimated depths in this column are based on geology observed at nearby monitoring wells but are approximate.

MWs will be constructed using 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) with a 10-foot, 0.010-inch slotted screen. Deep screens will be targeted to intersect the upper portion of the deep WBZ, but may be adjusted based on field observations such as PID readings.

bgs = below ground surface

CVOC = chlorinated volatile organic compounds

MW = monitoring well

PID = photoionization detection

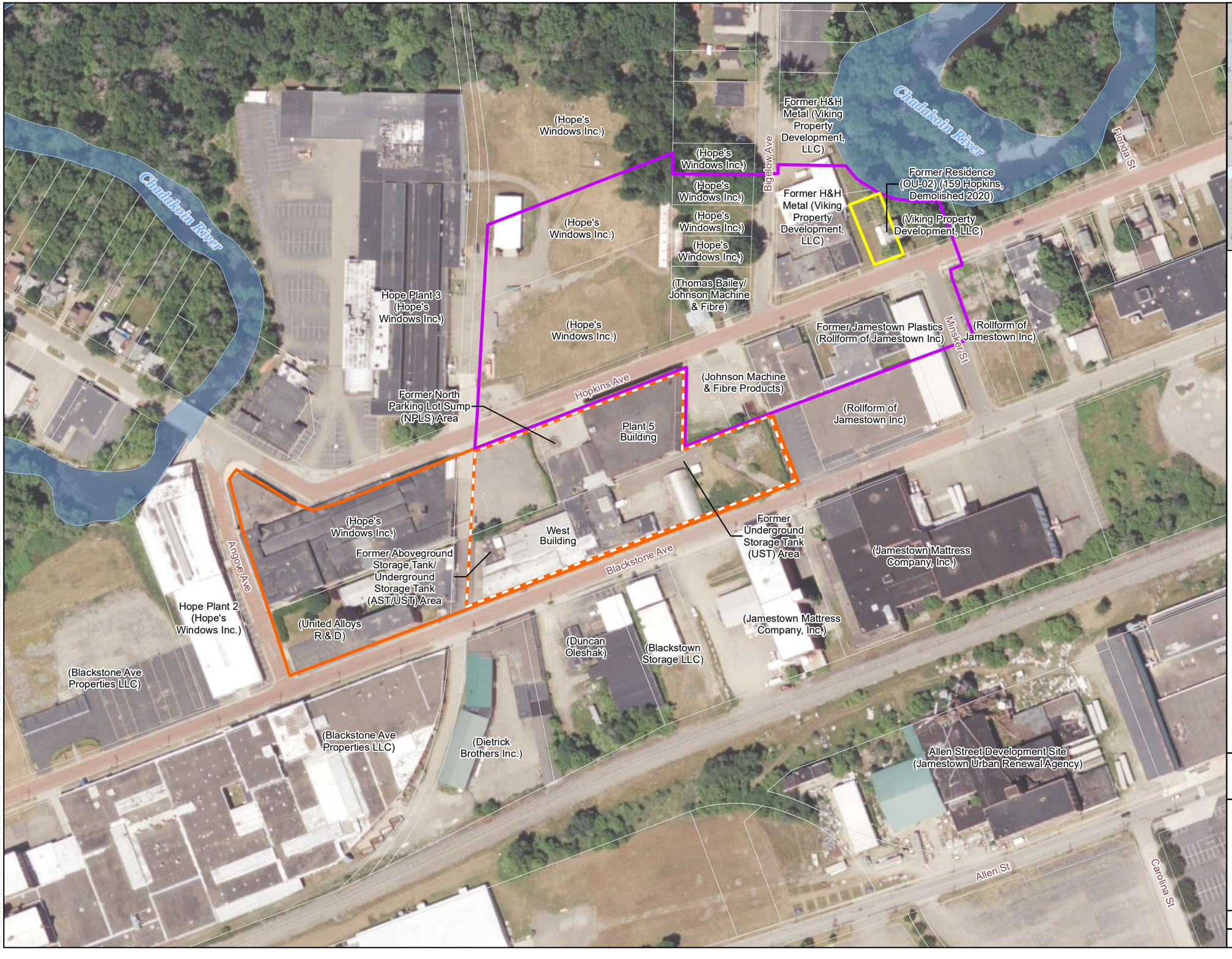
UST = underground storage tank

WBZ = water bearing zone

Table 6. Proposed OU-03 Groundwater Level Monitoring Wells
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Location Identification	Water Bearing Zone	Existing/Proposed
MW-14D	Deep	Existing
MW-15D	Deep	Existing
MW-16D	Deep	Existing
MW-22D	Deep	Existing
MW-25D	Deep	Existing
MW-106D	Deep	Existing
MW-108D	Deep	Proposed
MW-109D	Deep	Existing
MW-110D	Deep	Existing
MW-119D	Deep	Existing
MW-120D	Deep	Existing
MW-121D	Deep	Existing
MW-122D	Deep	Existing
MW-125D	Deep	Proposed
MW-126D	Deep	Proposed
MW-14S	Shallow	Existing
MW-15S	Shallow	Existing
MW-16S	Shallow	Existing
MW-18	Shallow	Existing
MW-25S	Shallow	Existing
MW-103S	Shallow	Existing
MW-104S	Shallow	Existing
MW-105S	Shallow	Existing
MW-106S	Shallow	Existing
MW-107S	Shallow	Existing
MW-108S	Shallow	Existing
MW-109S	Shallow	Existing
MW-125S	Shallow	Proposed
MW-126S	Shallow	Proposed
MW-134S	Shallow	Proposed
MW-135S	Shallow	Proposed
MW-135D	Deep	Proposed

Figures





OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Extent of OU-01 Investigation/Remediation Area

Former OU-02 Area

Approximate OU-03 Investigation Area

Parcel

Chadakoin River

Notes:
1. Exact boundary of OU-03 is to be determined.
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit

N

BASE MAP SOURCE:
Bing Aerial Imagery 2022

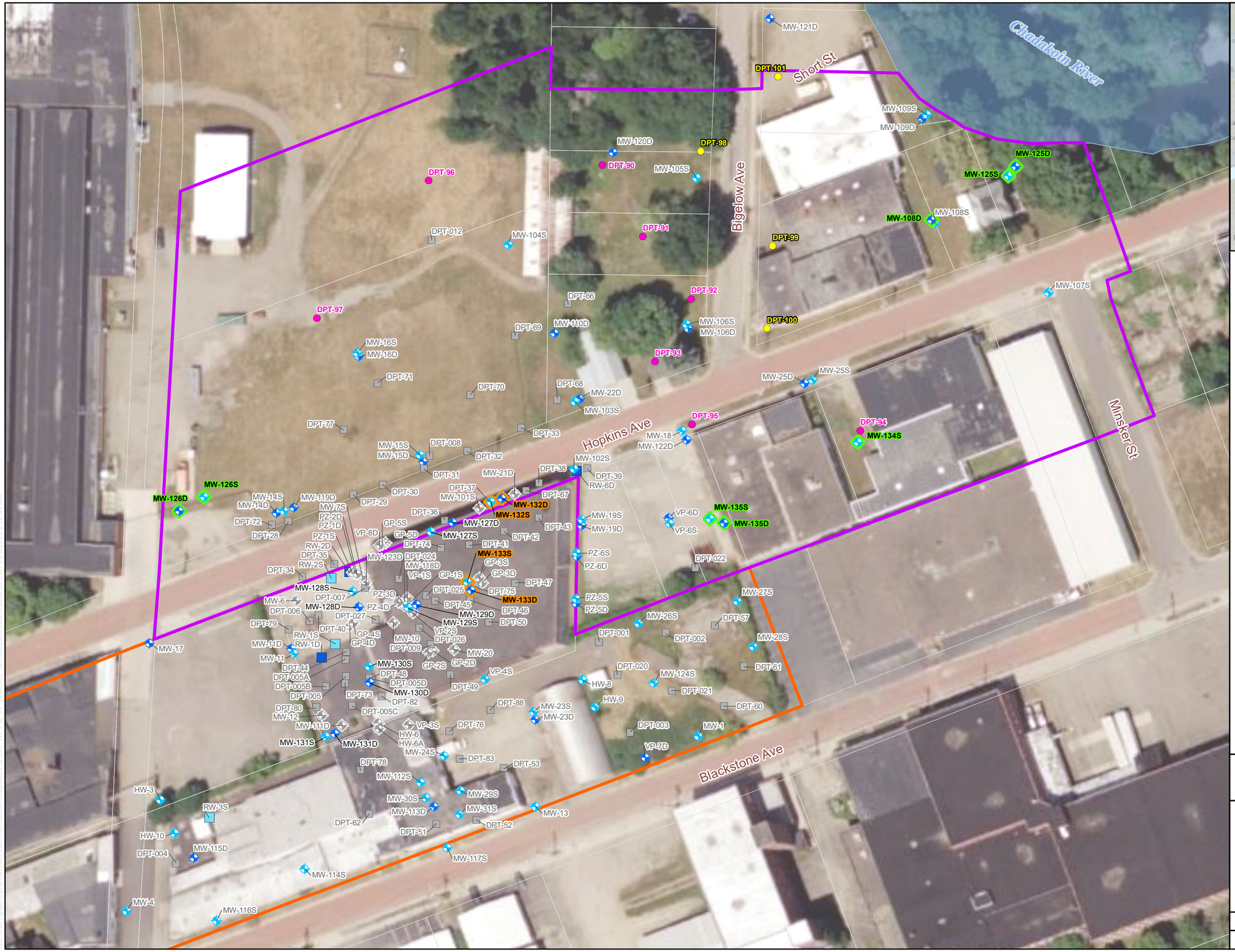
0 75 150 300
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 1
Site Overview Map
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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Essex Specialty Products, Inc

Essex-Hope Site, Jamestown, New York

FIGURE 2
Sample Locations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE
REVIEWED BY: WL

Jacobs



2022 MIP Location

2016 MIP Location

OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

Chautauqua County Tax Parcels

Chadakoin River

Notes:
1. MIP = Membrane Interface Probe
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit

N

BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

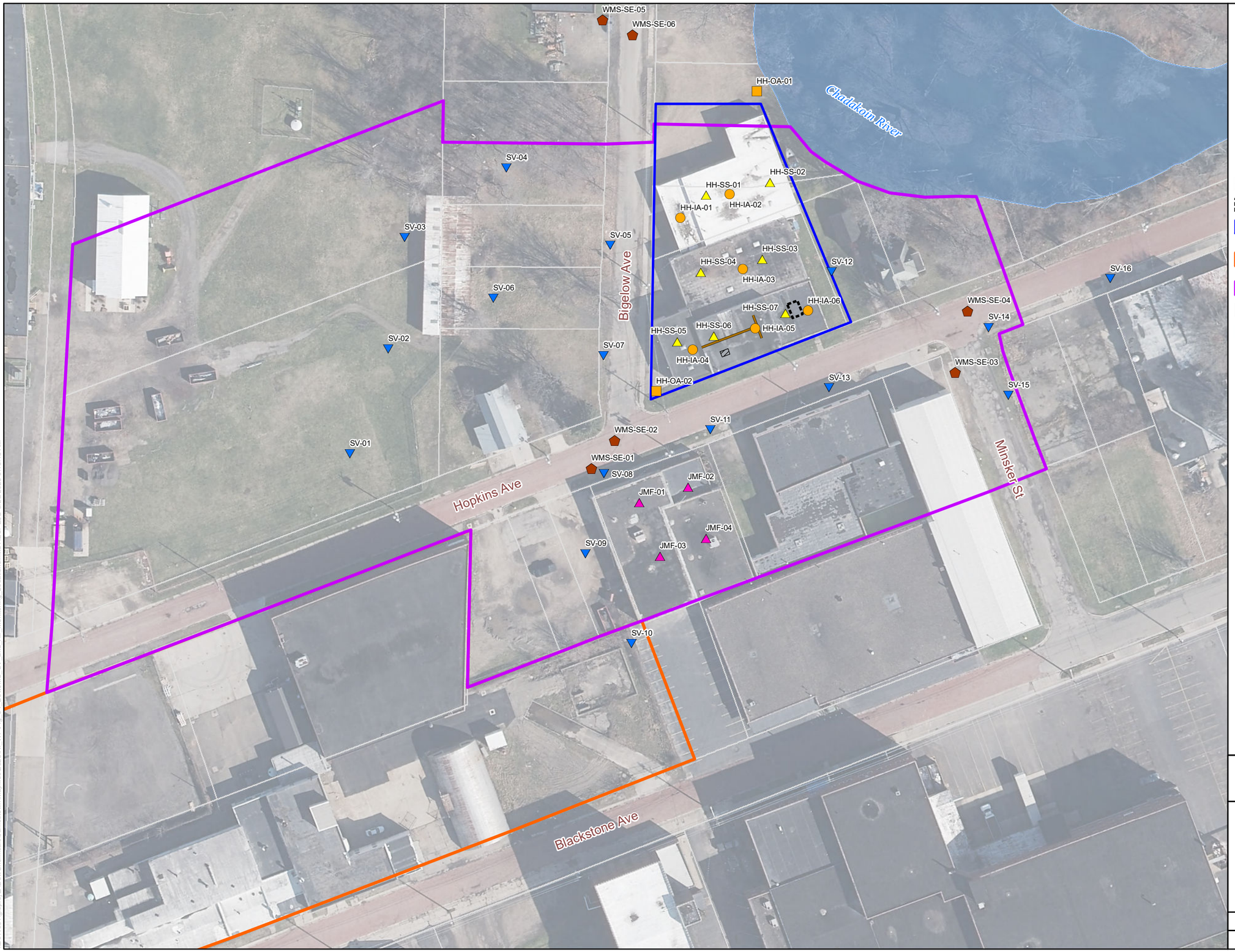
0 35 70 140
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 3
Membrane Interface Probe Locations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

\\D-1vs01\gispro\R\Proj\Chemicals\Jamestown\MapFiles\2025\RI_WP\Fig_03_Prev\MIS_MIP_Locations.mxd ASEBEL/0 9/28/2025 9:13:16 AM



- 2019 Subslab Vapor Sample Location
- 2018, 2021 Subslab Vapor Sample Location
- 2018-2019 Soil Vapor Sample Location
- 2018-2019 Storm/Sanitary Sewer Sampling Location
- 2021 Outdoor Air Sample
- 2021 Indoor Air Sample
- 9" Deep Utility Trench
- 5' Deep Pit for Press Filled with Gravel
- Former Boiler Housing 5' Deep; Cement Bottom
- H&H Metals VI Investigation Area
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area
- Chautauqua County Tax Parcels
- Chadakoin River

Notes:
1. NYSDEC = New York Department of Environmental Conservation
2. OU = operable unit
3. VI = vapor intrusion

N

BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

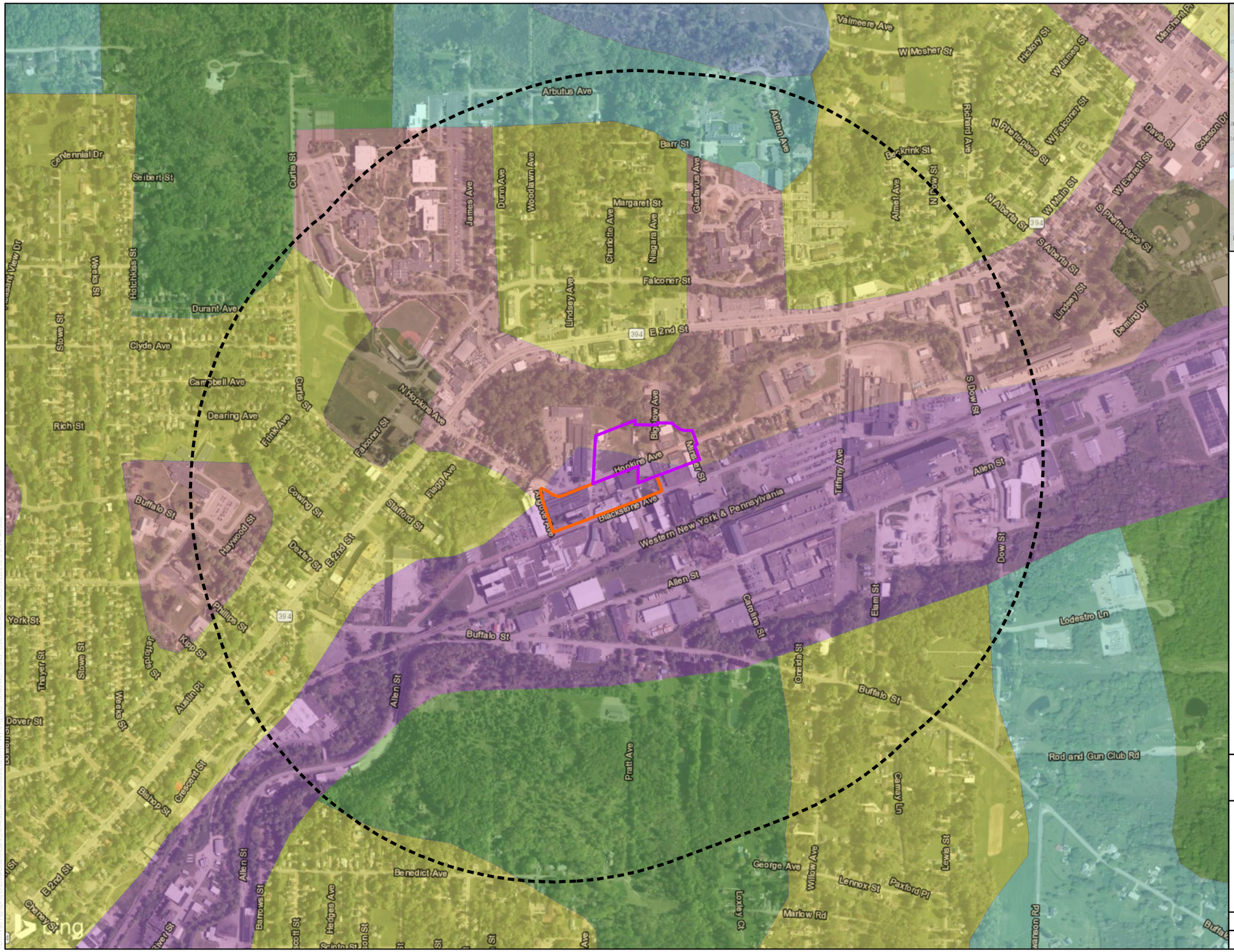
0 37.5 75 150
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 4
Soil Vapor and Air Monitoring Locations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

C:\Projects\01\visions\ID\DowChemicals\Jamestown\Mapfiles\2025\RI_WP\Fig_04_DowJMS_SV_and_Air_Monitoring_Locations.mxd AESPE,IO 8/29/2025 9:13:48 AM


Site Boundary 0.5-mile Buffer
Approximate OU-03 Investigation Area
OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
Historical Land Use Designations
Commercial and Services
Cropland and Pasture
Deciduous Forest Land
Industrial
Other Urban or Built-up Land
Residential
Strip Mine, Quarry and/or Gravel Pit
Notes:
1. Enhanced Historical Land-Use and Land-Cover Data Sets of the U.S. Geological Survey (April 1, 2007).
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit
N
BASE MAP SOURCE:
Bing Aerial Imagery 2022
0
350
700
1,400
Scale in Feet
North Bay
Montreal
Ottawa
Canada
Barrie
Kingston
Brockville
Toronto
Lake Ontario
Rochester
New York
Buffalo
Project Area
Albany
PENNSYLVANIA
Pittsburgh
Trenton
Centennial Dr
Seibert St
Curtis St
Arbutus Ave
Barr St
Adrian Ave
Valmeere Ave
W Mosher St
Hickory St
W James St
Richard Ave
N Phillipsbea St
W Falconer St
Davis St
Colleson Dr
Backrink St
Almet Ave
N Dow St
N Alberta St
W Main St
W Exchange St
S Phillipsbea St
S Alberta St
Lindsey St
Deming Dr
James Ave
Dunn Ave
Woodlawn Ave
Margaret St
Gustavus Ave
Charlotte Ave
Niagara Ave
Falconer St
E 2nd St
Durant Ave
Clyde Ave
Campbell Ave
Dearing Ave
Rich St
Frink Ave
Curtis St
N Hopkins Ave
Falconer St
Bigelow Ave
Hopkins Ave
Main St
Blackstone Ave
Western New York & Pennsylvania
Tiffany Ave
Allen St
S Dow St
Dow St
Elam St
Carolina St
Oneida St
Lodestro Ln
Rod and Gun Club Rd
Buffalo St
Pratt Ave
Canary Ln
Lewis St
George Ave
Willow Ave
Lennox St
Paxford Pl
Marlow Rd
Lockley Ct
Benedict Ave
Allen St
Barrows St
Hedges Ave
Scott St
Crescent St
Bishop St
Chestnut St
E 2nd St
Dover St
York St
Thayer St
Stowe St
Weeks St
Austin Pl
Jarolds St
Phillips St
Kipp St
Haywood St
Dexter St
Cowing St
Stanford St
Flagg Ave
Buffalo St
Hotchkiss St
Clyde Ave
Durant Ave
Stowe St
Weeks St
Curtis St
Rich St
Dearing Ave
Frink Ave
Falconer St
N Hopkins Ave
Bigelow Ave
Hopkins Ave
Blackstone Ave
Main St

Map ID	Facility Name	SPILLS ID	STATUS
A	INTERSTATE CHEMICAL CO.	9306084	CLOSED
B	HOPE'S WINDOWS	1002737	CLOSED
C	EI LILLY (ESSEX CHEMICAL)	9006906	CLOSED
D	LILLY INDUSTRIES	9201470	CLOSED
E	LILLY INDUSTRIES	9204735	CLOSED
F	LILLY COATING	9100810	CLOSED
G	TRUCK LP#PX8218	0275163	CLOSED
H	JOHNSON MACHINE	9606157	CLOSED
I	H & H METAL COMPANY	9307513	CLOSED
J	ROLLFORM #2	9104026	CLOSED
K	CHADAKOIN RIVER	0403303	CLOSED
L	ROBO MART	1905354	NO RECORD OF CLOSURE
M	RED STAR EXPRESS	8909155	CLOSED
N	KEUKA LEASING	9314475	CLOSED
O	RED STAR EXPRESS	9314481	CLOSED
P	CART FACILITY	0850190	CLOSED
Q	JAMESTOWN PIPE & SUPPLY	9301932	CLOSED
R	JAMESTOWN METAL	9000157	CLOSED
S	TRUCK AT JAMESTOWN METAL	0075264	CLOSED
T	VEHICLE WIND TUNNEL	2305066	CLOSED
U	CRAWFORD FURNITURE	9203331	CLOSED
V	FIRE AT FORMER FURNITURE MANUFACTURE BUILDING	2207006	CLOSED
W	FIRE	2207017	CLOSED
X	PARKING LOT	1904953	CLOSED
Y	DIESEL SPILL	0275226	CLOSED
Z	BLACKSTONE CORPORATION	8704975	CLOSED
AA	BLACKSTONE CORPORATION	8705955	CLOSED
AB	BLACKSTONE CORPORATION	8702274	CLOSED
AC	BLACKSTONE	8804325	CLOSED
AD	BLACKSTONE	8904216	CLOSED
AE	BLACKSTONE CORPORATION	9007277	CLOSED
AF	HANSON AGGREGATES	1900400	CLOSED
AG	TITANX ENGINE COOLING	1112085	CLOSED
AH	VALEO	0708422	CLOSED
AI	HYDRAULIC LINE LEAK	0004707	CLOSED
AJ	VALEO ENGINE COOLING TANK	9707068	CLOSED
AK	VALEO ENGINE COOLING	9975054	CLOSED
AL	TITANX	1305007	CLOSED
AM	DAWSON METAL	9311164	CLOSED
AN	ICE TRUCK-ALLEN ST	9005417	CLOSED
AO	JAMESTOWN STERLING CORP	9111177	CLOSED
AP	OIL IN DITCH AT ALLEN ST.	9701969	CLOSED
AQ	VALEO/CHAUTAUQUA IDA	9875128	CLOSED
AR	AMERICAN LOCKER	9975581	CLOSED
AS	ROADWAY	0607740	CLOSED
AT	LINDENBERGER VEHICLE	9975256	CLOSED
AU	SUPERIOR GRINDING INC	0011522	CLOSED
AV	ANGELICA TEXTILE SVCES	9614177	CLOSED
AW	JAMESTOWN FD STATION #4	9408629	CLOSED
AX	DALSTROM	8904092	CLOSED
AY	GOLDEN TAXI	9975526	CLOSED
AZ	ON THE ROAD BY ALLEN ST	1600669	CLOSED
BA	LUTHERAN SOCIAL SERVICE	9606332	CLOSED
BB	COVENANT MANOR APARTMENTS	1207338	CLOSED
BC	JAMESTOWN COMM. COLLEGE	9306064	CLOSED
BD	CONSTRUCTION SITE TANK	9810258	CLOSED
BE	DALLSTROM BLDG.	0651259	CLOSED
BF	SCHNEIDER CARRIERS	9212472	CLOSED
BG	JAMESTOWN LAMINATING	9100278	CLOSED

Map ID	Facility Name	Registry ID	Map ID	Facility Name	Registry ID
01	LUTHERN SOCIAL SERVICES	110004528084	26	ULLY INDUSTRIAL COATINGS	110000885409
02	KACZAR COLLISION	110004461537	27	ESSEX SPECIALTY PRODUCTS LLC	110004538082
03	FAMILY DOLLAR STORE 1794	110063687498	28	ESSEX SPECIALTY PRODUCTS LLC	110060893136
04	JAMESTOWN TOOLING & MACHINING	110004443139	29	SCHAEFER PLUMBING & SUPPLY	110004554232
05	JAMESTOWN LAMINATING CO	110001567108	30	CUSTOM PRODUCTION MANUFACTURING INC	110070224919
06	JAMESTOWN SCIENTIFIC LLC	110019750759	31	JOHNSON MACHINE & FIBRE PRO	110004408034
07	SHERWIN-WILLIAMS CO THE	110000806414	32	ROLLFORM OF JAMESTOWN	110004427576
08	JAMESTOWN COMMUNITY COLLEGE	110004521651	33	JAMESTOWN METAL PRODUCTS LLC	110000328217
09	SUNOCO SERVICE STATION	110004328736	34	JAMESTOWN BRONZE WORKS INC	110004357133
10	SOFCO	110004320217	35	DOMINION VOTING SYSTEMS INC	110045410248
11	FENTON MOBILITY PRODUCTS INC	110006539601	36	CHAUTAUQUA HARDWARE CORP	110013315867
12	J S AUTO SUPPLY CO INC	110004345236	37	CHAUTAUQUA HARDWARE CORP	110064186848
13	J S COMPLETE AUTOMOTIVE REFINISH	110004485245	38	VALPRO SANITARY SUPPLIES INC	110071061337
14	INDUSTRIAL METAL FINISHING INC	110031337033	39	JAMESTOWN MALLEABLE FOUNDRY	110004386575
15	EZ MODULAR OFFICES INC	110001613335	40	INSCAPE (NEW YORK), INC.	110071080986
16	NEW ERA SIGN CO INC	110004532827	41	VALEO INC ENGINE COOLING TRUCK DIVISION	110000328173
17	JAMESTOWN PUBLIC SCHOOLS	110004474676	42	JAMESTOWN RMC	110041902055
18	DAHLSTROM MANUFACTURING CO INC	110001567082	43	JAMESTOWN STERLING CORP.	110007998275
19	SPRAY-TECH FINISHING BUFFALO ST PROPERTY	110019850197	44	BUSH INDUSTRIES - ALLEN ST	110019477234
20	CREATIVE FINISHES	110024425861	45	INDUSTRIAL METAL FINISHING INC	110069705652
21	CLASSIC BRASS INC	110001613111	46	ALLEN STREET DEVELOPMENT	110071150967
22	CUSTOM PAINTING	110008088899	47	KESTER SOLDER DIV LITTON SYST	110004459292
23	INNOVATIVE TOOL & MACHINE CO INC	110004381400	48	JAMESTOWN FABRICATED STEEL INC	110004310200
24	HOPE'S WINDOWS INC	110000328208	49	JAMESTOWN BROAD OF PUBLIC UTILITIES	110004389778
25	BLACKSTONE BUSINESS ENTERPRISES INC	110001567055	50	COLECRAFT COMMERCIAL FURNISHINGS	110001567288



EPA Facility

NYSDEC Spills Sites Status

Closed

No Record of Closure

Site Boundary 0.5-mile Buffer

Notes:
1. EPA Facility data provided by EPA Facility Registry Service (FRS) Query (accessed January 15, 2025; https://www.epa.gov/frs/frs-query).
2. Information from the following databases:
   NYSDEC SPILLS Database
   NYSDEC Remediation Site Database
   EPA Cleanup in My Community Map Database
3. SPILLS database results were not provided with geographic coordinates and were reviewed by street name and address; only sites without a closure record shown on map.
4. EPA = U.S. Environmental Protection Agency
5. NYSDEC = New York Department of Environmental Conservation
6. OU = operable unit
7. Non-NPL = non-National Priority List site

N

BASE MAP SOURCE:
Bing Aerial Imagery 2022

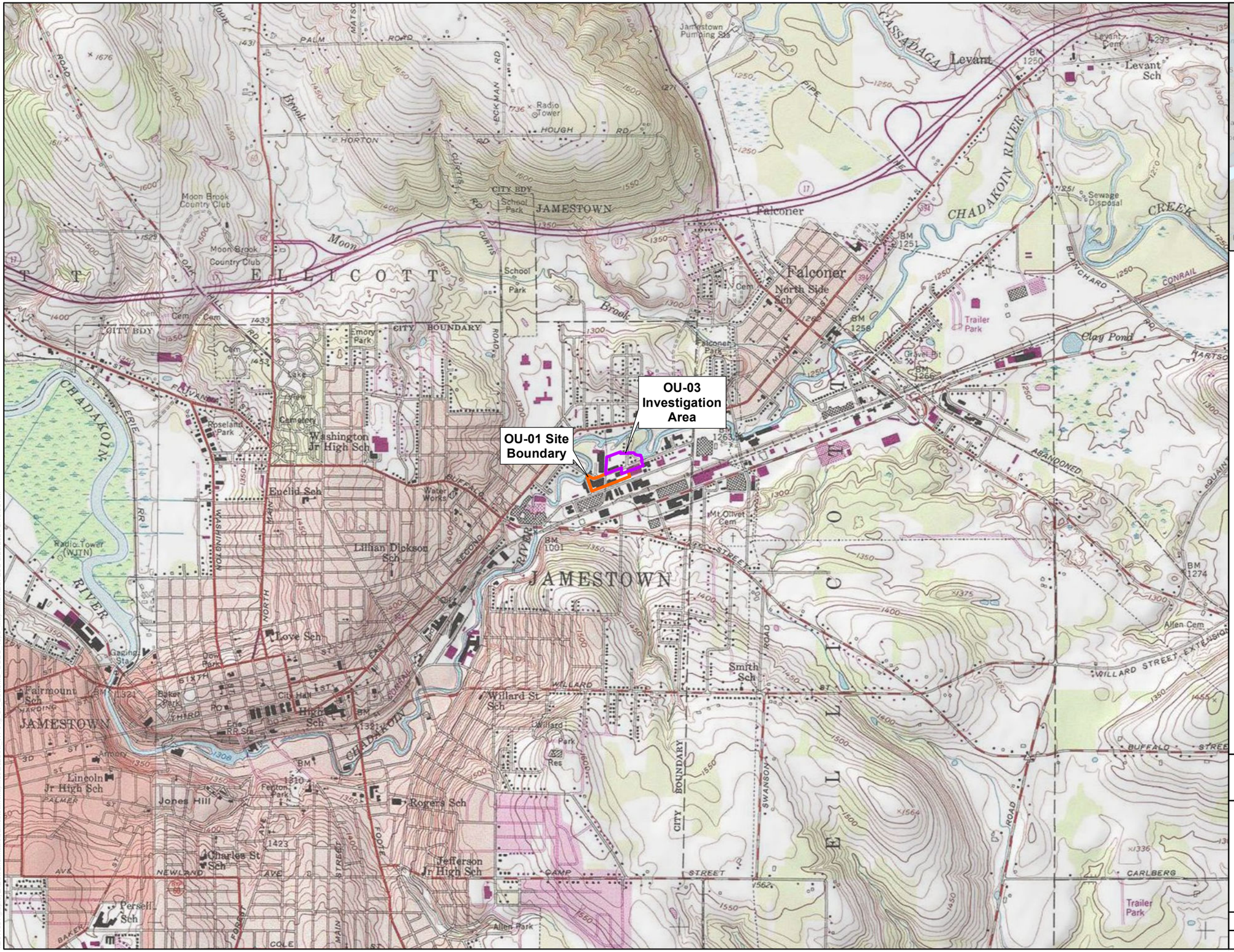
0 350 700 1,400

Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 6
EPA Facilities
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	





OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

Notes:
1. Jamestown USGS 7.5-minute Topographic Quadrangle (https://apps.nationalmap.gov/datasets/; accessed December 24, 2024).
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit
4. USGS = United States Geological Survey

N

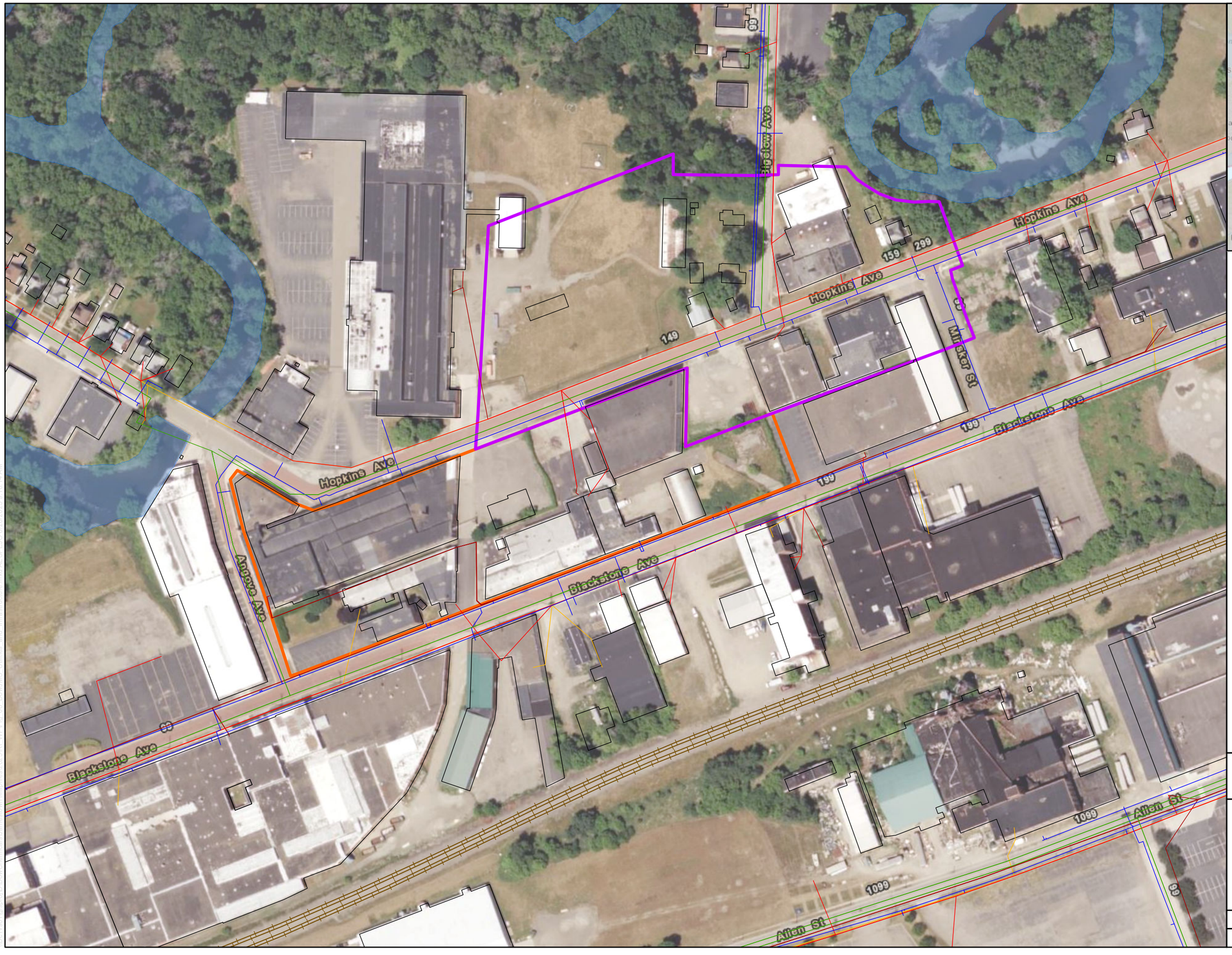
BASE MAP SOURCE:
USGS Topographic Map

0 1,000 2,000 4,000
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 7
USGS 7.5 Minute Topographic Map
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	





- Sanitary Sewer
- Water Main
- Electric (Overhead)
- Electric (Underground)
- Fiber Optic Cable
- Railroad
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area
- Building
- Chadakoin River

Notes:
1. Utility data provided by Jamestown Board of Public Utilities (JBPU) (accessed January 15, 2025; https://gis.jamestownbpu.com/).
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit

N

BASE MAP SOURCE:
Bing Aerial Imagery 2022

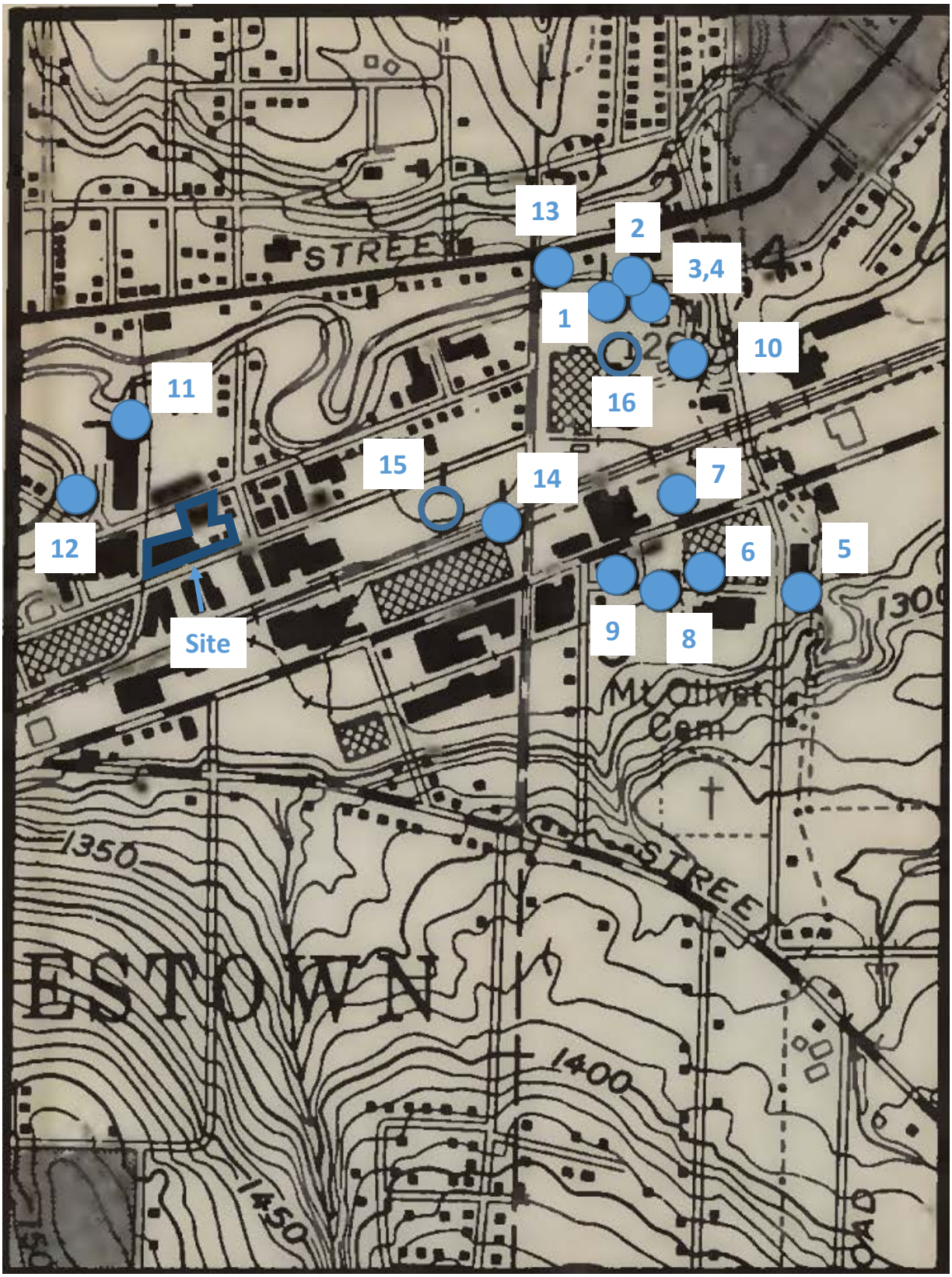
0 75 150 300
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 8
Utilities and Infrastructure
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

\\Jacobs\Projects\D\DenverGIS\Projects\Jamestown\MapFiles\2025\RI_WorkPlan_08_DrawMS_Utilities_and_Infrastructure.mxd AE 5/5/2025 8:19:14 AM

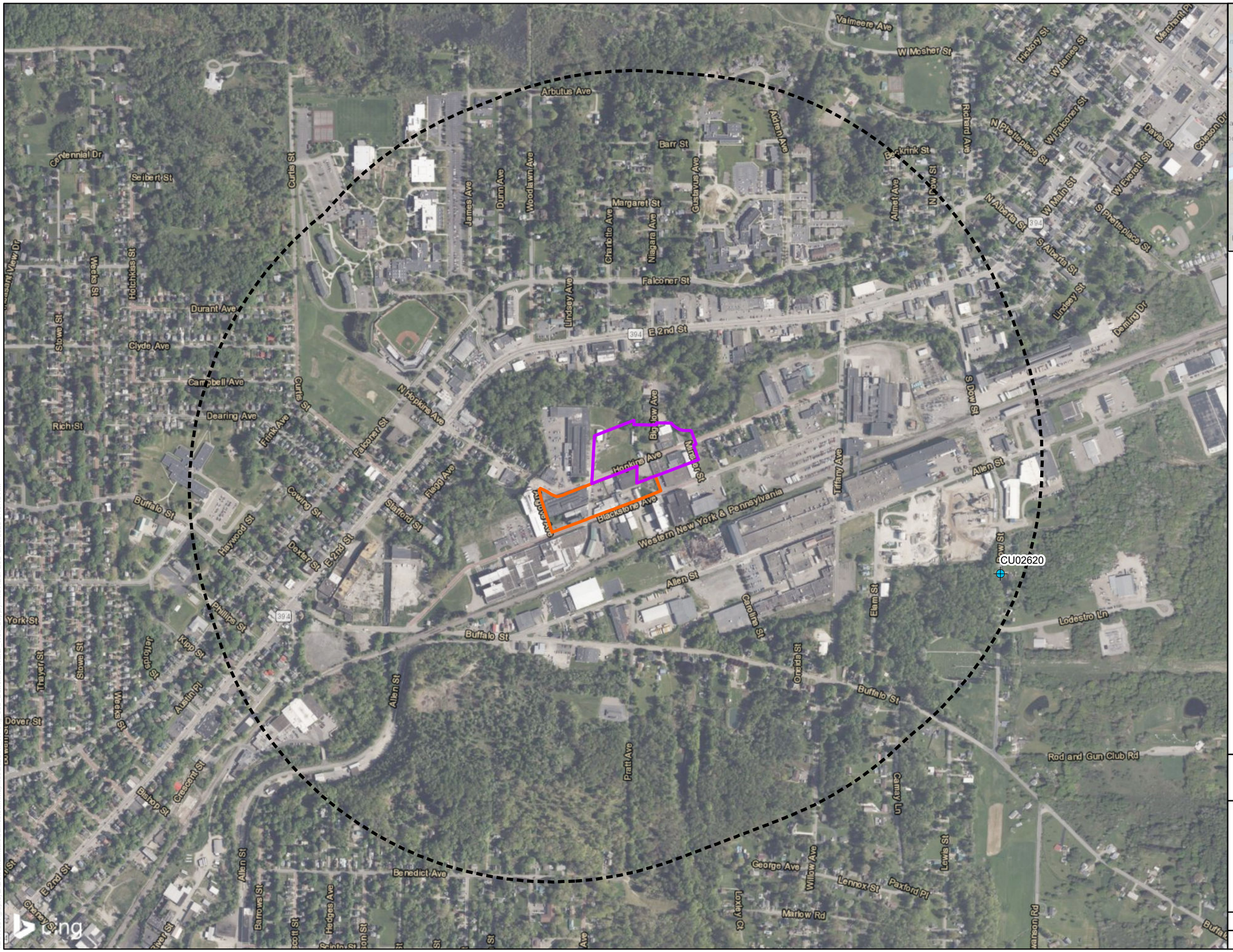


Number on map should be appended with 210-915-#

Plate 2, Inset 2 of Crain, 1966, Ground-water Resources of the Jamestown, NY area, NY Conservation Department Bulletin 58.

FIGURE 9a
Map of Nearby Wells in 1966
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

Jacobs





Water Well

Site Boundary 0.5-mile Buffer

OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

Notes:
1. Water Well data provided by NYSDEC Publisher (March 15, 2022, accessed December 24, 2024; https://data.gis.ny.gov/). Gas Well data provided by NYSDEC Division of Mineral Resources (accessed December 24, 2024; https://dec.ny.gov/environmental-protection/oil-gas/wells-data-geographical-information).
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit

N

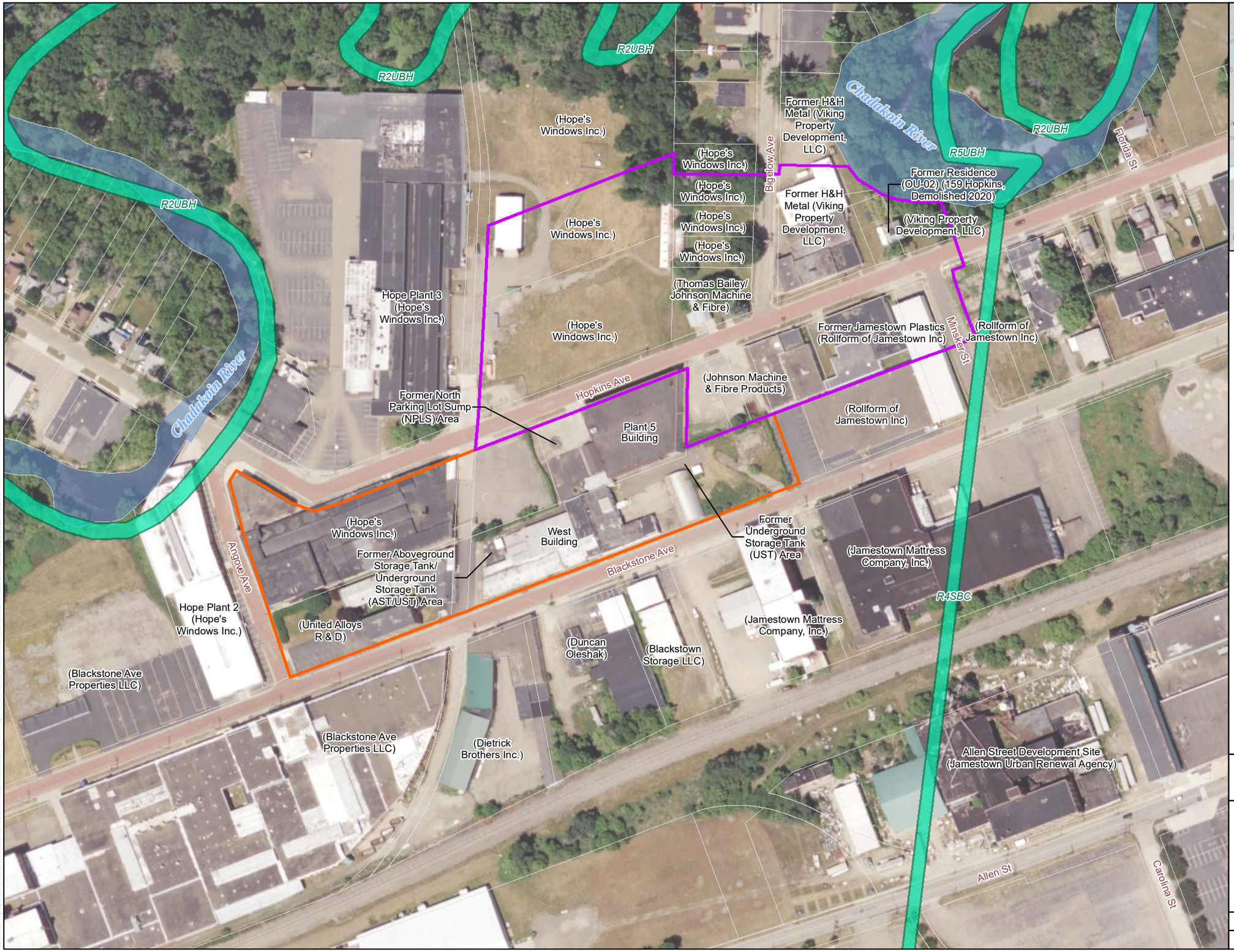
BASE MAP SOURCE:
Bing Aerial Imagery 2022

0 350 700 1,400
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 9b
Water Well Supply Search
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	





OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

Parcel

Chadakoin River

NWI Wetlands

Riverine

Notes:

1. Wetlands data provided by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) accessed December 24, 2024.(https://www.fws.gov/program/national-wetlands-inventory/download-state-wetlands-data)
2. NYSDEC = New York Department of Environmental Conservation
3. OU = operable unit
4. Riverine Descriptors
   System: R = riverine
   Subsystem: 2 = lower perennial, 4 = intermittent, 5 = unknown perennial
   Class: UB = unconsolidated bottom, SB = streambed
   Modifier: C = seasonally flooded, H = permanently flooded

N

BASE MAP SOURCE:
Bing Aerial Imagery 2022

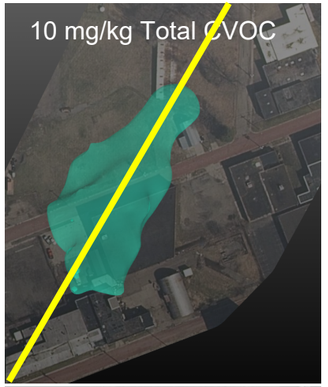
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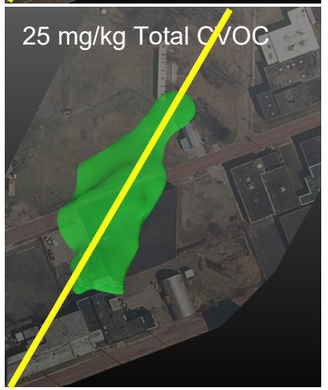
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 10
Wetlands Delineation
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

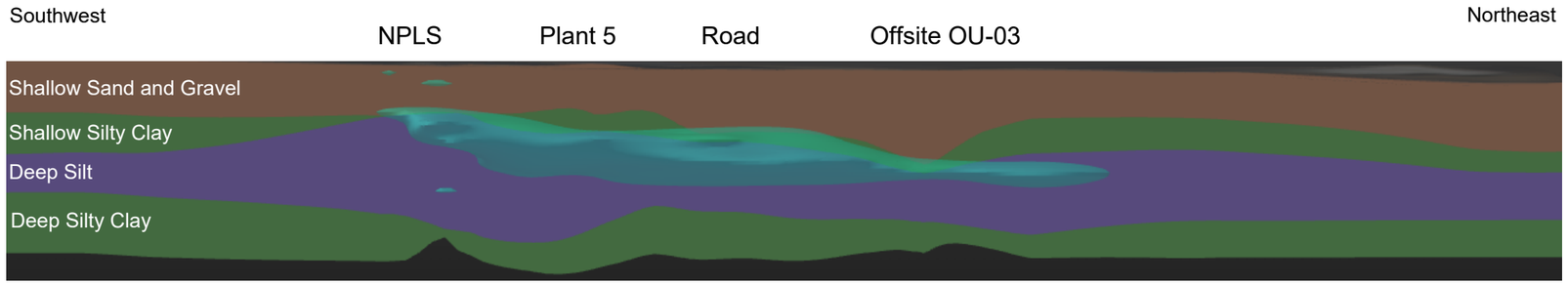
CREATED BY: AE	Jacobs
REVIEWED BY: WL	

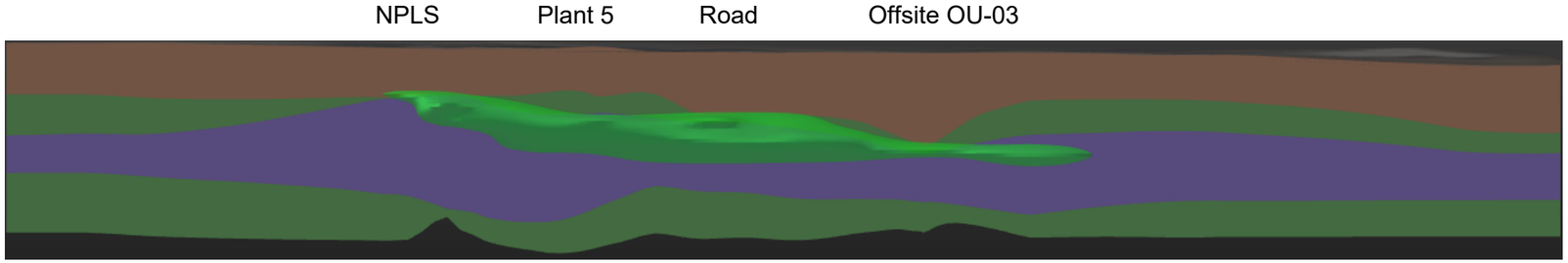


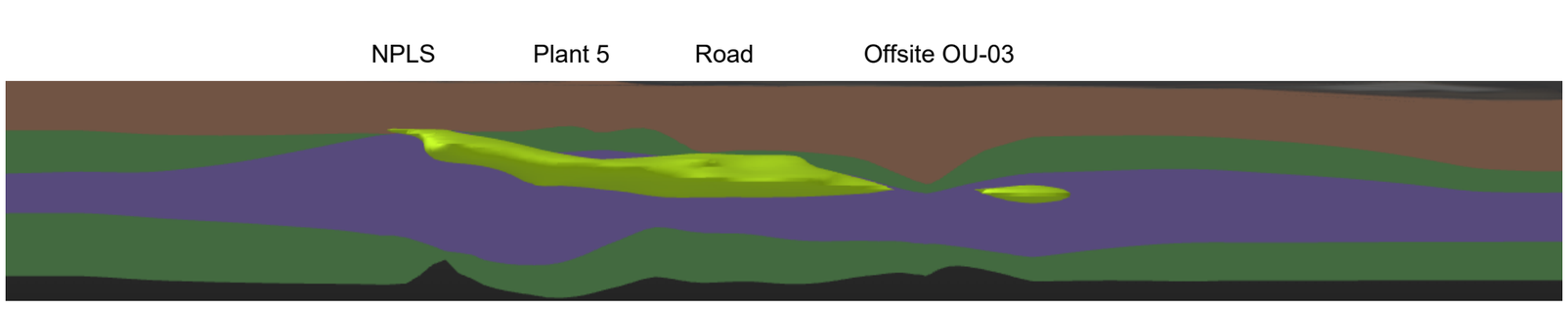


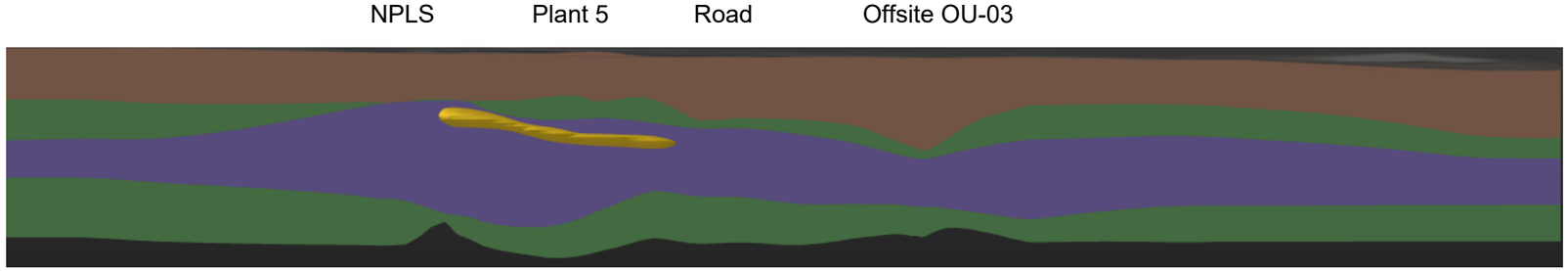






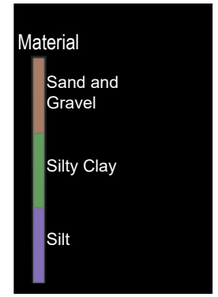


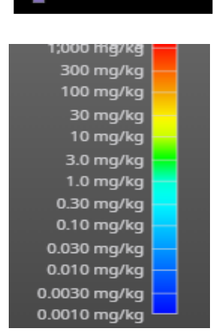




Notes:

1. Cross-section location shown by yellow line
2. Vertical scale exaggerated approximately 2x
3. Images were generated using Earth Volumetric Studio (EVS)
4. Total chlorinated volatile organic compounds (CVOC) in soil provided in milligrams per kilogram (mg/kg) using data from 2016, 2017, 2019, and 2022
5. NPLS = former North Parking Lot Sump area
6. OU = operational unit





Scale Varies

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

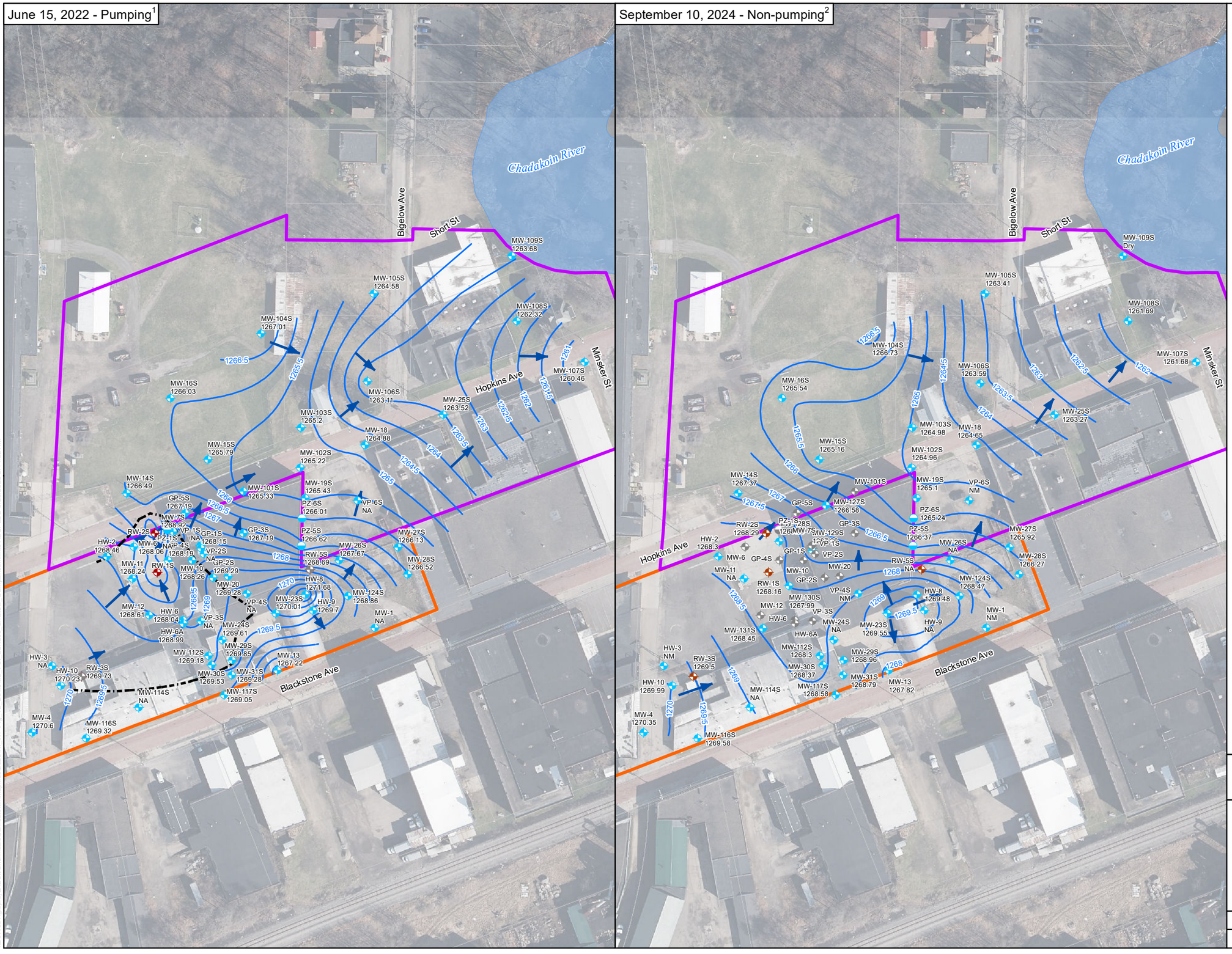
FIGURE 11
EVS Model of CVOC Soil Concentrations
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: SK	Jacobs
REVIEWED BY: BC	

\\hrvaxisdatafile\GIS_SHARE\ENB\GIS\00_Proj\DDeus_Chemical\Jamestown\Mapfiles\Engineering\Investigation\Report\2020\DeusMS_Fig02_Plant5InvestArea_20200205.mxd elew3 2/10/2020 2:53:57 PM

June 15, 2022 - Pumping[1]

September 10, 2024 - Non-pumping[2]



- Monitoring Well
- Piezometer
- Recovery Well
- Inactive Recovery Well
- Abandoned Monitoring Well
- Abandoned Piezometer
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Extent of Capture Zone
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area
- Chautauqua County Tax Parcels
- Chadakoin River

Notes:
1. Pumping rates the week prior to measuring June 15, 2022 water levels (gpm):
   RW-1S: 0.16 gpm
   RW-2S: 1.39 gpm
2. The groundwater extraction and treatment system was shut down for installation of a thermal treatment system prior to measuring September 10, 2024 water levels.
3. All elevations are in feet above mean sea level, NAVD88.
4. gpm = gallons per minute
5. NA = Not accessible
6. NAVD88 = North American Vertical Datum of 1988
7. NM = Water level could not be measured
8. NYSDEC = New York Department of Environmental Conservation
9. OU = operable unit

N

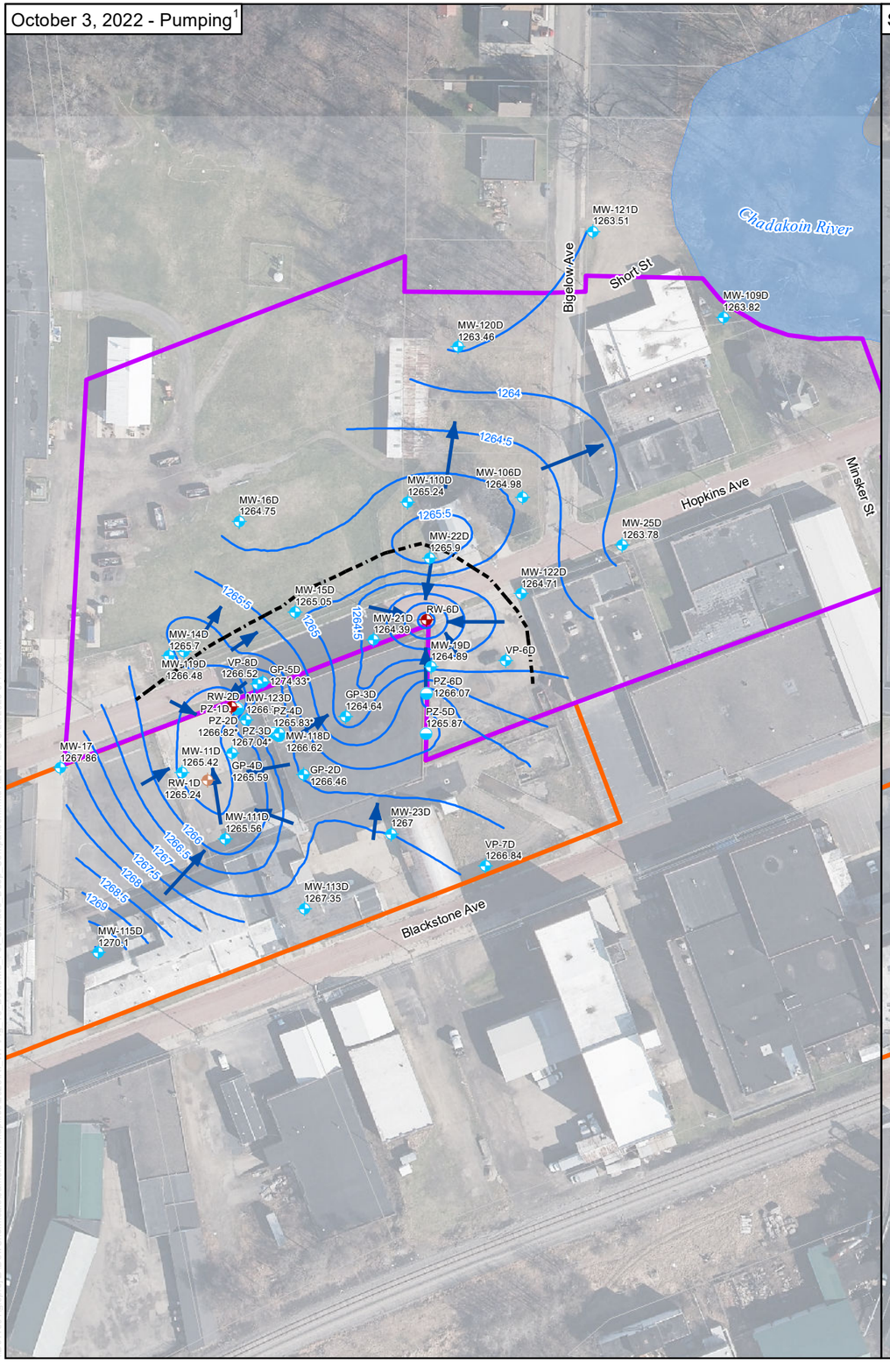
BASE MAP SOURCE:
Chautauqua County (2016): City Of Jamestown
New York State Plane, West Zone, NAD 83
(2011), US Survey Feet
Orthoimagery Type: 6" Resolution 4 band Digital

0 62.5 125 250
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 12
Potentiometric Surface – Shallow Zone Pumping Vs. Non-pumping Comparison
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	



- Monitoring Well
- Piezometer
- Recovery Well
- Inactive Recovery Well
- Abandoned Monitoring Well
- Abandoned Piezometer
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Extent of Capture Zone
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area
- Chautauqua County Tax Parcels
- Chadakoin River

Notes:
1. Pumping rates the week prior to measuring October 3, 2022 water levels (gpm):
   RW-2D: 1.46 gpm
   RW-6D: 0.36 gpm
2. The groundwater extraction and treatment system was shut down for installation of a thermal treatment system prior to measuring September 10, 2024 water levels.
3. Groundwater elevation interpreted as anomalous, excluded from contour interpretation.
4. All elevations are in feet above mean sea level, NAVD88.
5. gpm = gallons per minute
6. NA = Not accessible - well not accessible due to thermal remediation construction or other access issue
7. NAVD88 = North American Vertical Datum of 1988
8. NM = water level could not be measured
9. NYSDEC = New York Department of Environmental Conservation
10. OU = operable unit

N

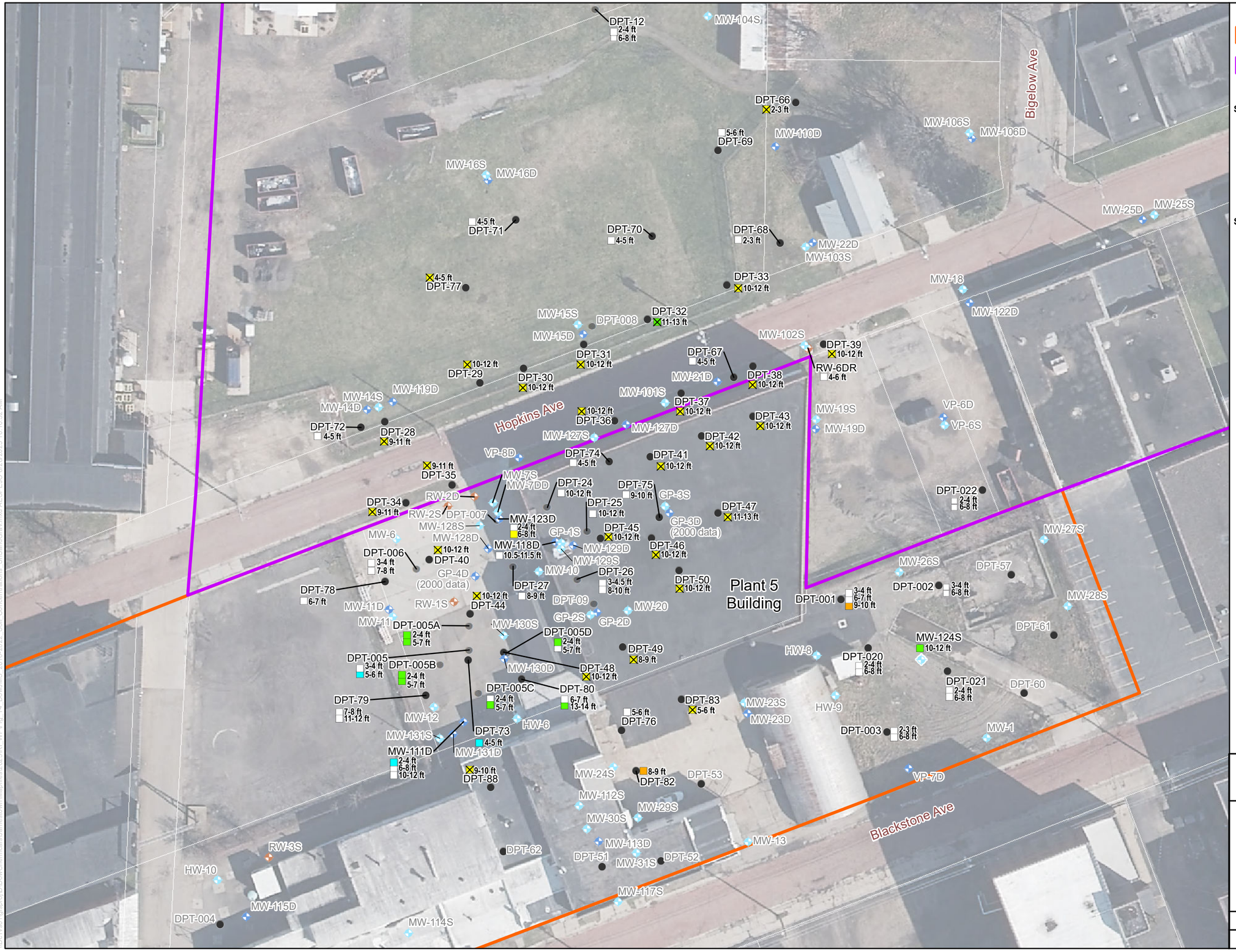
BASE MAP SOURCE:
Chautauqua County (2016): City Of Jamestown
New York State Plane, West Zone, NAD 83
(2011), US Survey Feet
Orthoimagery Type: 6" Resolution 4 band Digital

0 62.5 125 250
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 13
Potentiometric Surface – Deep Zone Pumping Vs. Non-pumping Comparison
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	



OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

X Acetone Exceedance Only

Sampling Locations

- Deep Monitoring Well
- Shallow Monitoring Well
- Recovery Well
- Direct Push Technology Boring

Soil Concentrations (mg/kg)

- < Unrestricted SCOs for VOCs
- > SCO, < 1
- 1 - 10
- 10 - 25
- 25 - 100
- 100 - 500
- 500+

Notes:

1. Soil concentrations depicted in this figure are based on any volatile organic compound exceedances in soil collected during the 2016 (CH2M 2017), 2017 (CH2M 2018), 2019 (Jacobs 2020), and 2022 (Jacobs 2023) investigations.
2. This figure reflects exceedances of the lowest value between the 1994 Record of Decision (ROD) Remedial Action Objectives or the 2023 Amended ROD applicable standard, criteria, and guidance for OU-01 protection of groundwater soil cleanup objective.
3. mg/kg = milligram(s) per kilogram
4. NYSDEC = New York Department of Environmental Conservation
5. OU = operable unit
6. SCO = soil cleanup objectives
7. VOC = volatile organic compound

N

BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

0 25 50 100

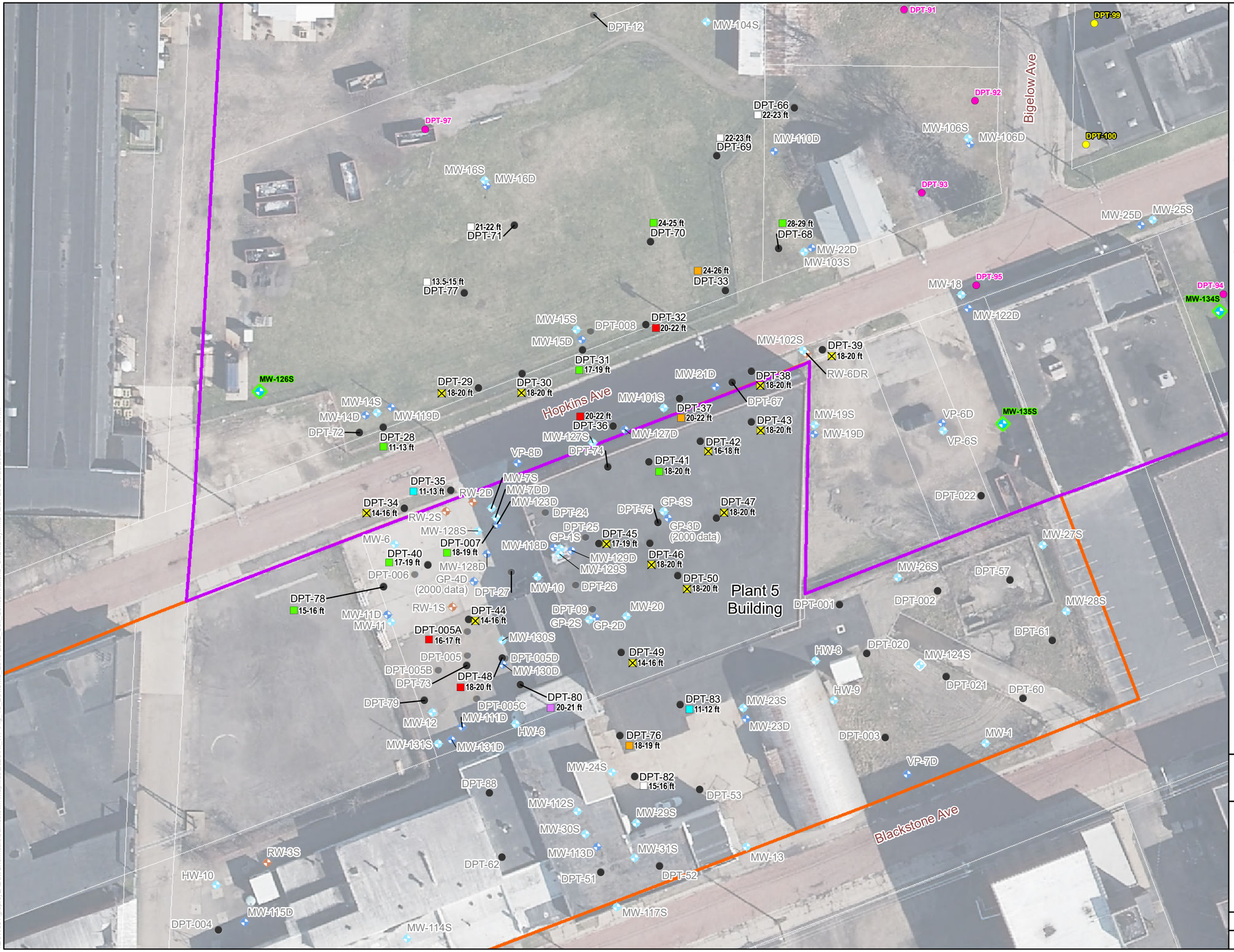
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 14
2016 to 2022 Soil Concentrations Shallow Sand and Gravel
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

X Acetone Exceedance Only

Proposed Soil Boring

Proposed Soil Boring Step-out

Proposed Shallow Monitoring Well

Sampling Locations

Deep Monitoring Well

Shallow Monitoring Well

Recovery Well

Direct Push Technology Boring

Soil Concentrations (mg/kg)

< Unrestricted SCOs for VOCs

< 1

1 - 10

10 - 25

25 - 100

100 - 500

500+

Notes:

1. Soil concentrations depicted in this figure are based on any volatile organic compound exceedances in soil collected during the 2016 (CH2M 2017), 2017 (CH2M 2018), 2019 (Jacobs 2020), and 2022 (Jacobs 2023) investigations.
2. This figure reflects exceedances of the lowest value between the 1994 Record of Decision (ROD) Remedial Action Objectives or the 2023 Amended ROD applicable standard, criteria, and guidance for OU-01 protection of groundwater soil cleanup objective.
3. The sampling objective for each of the proposed soil boring locations is outlined in Table 4.
4. mg/kg = milligram(s) per kilogram
5. NYSDEC = New York Department of Environmental Conservation
6. OU = operable unit
7. SCO = soil cleanup objectives
8. VOC = volatile organic compound

N

BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

0 25 50 100

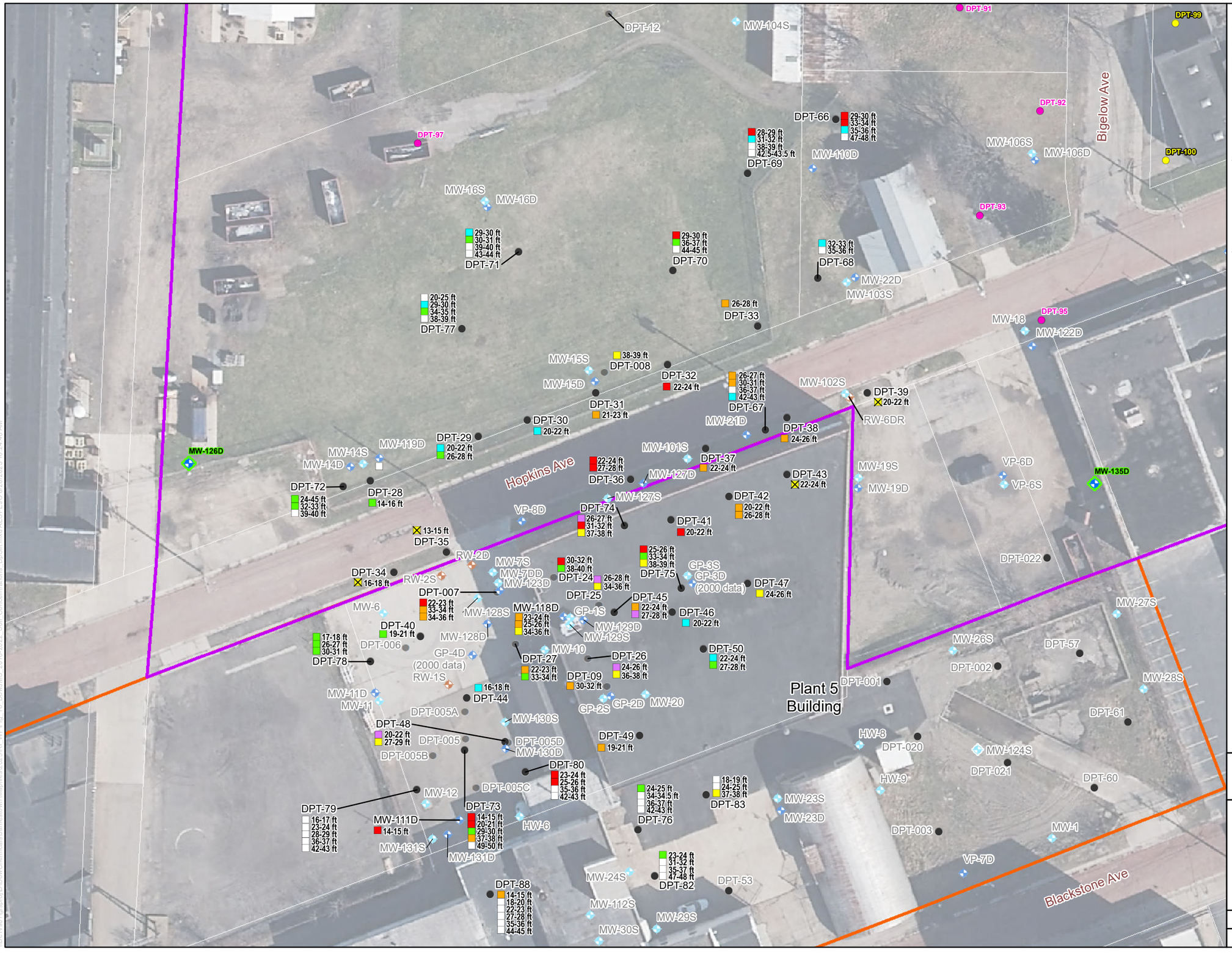
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 15
2016 to 2022 Soil Concentrations
Shallow Silty Clay
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

X Acetone Exceedance Only

Proposed Soil Boring

Proposed Soil Boring Step-out

Proposed Deep Monitoring Well

Sampling Locations

Deep Monitoring Well

Shallow Monitoring Well

Recovery Well

Direct Push Technology Boring

Soil Concentrations (mg/kg)

< Unrestricted SCOs for VOCs

< 1

1 - 10

10 - 25

25 - 100

100 - 500

500+

Notes:

1. Soil concentrations depicted in this figure are based on any volatile organic compound exceedances in soil collected during the 2016 (CH2M 2017), 2017 (CH2M 2018), 2019 (Jacobs 2020), and 2022 (Jacobs 2023) investigations.
2. This figure reflects exceedances of the lowest value between the 1994 Record of Decision (ROD) Remedial Action Objectives or the 2023 Amended ROD applicable standard, criteria, and guidance for OU-01 protection of groundwater soil cleanup objective.
3. The sampling objective for each of the proposed soil boring locations is outlined in Table 4.
4. mg/kg = milligram(s) per kilogram
5. NYSDEC = New York Department of Environmental Conservation
6. OU = operable unit
7. SCO = soil cleanup objectives
8. VOC = volatile organic compound

N

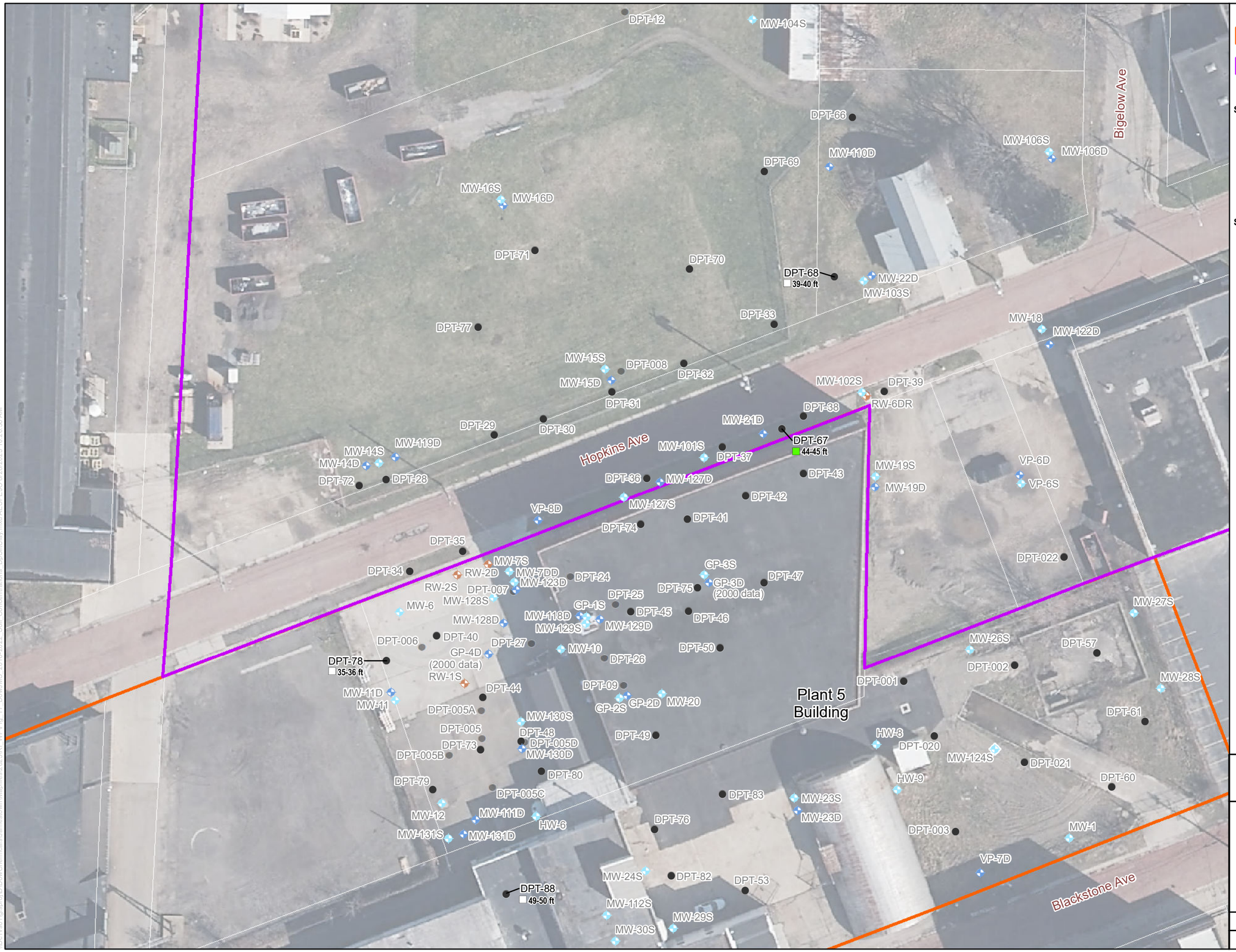
BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 16
2016 to 2022 Soil Concentrations
Deep Silt
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)

Approximate OU-03 Investigation Area

X Acetone Exceedance Only

Sampling Locations

- Deep Monitoring Well
- Shallow Monitoring Well
- Recovery Well
- Direct Push Technology Boring

Soil Concentrations (mg/kg)

- < Unrestricted SCOs for VOCs
- < 1
- 1 - 10
- 10 - 25
- 25 - 100
- 100 - 500
- 500+

Notes:

1. Soil concentrations depicted in this figure are based on any volatile organic compound exceedances in soil collected during the 2016 (CH2M 2017), 2017 (CH2M 2018), 2019 (Jacobs 2020), and 2022 (Jacobs 2023) investigations.
2. This figure reflects exceedances of the lowest value between the 1994 Record of Decision (ROD) Remedial Action Objectives or the 2023 Amended ROD applicable standard, criteria, and guidance for OU-01 protection of groundwater soil cleanup objective.
3. mg/kg = milligram(s) per kilogram
4. NYSDEC = New York Department of Environmental Conservation
5. OU = operable unit
6. SCO = soil cleanup objectives
7. VOC = volatile organic compound

N

BASE MAP SOURCE:
NYS Office of Information Technology Services, GIS Program Office, Obtained: Feb 2019.

0 22.5 45 90

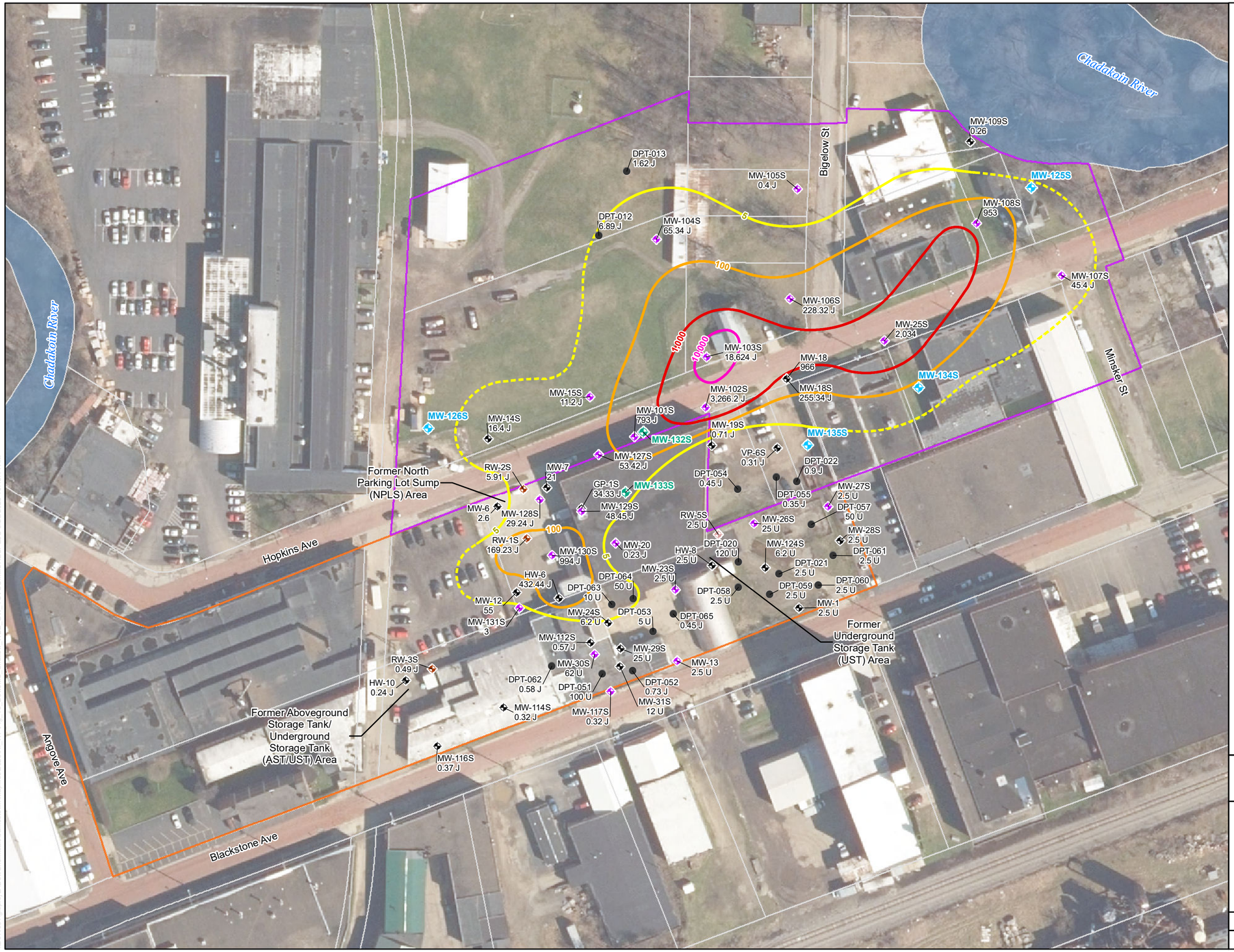
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 17
2016 to 2022 Soil Concentrations
Deep Silt Clay
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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- Proposed Shallow Monitoring Well
- Proposed Shallow Monitoring Well (OU-01 ISTT)
- Monitoring Well (CVOC Result in 2020-2024)
- Monitoring Well (CVOC Result in 2016-2019)
- Direct Push Technology Boring (CVOC Result in 2016-2017)
- Recovery Well - Inactive (CVOC Result in 2024)
- Recovery Well - Inactive (CVOC Result in 2017)

Shallow WBZ Total CVOC Contour (µg/L)
(Dashed Where Inferred)

- 5
- 100
- 1,000
- 10,000
- Chautauqua County Tax Parcels
- Chadakoin River
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area

Notes:
1. The sampling objective for each of the proposed monitoring wells is outlined in Table 5.
2. µg/L = microgram per liter
3. CVOC = chlorinated volatile organic compound
4. ISTT = in situ thermal treatment
5. J = One or more detected CVOC concentrations were estimated.
6. NYSDEC = New York Department of Environmental Conservation
7. OU = operable unit
8. U = CVOCs were nondetect, the total CVOC result defaulted to the result with the highest reporting limit.
9. WBZ = water-bearing zone

N

BASE MAP SOURCE:
Imagery: Statewide Digitial Orthoimagery 2016 of Chautauqua County, New York Stat Gov 2016;
Tax Parcel Source: Chautauqua County Department of Information Services. Last updated July 7th, 2017.

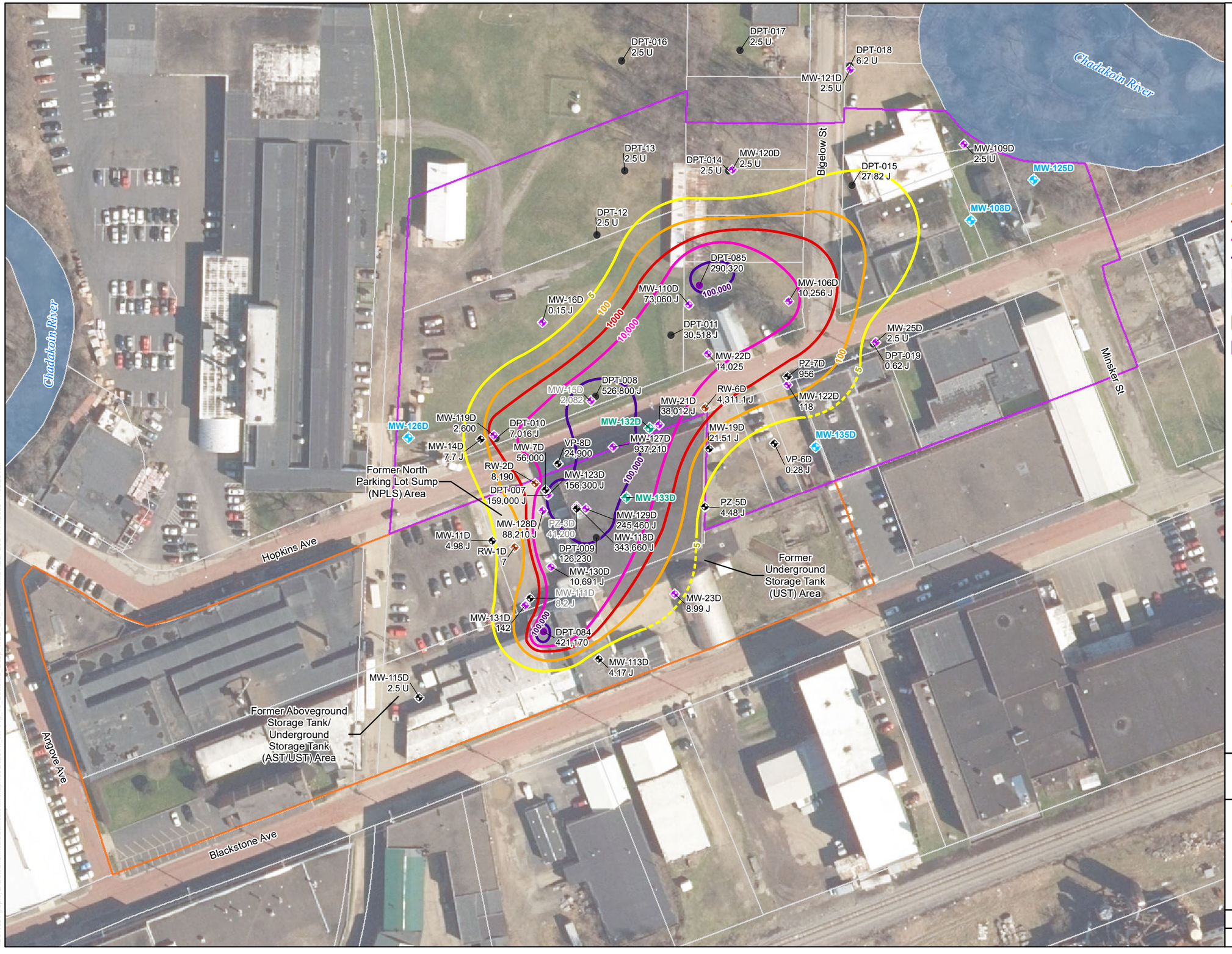
0 50 100 200
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 18
Groundwater Shallow WBZ Total CVOC Concentration Plume
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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- Proposed Deep Monitoring Well
- Proposed Deep Monitoring Well (OU-01 ISTT)
- Monitoring Well (CVOC Result in 2020-2024)
- Monitoring Well (CVOC Result in 2016-2019)
- Direct Push Technology Boring (CVOC Result in 2022)
- Direct Push Technology Boring (CVOC Result in 2016-2017)
- Recovery Well - Inactive (CVOC Result in 2024)

Deep WBZ Total CVOC Contour (µg/L)
(Dashed Where Inferred)

- 5
- 100
- 1,000
- 10,000
- 100,000
- Chautauqua County Tax Parcels
- Chadakoin River
- OU-01 Site Boundary as defined by the July 2023 Order on Consent September 2023 Amended Record of Decision (NYSDEC 2023)
- Approximate OU-03 Investigation Area

Notes:
1. Gray results were not used in isoconcentration contour interpretation.
2. The sampling objective for each of the proposed monitoring wells is outlined in Table 5.
3. µg/L = microgram per liter
4. CVOC = chlorinated volatile organic compound
5. ISTT = in situ thermal treatment
6. J = One or more detected CVOC concentrations were estimated.
7. NYSDEC = New York Department of Environmental Conservation
8. OU = operable unit
9. U = CVOCs were nondetect, the total CVOC result defaulted to the result with the highest reporting limit.
10. WBZ = water-bearing zone

N

BASE MAP SOURCE:
Imagery: Statewide Digitial Orthoimagery 2016 of Chautauqua County, New York Stat Gov 2016;
Tax Parcel Source: Chautauqua County Department of Information Services. Last updated July 7th, 2017.

0 50 100 200
Scale in Feet

Essex Specialty Products, Inc	Essex-Hope Site, Jamestown, New York

FIGURE 19
Groundwater Deep WBZ Total CVOC Concentration Plume
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, NY, OU-03

CREATED BY: AE	Jacobs
REVIEWED BY: WL	

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Appendix A.
Detected Volatile Organic Compounds in Soil 2016 - 2022

Appendix A. Detected Volatile Organic Compounds in Soil - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-001	DPT-001	DPT-001	DPT-002	DPT-002	DPT-003	DPT-003	DPT-004	DPT-004
			Date of Collection	09/19/2016	09/19/2016	09/19/2016	09/20/2016	09/20/2016	09/19/2016	09/19/2016	09/19/2016	09/19/2016
			Sample Depth	03-04 ft	06-07 ft	09-10 ft	03-04 ft	06-08 ft	02-03 ft	06-08 ft	02-03 ft	02-03 ft
			Sample Type	N	N	N	N	N	N	N	N	FD
			Geologic Unit	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1,1-Trichloroethane	1	0.68	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.14**	**0.10**
1,1-Dichloroethene	1	0.33	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	0.089 U	0.082 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.0063 U	0.0058 U	1.2 U	0.0057 U	0.0065 UJ	0.0064 U	0.0054 U	0.44 U	0.41 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0063 U	0.0058 U	**36 J**	0.0057 U	0.0065 UJ	0.0064 U	**0.00023 J**	**0.18 J**	**0.27 J**
1,2-Dichloroethene (Total)	1	NC	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	0.089 U	0.082 U
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0063 U	0.0058 U	**2.6 J**	0.0057 U	0.0065 UJ	0.0064 U	0.0054 U	**0.12 J**	**0.15 J**
Methyl isobutyl ketone (4-Methyl-2-pentanone)	1	1[c]	mg/kg	0.012 U	0.012 U	2.4 U	0.011 U	0.013 UJ	0.013 U	0.011 U	**0.50 J**	**0.27 J**
Acetone	1	0.05	mg/kg	0.012 U	0.012 U	2.4 U	**0.0065 J**	**0.0096 J**	0.013 U	0.011 U	0.89 U	0.82 U
Benzene	1	0.06	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.034 J**	**0.043 J**
Bromomethane	1	NC	mg/kg	0.0025 U	0.0023 U	0.49 U	0.0023 U	0.0026 U	0.0026 U	0.0021 U	**0.032 J**	**0.054 J**
Chloroform	1	0.37	mg/kg	0.0019 U	0.0017 U	0.37 U	0.0017 U	0.0020 UJ	0.0019 U	0.0016 U	0.13 U	0.12 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	0.089 U	0.082 U
Ethylbenzene	1	1	mg/kg	0.0012 U	0.0012 U	**1.1 J**	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.13 J**	**0.24 J**
Isopropylbenzene	1	2.3[c]	mg/kg	0.0012 U	0.0012 U	**1.2 J**	0.0011 U	**0.00071 J**	0.0013 U	0.0011 U	**0.031 J**	**0.056 J**
Methylene Chloride	1	0.05	mg/kg	0.012 U	0.012 U	2.4 U	0.011 U	0.013 UJ	0.013 U	0.011 U	0.89 U	0.82 U
Naphthalene	1	12	mg/kg	0.0063 U	0.0058 U	**1.1 J**	0.0057 U	0.0065 UJ	0.0064 U	0.0054 U	**0.088 J**	**0.064 J**
n-Butylbenzene	1	12	mg/kg	0.0012 U	0.0012 U	**0.95 J**	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.027 J**	**0.068 J**
n-Propylbenzene	1	3.9	mg/kg	0.0012 U	0.0012 U	**6.3 J**	0.0011 U	**0.00022 J**	0.0013 U	0.0011 U	**0.034 J**	**0.045 J**
p-Isopropyltoluene	1	10[c]	mg/kg	0.0012 U	0.0012 U	**0.53 J**	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.011 J**	**0.017 J**
sec-Butylbenzene	1	11	mg/kg	0.0012 U	0.0012 U	**0.52 J**	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.021 J**	**0.026 J**
tert-Butylbenzene	1	5.9	mg/kg	0.0063 U	0.0058 U	**0.040 J**	0.0057 U	0.0065 UJ	0.0064 U	0.0054 U	0.44 U	0.41 U
Tetrachloroethene	1	1.3	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	**0.062 J**	**0.070 J**
Toluene	1	0.7	mg/kg	0.0019 U	0.0017 U	0.37 U	0.0017 U	0.0020 UJ	0.0019 U	0.0016 U	**0.85**	**0.73**
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0019 U	0.0017 U	0.37 U	0.0017 U	0.0020 UJ	0.0019 U	0.0016 U	0.13 U	0.12 U
Trichloroethene	1	0.47	mg/kg	0.0012 U	0.0012 U	0.24 U	0.0011 U	0.0013 UJ	0.0013 U	0.0011 U	0.089 U	0.082 U
Vinyl Chloride	1	0.02	mg/kg	0.0025 U	0.0023 U	0.49 U	0.0023 U	0.0026 UJ	0.0026 U	0.0021 U	0.18 U	0.16 U
Xylenes, m & p	1	NC	mg/kg	0.0025 U	0.0023 U	0.49 U	0.0023 U	0.0026 UJ	0.0026 U	0.0021 U	**0.80 J**	**1.3 J**
Xylene, o	1	NC	mg/kg	0.0025 U	0.0023 U	0.49 U	0.0023 U	0.0026 UJ	0.0026 U	0.0021 U	**0.44 J**	**0.85 J**
Xylenes, Total	1	1.6	mg/kg	0.0025 U	0.0023 U	0.49 U	0.0023 U	0.0026 UJ	0.0026 U	0.0021 U	**1.2 J**	**2.2 J**
VOC, Total	10	-	mg/kg	0.12 UJ	0.12 UJ	**50 J**	**0.0065 J**	**0.011 J**	0.13 UJ	**0.00023 J**	**3.5 J**	**4.4 J**
CVOC, Total	-	-	mg/kg	0.012 U	0.012 U	2.4 U	0.011 U	0.013 UJ	0.013 UJ	0.011 UJ	**0.20 J**	**0.17 J**
CBTEX, Total	-	-	mg/kg	0.0025 U	0.0023 U	**2.3 J**	0.0023 U	**0.00071 J**	0.0026 U	0.0021 U	**2.3 J**	**3.2 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-004	DPT-005	DPT-005	DPT-006	DPT-006	DPT-007	DPT-007	DPT-007	DPT-007
			Date of Collection	09/19/2016	09/19/2016	09/19/2016	09/19/2016	09/19/2016	09/21/2016	09/21/2016	09/21/2016	09/20/2016
			Sample Depth	06-07 ft	03-04 ft	05-06 ft	03-04 ft	07-08 ft	18-19 ft	22-23 ft	33-34 ft	34-36 ft
			Sample Type	N	N	N	N	N	N	N	N	N
			Geologic Unit	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1,1-Trichloroethane	1	0.68	mg/kg	0.0010 U	0.0011 U	0.16 U	0.0012 U	0.0011 U	0.057 U	3.8 U	0.33 U	0.74 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0010 U	0.0011 U	0.16 U	0.0012 U	0.0011 U	0.057 U	3.8 U	**0.22 J**	0.74 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.0050 U	0.0055 U	0.78 U	0.0061 U	0.0054 U	0.29 U	19 U	1.6 U	3.7 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0050 U	0.0055 U	**0.34 J**	0.0061 U	0.0054 U	**1.5**	19 U	1.6 U	**0.21 J**
1,2-Dichloroethene (Total)	1	NC	mg/kg	0.0010 U	**0.0015**	**0.49 J**	0.0012 U	0.0011 U	**0.66**	**91**	**10 J**	**11**
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0050 U	0.0055 U	**0.11 J**	0.0061 U	0.0054 U	**0.39**	19 U	1.6 U	3.7 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	1	1[c]	mg/kg	0.010 U	0.011 U	1.6 U	0.012 U	0.011 U	0.57 U	38 U	3.3 U	7.4 U
Acetone	1	0.05	mg/kg	**0.012**	**0.0097 J**	1.6 U	0.012 U	0.011 U	0.57 U	38 U	3.3 U	7.4 U
Benzene	1	0.06	mg/kg	0.0010 U	**0.00031 J**	**0.25**	0.0012 U	0.0011 U	**0.021 J**	3.8 U	**0.20 J**	0.74 U
Bromomethane	1	NC	mg/kg	0.0020 U	0.0022 U	0.065 U	0.0024 U	0.0022 U	0.11 U	7.5 U	0.66 U	1.5 U
Chloroform	1	0.37	mg/kg	0.0015 U	**0.00044 J**	0.24 U	0.0018 U	0.0016 U	0.086 U	5.6 U	0.50 U	1.1 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0010 U	**0.0015**	**0.41**	0.0012 U	0.0011 U	**0.66**	**91**	**10**	**11**
Ethylbenzene	1	1	mg/kg	0.0010 U	0.0011 U	**0.23**	0.0012 U	0.0011 U	**0.053 J**	3.8 U	0.33 U	0.74 U
Isopropylbenzene	1	2.3[c]	mg/kg	0.0010 U	0.0011 U	**0.063 J**	0.0012 U	0.0011 U	**0.040 J**	3.8 U	0.33 U	0.74 U
Methylene Chloride	1	0.05	mg/kg	0.010 U	**0.0020 J**	**0.48 J**	0.012 U	0.011 U	0.57 U	38 U	3.3 U	**0.86 J**
Naphthalene	1	12	mg/kg	0.0050 U	0.0055 U	**0.37 J**	0.0061 U	0.0054 U	0.29 U	19 U	1.6 U	3.7 U
n-Butylbenzene	1	12	mg/kg	0.0010 U	0.0011 U	**0.038 J**	0.0012 U	0.0011 U	**0.0086 J**	3.8 U	0.33 U	0.74 U
n-Propylbenzene	1	3.9	mg/kg	0.0010 U	0.0011 U	**0.12 J**	0.0012 U	0.0011 U	**0.22**	3.8 U	0.33 U	0.74 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0010 U	0.0011 U	**0.021 J**	0.0012 U	0.0011 U	**0.011 J**	3.8 U	0.33 U	0.74 U
sec-Butylbenzene	1	11	mg/kg	0.0010 U	0.0011 U	**0.033 J**	0.0012 U	0.0011 U	0.057 U	3.8 U	0.33 U	0.74 U
tert-Butylbenzene	1	5.9	mg/kg	0.0050 U	0.0055 U	0.78 U	0.0061 U	0.0054 U	0.29 U	19 U	1.6 U	3.7 U
Tetrachloroethene	1	1.3	mg/kg	0.0010 U	0.0011 U	**0.028 J**	0.0012 U	0.0011 U	0.057 U	3.8 U	0.33 U	0.74 U
Toluene	1	0.7	mg/kg	0.0015 U	**0.00032 J**	**0.76**	0.0018 U	0.0016 U	0.076 U	5.6 U	0.16 U	**0.53 J**
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0015 U	0.0016 U	**0.078 J**	0.0018 U	0.0016 U	0.086 U	5.6 U	**0.19 J**	1.1 U
Trichloroethene	1	0.47	mg/kg	0.0010 U	**0.014**	**18**	**0.0016**	**0.00027 J**	**0.17**	**270**	**40**	**76**
Vinyl Chloride	1	0.02	mg/kg	0.0020 U	0.0022 U	0.31 U	0.0024 U	0.0022 U	**0.012 J**	**1.1 J**	**0.60 J**	**0.42 J**
Xylenes, m & p	1	NC	mg/kg	0.0020 U	0.0022 U	**0.72**	0.0024 U	0.0022 U	**0.20**	7.5 U	0.66 U	1.5 U
Xylene, o	1	NC	mg/kg	0.0020 U	0.0022 U	**0.40**	0.0024 U	0.0022 U	**0.13**	7.5 U	0.66 U	1.5 U
Xylenes, Total	1	1.6	mg/kg	0.0020 U	0.0022 U	**1.1**	0.0024 U	0.0022 U	**0.33**	7.5 U	0.66 U	1.5 U
VOC, Total	10	-	mg/kg	**0.012**	**0.028 J**	**22 J**	**0.0016**	**0.00027 J**	**3.4 J**	**360 J**	**51 J**	**89 J**
CVOC, Total	-	-	mg/kg	0.010 UJ	**0.018 J**	**19 J**	**0.0016**	**0.00027 J**	**0.84 J**	**360 J**	**51 J**	**88 J**
CBTEX, Total	-	-	mg/kg	0.0020 U	**0.00063 J**	**2.4 J**	0.0024 U	0.0022 U	**0.44 J**	7.5 U	**0.20 J**	**0.53 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-008	DPT-009	MW-111D	MW-111D	MW-111D	MW-111D	MW-114S	MW-114S	MW-114S
			Date of Collection	09/20/2016	09/20/2016	10/13/2016	10/13/2016	10/13/2016	10/13/2016	09/22/2016	09/22/2016	09/22/2016
			Sample Depth	38-39 ft	30-32 ft	02-04 ft	06-08 ft	10-12 ft	14-15 ft	03-04 ft	03-04 ft	07-08 ft
			Sample Type	N	N	N	N	N	N	N	FD	N
			Geologic Unit	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Deep Silt	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel
			Operable Unit	OU-03	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1,1-Trichloroethane	1	0.68	mg/kg	0.0013 U	0.69 U	0.063 U	0.0011 U	0.061 U	3.6 U	0.0012 U	0.0012 U	0.0012 U
1,1-Dichloroethene	1	0.33	mg/kg	**0.00066 J**	0.69 U	0.063 U	0.0011 U	0.061 U	3.6 U	0.0012 U	0.0012 U	0.0012 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	**0.00020 J**	3.5 U	0.31 U	0.0056 U	0.30 U	18 U	0.0059 U	0.0060 U	0.0061 UJ
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0067 U	**0.16 J**	**0.25 J**	0.0056 U	**0.019 J**	**290**	**0.00059 J**	**0.0013 J**	**0.0012 J**
1,2-Dichloroethene (Total)	1	NC	mg/kg	**0.20 J**	**11**	**0.087**	**0.00030 J**	**0.020 J**	3.6 U	0.0012 U	0.0012 U	0.0012 U
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0067 U	3.5 U	**0.062 J**	0.0056 U	**0.0098 J**	**72**	0.0059 U	**0.00061 J**	**0.00053 J**
Methyl isobutyl ketone (4-Methyl-2-pentanone)	1	1[c]	mg/kg	0.013 U	6.9 U	0.63 U	0.011 U	0.61 U	36 U	0.012 UJ	0.012 UJ	0.012 UJ
Acetone	1	0.05	mg/kg	0.013 U	6.9 U	**0.17 J**	0.011 U	0.61 U	36 U	**0.0075 J**	**0.017**	**0.016**
Benzene	1	0.06	mg/kg	0.0013 U	0.69 U	**0.23**	0.0011 U	0.061 U	3.6 U	0.0012 U	0.0012 U	0.0012 U
Bromomethane	1	NC	mg/kg	0.0027 U	1.4 U	0.12 U	0.0022 U	0.12 U	7.3 U	0.0023 U	0.0024 U	0.0024 U
Chloroform	1	0.37	mg/kg	0.0020 U	1.0 U	0.094 U	0.0017 U	0.092 U	5.4 U	0.0018 U	0.0018 U	0.0018 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.20**	**11**	**0.087**	**0.00030 J**	**0.020 J**	3.6 U	0.0012 U	0.0012 U	0.0012 U
Ethylbenzene	1	1	mg/kg	0.0013 U	0.69 U	**0.18**	0.0011 U	0.061 U	**1.4 J**	0.0012 U	0.0012 U	**0.00022 J**
Isopropylbenzene	1	2.3[c]	mg/kg	0.0013 U	0.69 U	**0.075**	0.0011 U	**0.011 J**	**6.3**	0.0012 U	0.0012 U	0.0012 U
Methylene Chloride	1	0.05	mg/kg	0.013 U	6.9 U	0.63 U	0.011 U	0.61 U	36 U	0.012 U	0.012 U	0.012 U
Naphthalene	1	12	mg/kg	**0.00022 J**	3.5 U	**0.41**	0.0056 U	0.30 U	18 U	**0.0010 J**	**0.0013 J**	**0.0012 J**
n-Butylbenzene	1	12	mg/kg	0.0013 U	0.69 U	**0.044 J**	0.0011 U	**0.023 J**	**5.2**	0.0012 U	0.0012 U	0.0012 UJ
n-Propylbenzene	1	3.9	mg/kg	0.0013 U	0.69 U	**0.12**	0.0011 U	**0.0079 J**	**47**	0.0012 U	0.0012 U	0.0012 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0013 U	0.69 U	**0.019 J**	0.0011 U	0.061 U	**3.8**	0.0012 U	0.0012 U	**0.00077 J**
sec-Butylbenzene	1	11	mg/kg	0.0013 U	0.69 U	**0.035 J**	0.0011 U	**0.040 J**	3.6 U	0.0012 U	0.0012 U	0.0012 U
tert-Butylbenzene	1	5.9	mg/kg	0.0067 U	3.5 U	0.31 U	0.0056 U	0.30 U	18 U	0.0059 U	0.0060 U	0.0061 U
Tetrachloroethene	1	1.3	mg/kg	0.0013 U	0.69 U	**0.024 J**	0.0011 U	0.061 U	3.6 U	0.0012 U	0.0012 U	0.0012 U
Toluene	1	0.7	mg/kg	0.0020 U	**0.62 J**	**0.81**	0.0017 U	0.092 U	5.4 U	0.0018 U	**0.00031 J**	**0.00042 J**
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00032 J**	1.0 U	0.094 U	0.0017 U	0.092 U	5.4 U	0.0018 U	0.0018 U	0.0018 U
Trichloroethene	1	0.47	mg/kg	**0.0014**	**88**	**10**	**0.0055**	0.061 U	3.6 U	0.0012 U	0.0012 U	0.0012 U
Vinyl Chloride	1	0.02	mg/kg	**0.066**	**0.19 J**	0.12 U	0.0022 U	0.12 U	7.3 U	0.0023 U	0.0024 U	0.0024 U
Xylenes, m & p	1	NC	mg/kg	0.0027 U	1.4 U	**0.59**	0.0022 U	0.12 U	**5.6 J**	**0.0010 J**	**0.0015 J**	**0.0018 J**
Xylene, o	1	NC	mg/kg	0.0027 U	1.4 U	**0.41**	0.0022 U	0.12 U	**2.1 J**	0.0023 U	**0.0015 J**	**0.0016 J**
Xylenes, Total	1	1.6	mg/kg	0.0027 U	1.4 U	**1.0**	0.0022 U	0.12 U	**7.7 J**	**0.0010 J**	**0.0030 J**	**0.0034 J**
VOC, Total	10	-	mg/kg	**0.27 J**	**100 J**	**14 J**	**0.0058 J**	**0.13 J**	**430 J**	**0.010 J**	**0.024 J**	**0.024 J**
CVOC, Total	-	-	mg/kg	**0.27 J**	**99 J**	**10 J**	**0.0058 J**	**0.020 J**	36 U	0.012 U	0.012 U	0.012 UJ
CBTEX, Total	-	-	mg/kg	0.0027 U	**0.62 J**	**2.3**	0.0022 U	**0.011 J**	**15 J**	**0.0010 J**	**0.0033 J**	**0.0040 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-115D	MW-115D	RW-6DR
			Date of Collection	09/29/2016	09/29/2016	10/11/2016
			Sample Depth	03-04 ft	04-05 ft	04-06 ft
			Sample Type	N	N	N
			Geologic Unit	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel
			Operable Unit	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit			
1,1,1-Trichloroethane	1	0.68	mg/kg	0.00093 U	0.11 U	0.0012 U
1,1-Dichloroethene	1	0.33	mg/kg	0.00093 U	0.11 U	0.0012 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.0046 U	0.57 U	0.0061 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0046 U	**2.4**	0.0061 U
1,2-Dichloroethene (Total)	1	NC	mg/kg	0.00093 U	0.11 U	0.0012 U
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0046 U	**1.0**	0.0061 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	1	1[c]	mg/kg	0.0093 U	1.1 U	0.012 U
Acetone	1	0.05	mg/kg	**0.0021 J**	1.1 U	0.012 U
Benzene	1	0.06	mg/kg	0.00093 U	0.11 U	0.0012 U
Bromomethane	1	NC	mg/kg	0.0018 U	**0.079 J**	0.0024 U
Chloroform	1	0.37	mg/kg	0.0014 U	0.17 U	0.0018 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.00093 U	0.11 U	0.0012 U
Ethylbenzene	1	1	mg/kg	0.00093 U	**0.38**	0.0012 U
Isopropylbenzene	1	2.3[c]	mg/kg	0.00093 U	**0.18**	0.0012 U
Methylene Chloride	1	0.05	mg/kg	0.0093 U	1.1 U	0.012 U
Naphthalene	1	12	mg/kg	0.0046 U	**0.12 J**	0.0061 U
n-Butylbenzene	1	12	mg/kg	0.00093 U	**0.25**	0.0012 U
n-Propylbenzene	1	3.9	mg/kg	0.00093 U	**0.57**	0.0012 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.00093 U	**0.16**	0.0012 U
sec-Butylbenzene	1	11	mg/kg	0.00093 U	**0.11**	0.0012 U
tert-Butylbenzene	1	5.9	mg/kg	0.0046 U	**0.016 J**	0.0061 U
Tetrachloroethene	1	1.3	mg/kg	0.00093 U	0.11 U	0.0012 U
Toluene	1	0.7	mg/kg	0.0014 U	0.17 U	0.0018 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0014 U	0.17 U	0.0018 U
Trichloroethene	1	0.47	mg/kg	0.00093 U	0.11 U	**0.0017**
Vinyl Chloride	1	0.02	mg/kg	0.0018 U	0.23 U	0.0024 U
Xylenes, m & p	1	NC	mg/kg	0.0018 U	**3.0**	0.0024 U
Xylene, o	1	NC	mg/kg	0.0018 U	**0.040 J**	0.0024 U
Xylenes, Total	1	1.6	mg/kg	0.0018 U	**3.0 J**	0.0024 U
VOC, Total	10	-	mg/kg	**0.0021 J**	**8.3 J**	**0.0017**
CVOC, Total	-	-	mg/kg	0.0093 U	1.1 U	**0.0017**
CBTEX, Total	-	-	mg/kg	0.0018 U	**3.6 J**	0.0024 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-005A	DPT-005A	DPT-005A	DPT-005B	DPT-005B	DPT-005B	DPT-005D	DPT-005D	DPT-012
			Date of Collection	9/20/2017	9/20/2017	9/20/2017	9/19/2017	9/19/2017	9/20/2017	9/20/2017	9/20/2017	9/13/2017
			Sample Depth	02-04 ft	05-07 ft	16-17 ft	02-04 ft	02-04 ft	05-07 ft	02-04 ft	05-07 ft	02-04 ft
			Sample Type	N	N	N	N	FD	N	N	N	N
			Geologic Unit	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1-Dichloroethene	1	0.33	mg/kg	0.067 U	0.05 U	2.2 U	0.052 U	0.051 U	0.058 U	0.07 U	0.00075 U	0.00088 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.34 U	0.25 U	11 U	0.26 U	0.26 U	0.29 U	0.35 U	0.0037 U	0.0044 UJ
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.062 J**	**0.078 J**	**7.8 J**	**0.041 J**	**0.065 J**	**0.18 J**	**0.23 J**	**0.00093 J**	0.0044 UJ
1,2-Dichloroethene (Total)	1	NC	mg/kg	**0.03 J**	**0.22 J**	**12**	**0.035 J**	**0.05 J**	**0.42 J**	**0.34 J**	**0.00039 J**	0.00088 U
1,3,5-Trimethylbenzene	1	8.4	mg/kg	**0.021 J**	**0.033 J**	**1.6 J**	**0.014 J**	**0.031 J**	**0.065 J**	**0.078 J**	0.0037 U	0.0044 UJ
Acetone	1	0.05	mg/kg	0.67 UJ	**0.14 J**	22 UJ	0.52 UJ	0.51 UJ	0.58 U	0.7 UJ	0.0075 UJ	0.0088 UJ
Benzene	1	0.06	mg/kg	**0.03 J**	**0.025 J**	2.2 U	**0.015 J**	**0.028 J**	**0.095**	**0.31**	0.00075 U	0.00088 U
Bromomethane	1	NC	mg/kg	0.13 U	0.099 U	4.5 U	0.1 U	0.1 U	0.12 U	0.14 U	0.0015 U	0.0018 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.67 U	0.5 U	22 U	0.52 U	0.51 U	0.58 U	0.7 U	0.0075 U	0.0088 U
Chloromethane	1	NC	mg/kg	0.34 U	0.25 U	11 U	0.26 U	0.26 U	0.29 U	0.35 U	0.0037 U	0.0044 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.03 J**	**0.2**	**12**	**0.035 J**	**0.05 J**	**0.4**	**0.28**	**0.00039 J**	0.00088 U
Ethylbenzene	1	1	mg/kg	**0.021 J**	**0.04 J**	2.2 U	**0.015 J**	**0.021 J**	**0.085**	**0.1**	0.00075 U	0.00088 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.067 U	**0.012 J**	2.2 U	0.052 U	0.051 U	**0.023 J**	**0.029 J**	0.00075 U	0.00088 U
Methyl Ethyl Ketone (2-Butanone)	1	0.12	mg/kg	0.67 UJ	0.5 UJ	22 UJ	0.52 UJ	0.51 UJ	0.58 UJ	0.7 UJ	0.0075 UJ	0.0088 UJ
Methylene Chloride	1	0.05	mg/kg	0.67 U	0.5 U	22 U	0.52 U	0.51 U	**0.18 J**	**0.13 J**	0.0075 U	0.0088 U
Naphthalene	1	12	mg/kg	**0.086 J**	**0.11 J**	11 U	**0.062 J**	**0.1 J**	**0.21 J**	**0.2 J**	**0.00018 J**	0.0044 UJ
n-Butylbenzene	1	12	mg/kg	0.067 U	0.05 U	2.2 U	0.052 U	0.051 U	**0.022 J**	**0.025 J**	0.00075 U	0.00088 UJ
n-Propylbenzene	1	3.9	mg/kg	**0.022 J**	**0.027 J**	**0.8 J**	**0.012 J**	**0.018 J**	**0.047 J**	**0.05 J**	0.00075 U	0.00088 UJ
p-Isopropyltoluene	1	10[c]	mg/kg	**0.018 J**	**0.018 J**	2.2 U	**0.036 J**	**0.066**	**0.027 J**	**3**	0.00075 U	0.00088 UJ
Sec-Butylbenzene	1	11	mg/kg	0.067 U	0.05 U	2.2 U	0.052 U	0.051 U	0.058 U	**0.024 J**	0.00075 U	0.00088 UJ
Tetrachloroethene	1	1.3	mg/kg	0.067 U	0.05 U	2.2 U	0.052 U	0.051 U	0.058 U	0.07 U	0.00075 U	**0.00087 J**
Toluene	1	0.7	mg/kg	**0.092 J**	**0.11**	3.4 U	**0.048 J**	**0.081**	**0.32**	**0.57**	0.0011 U	0.0013 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.1 U	**0.021 J**	3.4 U	0.078 U	0.077 U	**0.021 J**	**0.063 J**	0.0011 U	0.0013 U
Trichloroethene	1	0.47	mg/kg	**1.6**	**3.3**	**180**	**0.89**	**1.7**	**6.9**	**2.6**	**0.005**	0.00088 U
Vinyl Chloride	1	0.02	mg/kg	0.13 U	0.099 U	4.5 U	0.1 U	0.1 U	0.12 U	**0.078 J**	0.0015 U	0.0018 U
Xylenes, m & p	1	NC	mg/kg	**0.085 J**	**0.12**	4.5 U	**0.065 J**	**0.086 J**	**0.32**	**0.4**	0.0015 U	0.0018 U
Xylene, o	1	NC	mg/kg	**0.066 J**	**0.077 J**	4.5 U	**0.046 J**	**0.055 J**	**0.16**	**0.21**	0.0015 U	0.0018 UJ
Xylenes, Total	1	1.6	mg/kg	**0.15 J**	**0.2 J**	4.5 U	**0.11 J**	**0.14 J**	**0.48**	**0.61**	0.0015 U	0.0018 U
VOC, Total	10	-	mg/kg	**2.133 J**	**4.311 J**	**202.2 J**	**1.279 J**	**2.301 J**	**9.055 J**	**8.377 J**	**0.0065 J**	**0.00087 J**
CVOC, Total	-	-	mg/kg	**1.63 J**	**3.521 J**	**192**	**0.925 J**	**1.75 J**	**7.501 J**	**3.151 J**	**0.00539 J**	**0.00087 J**
CBTEX, Total	-	-	mg/kg	**0.294 J**	**0.384 J**	4.5 U	**0.189 J**	**0.271 J**	**1.003 J**	**1.619 J**	0.0015 U	0.0018 UJ

Appendix A. Detected Volatile Organic Compounds in Soil - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-012	DPT-020	DPT-020	DPT-021	DPT-021	DPT-022	DPT-022	DPT-022	DPT-024
			Date of Collection	9/13/2017	9/19/2017	9/19/2017	9/19/2017	9/19/2017	9/19/2017	9/19/2017	9/19/2017	9/21/2017
			Sample Depth	06-08 ft	02-04 ft	06-08 ft	02-4 ft	06-08 ft	02-04 ft	02-04 ft	06-08 ft	10-12 ft
			Sample Type	N	N	N	N	N	N	FD	N	N
			Geologic Unit	Shallow Sand & Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand and Gravel
			Operable Unit	OU-03	OU-01	OU-01	OU-01	OU-01	OU-03	OU-03	OU-03	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1-Dichloroethene	1	0.33	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.0044 U	0.0048 U	0.27 U	0.0049 U	0.56 U	0.0051 U	0.005 U	0.0045 U	0.0043 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0044 U	0.0048 U	0.27 U	0.0049 U	0.56 U	0.0051 U	0.005 U	0.0045 U	0.0043 U
1,2-Dichloroethene (Total)	1	NC	mg/kg	0.00088 U	**0.00082 J**	0.054 U	0.00098 U	0.11 U	**0.002**	0.00099 U	**0.00054 J**	**0.00038 J**
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0044 U	0.0048 U	0.27 U	0.0049 U	0.56 U	0.0051 U	0.005 U	0.0045 U	0.0043 U
Acetone	1	0.05	mg/kg	**0.0088 J**	0.0096 UJ	0.54 UJ	0.0098 UJ	1.1 UJ	0.01 UJ	0.0099 UJ	0.009 UJ	0.0085 UJ
Benzene	1	0.06	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Bromomethane	1	NC	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	0.002 U	0.002 U	0.0018 U	0.0017 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.0088 U	0.0096 U	**0.1 J**	0.0098 U	1.1 U	0.01 U	0.0099 U	0.009 U	0.0085 U
Chloromethane	1	NC	mg/kg	0.0044 U	0.0048 U	0.27 U	0.0049 U	0.56 U	0.0051 U	0.005 U	0.0045 U	0.0043 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.00088 U	**0.00082 J**	0.054 U	0.00098 U	0.11 U	**0.002**	0.00099 U	**0.00054 J**	**0.00038 J**
Ethylbenzene	1	1	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Methyl Ethyl Ketone (2-Butanone)	1	0.12	mg/kg	0.0088 UJ	0.0096 UJ	0.54 UJ	0.0098 UJ	1.1 UJ	0.01 UJ	0.0099 UJ	0.009 UJ	0.0085 UJ
Methylene Chloride	1	0.05	mg/kg	0.0088 U	0.0096 U	0.54 U	0.0098 U	1.1 U	0.01 U	0.0099 U	0.009 U	0.0085 U
Naphthalene	1	12	mg/kg	0.0044 U	0.0048 U	0.27 U	0.0049 U	0.56 U	0.0051 U	0.005 U	0.0045 U	0.0043 U
n-Butylbenzene	1	12	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
n-Propylbenzene	1	3.9	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Sec-Butylbenzene	1	11	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Tetrachloroethene	1	1.3	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	0.001 U	0.00099 U	0.0009 U	0.00085 U
Toluene	1	0.7	mg/kg	0.0013 U	0.0014 U	0.082 U	0.0015 U	0.17 U	0.0015 U	0.0015 U	0.0013 U	0.0013 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0013 U	0.0014 U	0.082 U	0.0015 U	0.17 U	0.0015 U	0.0015 U	0.0013 U	0.0013 U
Trichloroethene	1	0.47	mg/kg	0.00088 U	0.00096 U	0.054 U	0.00098 U	0.11 U	**0.00083 J**	0.00099 U	0.0009 U	**0.0013**
Vinyl Chloride	1	0.02	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	**0.0016 J**	0.002 U	0.0018 U	0.0017 U
Xylenes, m & p	1	NC	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	0.002 U	0.002 U	0.0018 U	0.0017 U
Xylene, o	1	NC	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	0.002 U	0.002 U	0.0018 U	0.0017 U
Xylenes, Total	1	1.6	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	0.002 U	0.002 U	0.0018 U	0.0017 U
VOC, Total	10	-	mg/kg	**0.0088 J**	**0.00082 J**	**0.1 J**	0.039 UJ	4.5 UJ	**0.00443 J**	0.04 UJ	**0.00054 J**	**0.00168 J**
CVOC, Total	-	-	mg/kg	0.0088 UJ	**0.00082 J**	0.54 UJ	0.0098 UJ	1.1 UJ	**0.00443 J**	0.0099 UJ	**0.00054 J**	**0.00168 J**
CBTEX, Total	-	-	mg/kg	0.0018 U	0.0019 U	0.11 U	0.002 U	0.22 U	0.002 U	0.002 U	0.0018 U	0.0017 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-024	DPT-024	DPT-024	DPT-025	DPT-025	DPT-025	DPT-025	DPT-026	DPT-026
			Date of Collection	9/21/2017	9/21/2017	9/21/2017	9/21/2017	9/21/2017	9/21/2017	9/21/2017	9/22/2017	9/22/2017
			Sample Depth	30-32 ft	30-32 ft	38-40 ft	10-12 ft	26-28 ft	26-28 ft	34-36 ft	03-4.5 ft	08-10 ft
			Sample Type	N	FD	N	N	N	FD	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silt	Shallow Sand and Gravel	Deep Silt	Deep Silt	Deep Silt	Shallow Sand and Gravel	Shallow Sand and Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1-Dichloroethene	1	0.33	mg/kg	**0.2 J**	1.2 U	0.059 U	0.00084 U	12 U	**0.21**	0.065 U	0.071 U	0.065 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	1.8 U	6.1 U	0.3 U	0.0042 U	61 U	**0.032 J**	0.32 U	0.36 U	0.32 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	1.8 U	6.1 U	0.3 U	0.0042 U	**8.4 J**	**12 J**	0.32 U	**0.076 J**	**0.051 J**
1,2-Dichloroethene (Total)	1	NC	mg/kg	**13 J**	**28 J**	**0.45 J**	**0.0004 J**	**48**	**56**	0.065 U	0.071 U	0.065 U
1,3,5-Trimethylbenzene	1	8.4	mg/kg	1.8 U	6.1 U	0.3 U	0.0042 U	**2.3 J**	**2.7**	0.32 U	**0.03 J**	**0.019 J**
Acetone	1	0.05	mg/kg	3.5 UJ	12 UJ	0.59 UJ	0.0084 UJ	120 UJ	0.62 UJ	0.65 UJ	0.71 UJ	0.65 UJ
Benzene	1	0.06	mg/kg	0.35 U	1.2 U	**0.86**	0.00084 U	12 U	**0.098**	**0.95**	0.071 U	0.065 U
Bromomethane	1	NC	mg/kg	0.71 U	2.4 U	0.12 U	0.0017 U	24 U	0.12 U	0.13 U	0.14 U	0.13 U
Carbon Disulfide	1	0.3[c]	mg/kg	3.5 U	12 U	0.59 U	0.0084 U	120 U	0.62 U	0.65 U	0.71 U	0.65 U
Chloromethane	1	NC	mg/kg	1.8 U	6.1 U	0.3 U	0.0042 U	61 U	**0.066 J**	0.32 U	0.36 U	0.32 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**13 J**	**28 J**	**0.4**	**0.0004 J**	**48**	**56**	0.065 U	0.071 U	0.065 U
Ethylbenzene	1	1	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**0.2**	0.065 U	0.071 U	0.065 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**0.16**	0.065 U	0.071 U	0.065 U
Methyl Ethyl Ketone (2-Butanone)	1	0.12	mg/kg	3.5 UJ	12 UJ	0.59 UJ	0.0084 UJ	120 UJ	0.62 UJ	0.65 UJ	0.71 UJ	0.65 UJ
Methylene Chloride	1	0.05	mg/kg	**0.7 J**	12 U	0.59 U	0.0084 U	120 U	0.62 U	0.65 U	0.71 U	0.65 U
Naphthalene	1	12	mg/kg	1.8 U	6.1 U	0.3 U	**0.00018 J**	**15 J**	**0.31 J**	0.32 U	**5.9**	**6**
n-Butylbenzene	1	12	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**0.16**	0.065 U	0.071 U	0.065 U
n-Propylbenzene	1	3.9	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**1**	0.065 U	0.071 U	0.065 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**0.07**	0.065 U	**0.053 J**	**0.043 J**
Sec-Butylbenzene	1	11	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**0.1**	0.065 U	0.071 U	0.065 U
Tetrachloroethene	1	1.3	mg/kg	0.35 U	1.2 U	0.059 U	0.00084 U	12 U	**2.8**	0.065 U	0.071 U	0.065 U
Toluene	1	0.7	mg/kg	0.53 U	1.8 U	0.089 U	0.0012 U	18 U	**0.2**	0.097 U	0.11 U	**0.015 J**
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.53 U	1.8 U	**0.051 J**	0.0012 U	18 U	**0.18**	0.097 U	0.11 U	0.098 U
Trichloroethene	1	0.47	mg/kg	**56**	**140**	**0.075**	**0.00065 J**	**1100**	**1400**	0.065 U	**0.032 J**	**0.028 J**
Vinyl Chloride	1	0.02	mg/kg	**0.84**	2.4 U	**1.5**	**0.00034 J**	24 U	**0.5**	**0.83**	0.14 U	0.13 U
Xylenes, m & p	1	NC	mg/kg	0.71 U	2.4 U	0.12 U	0.0017 U	24 U	**1.3**	0.13 U	**0.032 J**	0.13 U
Xylene, o	1	NC	mg/kg	0.71 U	2.4 U	0.12 U	0.0017 U	24 U	**0.81**	0.13 U	0.14 U	0.13 U
Xylenes, Total	1	1.6	mg/kg	0.71 U	2.4 U	0.12 U	0.0017 U	24 U	**2.1**	0.13 U	**0.032 J**	0.13 U
VOC, Total	10	-	mg/kg	**70.74 J**	**168 J**	**2.886 J**	**0.00157 J**	**1173.7 J**	**1478.896 J**	**1.78**	**6.123 J**	**6.156 J**
CVOC, Total	-	-	mg/kg	**70.74 J**	**168 J**	**2.026 J**	**0.00139 J**	**1148**	**1459.788 J**	**0.83**	**0.032 J**	**0.028 J**
CBTEX, Total	-	-	mg/kg	0.71 U	2.4 U	**0.86**	0.0017 U	24 U	**2.768**	**0.95**	**0.032 J**	**0.015 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-026	DPT-026	DPT-27	DPT-27	DPT-27	MW-118D	MW-118D	MW-118D	MW-118D
			Date of Collection	9/22/2017	9/22/2017	10/6/2017	10/6/2017	10/6/2017	10/3/2017	10/4/2017	10/4/2017	10/4/2017
			Sample Depth	24-26 ft	36-38 ft	08-09 ft	22-23 ft	33-34 ft	10.5-11.5 ft	23-24 ft	25-26 ft	34-36 ft
			Sample Type	N	N	N	N	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Shallow Sand and Gravel	Deep Silt	Deep Silt	Shallow Sand and Gravel	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit									
1,1-Dichloroethene	1	0.33	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	**0.057 J**	0.00087 U	0.39 U	0.46 U	0.054 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	19 U	0.27 U	0.0043 U	4.6 U	0.47 U	0.0043 U	1.9 U	2.3 U	0.27 UJ
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**14 J**	0.27 U	0.0043 U	**1.4 J**	0.47 U	**0.00033 J**	**2**	2.3 U	0.27 UJ
1,2-Dichloroethene (Total)	1	NC	mg/kg	**100**	**0.02 J**	0.00086 U	**72**	**2.8 J**	**0.0024**	**91**	**65**	**0.13**
1,3,5-Trimethylbenzene	1	8.4	mg/kg	**3.6 J**	0.27 U	0.0043 U	**0.33 J**	0.47 U	**0.00016 J**	**0.43 J**	2.3 U	0.27 UJ
Acetone	1	0.05	mg/kg	37 UJ	0.55 UJ	**0.0092 J**	**2.2 J**	0.95 U	**0.014 J**	3.9 UJ	4.6 UJ	0.54 UJ
Benzene	1	0.06	mg/kg	3.7 U	**0.52**	**0.00025 J**	0.93 U	**0.2**	**0.00058 J**	0.39 U	0.46 U	**0.57**
Bromomethane	1	NC	mg/kg	7.5 U	0.11 U	0.0017 U	1.8 U	0.19 U	0.0017 U	0.78 U	0.92 U	0.11 U
Carbon Disulfide	1	0.3[c]	mg/kg	37 U	0.55 U	0.0086 U	9.3 U	0.95 U	0.0087 U	3.9 U	4.6 U	0.54 U
Chloromethane	1	NC	mg/kg	19 U	0.27 U	**0.00075 J**	4.6 U	0.47 U	0.0043 U	1.9 U	2.3 U	0.27 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**100**	**0.02 J**	0.00086 U	**72**	**2.7**	**0.0024**	**91**	**65**	**0.13**
Ethylbenzene	1	1	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 UJ
Methyl Ethyl Ketone (2-Butanone)	1	0.12	mg/kg	37 UJ	0.55 UJ	0.0086 UJ	9.3 UJ	**0.13 J**	0.0087 UJ	3.9 UJ	4.6 UJ	0.54 UJ
Methylene Chloride	1	0.05	mg/kg	37 U	0.55 U	0.0086 U	9.3 U	0.95 U	0.0087 U	3.9 U	4.6 U	0.54 U
Naphthalene	1	12	mg/kg	19 U	**0.018 J**	0.0043 U	4.6 U	0.47 U	0.0043 U	1.9 U	2.3 U	0.27 U
n-Butylbenzene	1	12	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 UJ
n-Propylbenzene	1	3.9	mg/kg	**1.1 J**	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	**0.25 J**	0.46 U	0.054 UJ
p-Isopropyltoluene	1	10[c]	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 UJ
Sec-Butylbenzene	1	11	mg/kg	3.7 U	0.055 U	0.00086 U	0.93 U	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 UJ
Tetrachloroethene	1	1.3	mg/kg	**2.5 J**	0.055 U	0.00086 U	**0.31 J**	0.095 U	0.00087 U	0.39 U	0.46 U	0.054 U
Toluene	1	0.7	mg/kg	5.6 U	0.082 U	**0.00021 J**	1.4 U	0.14 U	0.0013 U	**0.083 J**	0.69 U	0.082 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	5.6 U	0.082 U	0.0013 U	1.4 U	**0.12 J**	0.0013 U	0.58 U	0.69 U	0.082 U
Trichloroethene	1	0.47	mg/kg	**1000**	**0.049 J**	**0.0006 J**	**81**	**9.9**	**0.012**	0.39 U	0.46 U	**0.047 J**
Vinyl Chloride	1	0.02	mg/kg	7.5 U	0.11 U	0.0017 U	1.8 U	**0.16 J**	0.0017 U	**0.14 J**	**1**	**0.024 J**
Xylenes, m & p	1	NC	mg/kg	7.5 U	0.11 U	0.0017 U	**0.36 J**	0.19 U	**0.00035 J**	**0.3 J**	**0.19 J**	0.11 U
Xylene, o	1	NC	mg/kg	7.5 U	0.11 U	0.0017 U	1.8 U	0.19 U	0.0017 U	**0.2 J**	0.92 U	0.11 U
Xylenes, Total	1	1.6	mg/kg	7.5 U	0.11 U	0.0017 U	**0.36 J**	0.19 U	**0.00035 J**	**0.5 J**	**0.19 J**	0.11 U
VOC, Total	10	-	mg/kg	**1121.2 J**	**0.607 J**	**0.01101 J**	**157.6 J**	**13.267 J**	**0.02982 J**	**94.403 J**	**66.19 J**	**0.771 J**
CVOC, Total	-	-	mg/kg	**1102.5 J**	**0.069 J**	**0.00135 J**	**153.31 J**	**12.937 J**	**0.0144**	**91.14 J**	**66**	**0.201 J**
CBTEX, Total	-	-	mg/kg	7.5 U	**0.52**	**0.00046 J**	**0.36 J**	**0.2**	**0.00093 J**	**0.583 J**	**0.19 J**	**0.57**

Appendix A. Detected Volatile Organic Compounds in Soil - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	MW-123D	MW-123D	SB-05C	SB-05C
			Date of Collection	9/26/2017	9/27/2017	9/25/2017	9/26/2017
			Sample Depth	02-04 ft	06-08 ft	02-04 ft	05-07 ft
			Sample Type	N	N	N	N
			Geologic Unit	Shallow Sand and Gravel	Shallow Sand and Gravel	Shallow Sand & Gravel	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit				
1,1-Dichloroethene	1	0.33	mg/kg	0.00093 U	0.05 U	0.059 U	0.064 U
1,2,3-Trichlorobenzene	1	NC	mg/kg	0.0047 U	0.25 U	0.29 U	0.32 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0047 U	**0.1 J**	**0.046 J**	**0.082 J**
1,2-Dichloroethene (Total)	1	NC	mg/kg	**0.0039 J**	**0.034 J**	**0.13 J**	**0.21 J**
1,3,5-Trimethylbenzene	1	8.4	mg/kg	0.0047 U	**0.019 J**	**0.023 J**	**0.04 J**
Acetone	1	0.05	mg/kg	**0.031**	0.5 U	0.59 U	**0.45 J**
Benzene	1	0.06	mg/kg	**0.0003 J**	**0.01 J**	**0.025 J**	**0.027 J**
Bromomethane	1	NC	mg/kg	0.0019 U	0.1 U	**0.085 J**	0.13 UJ
Carbon Disulfide	1	0.3[c]	mg/kg	0.0093 U	0.5 U	0.59 U	0.64 U
Chloromethane	1	NC	mg/kg	0.0047 U	0.25 U	0.29 U	0.32 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.0035**	**0.034 J**	**0.11**	**0.19**
Ethylbenzene	1	1	mg/kg	0.00093 U	**0.1**	**0.015 J**	**0.067**
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.00093 U	**0.04 J**	**0.014 J**	0.064 U
Methyl Ethyl Ketone (2-Butanone)	1	0.12	mg/kg	0.0093 UJ	0.5 UJ	0.59 UJ	0.64 UJ
Methylene Chloride	1	0.05	mg/kg	0.0093 U	0.5 U	0.59 U	**0.18 J**
Naphthalene	1	12	mg/kg	0.0047 U	**0.18 J**	**0.076 J**	**0.24 J**
n-Butylbenzene	1	12	mg/kg	0.00093 U	**0.014 J**	0.059 U	0.064 U
n-Propylbenzene	1	3.9	mg/kg	0.00093 U	**0.071**	0.059 U	**0.028 J**
p-Isopropyltoluene	1	10[c]	mg/kg	0.00093 U	**0.037 J**	**0.16**	0.064 U
Sec-Butylbenzene	1	11	mg/kg	0.00093 U	**0.016 J**	**0.013 J**	0.064 U
Tetrachloroethene	1	1.3	mg/kg	0.00093 U	**0.05**	0.059 U	0.064 U
Toluene	1	0.7	mg/kg	0.0014 U	**0.15**	**0.082 J**	**0.14**
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00037 J**	0.076 U	**0.022 J**	**0.02 J**
Trichloroethene	1	0.47	mg/kg	**0.0007 J**	**0.63**	**0.45**	**6.2**
Vinyl Chloride	1	0.02	mg/kg	**0.00068 J**	0.1 U	0.12 U	0.13 U
Xylenes, m & p	1	NC	mg/kg	0.0019 U	**0.22**	**0.074 J**	**0.32**
Xylene, o	1	NC	mg/kg	0.0019 U	**0.18 J**	**0.057 J**	**0.14 J**
Xylenes, Total	1	1.6	mg/kg	0.0019 U	**0.4**	**0.13 J**	**0.46**
VOC, Total	10	-	mg/kg	**0.03655 J**	**1.851 J**	**1.252 J**	**8.124 J**
CVOC, Total	-	-	mg/kg	**0.00525 J**	**0.714 J**	**0.582 J**	**6.59 J**
CBTEX, Total	-	-	mg/kg	**0.0003 J**	**0.7 J**	**0.267 J**	**0.694 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

				Location ID	DPT-28	DPT-28	DPT-28	DPT-29	DPT-29	DPT-29	DPT-29	DPT-30	DPT-30	DPT-30
				Date of Collection	09/25/2019	09/25/2019	09/25/2019	09/26/2019	09/26/2019	09/26/2019	09/26/2019	09/26/2019	09/26/2019	09/26/2019
				Sample Depth	09-11 ft	11-13 ft	14-16 ft	10-12 ft	18-20 ft	20-22 ft	26-28 ft	10-12 ft	18-20 ft	18-20 ft
				Sample Type	N	N	N	N	N	N	N	N	N	FD
				Geologic Unit	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Shallow Silty Clay
				Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit											
1,1-Dichloroethene	1	0.33	mg/kg	0.00099 U	0.071 U	**0.015 J**	0.0010 U	0.0012 U	**0.034 J**	**0.043 J**	0.0010 U	0.0010 U	0.0012 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0020 U	0.14 U	0.12 U	0.0021 U	0.0024 U	0.13 U	0.16 U	0.0020 U	0.0021 U	0.0024 U
1,2-Dichloroethane	1	0.02	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
1,2-Dichloroethene, Total	1	NC	mg/kg	0.00099 U	**0.57 J**	**0.53 J**	**0.00026 J**	**0.0064**	**18 J**	**7.8**	**0.00061 J**	**0.0039**	**0.0025**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0020 U	0.14 U	0.12 U	0.0021 U	0.0024 U	0.13 U	0.16 U	0.0020 U	0.0021 U	0.0024 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	**0.0027 J**	0.71 U	0.63 U	0.01 U	0.012 U	0.66 U	0.78 U	**0.0086 J**	**0.0033 J**	0.012 U
Acetone	1	0.05	mg/kg	**0.13 J**	0.71 U	0.63 U	**0.15 J**	**0.19 J**	0.66 U	0.78 U	**0.41 J**	**0.18 J**	**0.14 J**
Benzene	1	0.06	mg/kg	0.00049 U	0.036 U	0.031 U	0.00052 U	0.00060 U	0.033 U	**0.014 J**	0.00050 U	0.00052 U	0.00060 U
Chloroform	1	0.37	mg/kg	0.0015 U	0.11 U	0.094 U	0.0016 U	0.0018 U	0.099 U	0.12 U	0.0015 U	0.0016 U	0.0018 U
Chloromethane	1	NC	mg/kg	0.0040 U	0.28 U	0.25 U	0.0042 U	0.0048 U	0.26 U	0.31 U	0.0040 U	0.0042 U	0.0048 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.00099 U	**0.55**	**0.49**	0.0010 U	**0.0064**	**18**	**7.6**	**0.00061 J**	**0.0039**	**0.0025**
Ethylbenzene	1	1	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
Methylene Chloride	1	0.05	mg/kg	0.0049 U	0.36 U	0.31 U	0.0052 U	0.0060 U	0.33 U	0.39 U	0.0050 U	0.0052 U	0.0060 U
Naphthalene	1	12	mg/kg	0.0040 U	0.28 U	0.25 U	0.0042 U	0.0048 U	0.26 U	0.31 U	0.0040 U	0.0042 U	0.0048 U
n-Butylbenzene	1	12	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
n-Propylbenzene	1	3.9	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
sec-Butylbenzene	1	11	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	**0.00062 J**	0.14 U	0.12 U	**0.0011 J**	**0.00073 J**	0.13 U	0.16 U	**0.00096 J**	**0.00063 J**	**0.00079 J**
tert-Butylbenzene	1	5.9	mg/kg	0.0020 U	0.14 U	0.12 U	0.0021 U	0.0024 U	0.13 U	0.16 U	0.0020 U	0.0021 U	0.0024 U
Tetrachloroethene	1	1.3	mg/kg	0.00049 U	0.036 U	0.031 U	0.00052 U	0.00060 U	0.033 U	0.039 U	0.00050 U	0.00052 U	0.00060 U
Toluene	1	0.7	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0015 U	**0.016 J**	**0.04 J**	**0.00026 J**	0.0018 U	**0.048 J**	**0.19**	0.0015 U	0.0016 U	0.0018 U
Trichloroethene	1	0.47	mg/kg	0.00082 U	**6**	**7.3**	0.00052 U	0.00060 U	**0.084**	**7.5**	**0.0015**	**0.016 J**	0.00060 U
Vinyl Chloride	1	0.02	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	**0.01**	**0.78**	**0.084**	0.0010 U	**0.0022**	**0.0023**
Xylenes, m & p	1	NC	mg/kg	0.0020 U	0.14 U	0.12 U	0.0021 U	0.0024 U	0.13 U	0.16 U	0.0020 U	0.0021 U	0.0024 U
Xylene, o	1	NC	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
Xylenes, Total	1	1.6	mg/kg	0.00099 U	0.071 U	0.063 U	0.0010 U	0.0012 U	0.066 U	0.078 U	0.0010 U	0.0010 U	0.0012 U
Total VOCs	10	-	mg/kg	**0.13 J**	**6.6 J**	**7.8 J**	**0.15 J**	**0.21 J**	**19 J**	**15 J**	**0.42 J**	**0.21 J**	**0.15 J**
Total CVOCs	-	-	mg/kg	0.0099 UJ	**6.6 J**	**7.8 J**	**0.00026 J**	**0.016**	**19 J**	**15 J**	**0.0021 J**	**0.022 J**	**0.0048**
Total CBTEX	-	-	mg/kg	0.0020 U	0.14 U	0.12 U	0.0021 U	0.0024 U	0.13 U	**0.014 J**	0.0020 U	0.0021 U	0.0024 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

				Location ID	DPT-30	DPT-31	DPT-31	DPT-31	DPT-32	DPT-32	DPT-32	DPT-32	DPT-33	DPT-33
				Date of Collection	09/26/2019	09/26/2019	09/26/2019	09/26/2019	09/20/2019	09/20/2019	09/20/2019	09/20/2019	09/20/2019	09/20/2019
				Sample Depth	20-22 ft	10-12 ft	17-19 ft	21-23 ft	11-13 ft	20-22 ft	22-24 ft	22-24 ft	10-12 ft	24-26 ft
				Sample Type	N	N	N	N	N	N	N	FD	N	N
				Geologic Unit	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay
				Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit											
1,1-Dichloroethene	1	0.33	mg/kg	**0.05 J**	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.14 U	0.0022 U	0.14 U	0.69 U	0.0022 UJ	2.8 U	1.4 U	1.4 U	0.0022 U	0.75 U
1,2-Dichloroethane	1	0.02	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**19 J**	0.0011 U	**0.17**	**45 J**	0.0011 UJ	**17**	**12**	**13**	0.0011 U	**2.3**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.14 U	0.0022 U	0.14 U	0.69 U	0.0022 UJ	2.8 U	1.4 U	1.4 U	0.0022 U	0.75 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	0.68 U	0.011 U	0.71 U	3.4 U	0.011 UJ	14 U	7.1 U	7 U	**0.0040 J**	3.8 U
Acetone	1	0.05	mg/kg	0.68 U	**0.13 J**	0.71 U	3.4 U	**1.5 J**	14 U	7.1 U	7 U	**0.37 J**	3.8 U
Benzene	1	0.06	mg/kg	0.034 U	0.00054 U	0.036 U	0.17 U	0.00055 UJ	0.69 U	0.35 U	0.35 U	0.00054 U	0.19 U
Chloroform	1	0.37	mg/kg	0.1 U	0.0016 U	0.11 U	0.52 U	0.0016 U	2.1 U	1.1 U	1 U	0.0016 U	0.56 U
Chloromethane	1	NC	mg/kg	0.27 U	0.0044 U	0.28 U	1.4 U	0.0044 UJ	5.5 U	2.8 U	2.8 U	0.0043 U	1.5 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**19**	0.0011 U	**0.17**	**45**	0.0011 UJ	**17**	**12**	**13**	0.0011 U	**2.3**
Ethylbenzene	1	1	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	**0.00066 J**	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Methylene Chloride	1	0.05	mg/kg	0.34 U	0.0054 U	0.36 U	1.7 U	0.0055 UJ	6.9 U	3.5 U	3.5 U	0.0054 U	1.9 U
Naphthalene	1	12	mg/kg	0.27 U	0.0044 U	0.28 U	1.4 U	0.0044 UJ	5.5 U	2.8 U	2.8 U	0.0043 U	1.5 U
n-Butylbenzene	1	12	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	**0.0016 J**	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
n-Propylbenzene	1	3.9	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
sec-Butylbenzene	1	11	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	**0.0029 J**	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	0.14 U	**0.0010 J**	0.14 U	0.69 U	**0.0024 J**	2.8 U	1.4 U	1.4 U	**0.0022**	0.75 U
tert-Butylbenzene	1	5.9	mg/kg	0.14 U	0.0022 U	0.14 U	0.69 U	**0.0015 J**	2.8 U	1.4 U	1.4 U	0.0022 U	0.75 U
Tetrachloroethene	1	1.3	mg/kg	0.034 U	0.00054 U	0.036 U	0.17 U	0.00055 UJ	0.69 U	0.35 U	0.35 U	0.00054 U	0.19 U
Toluene	1	0.7	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.052 J**	0.0016 U	0.11 U	**0.13 J**	0.0016 UJ	2.1 U	1.1 U	1 U	0.0016 U	0.56 U
Trichloroethene	1	0.47	mg/kg	**0.011 J**	0.00054 U	**4.2**	**60**	0.00055 UJ	**190**	**140**	**150**	0.00054 U	**57**
Vinyl Chloride	1	0.02	mg/kg	**0.48**	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Xylenes, m & p	1	NC	mg/kg	0.14 U	0.0022 U	0.14 U	0.69 U	0.0022 UJ	2.8 U	1.4 U	1.4 U	0.0022 U	0.75 U
Xylene, o	1	NC	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Xylenes, Total	1	1.6	mg/kg	0.068 U	0.0011 U	0.071 U	0.34 U	0.0011 UJ	1.4 U	0.71 U	0.7 U	0.0011 U	0.38 U
Total VOCs	10	-	mg/kg	**20 J**	**0.13 J**	**4.4**	**110 J**	**1.5 J**	**210**	**150**	**160**	**0.38 J**	**59**
Total CVOCs	-	-	mg/kg	**20 J**	0.011 UJ	**4.4**	**110 J**	0.011 UJ	**210**	**150**	**160**	0.011 UJ	**59**
Total CBTEX	-	-	mg/kg	0.14 U	0.0022 U	0.14 U	0.69 U	**0.00066 J**	2.8 U	1.4 U	1.4 U	0.0022 U	0.75 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-33	DPT-34	DPT-34	DPT-34	DPT-34	DPT-35	DPT-35	DPT-35	DPT-36	DPT-36
			Date of Collection	09/20/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019	09/18/2019
			Sample Depth	26-28 ft	09-11 ft	14-16 ft	14-16 ft	16-18 ft	09-11 ft	11-13 ft	13-15 ft	10-12 ft	20-22 ft
			Sample Type	N	N	N	FD	N	N	N	N	N	N
			Geologic Unit	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay
			Operable Unit	OU-03	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.58 U	0.0020 U	0.0026 U	0.0024 U	0.0025 U	0.0020 U	0.25 U	0.0024 U	0.0018 U	**0.83 J**
1,2-Dichloroethane	1	0.02	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**2.6**	0.0010 U	**0.00034 J**	**0.00065 J**	**0.014**	0.0010 U	**0.51**	**0.041 J**	0.00090 U	**19**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.58 U	0.0020 U	0.0026 U	0.0024 U	0.0025 U	0.0020 U	0.25 U	0.0024 U	0.0018 U	3 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	2.9 U	0.01 UJ	**0.0065 J**	0.012 UJ	0.013 UJ	0.01 UJ	1.2 UJ	0.012 UJ	**0.0059 J**	15 U
Acetone	1	0.05	mg/kg	2.9 U	**0.073**	**0.41 J**	**0.033 J**	**0.24**	**0.14**	1.2 U	**0.091**	**0.48 J**	15 U
Benzene	1	0.06	mg/kg	0.14 U	0.00050 U	0.00065 U	0.00060 U	0.00063 U	0.00051 U	0.063 U	**0.0022**	0.00045 U	0.75 U
Chloroform	1	0.37	mg/kg	0.43 U	0.0015 U	0.0019 U	0.0018 U	0.0019 U	0.0015 U	0.19 U	0.0018 U	0.0014 U	2.2 U
Chloromethane	1	NC	mg/kg	1.2 U	0.0040 UJ	0.0052 UJ	0.0048 UJ	0.0050 UJ	0.0040 UJ	0.5 U	0.0048 UJ	0.0036 U	6 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**2.6**	0.0010 U	**0.00034 J**	**0.00049 J**	**0.012**	0.0010 U	**0.51**	**0.04**	0.00090 U	**19**
Ethylbenzene	1	1	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
Methylene Chloride	1	0.05	mg/kg	1.4 U	0.0050 U	0.0065 U	0.0060 U	0.0063 U	0.0051 U	0.63 U	0.0060 U	0.0045 U	7.5 U
Naphthalene	1	12	mg/kg	1.2 U	0.0040 U	0.0052 U	0.0048 U	0.0050 U	0.0040 U	0.5 U	0.0048 U	0.0036 U	6 U
n-Butylbenzene	1	12	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
n-Propylbenzene	1	3.9	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
sec-Butylbenzene	1	11	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	0.58 U	**0.00044 J**	0.0026 U	**0.00041 J**	**0.00050 J**	**0.00044 J**	0.25 U	**0.00050 J**	**0.0018**	3 U
tert-Butylbenzene	1	5.9	mg/kg	0.58 U	0.0020 U	0.0026 U	0.0024 U	0.0025 U	0.0020 U	0.25 U	0.0024 U	0.0018 U	3 U
Tetrachloroethene	1	1.3	mg/kg	0.14 U	0.00050 U	**0.00041 J**	0.00060 U	0.00063 U	0.00051 U	0.063 U	0.00060 U	0.00045 U	0.75 U
Toluene	1	0.7	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.43 U	0.0015 U	0.0019 U	**0.00016 J**	**0.0020**	0.0015 U	0.19 U	**0.0011 J**	0.0014 U	2.2 U
Trichloroethene	1	0.47	mg/kg	**48**	0.00050 U	**0.0064**	**0.0052**	**0.094**	**0.00040 J**	**16**	**0.00028 J**	**0.00026 J**	**340**
Vinyl Chloride	1	0.02	mg/kg	0.29 U	0.0010 UJ	0.0013 UJ	0.0012 UJ	0.0013 UJ	0.0010 UJ	0.12 U	**0.012 J**	0.00090 U	1.5 U
Xylenes, m & p	1	NC	mg/kg	0.58 U	0.0020 U	0.0026 U	0.0024 U	0.0025 U	0.0020 U	0.25 U	0.0024 U	0.0018 U	3 U
Xylene, o	1	NC	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
Xylenes, Total	1	1.6	mg/kg	0.29 U	0.0010 U	0.0013 U	0.0012 U	0.0013 U	0.0010 U	0.12 U	0.0012 U	0.00090 U	1.5 U
Total VOCs	10	-	mg/kg	**51**	**0.073 J**	**0.42 J**	**0.039 J**	**0.35 J**	**0.14 J**	**17**	**0.15 J**	**0.49 J**	**360 J**
Total CVOCs	-	-	mg/kg	**51**	0.01 UJ	**0.0072 J**	**0.0059 J**	**0.11**	**0.00040 J**	**17**	**0.053 J**	**0.00026 J**	**360**
Total CBTEX	-	-	mg/kg	0.58 U	0.0020 U	0.0026 U	0.0024 U	0.0025 U	0.0020 U	0.25 U	**0.0022**	0.0018 U	3 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-36	DPT-36	DPT-37	DPT-37	DPT-37	DPT-38	DPT-38	DPT-38	DPT-38	DPT-39
			Date of Collection	09/18/2019	09/18/2019	09/19/2019	09/19/2019	09/19/2019	09/19/2019	09/19/2019	09/19/2019	09/19/2019	09/19/2019
			Sample Depth	22-24 ft	27-28 ft	10-12 ft	20-22 ft	22-24 ft	10-12 ft	10-12 ft	18-20 ft	24-26 ft	10-12 ft
			Sample Type	N	N	N	N	N	N	FD	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	1.4 U	**2.6 J**	0.0020 U	0.32 U	0.53 U	0.0020 U	0.0019 U	0.0025 U	0.24 U	0.0021 U
1,2-Dichloroethane	1	0.02	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**10**	**17**	**0.0031**	**3.4**	**5.3**	**0.0041 J**	**0.0024 J**	**0.00026 J**	**11 J**	**0.0025**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	1.4 U	**0.7 J**	0.0020 U	0.32 U	0.53 U	0.0020 U	0.0019 U	0.0025 U	0.24 U	0.0021 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	7 U	14 U	0.0099 U	1.6 U	2.6 U	0.01 U	0.0095 U	0.012 U	1.2 U	0.01 U
Acetone	1	0.05	mg/kg	7 U	14 U	**0.24 J**	1.6 U	2.6 U	**0.058 J**	**0.48 J**	**0.44 J**	1.2 U	**0.4 J**
Benzene	1	0.06	mg/kg	0.35 U	0.73 U	0.00049 U	**0.043 J**	**0.07 J**	0.00051 U	0.00048 U	0.00063 U	**0.024 J**	0.00053 U
Chloroform	1	0.37	mg/kg	1 U	2.2 U	0.0015 U	0.24 U	0.4 U	0.0015 U	0.0014 U	0.0019 U	0.18 U	0.0016 U
Chloromethane	1	NC	mg/kg	2.8 U	5.8 U	**0.0015 J**	0.63 U	1.1 U	0.0041 U	**0.0012 J**	**0.0017 J**	0.49 U	**0.0016 J**
cis-1,2-Dichloroethene	1	0.25	mg/kg	**10**	**17**	**0.0031**	**3.4**	**5.3**	**0.0041 J**	**0.0024 J**	**0.00026 J**	**11**	**0.0025**
Ethylbenzene	1	1	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
Methylene Chloride	1	0.05	mg/kg	3.5 U	7.3 U	0.0049 U	0.79 U	1.3 U	0.0051 U	0.0048 U	0.0063 U	0.61 U	0.0053 U
Naphthalene	1	12	mg/kg	2.8 U	5.8 U	0.0039 U	0.63 U	1.1 U	0.0041 U	0.0038 U	0.0050 U	0.49 U	0.0042 U
n-Butylbenzene	1	12	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
n-Propylbenzene	1	3.9	mg/kg	0.7 U	**0.32 J**	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
sec-Butylbenzene	1	11	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	1.4 U	2.9 U	**0.0020**	0.32 U	0.53 U	**0.0021**	**0.0024**	**0.0022 J**	0.24 U	**0.0028**
tert-Butylbenzene	1	5.9	mg/kg	1.4 U	2.9 U	0.0020 U	0.32 U	0.53 U	0.0020 U	0.0019 U	0.0025 U	0.24 U	0.0021 U
Tetrachloroethene	1	1.3	mg/kg	0.35 U	0.73 U	0.00049 U	0.079 U	0.13 U	0.00051 U	0.00048 U	0.00063 U	0.061 U	0.00053 U
Toluene	1	0.7	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	1 U	2.2 U	0.0015 U	0.24 U	0.4 U	0.0015 U	0.0014 U	0.0019 U	**0.032 J**	0.0016 U
Trichloroethene	1	0.47	mg/kg	**170**	**280**	**0.048**	**26**	**48**	**0.011**	**0.0085**	**0.00028 J**	**26**	**0.0090**
Vinyl Chloride	1	0.02	mg/kg	0.7 U	1.4 U	0.00099 U	**0.076 J**	**0.16 J**	0.0010 U	0.00095 U	0.0012 U	**0.095 J**	0.0010 U
Xylenes, m & p	1	NC	mg/kg	1.4 U	2.9 U	0.0020 U	0.32 U	0.53 U	0.0020 U	0.0019 U	0.0025 U	0.24 U	0.0021 U
Xylene, o	1	NC	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
Xylenes, Total	1	1.6	mg/kg	0.7 U	1.4 U	0.00099 U	0.16 U	0.26 U	0.0010 U	0.00095 U	0.0012 U	0.12 U	0.0010 U
Total VOCs	10	-	mg/kg	**180**	**300 J**	**0.29 J**	**30 J**	**54 J**	**0.075 J**	**0.49 J**	**0.44 J**	**37 J**	**0.42 J**
Total CVOCs	-	-	mg/kg	**180**	**300**	**0.053 J**	**29 J**	**53 J**	**0.015 J**	**0.012 J**	**0.0022 J**	**37 J**	**0.013 J**
Total CBTEX	-	-	mg/kg	1.4 U	2.9 U	0.0020 U	**0.043 J**	**0.07 J**	0.0020 U	0.0019 U	0.0025 U	**0.024 J**	0.0021 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-39	DPT-39	DPT-40	DPT-40	DPT-40	DPT-40	DPT-41	DPT-41	DPT-41	DPT-42
			Date of Collection	09/19/2019	09/19/2019	09/17/2019	09/17/2019	09/17/2019	09/17/2019	09/24/2019	09/24/2019	09/24/2019	09/25/2019
			Sample Depth	18-20 ft	20-22 ft	10-12 ft	10-12 ft	17-19 ft	19-21 ft	10-12 ft	18-20 ft	20-22 ft	10-12 ft
			Sample Type	N	N	N	FD	N	N	N	N	N	N
			Geologic Unit	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	**0.026 J**	0.71 U	0.00091 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0021 U	0.0022 UJ	0.0021 U	0.0024 U	**0.078 J**	0.14 U	0.0018 U	0.14 U	1.4 U	0.0018 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**0.043 J**	**0.074 J**	**0.00018 J**	0.0012 U	**3.9 J**	**1 J**	0.00089 U	**2.3 J**	**9.1**	0.00091 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0021 U	0.0022 UJ	0.0021 U	0.0024 U	**0.019 J**	0.14 U	0.0018 U	0.14 U	1.4 U	0.0018 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	0.01 U	**0.017 J**	0.01 UJ	0.012 UJ	0.78 UJ	0.68 UJ	**0.0055 J**	0.71 U	7.1 U	0.0091 U
Acetone	1	0.05	mg/kg	**0.48 J**	**0.9 J**	**0.042 J**	**0.15 J**	0.78 U	0.68 U	**0.36 J**	0.71 U	7.1 U	**0.16 J**
Benzene	1	0.06	mg/kg	0.00053 U	0.00054 UJ	0.00052 U	0.00059 U	0.039 U	0.034 U	0.00044 U	**0.027 J**	0.36 U	0.00046 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.0016 U	0.0016 U	0.0018 U	0.12 U	0.1 U	0.0013 U	**0.011 J**	**0.11 J**	0.0014 U
Chloromethane	1	NC	mg/kg	**0.0018 J**	**0.0018 J**	0.0042 UJ	0.0047 UJ	0.31 U	0.27 U	0.0036 U	0.28 U	2.8 U	0.0036 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.043**	**0.073 J**	0.0010 U	0.0012 U	**3.8**	**1**	0.00089 U	**2.3**	**9.1**	0.00091 U
Ethylbenzene	1	1	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	**0.037 J**	**0.02 J**	0.00089 U	0.071 U	**0.12 J**	0.00091 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	**0.011 J**	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
Methylene Chloride	1	0.05	mg/kg	0.0053 U	**0.0025 J**	0.0052 U	0.0059 U	0.39 U	0.34 U	0.0044 U	0.35 U	3.6 U	0.0046 U
Naphthalene	1	12	mg/kg	0.0042 U	0.0043 UJ	0.0042 U	0.0047 U	0.31 U	0.27 U	0.0036 U	0.28 U	2.8 U	0.0036 U
n-Butylbenzene	1	12	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
n-Propylbenzene	1	3.9	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	**0.019 J**	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
sec-Butylbenzene	1	11	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	**0.0020 J**	**0.0029 J**	**0.00034 J**	**0.00048 J**	0.16 U	0.14 U	0.0018 U	0.14 U	1.4 U	0.0018 U
tert-Butylbenzene	1	5.9	mg/kg	0.0021 U	0.0022 UJ	0.0021 U	0.0024 U	0.16 U	0.14 U	0.0018 U	0.14 U	1.4 U	0.0018 U
Tetrachloroethene	1	1.3	mg/kg	0.00053 U	0.00054 UJ	0.00052 U	0.00059 U	**0.64**	0.034 U	0.00044 U	0.035 U	0.36 U	0.00046 U
Toluene	1	0.7	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	0.078 U	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00029 J**	**0.00077 J**	**0.00018 J**	0.0018 U	**0.087 J**	**0.035 J**	0.0013 U	**0.01 J**	1.1 U	0.0014 U
Trichloroethene	1	0.47	mg/kg	**0.0038**	**0.0050 J**	**0.00016 J**	**0.00020 J**	2.2	**0.057**	0.00044 U	**3**	**120**	0.00046 U
Vinyl Chloride	1	0.02	mg/kg	**0.00054 J**	0.0011 UJ	0.0010 UJ	0.0012 UJ	**0.034 J**	0.068 U	0.00089 U	**0.068 J**	0.71 U	0.00091 U
Xylenes, m & p	1	NC	mg/kg	0.0021 U	0.0022 UJ	0.0021 U	0.0024 U	**0.071 J**	0.14 U	0.0018 U	0.14 U	1.4 U	0.0018 U
Xylene, o	1	NC	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	**0.029 J**	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
Xylenes, Total	1	1.6	mg/kg	0.0010 U	0.0011 UJ	0.0010 U	0.0012 U	**0.1 J**	0.068 U	0.00089 U	0.071 U	0.71 U	0.00091 U
Total VOCs	10	-	mg/kg	**0.53 J**	**1 J**	**0.043 J**	**0.15 J**	**7 J**	**1.1 J**	**0.37 J**	**5.4 J**	**130 J**	**0.16 J**
Total CVOCs	-	-	mg/kg	**0.049 J**	**0.083 J**	**0.00034 J**	**0.00020 J**	**6.8 J**	**1.1 J**	0.0089 U	**5.4 J**	**130 J**	0.0091 U
Total CBTEX	-	-	mg/kg	0.0021 U	0.0022 UJ	0.0021 U	0.0024 U	**0.15 J**	**0.02 J**	0.0018 U	**0.027 J**	**0.12 J**	0.0018 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-42	DPT-42	DPT-42	DPT-43	DPT-43	DPT-43	DPT-43	DPT-44	DPT-44	DPT-44
			Date of Collection	09/25/2019	09/25/2019	09/25/2019	09/25/2019	09/25/2019	09/25/2019	09/25/2019	09/17/2019	09/17/2019	09/17/2019
			Sample Depth	16-18 ft	20-22 ft	26-28 ft	10-12 ft	18-20 ft	18-20 ft	22-24 ft	10-12 ft	14-16 ft	16-18 ft
			Sample Type	N	N	N	N	N	FD	N	N	N	N
			Geologic Unit	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	0.13 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0022 U	**2.2**	1.4 U	0.0019 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	**0.032 J**	**4.8 J**
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	0.13 U
1,2-Dichloroethene, Total	1	NC	mg/kg	0.0011 U	**4.3**	**5.9**	0.00096 U	0.0011 U	0.0011 U	0.0011 U	**0.0033**	**0.35**	**12 J**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0022 U	**0.44 J**	1.4 U	0.0019 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	0.14 U	**0.24 J**
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	**0.0031 J**	3.6 U	6.8 U	**0.0033 J**	0.011 U	**0.0030 J**	**0.0042 J**	**0.0045 J**	0.7 UJ	1.3 UJ
Acetone	1	0.05	mg/kg	**0.25 J**	3.6 U	6.8 U	**0.26 J**	0.011 U	**0.29 J**	**0.36 J**	**0.26**	0.7 U	1.3 U
Benzene	1	0.06	mg/kg	0.00054 U	**0.12 J**	**0.15 J**	0.00048 U	0.00055 U	0.00053 U	0.00055 U	0.00054 U	0.035 U	0.063 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.54 U	1 U	0.0014 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.1 U	0.19 U
Chloromethane	1	NC	mg/kg	0.0044 U	1.4 U	2.7 U	0.0038 U	0.0044 U	0.0042 U	0.0044 U	0.0043 UJ	0.28 U	0.51 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0011 U	**4.3**	**5.9**	0.00096 U	0.0011 U	0.0011 U	0.0011 U	**0.0033**	**0.35**	**12**
Ethylbenzene	1	1	mg/kg	0.0011 U	**0.051 J**	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	**0.048 J**
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.18**	**0.11 J**
Methylene Chloride	1	0.05	mg/kg	0.0054 U	1.8 U	3.4 U	0.0048 U	0.0055 U	0.0053 U	0.0055 U	0.0054 U	0.35 U	0.63 U
Naphthalene	1	12	mg/kg	0.0044 U	1.4 U	2.7 U	0.0038 U	0.0044 U	0.0042 U	0.0044 U	0.0043 U	0.28 U	0.51 U
n-Butylbenzene	1	12	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.063 J**	**0.13**
n-Propylbenzene	1	3.9	mg/kg	0.0011 U	**0.16 J**	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.018 J**	**0.98 J**
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	**0.1 J**
sec-Butylbenzene	1	11	mg/kg	0.0011 U	0.36 U	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.14**	**0.12 J**
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	0.0022 U	0.72 U	1.4 U	0.0019 U	0.0022 U	0.0021 U	0.0022 U	**0.0025**	0.14 U	0.25 U
tert-Butylbenzene	1	5.9	mg/kg	0.0022 U	0.72 U	1.4 U	0.0019 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	**0.0096 J**	0.25 U
Tetrachloroethene	1	1.3	mg/kg	0.00054 U	0.18 U	0.34 U	0.00048 U	0.00055 U	0.00053 U	0.00055 U	0.00054 U	0.035 U	**0.12**
Toluene	1	0.7	mg/kg	0.0011 U	**0.27 J**	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 UJ	0.13 UJ
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0016 U	0.54 U	1 U	0.0014 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.1 U	**0.056 J**
Trichloroethene	1	0.47	mg/kg	0.00054 U	**55**	**88**	**0.00064**	0.00055 U	0.00053 U	0.00055 U	**0.0058**	0.035 U	**16**
Vinyl Chloride	1	0.02	mg/kg	0.0011 U	**0.39**	**0.64 J**	0.00096 U	0.0011 U	0.0011 U	**0.019**	0.0011 UJ	0.07 U	**0.078 J**
Xylenes, m & p	1	NC	mg/kg	0.0022 U	**0.26 J**	1.4 U	0.0019 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	0.14 U	**0.097 J**
Xylene, o	1	NC	mg/kg	0.0011 U	**0.14 J**	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	0.13 U
Xylenes, Total	1	1.6	mg/kg	0.0011 U	**0.4 J**	0.68 U	0.00096 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.07 U	**0.097 J**
Total VOCs	10	-	mg/kg	**0.25 J**	**63 J**	**95 J**	**0.26 J**	0.088 UJ	**0.29 J**	**0.38 J**	**0.28 J**	**0.79 J**	**35 J**
Total CVOCs	-	-	mg/kg	0.011 U	**60**	**95 J**	**0.00064**	0.011 UJ	0.011 UJ	**0.019**	**0.0091**	**0.35**	**28 J**
Total CBTEX	-	-	mg/kg	0.0022 U	**0.84 J**	**0.15 J**	0.0019 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	**0.18**	**0.26 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-44	DPT-45	DPT-45	DPT-45	DPT-45	DPT-46	DPT-46	DPT-46	DPT-47	DPT-47
			Date of Collection	09/17/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019
			Sample Depth	16-18 ft	10-12 ft	17-19 ft	22-24 ft	27-28 ft	10-12 ft	18-20 ft	20-22 ft	11-13 ft	11-13 ft
			Sample Type	FD	N	N	N	N	N	N	N	N	FD
			Geologic Unit	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.14 U	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**10 J**	0.0022 U	0.0023 U	0.69 U	**19**	0.0019 U	0.0022 U	0.3 U	0.0020 U	0.0020 U
1,2-Dichloroethane	1	0.02	mg/kg	0.14 U	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**17 J**	0.0011 U	0.0012 U	**15**	**39**	0.00094 U	0.0011 U	**1.9**	0.0010 U	0.0010 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	**0.22 J**	0.0022 U	0.0023 U	0.69 U	**4.7 J**	0.0019 U	0.0022 U	0.3 U	0.0020 U	0.0020 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	1.4 UJ	**0.014**	**0.0086 J**	3.5 U	34 U	**0.0062 J**	**0.0054 J**	1.5 U	**0.0031 J**	**0.014 J**
Acetone	1	0.05	mg/kg	1.4 U	**0.84 J**	**0.71 J**	3.5 U	34 U	**0.41 J**	**0.51 J**	1.5 U	**0.19 J**	**0.96 J**
Benzene	1	0.06	mg/kg	0.072 U	0.00055 U	0.00058 U	0.17 U	1.7 U	0.00047 U	0.00055 U	**0.059 J**	0.00050 U	0.00051 U
Chloroform	1	0.37	mg/kg	0.21 U	0.0016 U	0.0017 U	0.52 U	5.1 U	0.0014 U	0.0016 U	0.22 U	0.0015 U	0.0015 U
Chloromethane	1	NC	mg/kg	0.57 U	0.0044 U	0.0046 U	1.4 U	14 U	0.0038 U	0.0044 U	0.59 U	0.0040 U	0.0041 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**17**	0.0011 U	0.0012 U	**15**	**39**	0.00094 U	0.0011 U	**1.9**	0.0010 U	0.0010 U
Ethylbenzene	1	1	mg/kg	**0.056 J**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	**0.12 J**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
Methylene Chloride	1	0.05	mg/kg	0.72 U	0.0055 U	0.0058 U	1.7 U	17 U	0.0047 U	0.0055 U	0.74 U	0.0050 U	0.0051 U
Naphthalene	1	12	mg/kg	0.57 U	0.0044 U	0.0046 U	1.4 U	14 U	0.0038 U	0.0044 U	0.59 U	0.0040 U	0.0041 U
n-Butylbenzene	1	12	mg/kg	**0.18**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
n-Propylbenzene	1	3.9	mg/kg	**1.8 J**	0.0011 U	0.0012 U	0.35 U	**1.7 J**	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
p-Isopropyltoluene	1	10[c]	mg/kg	**0.12 J**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
sec-Butylbenzene	1	11	mg/kg	**0.15**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	0.29 U	**0.0015 J**	**0.0027**	0.69 U	6.8 U	**0.0028**	**0.0022**	0.3 U	**0.0023**	**0.0034**
tert-Butylbenzene	1	5.9	mg/kg	0.29 U	0.0022 U	0.0023 U	0.69 U	6.8 U	0.0019 U	0.0022 U	0.3 U	0.0020 U	0.0020 U
Tetrachloroethene	1	1.3	mg/kg	**0.079**	0.00055 U	0.00058 U	0.17 U	**2.5**	0.00047 U	0.00055 U	0.074 U	0.00050 U	0.00051 U
Toluene	1	0.7	mg/kg	0.14 UJ	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	**0.16**	0.0010 U	0.0010 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.088 J**	0.0016 U	0.0017 U	0.52 U	5.1 U	0.0014 U	0.0016 U	0.22 U	0.0015 U	0.0015 U
Trichloroethene	1	0.47	mg/kg	**12**	0.00055 U	0.00058 U	**47**	**560**	0.00047 U	0.00055 U	**20**	0.00050 U	0.00051 U
Vinyl Chloride	1	0.02	mg/kg	**0.073 J**	0.0011 U	**0.0017**	**0.22 J**	3.4 U	0.00094 U	**0.0014**	0.15 U	0.0010 U	0.0010 U
Xylenes, m & p	1	NC	mg/kg	**0.088 J**	**0.0012 J**	0.0023 U	0.69 U	6.8 U	0.0019 U	0.0022 U	0.3 U	0.0020 U	0.0020 U
Xylene, o	1	NC	mg/kg	**0.14**	0.0011 U	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
Xylenes, Total	1	1.6	mg/kg	**0.23 J**	**0.0012 J**	0.0012 U	0.35 U	3.4 U	0.00094 U	0.0011 U	0.15 U	0.0010 U	0.0010 U
Total VOCs	10	-	mg/kg	**42 J**	**0.86 J**	**0.72 J**	**62 J**	**630 J**	**0.42 J**	**0.52 J**	**22 J**	**0.2 J**	**0.98 J**
Total CVOCs	-	-	mg/kg	**29 J**	0.011 U	**0.0017**	**62 J**	**600**	0.0094 U	**0.0014**	**22**	0.01 U	0.01 U
Total CBTEX	-	-	mg/kg	**0.4 J**	**0.0012 J**	0.0023 U	0.69 U	6.8 U	0.0019 U	0.0022 U	**0.22 J**	0.0020 U	0.0020 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-47	DPT-47	DPT-48	DPT-48	DPT-48	DPT-48	DPT-49	DPT-49	DPT-49	DPT-50
			Date of Collection	09/24/2019	09/24/2019	09/17/2019	09/17/2019	09/17/2019	09/17/2019	09/23/2019	09/23/2019	09/23/2019	09/23/2019
			Sample Depth	18-20 ft	24-26 ft	10-12 ft	18-20 ft	20-22 ft	27-29 ft	08-09 ft	14-16 ft	19-21 ft	10-12 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Geologic Unit	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.072 J**	**0.049 J**	0.00099 U	0.0011 U	0.26 U	0.00096 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0022 U	0.0024 U	0.0021 U	**3.7 J**	**2.4**	0.26 U	0.0020 U	0.0022 U	0.53 U	0.0019 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	0.15 U	**0.037 J**	0.00099 U	0.0011 U	0.26 U	0.00096 U
1,2-Dichloroethene, Total	1	NC	mg/kg	0.0011 U	**0.00074 J**	**0.0010**	**26**	**14 J**	**0.61 J**	**0.00056 J**	**0.00029 J**	**10 J**	**0.00028 J**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0022 U	0.0024 U	0.0021 U	14 U	**0.56**	0.26 U	0.0020 U	0.0022 U	0.53 U	0.0019 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	**0.0055 J**	**0.0070 J**	**0.0040 J**	71 UJ	1.5 UJ	1.3 UJ	**0.0071 J**	**0.0048 J**	2.6 U	**0.0067 J**
Acetone	1	0.05	mg/kg	**0.53 J**	**0.57 J**	**0.18**	71 U	1.5 U	1.3 U	**0.29 J**	**0.35 J**	2.6 U	**0.26 J**
Benzene	1	0.06	mg/kg	0.00055 U	**0.0094**	0.00052 U	3.6 U	0.076 U	**0.21**	0.00050 U	**0.00026 J**	**0.23**	0.00048 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.0018 U	0.0016 U	11 U	0.23 U	0.19 U	0.0015 U	0.0017 U	0.4 U	0.0014 U
Chloromethane	1	NC	mg/kg	0.0044 U	0.0048 U	0.0042 UJ	28 U	0.61 UJ	0.51 UJ	0.0040 U	0.0044 U	1.1 U	0.0038 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0011 U	**0.00056 J**	**0.0010**	**26**	**14**	**0.56**	0.00099 U	0.0011 U	**10**	0.00096 U
Ethylbenzene	1	1	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.082 J**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.027 J**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
Methylene Chloride	1	0.05	mg/kg	0.0055 U	0.0060 U	0.0052 U	36 U	**0.36 J**	**0.29 J**	0.0050 U	0.0056 U	1.3 U	0.0048 U
Naphthalene	1	12	mg/kg	0.0044 U	0.0048 U	0.0042 U	28 U	0.61 U	0.51 U	**0.00074 J**	0.0044 U	1.1 U	0.0038 U
n-Butylbenzene	1	12	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	0.15 U	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
n-Propylbenzene	1	3.9	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.24**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.017 J**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
sec-Butylbenzene	1	11	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	0.15 U	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	**0.0029**	**0.0031**	**0.0024**	14 U	0.3 U	0.26 U	**0.0020**	**0.0013 J**	0.53 U	**0.0018 J**
tert-Butylbenzene	1	5.9	mg/kg	0.0022 U	0.0024 U	0.0021 U	14 U	0.3 U	0.26 U	0.0020 U	0.0022 U	0.53 U	**0.00014 J**
Tetrachloroethene	1	1.3	mg/kg	0.00055 U	0.00060 U	0.00052 U	3.6 U	**1.1**	0.064 U	0.00050 U	0.00056 U	0.13 U	0.00048 U
Toluene	1	0.7	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 UJ	**0.13 J**	0.13 U	0.00099 U	0.0011 U	**0.55**	0.00096 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0016 U	**0.00018 J**	0.0016 U	11 U	**0.049 J**	**0.052 J**	**0.00056 J**	**0.00029 J**	**0.051 J**	**0.00028 J**
Trichloroethene	1	0.47	mg/kg	0.00055 U	0.00060 U	**0.0017**	**1300**	**500**	**0.99**	**0.00067**	0.00056 U	**39**	**0.00023 J**
Vinyl Chloride	1	0.02	mg/kg	0.0011 U	**0.05**	0.0010 UJ	7.1 U	**0.64 J**	0.13 UJ	0.00099 U	0.0011 U	**0.18 J**	0.00096 U
Xylenes, m & p	1	NC	mg/kg	0.0022 U	0.0024 U	0.0021 U	14 U	**0.43**	0.26 U	0.0020 U	0.0022 U	0.53 U	0.0019 U
Xylene, o	1	NC	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.2**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
Xylenes, Total	1	1.6	mg/kg	0.0011 U	0.0012 U	0.0010 U	7.1 U	**0.63**	0.13 U	0.00099 U	0.0011 U	0.26 U	0.00096 U
Total VOCs	10	-	mg/kg	**0.54 J**	**0.64 J**	**0.19 J**	**1300 J**	**520 J**	**2.2 J**	**0.3 J**	**0.36 J**	**50 J**	**0.27 J**
Total CVOCs	-	-	mg/kg	0.011 U	**0.051 J**	**0.0027**	**1300**	**520 J**	**2 J**	**0.0012 J**	**0.00029 J**	**49 J**	**0.00051 J**
Total CBTEX	-	-	mg/kg	0.0022 U	**0.0094**	0.0021 U	14 UJ	**0.87 J**	**0.21**	0.0020 U	**0.00026 J**	**0.78**	0.0019 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-50	DPT-50	DPT-50	MW-124S
			Date of Collection	09/23/2019	09/23/2019	09/23/2019	09/10/2019
			Sample Depth	18-20 ft	22-24 ft	27-28 ft	10-12 ft
			Sample Type	N	N	N	N
			Geologic Unit	Shallow Silty Clay	Deep Silt	Deep Silt	Shallow Sand & Gravel
			Operable Unit	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit				
1,1-Dichloroethene	1	0.33	mg/kg	0.0012 U	0.15 U	0.07 U	0.1 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0023 U	0.3 U	**3.4**	**3.5**
1,2-Dichloroethane	1	0.02	mg/kg	0.0012 U	0.15 U	0.07 U	0.1 U
1,2-Dichloroethene, Total	1	NC	mg/kg	**0.00021 J**	**1.4**	**1**	0.1 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0023 U	0.3 U	**1**	0.21 U
2-Butanone (Methyl Ethyl Ketone)	1	0.12	mg/kg	**0.0050 J**	1.5 U	0.7 U	1 UJ
Acetone	1	0.05	mg/kg	**0.44 J**	1.5 U	0.7 U	1 U
Benzene	1	0.06	mg/kg	0.00058 U	**0.18**	**0.049**	0.053 U
Chloroform	1	0.37	mg/kg	0.0017 U	0.22 U	0.1 U	0.16 U
Chloromethane	1	NC	mg/kg	0.0046 U	0.59 U	0.28 U	0.42 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0012 U	**1.4**	**1**	0.1 U
Ethylbenzene	1	1	mg/kg	0.0012 U	**0.022 J**	**0.02 J**	**0.041 J**
Isopropylbenzene (Cumene)	1	2.3[c]	mg/kg	0.0012 U	0.15 U	**0.03 J**	**0.19**
Methylene Chloride	1	0.05	mg/kg	0.0058 U	0.74 U	0.35 U	0.53 U
Naphthalene	1	12	mg/kg	0.0046 U	0.59 U	0.28 U	**0.32 J**
n-Butylbenzene	1	12	mg/kg	0.0012 U	0.15 U	0.07 U	**0.26**
n-Propylbenzene	1	3.9	mg/kg	0.0012 U	0.15 U	**0.87**	**0.8**
p-Isopropyltoluene	1	10[c]	mg/kg	0.0012 U	0.15 U	**0.044 J**	**0.16**
sec-Butylbenzene	1	11	mg/kg	0.0012 U	0.15 U	**0.033 J**	**0.12**
Methyl tert-butyl Ether (MTBE)	1	0.93	mg/kg	**0.0016 J**	0.3 U	0.14 U	0.21 U
tert-Butylbenzene	1	5.9	mg/kg	0.0023 U	0.3 U	0.14 U	**0.018 J**
Tetrachloroethene	1	1.3	mg/kg	0.00058 U	0.074 U	0.035 U	0.053 U
Toluene	1	0.7	mg/kg	0.0012 U	**0.086 J**	0.07 U	0.1 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00021 J**	0.22 U	0.1 U	0.16 U
Trichloroethene	1	0.47	mg/kg	0.00058 U	**18**	**4.5**	0.053 U
Vinyl Chloride	1	0.02	mg/kg	**0.00054 J**	0.15 U	**0.031 J**	0.1 U
Xylenes, m & p	1	NC	mg/kg	0.0023 U	0.3 U	0.14 U	0.21 U
Xylene, o	1	NC	mg/kg	0.0012 U	0.15 U	0.07 U	0.1 U
Xylenes, Total	1	1.6	mg/kg	0.0012 U	0.15 U	0.07 U	0.1 U
Total VOCs	10	-	mg/kg	**0.45 J**	**20 J**	**11 J**	**5.4 J**
Total CVOCs	-	-	mg/kg	**0.00075 J**	**19**	**5.5 J**	1 U
Total CBTEX	-	-	mg/kg	0.0023 U	**0.29 J**	**0.099 J**	**0.23 J**

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-066	DPT-066	DPT-066	DPT-066	DPT-066	DPT-066	DPT-067	DPT-067	DPT-067	DPT-067
			Date of Collection	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022
			Sample Depth	02-03 ft	22-23 ft	29-30 ft	33-34 ft	35-36 ft	47-48 ft	4-5 ft	26-27 ft	30-31 ft	30-31 ft
			Sample Type	N	N	N	N	N	N	N	N	N	FD
			Geologic Unit	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.0011 U	0.001 U	0.66 U	0.69 U	0.071 U	0.001 U	0.00089 U	0.15 U	0.076 U	0.072 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.001 U	0.66 U	**0.3 J**	**0.06 J**	0.001 U	0.00089 U	0.15 U	0.076 U	**0.034 J**
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.0005 J**	0.002 UJ	1.3 U	1.4 U	0.14 U	0.002 UJ	0.0018 U	0.31 U	0.15 U	0.14 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.001 U	0.66 U	0.69 U	0.071 U	0.001 U	0.00089 U	0.15 U	0.076 U	0.072 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0021 U	0.002 UJ	1.3 U	1.4 U	0.14 U	0.002 UJ	0.0018 U	0.31 U	0.15 U	0.14 U
Acetone	1	0.05	mg/kg	**0.073**	**0.006 J**	6.6 U	6.9 U	0.71 U	0.01 U	0.0089 U	1.5 U	0.76 U	0.72 U
Benzene	1	0.06	mg/kg	0.00054 U	0.00051 U	0.33 U	0.34 U	0.036 U	0.0005 U	0.00045 U	**0.12**	0.038 U	0.036 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.011 U	0.01 U	6.6 U	6.9 U	0.71 U	0.01 U	0.0089 U	1.5 U	0.76 U	0.72 U
Chlorobenzene	1	1.1	mg/kg	0.00054 U	0.00051 UJ	0.33 U	0.34 U	0.036 U	0.0005 U	0.00045 U	0.077 U	0.038 U	0.036 U
Chloroethane	1	1.9[c]	mg/kg	0.0021 U	0.002 U	1.3 U	1.4 U	0.14 U	0.002 U	0.0018 U	0.31 U	0.15 U	0.14 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.0015 U	0.99 U	1 U	0.11 U	0.0015 U	0.0013 U	0.23 U	0.11 U	0.11 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0011 U	0.001 U	**25**	**53**	**11**	**0.00023 J**	0.00089 U	**8.3**	**26**	**30**
Ethylbenzene	1	1	mg/kg	**0.001 J**	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 U	0.00089 U	0.15 U	0.076 U	0.072 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 UJ	0.00089 U	0.15 U	0.076 U	0.072 U
Methyl ethyl ketone	1	0.12	mg/kg	0.011 U	0.01 U	6.6 U	6.9 U	0.71 U	0.01 U	0.0089 U	1.5 U	0.76 U	0.72 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.011 U	0.01 UJ	6.6 U	6.9 U	0.71 U	0.01 U	0.0089 U	1.5 U	0.76 U	0.72 U
Methylene chloride	1	0.05	mg/kg	0.0054 U	0.0051 U	3.3 U	3.4 U	0.36 U	0.005 U	0.0045 U	0.77 U	0.38 U	0.36 U
Naphthalene	1	12	mg/kg	0.0043 U	0.004 UJ	2.6 U	2.7 U	0.28 U	0.004 UJ	0.0036 U	0.62 U	0.3 U	0.29 U
n-Butylbenzene	1	12	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 UJ	0.00089 U	0.15 U	0.076 U	0.072 U
n-Propylbenzene	1	3.9	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 UJ	0.00089 U	0.15 U	0.076 U	0.072 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 UJ	0.00089 U	0.15 U	0.076 U	0.072 U
sec-Butylbenzene	1	11	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 UJ	0.00089 U	0.15 U	0.076 U	0.072 U
t-Butylbenzene	1	5.9	mg/kg	0.0021 U	0.002 UJ	1.3 U	1.4 U	0.14 U	0.002 UJ	0.0018 U	0.31 U	0.15 U	0.14 U
Tetrachloroethene	1	1.3	mg/kg	0.00054 U	0.00051 UJ	0.33 U	0.34 U	0.036 U	0.0005 U	0.00045 U	0.077 U	0.038 U	0.036 U
Toluene	1	0.7	mg/kg	0.0011 U	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 U	0.00089 U	0.15 U	**0.058 J**	**0.052 J**
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0016 U	0.0015 U	0.99 U	**0.17 J**	**0.048 J**	0.0015 U	0.0013 U	**0.024 J**	**0.32**	**0.48**
Trichloroethene	1	0.47	mg/kg	0.00054 U	0.00051 U	**260**	**290**	**0.75**	**0.0011**	0.00045 U	**69**	**0.058 J**	**0.13 J**
Vinyl chloride	1	0.02	mg/kg	0.0011 U	0.001 U	**0.41 J**	**0.45 J**	**0.14 J**	0.001 U	0.00089 U	0.15 U	**0.36 J**	**4.3 J**
Xylene, m & p	1	NC	mg/kg	**0.0054**	0.002 UJ	1.3 U	1.4 U	0.14 U	0.002 U	0.0018 U	0.31 U	0.15 U	0.14 U
Xylene, o	1	NC	mg/kg	**0.0018**	0.001 UJ	0.66 U	0.69 U	0.071 U	0.001 U	0.00089 U	0.15 U	0.076 U	0.072 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-067	DPT-067	DPT-067	DPT-068	DPT-068	DPT-068	DPT-068	DPT-068	DPT-068	DPT-069
			Date of Collection	4/6/2022	4/6/2022	4/6/2022	4/11/2022	4/11/2022	4/11/2022	4/11/2022	4/11/2022	4/11/2022	4/12/2022
			Sample Depth	36-37 ft	42-43 ft	44-45 ft	02-03 ft	02-03 ft	28-29 ft	32-33 ft	35-36 ft	39-40 ft	05-06 ft
			Sample Type	N	N	N	N	FD	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silty Clay	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silty Clay	Shallow Sand & Gravel
			Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.00098 U	0.074 U	0.0011 U	0.0011 U	0.001 U	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
1,1-Dichloroethene	1	0.33	mg/kg	0.00098 U	**0.024 J**	0.0011 U	0.0011 U	0.001 U	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.002 UJ	0.15 U	0.0021 U	0.0023 U	0.0021 UJ	0.14 U	0.14 U	0.002 U	0.0019 U	0.0019 U
1,2-Dichloroethane	1	0.02	mg/kg	0.00098 U	0.074 U	0.0011 U	0.0011 U	0.001 U	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.002 UJ	0.15 U	0.0021 U	0.0023 U	0.0021 UJ	0.14 U	0.14 U	0.002 U	0.0019 U	0.0019 U
Acetone	1	0.05	mg/kg	**0.0074 J**	0.74 U	**0.0054 J**	0.011 U	0.01 U	0.72 U	0.72 U	0.0098 U	0.0097 U	0.0094 U
Benzene	1	0.06	mg/kg	**0.029**	**0.24**	**0.00039 J**	0.00057 U	0.00053 U	0.036 U	**0.04**	0.00049 U	0.00049 U	0.00047 U
Carbon Disulfide	1	0.3[c]	mg/kg	**0.0061 J**	0.74 U	0.011 U	0.011 U	0.01 U	0.72 U	0.72 U	0.0098 U	0.0097 U	0.0094 U
Chlorobenzene	1	1.1	mg/kg	0.00049 U	0.037 U	0.00053 U	0.00057 U	0.00053 U	0.036 U	0.036 U	0.00049 U	0.00049 U	0.00047 U
Chloroethane	1	1.9[c]	mg/kg	0.002 U	0.15 U	0.0021 U	0.0023 U	0.0021 U	0.14 U	0.14 U	0.002 U	0.0019 U	0.0019 U
Chloroform	1	0.37	mg/kg	0.0015 U	0.11 U	0.0016 U	0.0017 U	0.0016 U	0.11 U	0.11 U	0.0015 U	0.0014 U	0.0014 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.022**	**9.3**	**0.0026**	0.00044 U	0.001 U	**0.43 J**	**10**	0.0026 U	0.00052 U	0.00019 U
Ethylbenzene	1	1	mg/kg	0.00098 U	0.074 U	0.0011 U	0.0011 U	0.001 U	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.00098 UJ	0.074 U	0.0011 U	0.0011 U	0.001 UJ	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
Methyl ethyl ketone	1	0.12	mg/kg	0.0098 U	0.74 U	0.011 U	0.011 U	0.01 U	0.72 U	0.72 U	0.0098 U	0.0097 U	0.0094 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.0098 U	0.74 U	0.011 U	0.011 U	0.01 U	0.72 U	0.72 U	0.0098 U	0.0097 U	0.0094 U
Methylene chloride	1	0.05	mg/kg	0.0049 U	0.37 U	0.0053 U	0.0057 U	0.0053 U	0.36 U	0.36 U	0.0049 U	0.0049 U	0.0047 U
Naphthalene	1	12	mg/kg	0.0039 UJ	0.3 U	0.0042 U	0.0046 U	0.0042 UJ	0.29 U	0.29 U	0.0039 U	0.0039 U	0.0038 U
n-Butylbenzene	1	12	mg/kg	0.00098 UJ	0.074 U	0.0011 U	0.0011 U	0.001 UJ	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
n-Propylbenzene	1	3.9	mg/kg	0.00098 UJ	0.074 U	0.0011 U	0.0011 U	0.001 UJ	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.00098 UJ	0.074 U	0.0011 U	0.0011 U	0.001 UJ	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
sec-Butylbenzene	1	11	mg/kg	0.00098 UJ	0.074 U	0.0011 U	0.0011 U	0.001 UJ	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U
t-Butylbenzene	1	5.9	mg/kg	0.002 UJ	0.15 U	0.0021 U	0.0023 U	0.0021 UJ	0.14 U	0.14 U	0.002 U	0.0019 U	0.0019 U
Tetrachloroethene	1	1.3	mg/kg	0.00049 U	0.037 U	0.00053 U	0.00057 U	0.00053 U	0.036 U	0.036 U	0.00049 U	0.00049 U	0.00047 U
Toluene	1	0.7	mg/kg	**0.0018**	0.074 U	0.0011 U	0.0011 U	0.001 U	0.072 U	**0.067 U**	0.00098 U	0.00097 U	0.00094 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00036 J**	**0.066 J**	**0.00079 J**	0.0017 U	0.0016 U	0.11 U	**0.02 J**	0.0015 U	0.0014 U	0.0014 U
Trichloroethene	1	0.47	mg/kg	**0.0052**	**0.032 J**	0.00053 U	**0.00052 U**	0.00053 U	**9.2**	**0.053**	0.00049 U	**0.00013 U**	**0.00032 U**
Vinyl chloride	1	0.02	mg/kg	**0.019 J**	**3.4 J**	**4 J**	0.0011 U	0.001 U	0.072 U	0.072 U	**0.011**	0.00097 U	0.00094 U
Xylene, m & p	1	NC	mg/kg	0.002 U	0.15 U	0.0021 U	0.0023 U	0.0021 U	0.14 U	0.14 U	0.002 U	0.0019 U	0.0019 U
Xylene, o	1	NC	mg/kg	0.00098 U	0.074 U	0.0011 U	0.0011 U	0.001 U	0.072 U	0.072 U	0.00098 U	0.00097 U	0.00094 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-069	DPT-069	DPT-069	DPT-069	DPT-069	DPT-070	DPT-070	DPT-070	DPT-070	DPT-070
			Date of Collection	4/12/2022	4/12/2022	4/12/2022	4/12/2022	4/12/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022	4/6/2022
			Sample Depth	22-23 ft	28-29 ft	31-32 ft	38-39 ft	42.5-43.5 ft	04-05 ft	24-25 ft	29-30 ft	36-37 ft	36-37 ft
			Sample Type	N	N	N	N	N	N	N	N	N	FD
			Geologic Unit	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	**0.15**	**0.076**	0.0011 U	0.00089 U	0.00083 U	**0.06 J**	0.59 U	**0.044 J**	**0.042 J**
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0022 U	0.12 U	0.14 U	0.0021 U	0.0018 U	0.0017 U	0.13 U	**0.64 J**	0.14 U	0.13 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0022 U	0.12 U	0.14 U	0.0021 U	0.0018 U	0.0017 U	0.13 U	**0.13 J**	0.14 U	0.13 U
Acetone	1	0.05	mg/kg	0.011 U	0.62 U	0.68 U	0.011 U	0.0089 U	0.0083 U	0.63 U	5.9 U	0.71 U	0.67 U
Benzene	1	0.06	mg/kg	0.00056 U	**0.013 J**	0.034 U	0.00053 U	0.00044 U	0.00042 U	0.032 U	0.3 U	0.036 U	0.033 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.011 U	0.62 U	0.68 U	0.011 U	0.0089 U	0.0083 U	0.63 U	5.9 U	0.71 U	0.67 U
Chlorobenzene	1	1.1	mg/kg	0.00056 U	0.031 U	0.034 U	0.00053 U	0.00044 U	0.00042 U	0.032 U	0.3 U	0.036 U	0.033 U
Chloroethane	1	1.9[c]	mg/kg	0.0022 U	0.12 U	0.14 U	0.0021 U	0.0018 U	0.0017 U	0.13 U	1.2 U	0.14 U	0.13 U
Chloroform	1	0.37	mg/kg	0.0017 U	0.093 U	0.1 U	0.0016 U	0.0013 U	0.0012 U	0.095 U	0.89 U	0.11 U	0.1 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.0037 U	**23**	**6.9**	0.00039 U	0.00089 U	**0.00043 J**	**6.1**	**26**	**3.4**	**3.7**
Ethylbenzene	1	1	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
Methyl ethyl ketone	1	0.12	mg/kg	0.011 U	0.62 U	0.68 U	0.011 U	0.0089 U	0.0083 U	0.63 U	5.9 U	0.71 U	0.67 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.011 U	0.62 U	0.68 U	0.011 U	0.0089 U	0.0083 U	0.63 U	5.9 U	0.71 U	0.67 U
Methylene chloride	1	0.05	mg/kg	0.0056 U	0.31 U	0.34 U	0.0053 U	0.0044 U	0.0042 U	0.32 U	3 U	0.36 U	0.33 U
Naphthalene	1	12	mg/kg	0.0045 U	0.25 U	0.27 U	0.0043 U	0.0036 U	0.0033 U	0.25 U	2.4 U	0.28 U	0.27 U
n-Butylbenzene	1	12	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
n-Propylbenzene	1	3.9	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
sec-Butylbenzene	1	11	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
t-Butylbenzene	1	5.9	mg/kg	0.0022 U	0.12 U	0.14 U	0.0021 U	0.0018 U	0.0017 U	0.13 U	1.2 U	0.14 U	0.13 U
Tetrachloroethene	1	1.3	mg/kg	0.00056 U	0.031 U	0.034 U	0.00053 U	0.00044 U	0.00042 U	0.032 U	**0.4**	0.036 U	0.033 U
Toluene	1	0.7	mg/kg	0.0011 U	**0.082 U**	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0017 U	**0.051 J**	**0.041 J**	0.0016 U	0.0013 U	0.0012 U	**0.019 J**	0.89 U	**0.022 J**	**0.025 J**
Trichloroethene	1	0.47	mg/kg	**0.0021 U**	**250**	**11**	**0.002 U**	**0.0018 U**	**0.00035 J**	**2.1**	**320**	**3**	**2.4**
Vinyl chloride	1	0.02	mg/kg	0.0011 U	**0.29**	**0.11 J**	0.0011 U	0.00089 U	0.00083 U	**0.23 J**	0.59 U	**0.05 J**	**0.041 J**
Xylene, m & p	1	NC	mg/kg	0.0022 U	0.12 U	0.14 U	0.0021 U	0.0018 U	0.0017 U	0.13 U	1.2 U	0.14 U	0.13 U
Xylene, o	1	NC	mg/kg	0.0011 U	0.062 U	0.068 U	0.0011 U	0.00089 U	0.00083 U	0.063 U	0.59 U	0.071 U	0.067 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-070	DPT-071	DPT-071	DPT-071	DPT-071	DPT-071	DPT-071	DPT-071	DPT-072	DPT-072
			Date of Collection	4/6/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022
			Sample Depth	44-45 ft	04-05 ft	21-22 ft	21-22 ft	29-30 ft	30-31 ft	39-40 ft	43-44 ft	04-05 ft	24-25 ft
			Sample Type	N	N	N	FD	N	N	N	N	N	N
			Geologic Unit	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt
			Operable Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.0011 U	0.001 U	0.001 U	0.0011 UJ	0.087 U	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.001 U	0.001 U	0.0011 UJ	**0.19**	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0021 UJ	0.002 U	0.002 UJ	0.0022 UJ	0.17 U	0.16 U	0.0021 UJ	0.0019 UJ	0.002 U	0.12 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.001 U	0.001 U	0.0011 UJ	0.087 U	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0021 UJ	0.002 U	0.002 UJ	0.0022 UJ	0.17 U	0.16 U	0.0021 UJ	0.0019 UJ	**0.0002 J**	0.12 U
Acetone	1	0.05	mg/kg	0.011 U	0.01 U	**0.0063 J**	**0.0067 J**	0.87 U	0.78 U	0.01 U	0.0097 U	**0.014**	0.6 U
Benzene	1	0.06	mg/kg	0.00053 U	0.00051 U	0.00051 U	0.00054 UJ	0.044 U	0.039 U	0.00052 U	0.00049 U	0.0005 U	**0.018 J**
Carbon Disulfide	1	0.3[c]	mg/kg	0.011 U	0.01 U	0.01 U	0.011 UJ	0.87 U	0.78 U	**0.0066 J**	0.0097 U	0.01 U	0.6 U
Chlorobenzene	1	1.1	mg/kg	0.00053 U	0.00051 U	0.00051 UJ	0.00054 UJ	0.044 U	0.039 U	0.00052 U	0.00049 U	0.0005 U	0.03 U
Chloroethane	1	1.9[c]	mg/kg	0.0021 U	0.002 U	0.002 U	0.0022 UJ	0.17 U	0.16 U	0.0021 U	0.0019 U	0.002 U	0.12 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.0015 U	0.0015 U	0.0016 UJ	0.13 U	0.12 U	0.0016 U	0.0015 U	0.0015 U	0.09 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.00022 J**	0.001 U	0.001 U	0.0011 UJ	**14**	**1.8**	**0.00023 J**	0.00097 U	0.001 U	**3.4**
Ethylbenzene	1	1	mg/kg	0.0011 U	0.001 U	0.001 UJ	0.0011 U	0.087 U	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.0011 UJ	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 UJ	0.00097 UJ	0.001 U	0.06 U
Methyl ethyl ketone	1	0.12	mg/kg	0.011 U	0.01 U	0.01 U	0.011 UJ	0.87 U	0.78 U	0.01 U	0.0097 U	0.01 U	0.6 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.011 U	0.01 U	0.01 UJ	0.011 UJ	0.87 U	0.78 U	0.01 U	0.0097 U	0.01 U	0.6 U
Methylene chloride	1	0.05	mg/kg	0.0053 U	0.0051 U	0.0051 U	0.0054 UJ	0.44 U	0.39 U	0.0052 U	0.0049 U	0.005 U	0.3 U
Naphthalene	1	12	mg/kg	0.0043 UJ	**0.00095 J**	0.0041 UJ	0.0044 UJ	0.35 U	0.31 U	0.0041 UJ	0.0039 UJ	0.004 U	0.24 U
n-Butylbenzene	1	12	mg/kg	0.0011 UJ	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 UJ	0.00097 UJ	0.001 U	0.06 U
n-Propylbenzene	1	3.9	mg/kg	0.0011 UJ	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 UJ	0.00097 UJ	0.001 U	0.06 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 UJ	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 UJ	0.00097 UJ	0.001 U	0.06 U
sec-Butylbenzene	1	11	mg/kg	0.0011 UJ	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 UJ	0.00097 UJ	0.001 U	0.06 U
t-Butylbenzene	1	5.9	mg/kg	0.0021 UJ	0.002 U	0.002 UJ	0.0022 UJ	0.17 U	0.16 U	0.0021 UJ	0.0019 UJ	0.002 U	0.12 U
Tetrachloroethene	1	1.3	mg/kg	0.00053 U	0.00051 U	0.00051 UJ	0.00054 UJ	0.044 U	0.039 U	0.00052 U	0.00049 U	0.0005 U	0.03 U
Toluene	1	0.7	mg/kg	0.0011 U	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0016 U	0.0015 U	0.0015 U	0.0016 UJ	**0.08 J**	0.12 U	0.0016 U	0.0015 U	0.0015 U	**0.37**
Trichloroethene	1	0.47	mg/kg	**0.00074**	0.00051 U	0.00051 U	0.00054 UJ	0.044 U	0.039 U	0.00052 U	0.00049 U	**0.0062**	**4.6**
Vinyl chloride	1	0.02	mg/kg	0.0011 U	0.001 U	0.001 U	0.0011 UJ	**0.2 J**	**0.44**	0.001 U	0.00097 U	0.001 U	0.06 U
Xylene, m & p	1	NC	mg/kg	0.0021 U	0.002 U	0.002 UJ	0.0022 UJ	0.17 U	0.16 U	0.0021 U	0.0019 U	0.002 U	0.12 U
Xylene, o	1	NC	mg/kg	0.0011 U	0.001 U	0.001 UJ	0.0011 UJ	0.087 U	0.078 U	0.001 U	0.00097 U	0.001 U	0.06 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-072	DPT-072	DPT-073	DPT-073	DPT-073	DPT-073	DPT-073	DPT-073	DPT-074	DPT-074
			Date of Collection	4/5/2022	4/5/2022	4/7/2022	4/7/2022	4/7/2022	4/11/2022	4/11/2022	4/11/2022	4/7/2022	4/7/2022
			Sample Depth	32-33 ft	39-40 ft	04-05 ft	14-15 ft	20-21 ft	29-30 ft	37-38 ft	49-50 ft	04-05 ft	26-27 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt
			Operable Unit	OU-03	OU-03	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.072 U	0.0011 U	0.075 U	0.64 U	0.36 U	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
1,1-Dichloroethene	1	0.33	mg/kg	0.072 U	0.0011 U	0.075 U	0.64 U	**0.18 J**	**0.012**	**0.11**	0.00091 U	0.00079 U	0.18 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.14 U	0.0023 UJ	**0.18**	**7.1**	**6.8**	0.0022 U	0.13 U	0.0018 U	0.0016 U	**0.12 J**
1,2-Dichloroethane	1	0.02	mg/kg	0.072 U	0.0011 U	0.075 U	0.64 U	0.36 U	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.14 U	0.0023 UJ	**0.052 J**	**1.5**	**1.4**	0.0022 U	0.13 U	0.0018 U	0.0016 U	0.36 U
Acetone	1	0.05	mg/kg	0.72 U	**0.01 J**	0.75 U	6.4 U	3.6 U	0.011 U	0.66 U	0.0091 U	0.0079 U	1.8 U
Benzene	1	0.06	mg/kg	0.036 U	0.00057 U	**0.18**	0.32 U	0.18 U	**0.00055 J**	0.033 U	0.00046 U	0.0004 U	0.09 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.72 U	0.011 U	0.75 U	6.4 U	3.6 U	0.011 U	0.66 U	0.0091 U	0.0079 U	1.8 U
Chlorobenzene	1	1.1	mg/kg	0.036 U	0.00057 UJ	0.037 U	0.32 U	0.18 U	0.00056 U	0.033 U	0.00046 U	0.0004 U	0.09 U
Chloroethane	1	1.9[c]	mg/kg	0.14 U	0.0023 U	0.15 U	1.3 U	0.73 U	0.0022 U	0.13 U	0.0018 U	0.0016 U	0.36 U
Chloroform	1	0.37	mg/kg	0.11 U	0.0017 U	**0.018 U**	0.97 U	0.54 U	0.0017 U	**0.0097 U**	0.0014 U	0.0012 U	0.27 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.4**	0.0011 U	**0.55**	**31**	**63 J**	**1.8**	**6.6**	0.0033 U	0.00079 U	**6.7**
Ethylbenzene	1	1	mg/kg	0.072 U	0.0011 UJ	**0.12**	**0.25 J**	**0.13 J**	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.072 U	0.0011 UJ	**0.032 J**	**0.12 J**	**0.092 J**	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
Methyl ethyl ketone	1	0.12	mg/kg	0.72 U	0.011 U	0.75 U	6.4 U	3.6 U	0.011 U	0.66 U	0.0091 U	0.0079 U	1.8 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.72 U	0.011 UJ	0.75 U	6.4 U	3.6 U	0.011 U	0.66 U	0.0091 U	0.0079 U	1.8 U
Methylene chloride	1	0.05	mg/kg	0.36 U	0.0057 U	**0.19 J**	3.2 U	1.8 U	0.0056 U	0.33 U	0.0046 U	0.004 U	0.9 U
Naphthalene	1	12	mg/kg	0.29 U	0.0045 UJ	**0.54**	2.6 U	**0.3 J**	0.0044 U	0.26 U	0.0036 U	0.0032 U	0.72 U
n-Butylbenzene	1	12	mg/kg	0.072 U	0.0011 UJ	**0.021 J**	0.64 U	0.36 U	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
n-Propylbenzene	1	3.9	mg/kg	0.072 U	0.0011 UJ	**0.063 J**	**0.76 J**	**0.53**	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.072 U	0.0011 UJ	**0.014 U**	0.64 U	0.36 U	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
sec-Butylbenzene	1	11	mg/kg	0.072 U	0.0011 UJ	**0.015 J**	0.64 U	0.36 U	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U
t-Butylbenzene	1	5.9	mg/kg	0.14 U	0.0023 UJ	0.15 U	1.3 U	0.73 U	0.0022 U	0.13 U	0.0018 U	0.0016 U	0.36 U
Tetrachloroethene	1	1.3	mg/kg	0.036 U	0.00057 UJ	**0.023 J**	**1.4**	**0.47**	0.00056 U	0.033 U	0.00046 U	0.0004 U	**0.035 J**
Toluene	1	0.7	mg/kg	0.072 U	0.0011 UJ	**0.6**	0.64 U	**0.56**	0.0011 U	**0.044 J**	0.00091 U	0.00079 U	0.18 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.036 J**	0.0017 U	**0.04 J**	**0.14 J**	**0.13 J**	**0.047**	**0.18**	0.0014 U	0.0012 U	0.27 U
Trichloroethene	1	0.47	mg/kg	**2**	0.00057 U	**13**	**280**	**150**	**0.053**	**32**	0.00046 U	**0.00028 J**	**740**
Vinyl chloride	1	0.02	mg/kg	0.072 U	**0.004 J**	0.075 U	0.64 U	**0.31 J**	**0.16**	**0.06 J**	**0.004 U**	0.00079 U	**0.15 J**
Xylene, m & p	1	NC	mg/kg	0.14 U	0.0023 UJ	**0.6**	**1 J**	**0.33 J**	0.0022 U	0.13 U	0.0018 U	0.0016 U	0.36 U
Xylene, o	1	NC	mg/kg	0.072 U	0.0011 UJ	**0.28**	**0.55 J**	**0.42**	0.0011 U	0.066 U	0.00091 U	0.00079 U	0.18 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-074	DPT-074	DPT-074	DPT-075	DPT-075	DPT-075	DPT-075	DPT-075	DPT-076	DPT-076
			Date of Collection	4/7/2022	4/7/2022	4/7/2022	4/7/2022	4/7/2022	4/7/2022	4/7/2022	4/7/2022	4/12/2022	4/12/2022
			Sample Depth	26-27 ft	31-32 ft	37-38 ft	09-10 ft	25-26 ft	25-26 ft	33-34 ft	38-39 ft	05-06 ft	18-19 ft
			Sample Type	FD	N	N	N	N	FD	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.16 U	0.29 U	0.00098 U	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 U	0.001 U	0.14 U
1,1-Dichloroethene	1	0.33	mg/kg	0.16 U	**0.084 J**	**0.00091 J**	0.001 U	0.29 U	**0.012 J**	0.072 U	0.00096 U	0.001 U	0.14 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.1 J**	0.57 U	0.002 UJ	0.002 U	**0.27 J**	**0.048 J**	0.14 U	0.0019 UJ	**0.002**	0.28 U
1,2-Dichloroethane	1	0.02	mg/kg	0.16 U	0.29 U	0.00098 U	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 U	0.001 U	**0.066 J**
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.32 U	0.57 U	0.002 UJ	0.002 U	0.58 U	**0.0096 J**	0.14 U	0.0019 UJ	**0.00093 J**	0.28 U
Acetone	1	0.05	mg/kg	1.6 U	2.9 U	0.0098 U	0.01 U	2.9 U	0.33 U	0.72 U	0.0096 U	**0.033**	1.4 U
Benzene	1	0.06	mg/kg	0.081 U	0.14 U	**0.00031 J**	0.0005 U	**0.6**	**0.083**	**0.061**	0.00048 U	**0.00032 J**	**2.2**
Carbon Disulfide	1	0.3[c]	mg/kg	1.6 U	2.9 U	0.0098 U	0.01 U	2.9 U	0.33 U	0.72 U	0.0096 U	0.01 U	1.4 U
Chlorobenzene	1	1.1	mg/kg	0.081 U	0.14 U	0.00049 U	0.0005 U	0.14 U	0.017 U	0.036 U	0.00048 UJ	0.00051 U	0.071 U
Chloroethane	1	1.9[c]	mg/kg	0.32 U	0.57 U	0.002 U	0.002 U	0.58 U	0.067 U	0.14 U	0.0019 U	0.002 U	0.28 U
Chloroform	1	0.37	mg/kg	0.24 U	0.43 U	0.0015 U	0.0015 U	0.43 U	0.05 U	0.11 U	0.0014 U	0.0015 U	0.21 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**6.5**	**24**	**0.18 J**	0.001 U	**14**	**2**	**1.3**	**0.00088 J**	0.001 U	**5.1**
Ethylbenzene	1	1	mg/kg	0.16 U	0.29 U	0.00098 U	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 UJ	**0.00063 J**	0.14 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.16 U	0.29 U	0.00098 UJ	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 UJ	**0.0093**	0.14 U
Methyl ethyl ketone	1	0.12	mg/kg	1.6 U	2.9 U	0.0098 U	0.01 U	2.9 U	0.33 U	0.72 U	0.0096 U	**0.031 J**	1.4 U
Methyl isobutyl ketone	1	1[c]	mg/kg	1.6 U	2.9 U	0.0098 U	0.01 U	2.9 U	0.33 U	0.72 U	0.0096 UJ	0.01 U	1.4 U
Methylene chloride	1	0.05	mg/kg	0.81 U	1.4 U	0.0049 U	0.005 U	1.4 U	0.17 U	0.36 U	0.0048 U	0.0051 U	0.71 U
Naphthalene	1	12	mg/kg	0.64 U	1.1 U	0.0039 UJ	0.004 U	1.2 U	0.13 U	0.29 U	0.0038 UJ	0.004 U	**0.12 J**
n-Butylbenzene	1	12	mg/kg	0.16 U	0.29 U	0.00098 UJ	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 UJ	**0.00017 J**	0.14 U
n-Propylbenzene	1	3.9	mg/kg	0.16 U	0.29 U	0.00098 UJ	0.001 U	0.29 U	**0.0064 J**	0.072 U	0.00096 UJ	**0.0026 J**	0.14 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.16 U	0.29 U	0.00098 UJ	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 UJ	**0.00029 J**	0.14 U
sec-Butylbenzene	1	11	mg/kg	0.16 U	0.29 U	0.00098 UJ	0.001 U	0.29 U	0.033 U	0.072 U	0.00096 UJ	**0.00057 J**	0.14 U
t-Butylbenzene	1	5.9	mg/kg	0.32 U	0.57 U	0.002 UJ	0.002 U	0.58 U	0.067 U	0.14 U	0.0019 UJ	0.002 U	0.28 U
Tetrachloroethene	1	1.3	mg/kg	**0.037 J**	0.14 U	0.00049 U	0.0005 U	**0.21**	**0.03**	0.036 U	0.00048 UJ	0.00051 U	0.071 U
Toluene	1	0.7	mg/kg	0.16 U	0.29 U	0.00098 U	0.001 U	**0.7**	**0.09 U**	0.072 U	0.00096 UJ	**0.001**	**0.55**
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.24 U	**0.19 J**	**0.0011 J**	0.0015 U	**0.039 J**	**0.0082 J**	**0.021 J**	0.0014 U	0.0015 U	**0.028 J**
Trichloroethene	1	0.47	mg/kg	**670**	**120**	**0.078**	0.0005 U	**110**	**150**	**0.024 J**	**0.00057 J**	**0.00044 U**	**64**
Vinyl chloride	1	0.02	mg/kg	**0.15 J**	**1.3**	**0.19 J**	0.001 U	**0.58**	**0.2**	**0.19**	**0.091 J**	0.001 U	**0.13 J**
Xylene, m & p	1	NC	mg/kg	0.32 U	0.57 U	0.002 U	0.002 U	0.58 U	0.067 U	0.14 U	0.0019 UJ	**0.0048**	0.28 U
Xylene, o	1	NC	mg/kg	0.16 U	0.29 U	0.00098 U	0.001 U	0.29 U	**0.013 J**	0.072 U	0.00096 UJ	**0.0011**	0.14 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-076	DPT-076	DPT-076	DPT-076	DPT-076	DPT-077	DPT-077	DPT-077	DPT-077	DPT-077
			Date of Collection	4/12/2022	4/12/2022	4/12/2022	4/12/2022	4/12/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022	4/5/2022
			Sample Depth	24-25 ft	34-34.5 ft	36-37 ft	42-43 ft	42-43 ft	04-05 ft	13.5-15 ft	20-25 ft	29-30 ft	34-35 ft
			Sample Type	N	N	N	N	FD	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-03	OU-03	OU-03	OU-03	OU-03
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.036 U	**0.0014**	0.0011 U	**0.00063 J**	**0.00068 J**	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
1,1-Dichloroethene	1	0.33	mg/kg	0.036 U	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	**0.059 J**	**0.035 J**
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.025 J**	0.0024 U	0.0021 U	0.0023 U	0.0017 U	0.0031 UJ	0.0018 U	0.002 U	0.13 U	0.13 U
1,2-Dichloroethane	1	0.02	mg/kg	0.036 U	**0.0013**	0.0011 U	**0.0012**	**0.0014**	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.073 U	0.0024 U	0.0021 U	0.0023 U	0.0017 U	0.0031 UJ	0.0018 U	0.002 U	0.13 U	0.13 U
Acetone	1	0.05	mg/kg	0.36 U	0.012 U	0.011 U	0.011 U	0.0084 U	**0.15 J**	0.0089 U	**0.0068 J**	0.67 U	0.67 U
Benzene	1	0.06	mg/kg	**0.47**	**0.046**	0.00053 U	**0.044**	**0.048**	0.00077 UJ	0.00045 U	0.00049 U	0.033 U	0.034 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.36 U	0.012 U	0.011 U	0.011 U	0.0084 U	0.015 UJ	0.0089 U	0.0098 U	0.67 U	0.67 U
Chlorobenzene	1	1.1	mg/kg	0.018 U	0.00059 U	0.00053 U	0.00057 U	0.00042 U	0.00077 UJ	0.00045 U	0.00049 U	0.033 U	0.034 U
Chloroethane	1	1.9[c]	mg/kg	0.073 U	0.0024 U	0.0021 U	0.0023 U	0.0017 U	0.0031 UJ	0.0018 U	0.002 U	0.13 U	0.13 U
Chloroform	1	0.37	mg/kg	**0.0051 J**	0.0018 U	0.0016 U	0.0017 U	0.0012 U	0.0023 UJ	0.0013 U	0.0015 U	0.1 U	0.1 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.59**	0.0012 U	0.0011 U	**0.0015**	**0.0016**	0.0015 UJ	**0.0017**	0.00098 U	**8.3**	**4.8**
Ethylbenzene	1	1	mg/kg	**0.04**	0.0012 U	0.0011 U	**0.00031 J**	**0.00029 J**	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	**0.044**	0.0012 U	0.0011 U	**0.00017 J**	**0.00014 J**	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
Methyl ethyl ketone	1	0.12	mg/kg	0.36 U	0.012 U	0.011 U	0.011 U	0.0084 U	**0.0043 J**	0.0089 U	0.0098 U	0.67 U	0.67 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.36 U	0.012 U	0.011 U	0.011 U	0.0084 U	0.015 UJ	0.0089 U	0.0098 U	0.67 U	0.67 U
Methylene chloride	1	0.05	mg/kg	0.18 U	0.0059 U	0.0053 U	0.0057 U	0.0042 U	0.0077 UJ	0.0045 U	0.0049 U	0.33 U	0.34 U
Naphthalene	1	12	mg/kg	0.15 U	0.0047 U	0.0042 U	0.0046 U	0.0033 U	**0.015 J**	0.0036 U	0.0039 U	0.27 U	0.27 U
n-Butylbenzene	1	12	mg/kg	0.036 U	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
n-Propylbenzene	1	3.9	mg/kg	**0.031 J**	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.036 U	0.0012 U	0.0011 U	0.0011 U	0.00084 U	**0.0029 J**	0.00089 U	0.00098 U	0.067 U	0.067 U
sec-Butylbenzene	1	11	mg/kg	0.036 U	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
t-Butylbenzene	1	5.9	mg/kg	0.073 U	0.0024 U	0.0021 U	0.0023 U	0.0017 U	0.0031 UJ	0.0018 U	0.002 U	0.13 U	0.13 U
Tetrachloroethene	1	1.3	mg/kg	0.018 U	0.00059 U	0.00053 U	0.00057 U	0.00042 U	0.00077 UJ	0.00045 U	0.00049 U	0.033 U	0.034 U
Toluene	1	0.7	mg/kg	**0.14 U**	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.055 U	0.0018 U	0.0016 U	0.0017 U	0.0012 U	0.0023 UJ	0.0013 U	0.0015 U	**0.036 J**	**0.016 J**
Trichloroethene	1	0.47	mg/kg	**9**	0.00059 U	**0.00015 J**	**0.0041**	**0.0049**	**0.0017 J**	**0.024**	0.00049 U	**10**	**0.78**
Vinyl chloride	1	0.02	mg/kg	**0.022 J**	0.0012 U	0.0011 U	0.0011 U	**0.00034 J**	0.0015 UJ	0.00089 U	0.00098 U	**0.033 J**	**0.27**
Xylene, m & p	1	NC	mg/kg	**0.21**	0.0024 U	0.0021 U	**0.0012 J**	**0.0011 J**	0.0031 UJ	0.0018 U	0.002 U	0.13 U	0.13 U
Xylene, o	1	NC	mg/kg	**0.018 J**	0.0012 U	0.0011 U	0.0011 U	0.00084 U	0.0015 UJ	0.00089 U	0.00098 U	0.067 U	0.067 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-077	DPT-078	DPT-078	DPT-078	DPT-078	DPT-078	DPT-078	DPT-078	DPT-079	DPT-079
			Date of Collection	4/5/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022
			Sample Depth	38-39 ft	06-07 ft	15-16 ft	17-18 ft	26-27 ft	30-31 ft	30-31 ft	35-36 ft	07-08 ft	11-12 ft
			Sample Type	N	N	N	N	N	N	FD	N	N	N
			Geologic Unit	Deep Silt	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silty Clay	Shallow Sand & Gravel	Shallow Sand & Gravel
			Operable Unit	OU-03	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.0011 U	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.001 U	**0.015 J**	**0.016 J**	0.063 U	**0.00098 J**	**0.0016**	0.00098 U	0.00081 U	0.00078 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0022 UJ	0.002 U	0.13 U	0.12 U	0.12 U	0.0021 U	0.0022 U	0.002 U	0.0016 U	0.0016 UJ
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0022 UJ	0.002 U	0.13 U	0.12 U	0.12 U	0.0021 U	0.0022 U	0.002 U	0.0016 U	0.0016 U
Acetone	1	0.05	mg/kg	**0.0064 J**	0.01 U	0.64 U	0.61 U	0.63 U	**0.006 J**	0.011 U	**0.0054 J**	0.0081 U	**0.0068 J**
Benzene	1	0.06	mg/kg	0.00054 U	0.00051 U	**0.031 J**	**0.016 J**	0.031 U	**0.0026**	**0.0033**	0.00049 U	0.0004 U	0.00039 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.011 U	0.01 U	0.64 U	0.61 U	0.63 U	0.01 U	0.011 U	0.0098 U	0.0081 U	0.0078 U
Chlorobenzene	1	1.1	mg/kg	0.00054 UJ	0.00051 U	0.032 U	0.03 U	0.031 U	0.00053 U	0.00054 U	0.00049 U	0.0004 U	0.00039 U
Chloroethane	1	1.9[c]	mg/kg	0.0022 U	0.002 U	0.13 U	0.12 U	0.12 U	0.0021 U	0.0022 U	**0.00045 J**	0.0016 U	0.0016 U
Chloroform	1	0.37	mg/kg	0.0016 U	0.0015 U	0.095 U	0.091 U	0.094 U	0.0016 U	0.0016 U	0.0015 U	0.0012 U	0.0012 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.00055 J**	0.001 U	**0.6**	**0.46**	**0.29**	**0.037**	**0.044**	0.00098 U	**0.00019 J**	**0.0024**
Ethylbenzene	1	1	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
Methyl ethyl ketone	1	0.12	mg/kg	0.011 U	0.01 U	0.64 U	0.61 U	0.63 U	0.01 U	0.011 U	0.0098 U	0.0081 U	0.0078 UJ
Methyl isobutyl ketone	1	1[c]	mg/kg	0.011 UJ	0.01 U	0.64 U	0.61 U	0.63 U	0.01 U	0.011 U	0.0098 U	0.0081 U	0.0078 UJ
Methylene chloride	1	0.05	mg/kg	0.0054 U	0.0051 U	0.32 U	0.3 U	0.31 U	0.0053 U	0.0054 U	0.0049 U	0.004 U	0.0039 U
Naphthalene	1	12	mg/kg	0.0044 UJ	0.0041 U	0.25 U	0.24 U	0.25 U	0.0042 U	0.0043 U	0.0039 U	0.0032 U	0.0031 UJ
n-Butylbenzene	1	12	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 UJ
n-Propylbenzene	1	3.9	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 UJ
sec-Butylbenzene	1	11	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
t-Butylbenzene	1	5.9	mg/kg	0.0022 UJ	0.002 U	0.13 U	0.12 U	0.12 U	0.0021 U	0.0022 U	0.002 U	0.0016 U	0.0016 U
Tetrachloroethene	1	1.3	mg/kg	0.00054 UJ	0.00051 U	0.032 U	0.03 U	0.031 U	0.00053 U	0.00054 U	0.00049 U	0.0004 U	0.00039 U
Toluene	1	0.7	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0016 U	0.0015 U	**0.075 J**	**0.1**	**0.11**	**0.0086**	**0.011**	0.0015 U	0.0012 U	0.0012 U
Trichloroethene	1	0.47	mg/kg	**0.00038 J**	**0.00049 J**	**3.8**	**2.8**	**3.7**	**1.9**	**1.8**	0.00049 U	**0.0021**	**0.012 J**
Vinyl chloride	1	0.02	mg/kg	**0.011 J**	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	**0.00069 J**	**0.00043 J**	0.00081 U	0.00078 U
Xylene, m & p	1	NC	mg/kg	0.0022 UJ	0.002 U	0.13 U	0.12 U	0.12 U	0.0021 U	0.0022 U	0.002 U	0.0016 U	0.0016 U
Xylene, o	1	NC	mg/kg	0.0011 UJ	0.001 U	0.064 U	0.061 U	0.063 U	0.001 U	0.0011 U	0.00098 U	0.00081 U	0.00078 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-079	DPT-079	DPT-079	DPT-079	DPT-079	DPT-080	DPT-080	DPT-080	DPT-080	DPT-080
			Date of Collection	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/23/2022	8/24/2022	8/24/2022	8/24/2022	8/24/2022	8/24/2022
			Sample Depth	16-17 ft	23-24 ft	28-29 ft	36-37 ft	42-43 ft	06-07 ft	13-14 ft	20-21 ft	23-24 ft	25-26 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.00083 U	**0.0013**	**0.00016 J**	0.0011 U	0.001 U	0.00081 U	0.047 U	0.58 U	0.56 U	0.0011 U
1,1-Dichloroethene	1	0.33	mg/kg	0.00083 U	**0.00028 J**	0.00098 U	**0.0021**	0.001 U	0.00081 U	**0.011 J**	**0.21 J**	**1.3**	**0.0068**
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.0016 U	0.0019 U	0.002 U	0.0021 U	0.0021 U	0.0016 U	**0.27**	**8.6**	**120**	**0.0085**
1,2-Dichloroethane	1	0.02	mg/kg	0.00083 U	**0.0012**	**0.001**	**0.00058 J**	0.001 U	0.00081 U	0.047 U	0.58 U	0.56 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.0016 U	0.0019 U	0.002 U	0.0021 U	0.0021 U	0.0016 U	**0.019 J**	**2.2**	**37**	**0.0029**
Acetone	1	0.05	mg/kg	0.0083 U	**0.0063 J**	**0.007 J**	0.011 U	0.01 U	**0.0052 J**	0.47 U	5.8 U	5.6 U	**0.0083 J**
Benzene	1	0.06	mg/kg	0.00041 U	**0.00039 J**	**0.0027**	**0.0019**	0.00052 U	0.0004 U	0.023 U	0.29 U	0.28 U	**0.00032 J**
Carbon Disulfide	1	0.3[c]	mg/kg	0.0083 U	0.0093 U	0.0098 U	0.011 U	0.01 U	0.0081 U	0.47 U	5.8 U	5.6 U	**0.0061 J**
Chlorobenzene	1	1.1	mg/kg	0.00041 U	0.00046 U	0.00049 U	0.00053 U	0.00052 U	0.0004 U	0.023 U	0.29 U	0.28 U	0.00056 U
Chloroethane	1	1.9[c]	mg/kg	0.0016 U	0.0019 U	0.002 U	0.0021 U	0.0021 U	0.0016 U	0.094 U	1.2 U	1.1 U	0.0022 U
Chloroform	1	0.37	mg/kg	0.0012 U	0.0014 U	0.0015 U	0.0016 U	0.0016 U	0.0012 U	0.07 U	0.86 U	0.85 U	0.0017 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.0074**	**0.0024**	**0.002**	**0.09**	**0.017**	**0.00015 J**	**1.9**	**15**	**38**	**1.9**
Ethylbenzene	1	1	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.015 J**	**0.16 J**	**0.42 J**	**0.00066 J**
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.081**	**0.14 J**	**1.3**	**0.00036 J**
Methyl ethyl ketone	1	0.12	mg/kg	0.0083 U	0.0093 U	0.0098 U	0.011 U	0.01 U	0.0081 U	0.47 U	5.8 U	5.6 U	0.011 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.0083 U	0.0093 U	0.0098 U	0.011 U	0.01 U	0.0081 U	0.47 U	5.8 U	5.6 U	0.011 U
Methylene chloride	1	0.05	mg/kg	0.0041 U	0.0046 U	0.0049 U	0.0053 U	0.0052 U	0.004 U	0.23 U	2.9 U	2.8 U	0.0056 U
Naphthalene	1	12	mg/kg	0.0033 U	0.0037 U	0.0039 U	0.0042 U	0.0042 U	0.0032 U	0.19 U	2.3 U	**0.67 J**	0.0045 U
n-Butylbenzene	1	12	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.026 J**	0.58 U	**2.1**	0.0011 U
n-Propylbenzene	1	3.9	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.18**	**1.4**	**19**	**0.0017**
p-Isopropyltoluene	1	10[c]	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.0053 J**	0.58 U	**2.2**	0.0011 U
sec-Butylbenzene	1	11	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	**0.043 J**	0.58 U	0.56 U	0.0011 U
t-Butylbenzene	1	5.9	mg/kg	0.0016 U	0.0019 U	0.002 U	0.0021 U	0.0021 U	0.0016 U	0.094 U	1.2 U	1.1 U	0.0022 U
Tetrachloroethene	1	1.3	mg/kg	**0.00033 J**	0.00046 U	0.00049 U	0.00053 U	0.00052 U	0.0004 U	**0.01 J**	**1**	**1.8**	0.00056 U
Toluene	1	0.7	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	0.047 U	**0.34 J**	**0.46 J**	0.0011 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00011 J**	**0.00049 J**	**0.001 J**	**0.0079**	**0.00054 J**	0.0012 U	**0.0075 J**	0.86 U	**0.24 J**	**0.013**
Trichloroethene	1	0.47	mg/kg	**0.05**	**0.0014**	0.00049 U	0.00053 U	0.00052 U	**0.0036**	**4.5**	**1200**	**290**	**0.085**
Vinyl chloride	1	0.02	mg/kg	0.00083 U	**0.0073**	**0.0015**	**0.00082 J**	**0.00066 J**	0.00081 U	**0.1**	**1.3**	**1.9**	**0.09**
Xylene, m & p	1	NC	mg/kg	0.0016 U	0.0019 U	0.002 U	0.0021 U	0.0021 U	0.0016 U	0.094 U	**0.57 J**	**0.59 J**	**0.00075 J**
Xylene, o	1	NC	mg/kg	0.00083 U	0.00093 U	0.00098 U	0.0011 U	0.001 U	0.00081 U	0.047 U	**0.28 J**	**0.43 J**	0.0011 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-080	DPT-080	DPT-082	DPT-082	DPT-082	DPT-082	DPT-082	DPT-082	DPT-082	DPT-082
			Date of Collection	8/24/2022	8/24/2022	8/24/2022	8/24/2022	8/24/2022	8/24/2022	8/25/2022	8/25/2022	8/25/2022	8/25/2022
			Sample Depth	35-36 ft	42-43 ft	08-09 ft	08-09 ft	15-16 ft	23-24 ft	31-32 ft	35-37 ft	47-48 ft	47-48 ft
			Sample Type	N	N	N	FD	N	N	N	N	N	FD
			Geologic Unit	Deep Silt	Deep Silt	Shallow Sand & Gravel	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	**0.00023 J**	0.0011 U	0.05 U	0.052 U	0.001 U	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
1,1-Dichloroethene	1	0.33	mg/kg	0.0011 U	0.0011 U	0.05 U	0.052 U	0.001 U	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.0079**	**0.00062 J**	**3.9**	**2.9**	**0.00037 J**	0.13 U	**0.0016 J**	**0.0006 J**	0.0021 U	0.0022 U
1,2-Dichloroethane	1	0.02	mg/kg	0.0011 U	0.0011 U	0.05 U	0.052 U	**0.0074**	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	**0.0025**	**0.00022 J**	**1.1**	**0.88**	0.002 U	0.13 U	**0.00051 J**	**0.0002 J**	0.0021 U	0.0022 U
Acetone	1	0.05	mg/kg	0.011 U	0.011 U	0.5 U	0.52 U	**0.0064 J**	0.66 U	0.011 U	0.01 U	0.011 U	0.011 U
Benzene	1	0.06	mg/kg	**0.0048**	0.00057 U	0.025 U	0.026 U	**0.014**	0.033 U	**0.0085**	**0.014**	0.00053 U	0.00054 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.011 U	0.011 U	0.5 U	0.52 U	0.01 U	0.66 U	0.011 U	0.01 U	0.011 U	0.011 U
Chlorobenzene	1	1.1	mg/kg	0.00057 U	0.00057 UJ	0.025 U	0.026 U	0.0005 U	0.033 U	**0.002**	0.0005 U	0.00053 U	0.00054 U
Chloroethane	1	1.9[c]	mg/kg	0.0023 U	0.0023 U	0.099 U	0.1 U	0.002 U	0.13 U	0.0022 U	0.002 U	0.0021 U	0.0022 U
Chloroform	1	0.37	mg/kg	0.0017 U	0.0017 U	0.074 U	0.078 U	0.0015 U	0.099 U	0.0016 U	0.0015 U	0.0016 U	0.0016 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.0014**	**0.00029 J**	0.05 U	0.052 U	**0.0021**	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
Ethylbenzene	1	1	mg/kg	0.0011 U	0.0011 UJ	**16 J**	**8.4 J**	**0.0023**	**4.2**	**0.0082**	**0.0026**	0.0011 U	0.0011 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	**0.00019 J**	0.0011 UJ	**1.5**	**1.1**	**0.00026 J**	**0.0072 J**	**0.00077 J**	**0.0003 J**	0.0011 U	0.0011 U
Methyl ethyl ketone	1	0.12	mg/kg	0.011 U	0.011 U	0.5 U	0.52 U	0.01 U	0.66 U	0.011 U	0.01 U	0.011 U	0.011 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.011 U	0.011 U	0.5 U	0.52 U	0.01 U	0.66 U	0.011 U	0.01 U	0.011 U	0.011 U
Methylene chloride	1	0.05	mg/kg	0.0057 U	0.0057 U	0.25 U	0.26 U	0.005 U	0.33 U	0.0055 U	0.005 U	0.0053 U	0.0054 U
Naphthalene	1	12	mg/kg	0.0045 U	0.0045 UJ	**2.4**	**1.7**	0.004 U	0.26 U	**0.00072 J**	0.004 UJ	0.0042 U	0.0044 U
n-Butylbenzene	1	12	mg/kg	0.0011 U	0.0011 UJ	**0.8**	**0.48**	0.001 U	0.066 U	0.0011 U	0.001 UJ	0.0011 U	0.0011 U
n-Propylbenzene	1	3.9	mg/kg	**0.0013**	0.0011 UJ	**1.4**	**1.2**	0.001 U	0.066 U	**0.00053 J**	**0.00024 J**	0.0011 U	0.0011 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.0011 U	0.0011 UJ	**0.12**	**0.12**	0.001 U	0.066 U	0.0011 U	0.001 UJ	0.0011 U	0.0011 U
sec-Butylbenzene	1	11	mg/kg	0.0011 U	0.0011 UJ	**0.13**	**0.14**	0.001 U	0.066 U	0.0011 U	0.001 UJ	0.0011 U	0.0011 U
t-Butylbenzene	1	5.9	mg/kg	0.0023 U	0.0023 UJ	0.099 U	0.1 U	0.002 U	0.13 U	0.0022 U	0.002 U	0.0021 U	0.0022 U
Tetrachloroethene	1	1.3	mg/kg	0.00057 U	0.00057 UJ	0.025 U	0.026 U	0.0005 U	0.033 U	0.00055 U	0.0005 UJ	0.00053 U	0.00054 U
Toluene	1	0.7	mg/kg	0.0011 U	0.0011 UJ	0.05 U	0.052 U	0.001 U	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0017 U	0.0017 U	0.074 U	0.078 U	0.0015 U	0.099 U	0.0016 U	0.0015 U	0.0016 U	0.0016 U
Trichloroethene	1	0.47	mg/kg	**0.032**	**0.0063**	0.025 U	0.026 U	0.0005 U	0.033 U	0.00055 U	0.0005 U	0.00053 U	0.00054 U
Vinyl chloride	1	0.02	mg/kg	0.0011 U	0.0011 U	0.05 U	0.052 U	**0.0027**	0.066 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
Xylene, m & p	1	NC	mg/kg	0.0023 U	0.0023 UJ	**33 J**	**11 J**	**0.0044**	**0.09 J**	**0.016**	**0.0038**	0.0021 U	0.0022 U
Xylene, o	1	NC	mg/kg	0.0011 U	0.0011 UJ	**0.023 J**	0.052 U	0.001 U	0.066 U	**0.00063 J**	0.001 U	0.0011 U	0.0011 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-083	DPT-083	DPT-083	DPT-083	DPT-083	DPT-083	DPT-88	DPT-88	DPT-88	DPT-88
			Date of Collection	8/25/2022	8/25/2022	8/25/2022	8/25/2022	8/25/2022	8/25/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022
			Sample Depth	05-06 ft	11-12 ft	18-19 ft	24-25 ft	37-38 ft	37-38 ft	09-10 ft	14-15 ft	18-20 ft	18-20 ft
			Sample Type	N	N	N	N	N	FD	N	N	N	FD
			Geologic Unit	Shallow Sand & Gravel	Shallow Silty Clay	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Shallow Sand & Gravel	Deep Silt	Deep Silt	Deep Silt
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit										
1,1-Dichloroethane	1	0.27	mg/kg	0.00085 U	0.055 U	0.00099 U	0.00097 U	0.00095 U	0.00097 U	0.00092 U	0.056 U	0.001 U	0.0011 U
1,1-Dichloroethene	1	0.33	mg/kg	0.00085 U	0.055 U	0.00099 U	**0.0024**	0.00095 U	0.00097 U	0.00092 U	0.056 U	0.001 U	0.0011 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	**0.14**	**0.26**	0.002 U	0.0019 U	0.0019 U	0.0019 U	**0.00046 J**	**10**	**0.001 J**	**0.00043 J**
1,2-Dichloroethane	1	0.02	mg/kg	0.00085 U	0.055 U	0.00099 U	0.00097 U	0.00095 U	0.00097 U	0.00092 U	0.056 U	0.001 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	**0.0019**	**0.1 J**	0.002 U	0.0019 U	0.0019 U	0.0019 U	0.0018 U	**2.6**	**0.00035 J**	0.0022 U
Acetone	1	0.05	mg/kg	**0.064**	0.55 U	**0.0066 J**	**0.011**	0.0095 U	0.0097 U	**0.095**	0.56 U	0.01 U	**0.0055 J**
Benzene	1	0.06	mg/kg	**0.0014**	**0.03**	0.0005 U	**0.0018**	0.00048 U	0.00048 U	0.00046 U	0.028 U	**0.0018**	**0.002**
Carbon Disulfide	1	0.3[c]	mg/kg	0.0085 U	0.55 U	0.0099 U	0.0097 U	0.0095 U	0.0097 U	0.0092 U	0.56 U	0.01 U	0.011 U
Chlorobenzene	1	1.1	mg/kg	**0.00021 J**	0.027 U	0.0005 U	0.00049 U	0.00048 U	0.00048 U	0.00046 U	0.028 U	0.0005 U	0.00055 U
Chloroethane	1	1.9[c]	mg/kg	0.0017 U	0.11 U	0.002 U	0.0019 U	0.0019 U	0.0019 U	0.0018 U	0.11 U	0.002 U	0.0022 U
Chloroform	1	0.37	mg/kg	0.0013 U	0.082 U	0.0015 U	0.0015 U	0.0014 U	0.0014 U	0.0014 U	0.085 U	0.0015 U	0.0017 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	0.00085 U	0.055 U	**0.00086 J**	**0.044**	0.00095 U	0.00097 U	0.00092 U	0.056 U	0.001 U	**0.0002 J**
Ethylbenzene	1	1	mg/kg	**0.019**	**0.14**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	**0.00024 J**	**14**	**0.0012**	**0.00035 J**
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	**0.051**	**0.13**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	**0.013**	**0.84**	**0.00029 J**	**0.00061 J**
Methyl ethyl ketone	1	0.12	mg/kg	**0.0075 J**	0.55 U	0.0099 U	0.0097 U	0.0095 U	0.0097 U	0.0092 U	0.56 U	0.01 U	0.011 U
Methyl isobutyl ketone	1	1[c]	mg/kg	**0.0011 J**	0.55 U	0.0099 U	0.0097 U	0.0095 U	0.0097 U	0.0092 U	0.56 U	0.01 U	0.011 U
Methylene chloride	1	0.05	mg/kg	0.0042 U	0.27 U	0.005 U	0.0049 U	0.0048 U	0.0048 U	0.0046 U	0.28 U	0.005 U	0.0055 U
Naphthalene	1	12	mg/kg	**0.0025 J**	0.22 U	0.004 U	0.0039 U	0.0038 U	0.0039 U	**0.00061 J**	**2.8**	0.004 U	0.0044 U
n-Butylbenzene	1	12	mg/kg	**0.0035**	0.055 U	0.00099 U	0.00097 U	0.00095 U	0.00097 U	**0.00087 J**	**0.4**	0.001 U	0.0011 U
n-Propylbenzene	1	3.9	mg/kg	**0.04**	**0.045 J**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	**0.016**	**1.7**	**0.00034 J**	**0.00067 J**
p-Isopropyltoluene	1	10[c]	mg/kg	**0.00038 J**	**0.011 J**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	0.00092 U	**0.094**	0.001 U	0.0011 U
sec-Butylbenzene	1	11	mg/kg	**0.0044**	**0.0098 J**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	**0.0019**	**0.12**	0.001 U	0.0011 U
t-Butylbenzene	1	5.9	mg/kg	**0.00079 J**	0.11 U	0.002 U	0.0019 U	0.0019 U	0.0019 U	**0.00021 J**	0.11 U	0.002 U	0.0022 U
Tetrachloroethene	1	1.3	mg/kg	0.00042 U	0.027 U	0.0005 U	0.00049 U	0.00048 U	0.00048 U	**0.0015**	0.028 U	0.0005 U	0.00055 U
Toluene	1	0.7	mg/kg	**0.03**	0.055 U	0.00099 U	0.00097 U	0.00095 U	0.00097 U	0.00092 U	0.056 U	0.001 U	0.0011 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	0.0013 U	0.082 U	0.0015 U	0.0015 U	0.0014 U	0.0014 U	0.0014 U	0.085 U	0.0015 U	0.0017 U
Trichloroethene	1	0.47	mg/kg	**0.00079**	0.027 U	0.0005 U	0.00049 U	0.00048 U	0.00048 U	0.00046 U	0.028 U	0.0005 U	0.00055 U
Vinyl chloride	1	0.02	mg/kg	0.00085 U	0.055 U	0.00099 U	**0.002**	**0.042**	**0.039**	0.00092 U	0.056 U	0.001 U	0.0011 U
Xylene, m & p	1	NC	mg/kg	**0.07**	**16**	0.002 U	0.0019 U	0.0019 U	0.0019 U	0.0018 U	**52**	**0.0042**	**0.0011 J**
Xylene, o	1	NC	mg/kg	**0.023**	**0.017 J**	0.00099 U	0.00097 U	0.00095 U	0.00097 U	0.00092 U	**6.7**	**0.00064 J**	0.0011 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York

			Location ID	DPT-88	DPT-88	DPT-88	DPT-88	DPT-88
			Date of Collection	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022
			Sample Depth	22-23 ft	27-28 ft	35-36 ft	44-45 ft	49-50 ft
			Sample Type	N	N	N	N	N
			Geologic Unit	Deep Silt	Deep Silt	Deep Silt	Deep Silt	Deep Silty Clay
			Operable Unit	OU-01	OU-01	OU-01	OU-01	OU-01
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs	Unit					
1,1-Dichloroethane	1	0.27	mg/kg	0.001 U	**0.00051 J**	**0.00036 J**	0.00073 U	0.00086 U
1,1-Dichloroethene	1	0.33	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U
1,2,4-Trimethylbenzene	1	3.6	mg/kg	0.002 U	0.0023 U	0.0017 U	0.0015 U	0.0017 U
1,2-Dichloroethane	1	0.02	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U
1,3,5-Trimethylbenzene (Mesitylene)	1	8.4	mg/kg	0.002 U	0.0023 U	0.0017 U	0.0015 U	0.0017 U
Acetone	1	0.05	mg/kg	**0.005 J**	**0.0091 J**	0.0085 U	0.0073 U	0.0086 U
Benzene	1	0.06	mg/kg	**0.0041**	**0.0052**	**0.0014**	0.00037 U	0.00043 U
Carbon Disulfide	1	0.3[c]	mg/kg	0.01 U	0.011 U	0.0085 U	0.0073 U	0.0086 U
Chlorobenzene	1	1.1	mg/kg	0.00051 U	0.00057 U	0.00042 U	0.00037 U	0.00043 U
Chloroethane	1	1.9[c]	mg/kg	0.002 U	0.0023 U	0.0017 U	0.0015 U	0.0017 U
Chloroform	1	0.37	mg/kg	0.0015 U	0.0017 U	0.0013 U	0.0011 U	0.0013 U
cis-1,2-Dichloroethene	1	0.25	mg/kg	**0.0014**	**0.00027 J**	0.00085 U	0.00073 U	0.00086 U
Ethylbenzene	1	1	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U
Isopropylbenzene (cumene)	1	2.3[c]	mg/kg	**0.00052 J**	0.0011 U	0.00085 U	0.00073 U	0.00086 U
Methyl ethyl ketone	1	0.12	mg/kg	0.01 U	0.011 U	0.0085 U	0.0073 U	0.0086 U
Methyl isobutyl ketone	1	1[c]	mg/kg	0.01 U	0.011 U	0.0085 U	0.0073 U	0.0086 U
Methylene chloride	1	0.05	mg/kg	0.0051 U	0.0057 U	0.0042 U	0.0037 U	0.0043 U
Naphthalene	1	12	mg/kg	0.0041 U	0.0046 U	0.0034 U	0.0029 U	0.0034 U
n-Butylbenzene	1	12	mg/kg	**0.00019 J**	0.0011 U	0.00085 U	0.00073 U	0.00086 U
n-Propylbenzene	1	3.9	mg/kg	**0.00056 J**	0.0011 U	0.00085 U	**0.00012 J**	0.00086 U
p-Isopropyltoluene	1	10[c]	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U
sec-Butylbenzene	1	11	mg/kg	**0.00015 J**	0.0011 U	0.00085 U	0.00073 U	0.00086 U
t-Butylbenzene	1	5.9	mg/kg	0.002 U	0.0023 U	0.0017 U	0.0015 U	0.0017 U
Tetrachloroethene	1	1.3	mg/kg	0.00051 U	0.00057 U	0.00042 U	0.00037 U	0.00043 U
Toluene	1	0.7	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U
trans-1,2-Dichloroethene	1	0.19	mg/kg	**0.00014 J**	**0.00022 J**	0.0013 U	0.0011 U	0.0013 U
Trichloroethene	1	0.47	mg/kg	0.00051 U	0.00057 U	0.00042 U	0.00037 U	0.00043 U
Vinyl chloride	1	0.02	mg/kg	0.001 U	0.0011 U	**0.0011**	**0.0025**	0.00086 U
Xylene, m & p	1	NC	mg/kg	0.002 U	0.0023 U	0.0017 U	0.0015 U	0.0017 U
Xylene, o	1	NC	mg/kg	0.001 U	0.0011 U	0.00085 U	0.00073 U	0.00086 U

Appendix A. Detected Volatile Organic Compounds in Soil - 2016 - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Notes:
[c] Supplemental Soil Cleanup Objective listed in Table 1 of CP-51 (NYSDEC 2010a); these are not promulgated standards
Detections in Bold
Exceedances of NYSDEC Remedial Action Objectives (RAOs) set forth in the 1994 Record of Decision (ROD)
Additional exceedances when compared to the 2023 Amended ROD applicable Standards, Criteria, and Guidance (SCGs)
- - = not analyzed
- = not available/not applicable
CBTEX = cumene (Isopropylbenzene), benzene, toluene, ethylbenzene, and xylenes
FD = field duplicate
ft = feet
J = Estimated detection
mg/kg = milligrams per kilogram
N = normal (parent) sample
NC = no promulgated criteria or guidance value
U = Analyte not detected
UJ = Analyte not detected (estimated)
VOC = volatile organic compound

Appendix B.
Detected Volatile Organic Compounds in Groundwater 2016 - 2024

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-007		DPT-007		DPT-008		DPT-008		DPT-009		DPT-009		HW-10		HW-6		MW-1		MW-101S	
			Sample Date	09/21/2016		09/21/2016		09/20/2016		09/20/2016		09/20/2016		09/20/2016		11/03/2016		11/03/2016		11/04/2016		11/02/2016	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	20 - 24		30 - 34		24 - 28		36 - 40		22 - 26		30 - 34		7 - 17		6 - 16		15.75 - 20.75		8 - 18	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Deep		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	1	U	1	U	2.5	U	25	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	1000	U	250	U	2500	U	100	U	**330**		250	U	1	U	**0.83**	J	0.5	U	**2.3**	J
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1000	U	250	U	2500	U	100	U	200	U	250	U	1	U	1	U	0.5	U	5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**58000**		**15000**		**460000**		**7300**		**52000**		**17000**		1	U	**440**		2.5	U	**240**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	1	U	**3.8**		2.5	U	25	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**58000**		**15000**		**460000**		**7300**		**52000**		**17000**		--		--		2.5	U	**240**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	--		--		1200000	U	50000	U	100000	U	120000	U	--		--		250	UJ	2500	UJ
Acetone	50	50	µg/l	10000	U	2500	U	25000	U	1000	U	2000	U	2500	U	10	U	10	U	5	U	50	U
Benzene	1[a]	1	µg/l	1000	U	250	U	2500	U	100	U	**120**	J	250	U	1	U	**0.3**	J	0.5	U	5	U
Bromodichloromethane	50[d]	50[d]	µg/l	1000	U	250	U	2500	U	100	U	200	U	250	U	1	U	1	U	0.5	U	5	U
Bromoform	50[d]	50[d]	µg/l	4000	U	1000	U	10000	U	400	U	800	U	1000	U	1	UJ	1	U	2	U	20	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
Chlorobenzene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	**0.31**	J	**0.36**	J	2.5	U	25	U
Chloroform	7[a]	7	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	1	U	1	U	2.5	U	25	U
Dibromochloromethane	50[d]	50[d]	µg/l	1000	U	250	U	2500	U	100	U	200	U	250	U	1	U	1	U	0.5	U	5	U
Ethylbenzene	5	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	1	U	1	U	2.5	U	25	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	**2.8**		**1.1**		2.5	U	25	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10000	U	2500	U	25000	U	1000	U	2000	U	2500	U	10	U	10	U	5	UJ	50	UJ
Naphthalene	5[a,b]	NC	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	--		--		2.5	U	25	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	1000	U	250	U	2500	U	100	U	200	U	250	U	1	U	1	U	0.5	U	5	U
Toluene	5	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	**430**	J	1200	U	1	U	1	U	2.5	U	25	U
Trichloroethene	5	5[b]	µg/l	**100000**		**10000**		**62000**		**1700**		**71000**		**30000**		1	U	**0.62**	J	0.5	U	**620**	
Vinyl Chloride	5	2	µg/l	**1000**	J	**230**	J	**4800**	J	**18**	J	**2900**		**450**	J	1	U	**430**		1	U	**3.2**	J
Xylene, m- & p-	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	10	U	10	U	2.5	U	25	U
Xylene, o-	5[a,b]	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	1	U	1	U	2.5	U	25	U
Xylenes, Total	5	5[b]	µg/l	5000	U	1200	U	12000	U	500	U	1000	U	1200	U	10	U	10	U	2.5	U	25	U
Total VOC	NC	NC	µg/l	**159000**	J	**25230**	J	**526800**	J	**9018**	J	**126780**	J	**47450**	J	**3.11**	J	**877.01**	J	5	U	**865.5**	J
Total CVOC	NC	NC	µg/l	**159000**	J	**25230**	J	**526800**	J	**9018**	J	**126230**		**47450**	J	1	U	**875.25**	J	2.5	U	**865.5**	J
Total CBTEX	NC	NC	µg/l	5000	U	250	U	2500	U	500	U	**550**	J	250	U	**2.8**		**1.4**	J	2.5	U	5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-102S		MW-102S		MW-103S		MW-104S		MW-105S		MW-106D		MW-106D		MW-106S		MW-107S		MW-108S	
			Sample Date	11/02/2016		11/02/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016	
			Sample Type	N		FD		N		N		N		N		FD		N		N		N	
			Sample Depth (feet bgs)	9 - 14		9 - 14		8 - 18		9 - 14		8 - 18		24 - 34		24 - 34		10 - 15		9 - 19		7 - 17	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Deep		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**0.58**		**0.6**		0.5	U	0.5	U	0.5	U	**9.5**		**8.5**		**0.28**	J	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**4**		2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U	2.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**85**		**87**		**15**		**4.8**		2.5	U	**2300**		**1800**		**17**		**3.3**		**7.6**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**5**	J	**4.5**	J	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**85**		**87**		**15**		**4.8**		2.5	U	**2300**	J	**1800**	J	**17**		**3.3**		**7.6**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**2.2**	J	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	UJ	250	UJ	250	UJ	250	UJ	1200	UJ	1200	UJ	250	UJ	250	UJ	250	UJ
Acetone	50	50	µg/l	5	U	5	U	5	U	5	U	5	U	25	U	25	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	**0.28**	J	0.5	U	**4.3**		**3.5**		**0.47**	J	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U	2.5	U	0.5	U	**1.4**		0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	2	U	10	U	10	U	2	U	**1.1**	J	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**1.3**	J	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**1.7**	J	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	**1**	J	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U	2.5	U	0.5	U	**2**		0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**1.2**	J	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	25	UJ	25	UJ	5	UJ	5	UJ	5	UJ
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**0.79**	J	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	**4.2**		2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	**0.37**	J	**0.24**	J	2.5	U	2.5	U	0.5	U	0.5	U	**0.29**	J
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**62**		**63**		**81**		**240**		**0.6**		**580**		**500**		**45**		**14**		**40**	
Vinyl Chloride	5	2	µg/l	**7.8**		**7.5**		1	U	**0.15**	J	1	U	**2800**		**2900**		**4.4**		1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U	12	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**155.38**		**158.1**		**96**		**245.6**	J	**0.84**	J	**5698.8**	J	**5216.5**	J	**82.54**	J	**22.8**	J	**47.89**	J
Total CVOC	NC	NC	µg/l	**155.38**		**158.1**		**96**		**245.32**	J	**0.84**	J	**5694.5**	J	**5213**	J	**66.68**	J	**17.3**		**47.89**	J
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**0.28**	J	2.5	U	**4.3**		**3.5**		**1.67**	J	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-110D		MW-111D		MW-112S		MW-112S		MW-113D		MW-114S		MW-115D		MW-116S		MW-117S		MW-11D	
			Sample Date	11/02/2016		11/03/2016		11/03/2016		11/03/2016		11/03/2016		11/03/2016		11/03/2016		11/03/2016		11/03/2016		11/04/2016	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	28 - 38		32 - 42		6 - 16		6 - 16		29 - 39		8 - 13		35 - 40		8 - 13		6 - 16		35 - 45	
			Water Bearing Zone (WBZ)	Deep		Deep		Shallow		Shallow		Deep		Shallow		Deep		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	**0.95**	J	2.5	U	2.5	U	**1.2**	J	25	U	1	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**130**	J	0.5	U	5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	1	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**270**		**220**		2.5	U	2.5	U	2.5	U	**12**		**80**		--	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	250	U	**0.48**	J	5	U	5	U	**0.29**	J	0.5	U	0.5	U	0.5	U	5	U	1	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**27000**		**2.2**	J	25	U	25	U	**0.89**	J	2.5	U	2.5	U	2.5	U	25	U	**0.51**	J
1,2-Dichloroethene, trans-	5	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	1	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**27000**		**2.2**	J	25	U	25	U	**0.89**	J	2.5	U	2.5	U	2.5	U	25	U	--	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**42**		**35**		2.5	U	2.5	U	2.5	U	**4.6**		**18**	J	--	
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	120000	UJ	250	UJ	2500	UJ	2500	UJ	250	UJ	250	UJ	250	UJ	250	UJ	2500	UJ	--	
Acetone	50	50	µg/l	2500	U	5	U	50	U	50	U	5	U	5	U	5	U	5	U	50	U	10	U
Benzene	1[a]	1	µg/l	250	U	**5.6**		5	U	5	U	**7.3**		0.5	U	0.5	U	**0.7**		**6.6**		1	U
Bromodichloromethane	50[d]	50[d]	µg/l	250	U	0.5	U	5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	1	U
Bromoform	50[d]	50[d]	µg/l	1000	U	2	U	20	U	20	U	2	U	2	U	2	U	2	U	20	U	1	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	--	
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**15**	J	**14**	J	2.5	U	2.5	U	2.5	U	2.5	U	25	U	--	
Butylbenzene, t-	5[a,b]	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	--	
Chlorobenzene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	1	U
Chloroform	7[a]	7	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	1	U
Dibromochloromethane	50[d]	50[d]	µg/l	250	U	0.5	U	5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	1	U
Ethylbenzene	5	5[b]	µg/l	1200	U	2.5	U	**1100**		**940**		**0.96**	J	2.5	U	2.5	U	2.5	U	**1200**		1	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**120**		**110**		2.5	U	2.5	U	2.5	U	**2.5**		**95**		1	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	2500	UJ	5	UJ	50	UJ	50	UJ	5	UJ	5	UJ	5	UJ	5	UJ	50	UJ	10	U
Naphthalene	5[a,b]	NC	µg/l	1200	U	2.5	U	**220**		**200**		2.5	U	2.5	U	2.5	U	**0.91**	J	**45**		--	
n-Propylbenzene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**72**		**62**		2.5	U	2.5	U	2.5	U	**1.4**	J	**45**		--	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**7.8**	J	**7.4**	J	2.5	U	2.5	U	2.5	U	2.5	U	25	U	--	
Tetrachloroethene	5[a,b]	5[b]	µg/l	250	U	0.5	U	5	U	5	U	0.5	U	**0.3**	J	0.5	U	0.5	U	5	U	1	U
Toluene	5	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	**47**		1	U
Trichloroethene	5	5[b]	µg/l	**64000**		0.5	U	5	U	5	U	0.5	U	0.5	U	0.5	U	**0.18**	J	5	U	**0.32**	J
Vinyl Chloride	5	2	µg/l	**600**		**10**		10	U	10	U	**3.6**		1	U	1	U	**0.56**	J	10	U	**5.1**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	1200	U	2.5	U	**1700**		**1400**		**3.4**		2.5	U	2.5	U	2.5	U	**1700**		10	U
Xylene, o-	5[a,b]	5[b]	µg/l	1200	U	2.5	U	25	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U	**430**		1	U
Xylenes, Total	5	5[b]	µg/l	1200	U	2.5	U	**1700**		**1400**		**3.4**		2.5	U	2.5	U	2.5	U	**2100**		10	U
Total VOC	NC	NC	µg/l	**91730**	J	**18.28**	J	**3546.8**	J	**2988.4**	J	**17.39**	J	**0.3**	J	5	U	**24.05**	J	**3666.6**	J	**5.93**	J
Total CVOC	NC	NC	µg/l	**91730**	J	**12.2**	J	5	U	5	U	**4.49**	J	**0.3**	J	2.5	U	**0.74**	J	5	U	**5.93**	J
Total CBTEX	NC	NC	µg/l	250	U	**5.6**		**2920**		**2450**		**11.66**	J	2.5	U	2.5	U	**3.2**		**3478.6**		10	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-12		MW-14D		MW-14S		MW-14S		MW-15D		MW-15S		MW-16D		MW-19D		MW-20		MW-21D	
			Sample Date	11/03/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/01/2016		11/02/2016		11/03/2016		11/02/2016	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	4 - 14		40 - 50		10 - 20		10 - 20		34 - 44		10 - 20		36 - 46		34 - 44		6.5 - 11.5		31.5 - 41	
			Water Bearing Zone (WBZ)	Shallow		Deep		Shallow		Shallow		Deep		Shallow		Deep		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	1	U	50	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	**140**	J	1	U	1	U	1	U	1	U	**120**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1	U	1	U	1	U	1	U	200	U	1	U	1	U	1	U	1	U	50	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**13**		1	U	**1.4**		**1.2**		**46000**		**1.4**		1	U	**66**		**1.1**		**120000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**0.19**	J	1	U	1	U	1	U	1000	U	1	U	1	U	**0.55**	J	1	U	**440**	
1,2-Dichloroethene, Total	NC	NC	µg/l	--		--		--		--		**46000**		--		--		--		--		--	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	--		--		--		--		100000	UJ	--		--		--		--		--	
Acetone	50	50	µg/l	10	U	10	U	10	U	10	U	2000	U	10	U	10	U	10	U	10	U	**13000**	
Benzene	1[a]	1	µg/l	1	U	1	U	1	U	1	U	200	U	1	U	1	U	1	U	**0.2**	J	**31**	J
Bromodichloromethane	50[d]	50[d]	µg/l	1	U	1	U	1	U	1	U	200	U	1	U	1	U	1	U	1	U	50	U
Bromoform	50[d]	50[d]	µg/l	1	UJ	1	UJ	1	UJ	1	UJ	800	U	1	UJ	1	UJ	1	UJ	1	UJ	50	UJ
Butylbenzene, n-	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
Butylbenzene, t-	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
Chlorobenzene	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	1	U	50	U
Chloroform	7[a]	7	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	1	U	50	U
Dibromochloromethane	50[d]	50[d]	µg/l	1	U	1	U	1	U	1	U	200	U	1	U	1	U	1	U	1	U	50	U
Ethylbenzene	5	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	**100**		50	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	**20**		50	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10	U	10	U	10	U	10	U	2000	UJ	10	U	10	U	10	U	10	U	500	U
Naphthalene	5[a,b]	NC	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
n-Propylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	--		--		--		--		1000	U	--		--		--		--		--	
Tetrachloroethene	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	200	U	1	U	1	U	1	U	1	U	50	U
Toluene	5	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	1	U	50	U
Trichloroethene	5	5[b]	µg/l	**16**		1	U	**9.6**		**11**		**12000**		**4.5**		1	U	**1.1**		**2.3**		**18**	J
Vinyl Chloride	5	2	µg/l	1	U	**6.9**		1	U	1	U	**2600**		1	U	**0.4**	J	**25**		1	U	**39000**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	10	U	10	U	10	U	10	U	1000	U	10	U	10	U	10	U	**240**		500	U
Xylene, o-	5[a,b]	5[b]	µg/l	1	U	1	U	1	U	1	U	1000	U	1	U	1	U	1	U	**1.8**		50	U
Xylenes, Total	5	5[b]	µg/l	10	U	10	U	10	U	10	U	1000	U	10	U	10	U	10	U	**240**		500	U
Total VOC	NC	NC	µg/l	**29.19**	J	**6.9**		**11**		**12.2**		**60740**	J	**5.9**		**0.4**	J	**92.65**	J	**365.4**	J	**172609**	J
Total CVOC	NC	NC	µg/l	**29.19**	J	**6.9**		**11**		**12.2**		**60740**	J	**5.9**		**0.4**	J	**92.65**	J	**3.4**		**159578**	J
Total CBTEX	NC	NC	µg/l	10	U	10	U	10	U	10	U	200	U	10	U	10	U	10	U	**362**	J	**31**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-21D		MW-22D		MW-23D		MW-23S		MW-24S		MW-25D		MW-25S		MW-25S		MW-26S		MW-26S	
			Sample Date	11/02/2016		11/03/2016		11/02/2016		11/02/2016		11/02/2016		11/02/2016		11/02/2016		11/02/2016		11/02/2016		11/02/2016	
			Sample Type	FD		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	31.5 - 41		32.5 - 42		28 - 37.5		5 - 14.5		5 - 14.5		31 - 41		7 - 17		7 - 17		5 - 15		5 - 15	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Shallow		Shallow		Deep		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-03		OU-01		OU-01		OU-01		OU-03		OU-03		OU-03		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	50	U	25	U	2.5	U	1	U	1	U	1	U	2.5	U	1	U	250	U	1	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**100**		5	U	0.5	U	1	U	1	U	1	U	0.5	U	1	U	50	U	1	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		**3800**		--	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	50	U	5	U	0.5	U	1	U	1	U	1	U	0.5	U	1	U	50	U	1	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**110000**		**190**		2.5	U	1	U	**1**		1	U	**28**		**25**		250	U	1	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**460**		25	U	2.5	U	1	U	1	U	1	U	2.5	U	1	U	250	U	1	U
1,2-Dichloroethene, Total	NC	NC	µg/l	--		**190**		2.5	U	--		--		--		**28**		--		250	U	--	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		**1000**		--	
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	--		2500	UJ	250	UJ	--		--		--		250	UJ	--		25000	UJ	--	
Acetone	50	50	µg/l	**11000**		50	U	5	U	10	U	10	U	10	U	5	U	10	U	500	U	10	U
Benzene	1[a]	1	µg/l	**29**	**J**	5	U	0.5	U	**0.2**	**J**	**0.82**	**J**	1	U	0.5	U	1	U	50	U	**0.32**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	50	U	5	U	0.5	U	1	U	1	U	1	U	0.5	U	1	U	50	U	1	U
Bromoform	50[d]	50[d]	µg/l	50	UJ	20	U	2	U	1	UJ	1	U	1	UJ	2	U	1	UJ	200	U	1	UJ
Butylbenzene, n-	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		250	U	--	
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		250	U	--	
Butylbenzene, t-	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		250	U	--	
Chlorobenzene	5[a,b]	5[b]	µg/l	50	U	25	U	2.5	U	**0.32**	**J**	**0.43**	**J**	1	U	2.5	U	1	U	250	U	1	U
Chloroform	7[a]	7	µg/l	50	U	25	U	2.5	U	1	U	1	U	1	U	2.5	U	1	U	250	U	1	U
Dibromochloromethane	50[d]	50[d]	µg/l	50	U	5	U	0.5	U	1	U	1	U	1	U	0.5	U	1	U	50	U	1	U
Ethylbenzene	5	5[b]	µg/l	50	U	25	U	2.5	U	**5.1**		**580**		1	U	2.5	U	1	U	**480**		**470**	
Isopropylbenzene	5[a,b]	5[b]	µg/l	50	U	25	U	2.5	U	**5.9**		**88**		1	U	2.5	U	1	U	**92**	**J**	**140**	
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	500	U	50	UJ	5	UJ	10	U	10	U	10	U	5	UJ	10	U	500	UJ	10	U
Naphthalene	5[a,b]	NC	µg/l	--		**15**	**J**	2.5	U	--		--		--		2.5	U	--		**91**	**J**	--	
n-Propylbenzene	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		**580**		--	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	--		25	U	2.5	U	--		--		--		2.5	U	--		250	U	--	
Tetrachloroethene	5[a,b]	5[b]	µg/l	50	U	5	U	0.5	U	1	U	1	U	1	U	0.5	U	1	U	50	U	1	U
Toluene	5	5[b]	µg/l	50	U	25	U	2.5	U	1	U	**6.5**		1	U	2.5	U	1	U	250	U	**1.3**	
Trichloroethene	5	5[b]	µg/l	50	U	**890**		0.5	U	1	U	1	U	1	U	**91**		**78**		50	U	1	U
Vinyl Chloride	5	2	µg/l	**37000**		**1.6**	**J**	**0.67**	**J**	1	U	1	U	1	U	1	U	1	U	100	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	500	U	25	U	2.5	U	**1.9**	**J**	**1200**		10	U	2.5	U	10	U	**1100**		**980**	
Xylene, o-	5[a,b]	5[b]	µg/l	50	U	25	U	2.5	U	**4**		**460**		1	U	2.5	U	1	U	250	U	**1.2**	
Xylenes, Total	5	5[b]	µg/l	500	U	25	U	2.5	U	**5.9**	**J**	**1700**		10	U	2.5	U	10	U	**1100**		**980**	
Total VOC	NC	NC	µg/l	**158589**	**J**	**1096.6**	**J**	**0.67**	**J**	**17.42**	**J**	**2336.75**	**J**	5	U	**119**		**103**		**7143**	**J**	**1592.82**	**J**
Total CVOC	NC	NC	µg/l	**147560**		**1081.6**	**J**	**0.67**	**J**	1	U	**1**		1	U	**119**		**103**		50	U	1	U
Total CBTEX	NC	NC	µg/l	**29**	**J**	5	U	2.5	U	**17.1**	**J**	**2335.32**	**J**	10	U	2.5	U	10	U	**1672**	**J**	**1592.82**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-26S		MW-27S		MW-28S		MW-29S		MW-30S		MW-6		MW-7		MW-7D		MW-7D		PZ-7D	
			Sample Date	11/02/2016		11/02/2016		11/02/2016		11/02/2016		11/03/2016		11/02/2016		11/03/2016		11/04/2016		11/04/2016		11/02/2016	
			Sample Type	FD		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	5 - 15		10 - 20		7 - 17		4 - 14		10 - 16		9.92 - 19.92		10.1 - 20.1		35 - 45		35 - 45		22 - 42	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	1	U	25	U	1	U	10	U	250	U	1	U	1	U	1200	U	100	U	1	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	1	U	5	U	1	U	10	U	50	U	1	U	1	U	**160**	J	**150**		**4.4**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		25	U	--		--		**750**		--		--		1200	U	--		--	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1	U	5	U	1	U	10	U	50	U	1	U	1	U	250	U	100	U	1	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	1	U	25	U	1	U	10	U	250	U	**0.36**	J	**27**		**46000**		**48000**		**270**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	1	U	25	U	1	U	10	U	250	U	1	U	1	U	1200	U	**150**		**5.7**	
1,2-Dichloroethene, Total	NC	NC	µg/l	--		25	U	--		--		250	U	--		--		**46000**		--		--	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		25	U	--		--		**160**	J	--		--		1200	U	--		--	
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	--		2500	UJ	--		--		25000	UJ	--		--		120000	UJ	--		--	
Acetone	50	50	µg/l	10	U	50	U	10	U	100	U	500	U	10	U	10	U	2500	U	1000	U	10	U
Benzene	1[a]	1	µg/l	**0.35**	J	5	U	1	U	**25**		50	U	1	U	1	U	250	U	**13**	J	**0.59**	J
Bromodichloromethane	50[d]	50[d]	µg/l	1	U	5	U	1	U	10	U	50	U	1	U	1	U	250	U	100	U	1	U
Bromoform	50[d]	50[d]	µg/l	1	UJ	20	U	1	UJ	10	UJ	200	U	1	UJ	1	U	1000	U	100	U	1	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	--		25	U	--		--		250	U	--		--		1200	U	--		--	
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	--		25	U	--		--		250	U	--		--		1200	U	--		--	
Butylbenzene, t-	5[a,b]	5[b]	µg/l	--		25	U	--		--		250	U	--		--		1200	U	--		--	
Chlorobenzene	5[a,b]	5[b]	µg/l	1	U	25	U	1	U	10	U	250	U	1	U	1	U	1200	U	100	U	1	U
Chloroform	7[a]	7	µg/l	1	U	25	U	1	U	10	U	250	U	1	U	**0.3**	J	1200	U	100	U	1	U
Dibromochloromethane	50[d]	50[d]	µg/l	1	U	5	U	1	U	10	U	50	U	1	U	1	U	250	U	100	U	1	U
Ethylbenzene	5	5[b]	µg/l	**460**		25	U	**22**		**3200**		**7300**		1	U	1	U	1200	U	100	U	1	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	**140**		25	U	**32**		**62**		**200**	J	1	U	1	U	1200	U	100	U	1	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10	U	50	UJ	10	U	100	U	500	UJ	10	U	10	U	2500	UJ	1000	U	10	U
Naphthalene	5[a,b]	NC	µg/l	--		25	U	--		--		**400**		--		--		1200	U	--		--	
n-Propylbenzene	5[a,b]	5[b]	µg/l	--		25	U	--		--		**130**	J	--		--		1200	U	--		--	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	--		25	U	--		--		250	U	--		--		1200	U	--		--	
Tetrachloroethene	5[a,b]	5[b]	µg/l	1	U	5	U	1	U	**1.3**	J	50	U	1	U	1	U	250	U	100	U	1	U
Toluene	5	5[b]	µg/l	**1.3**		25	U	**0.25**	J	**250**		250	U	1	U	1	U	1200	U	100	U	1	U
Trichloroethene	5	5[b]	µg/l	1	U	5	U	1	U	10	U	50	U	**3.4**		**9.3**		**2500**		**2300**		**660**	
Vinyl Chloride	5	2	µg/l	1	U	10	U	1	U	10	U	100	U	1	U	**0.14**	J	**6600**		**5400**		**16**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	**990**		25	U	**13**		**6800**		**26000**		10	U	10	U	1200	U	1000	U	10	U
Xylene, o-	5[a,b]	5[b]	µg/l	**1.1**		25	U	1	U	**1800**		**77**	J	1	U	1	U	1200	U	100	U	1	U
Xylenes, Total	5	5[b]	µg/l	**990**		25	U	**13**		**8600**		**26000**	J	10	U	10	U	1200	U	1000	U	10	U
Total VOC	NC	NC	µg/l	**1592.75**	J	50	U	**67.25**	J	**12138.3**	J	**35017**	J	**3.76**	J	**36.74**	J	**55260**	J	**56013**	J	**956.69**	J
Total CVOC	NC	NC	µg/l	1	U	5	U	1	U	**1.3**	J	50	U	**3.76**	J	**36.44**	J	**55260**	J	**56000**		**956.1**	
Total CBTEX	NC	NC	µg/l	**1592.75**	J	5	U	**67.25**	J	**12137**		**33577**	J	10	U	10	U	250	U	**13**	J	**0.59**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-1S		RW-1S		RW-2D		RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D		RW-6D	
			Sample Date	04/13/2016		11/03/2016		04/13/2016		11/03/2016		04/13/2016		11/03/2016		04/13/2016		11/03/2016		04/13/2016		11/03/2016	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	10.5 - 16		10.5 - 16		27 - 42		27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5					
			Water Bearing Zone (WBZ)	Shallow		Shallow		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**1.5**		**1.8**		**14**		**11**		1	U	1	U	1	U	1	U	**58**		**44**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**240**		**400**		**2400**	**D**	**2700**		**5.3**		**37**		**1.7**		**42**		**19000**	**D**	**20000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**2.3**		**2.2**		**35**		**17**		1	U	**0.26**	**J**	1	U	1	U	**200**		**52**	
1,2-Dichloroethene, Total	NC	NC	µg/l	--		--		--		--		--		--		--		--		--		--	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	--		--		--		--		--		--		--		--		--		--	
Acetone	50	50	µg/l	10	U	10	U	**78**		20	U	10	U	10	U	10	U	10	U	**36000**		**28000**	
Benzene	1[a]	1	µg/l	1	U	1	U	**7.3**		**5.6**		1	U	1	U	**11**		**1.8**		**81**		**57**	
Bromodichloromethane	50[d]	50[d]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
Bromoform	50[d]	50[d]	µg/l	1	U	1	UJ	2	U	2	UJ	1	U	1	UJ	1	U	1	UJ	20	U	20	UJ
Butylbenzene, n-	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
Butylbenzene, t-	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
Chlorobenzene	5[a,b]	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
Chloroform	7[a]	7	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
Dibromochloromethane	50[d]	50[d]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
Ethylbenzene	5	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	**11**		1	U	20	U	20	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	**12**		**1.6**		20	U	20	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10	U	10	U	20	U	20	U	10	U	10	U	10	U	10	U	**240**		200	U
Naphthalene	5[a,b]	NC	µg/l	--		--		--		--		--		--		--		--		--		--	
n-Propylbenzene	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	--		--		--		--		--		--		--		--		--		--	
Tetrachloroethene	5[a,b]	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	1	U	1	U	20	U	20	U
Toluene	5	5[b]	µg/l	1	U	1	U	**0.66**	**J**	**0.69**	**J**	1	U	1	U	1	U	1	U	20	U	20	U
Trichloroethene	5	5[b]	µg/l	**60**		**160**		**1900**	**D**	**2000**		**4.4**		**31**		**4.3**		**26**		**21000**	**D**	**6700**	
Vinyl Chloride	5	2	µg/l	**16**		**18**		**370**		**290**		**0.35**	**J**	**2.7**		**0.54**	**J**	**5**		**2700**		**2200**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	10	U	10	U	20	U	20	U	10	U	10	U	**23**		10	U	200	U	200	U
Xylene, o-	5[a,b]	5[b]	µg/l	1	U	1	U	2	U	2	U	1	U	1	U	**1.3**		1	U	20	U	20	U
Xylenes, Total	5	5[b]	µg/l	10	U	10	U	20	U	20	U	10	U	10	U	**24**		10	U	200	U	200	U
Total VOC	NC	NC	µg/l	**319.8**		**582**		**4804.96**	**J**	**5024.29**	**J**	**10.05**	**J**	**70.96**	**J**	**64.84**	**J**	**76.4**		**79279**		**57053**	
Total CVOC	NC	NC	µg/l	**319.8**		**582**		**4719**		**5018**		**10.05**	**J**	**70.96**	**J**	**6.54**	**J**	**73**		**42958**		**28996**	
Total CBTEX	NC	NC	µg/l	10	U	10	U	**7.96**	**J**	**6.29**	**J**	10	U	10	U	**58.3**		**3.4**		**81**		**57**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-010		DPT-010		DPT-011		DPT-011		DPT-011		DPT-012		DPT-012		DPT-012		DPT-013		DPT-013	
			Sample Date	09/15/2017		09/15/2017		09/14/2017		09/14/2017		09/15/2017		09/13/2017		09/15/2017		09/15/2017		09/11/2017		09/11/2017	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	20 - 24		32 - 36		11 - 15		22 - 26		32 - 36		11 - 15		26 - 30		36 - 40		11 - 15		24 - 28	
			Water Bearing Zone (WBZ)	Deep		Deep		Shallow		Deep		Deep		Shallow		Deep		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	UJ	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**17**	J	**8.1**		0.5	U	0.5	U	**68**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	20	U	2	U	0.5	U	0.5	U	50	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**5700**		**660**		**11**		3.6	U	**15000**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**310**		**14**		2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**6000**		**670**		**11**		3.6	U	**15000**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	10000	U	1000	U	250	U	250	U	25000	U	250	U	250	U	250	U	250	U	250	U
Acetone	50	50	µg/l	200	UJ	**15**	J	**4.9**	J	**2.9**	J	500	UJ	**1.9**	J	**5.7**	J	**13**	J	**24**	J	**3.8**	J
Benzene	1[a]	1	µg/l	20	U	**5.5**		0.5	U	0.5	U	**61**		0.5	U	0.5	U	0.5	U	**0.22**	J	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	20	U	2	U	0.5	U	0.5	U	50	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	80	U	8	U	2	U	2	U	200	U	2	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	20	U	2	U	0.5	U	0.5	U	50	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	200	UJ	20	UJ	5	UJ	5	UJ	500	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	20	U	2	U	0.5	U	0.5	U	50	U	**0.89**		0.5	U	0.5	U	**0.52**		0.5	U
Toluene	5	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	**2.1**	J	2.5	U
Trichloroethene	5	5[b]	µg/l	**900**	J	**12**	J	**21**	J	**14**	J	**15000**	J	**6**	J	0.5	UJ	0.5	UJ	**1.1**	J	0.5	UJ
Vinyl Chloride	5	2	µg/l	**89**		**39**		1	U	1	U	**450**		1	U	1	U	1	U	1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	100	U	10	U	2.5	U	2.5	U	250	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	200	UJ	20	UJ	5	UJ	5	UJ	500	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ
Total VOC	NC	NC	µg/l	**7016**	J	**753.6**	J	**36.9**	J	**16.9**	J	**30579**	J	**8.79**	J	**5.7**	J	**13**	J	**27.94**	J	**3.8**	J
Total CVOC	NC	NC	µg/l	**7016**	J	**733.1**	J	**32**	J	**14**	J	**30518**	J	**6.89**	J	2.5	U	2.5	U	**1.62**	J	2.5	U
Total CBTEX	NC	NC	µg/l	20	U	**5.5**		2.5	U	2.5	U	**61**		2.5	U	2.5	U	2.5	U	**2.32**	J	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-013		DPT-014		DPT-014		DPT-015		DPT-015		DPT-015		DPT-016		DPT-016		DPT-016		DPT-017	
			Sample Date	09/11/2017		09/12/2017		09/12/2017		09/12/2017		09/12/2017		09/12/2017		09/05/2017		09/06/2017		09/07/2017		09/07/2017	
			Sample Type	N		N		N		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	36 - 40		24 - 28		36 - 40		24 - 28		34 - 38		24 - 28		24 - 28		34 - 38		24 - 28		23 - 27	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Deep		Deep		Deep		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**0.7**	J	**18**		**7.4**	J	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**0.78**	J	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**0.7**	J	**19**	J	**7.4**	J	2.5	U	2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	250	U	250	U	250	U	250	U	250	U	250	U	250	U
Acetone	50	50	µg/l	**3.3**	J	**3**	J	**2.5**	J	5	UJ	**6.2**	J	**2**	J	**5.2**	J	5	UJ	**110**	J	**7.4**	J
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	**31**	J	**3.2**	J	5	UJ	5	UJ	5	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	UJ	0.5	U	0.5	U	0.5	UJ	**8.9**		**3**	J	0.5	UJ	0.5	UJ	0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	1	U	1	UJ	1	UJ	1	UJ	**0.14**	J	**0.09**	J	1	U	1	U	1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	**1.9**	J	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ
Total VOC	NC	NC	µg/l	**3.3**	J	**3**	J	**2.5**	J	**0.7**	J	**66.92**	J	**15.69**	J	**5.2**	J	5	U	**110**	J	**7.4**	J
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**0.7**	J	**27.82**	J	**10.49**	J	2.5	U	2.5	U	2.5	U	2.5	U
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-017		DPT-018		DPT-018		DPT-019		DPT-020		DPT-021		DPT-022		GP-1S		HW-10		HW-6	
			Sample Date	09/07/2017		09/08/2017		09/08/2017		09/19/2017		09/19/2017		09/19/2017		09/19/2017		10/19/2017		10/17/2017		03/16/2017	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	33 - 37		28 - 32		37 - 41		24 - 28		10 - 15		10 - 15		10 - 15		8 - 12.8		7 - 17		6 - 16	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-03		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	2.5	U	0.5	U	0.5	U	1.2	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**3400**		**170**		12	U	2.5	U	2.5	U	6.2	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	2.5	U	0.5	U	0.5	U	1.2	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	**16**		2.5	U	**200**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	**16**		2.5	U	**200**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	620	U	250	U	250	U	12000	U	250	U	1200	U	250	U	250	U	620	U
Acetone	50	50	µg/l	**51**	J	**16**	J	**1.7**	J	**3.6**	J	250	UJ	**3.6**	J	**11**	J	5	UJ	5	UJ	12	UJ
Benzene	1[a]	1	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	2.5	U	0.5	U	0.5	U	1.2	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	2.5	U	0.5	U	0.5	U	1.2	U
Bromoform	50[d]	50[d]	µg/l	2	U	5	U	2	U	2	U	100	U	2	U	10	U	2	U	2	U	5	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**52**	J	**1**	J	**5.1**	J	2.5	U	2.5	U	6.2	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	**4.1**		12	U	2.5	U	**0.9**	J	6.2	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	**1.2**	J	12	U	2.5	U	**5.3**		6.2	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
Chloroform	7[a]	7	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	2.5	U	0.5	U	0.5	U	1.2	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**610**		**7.4**		12	U	2.5	U	2.5	U	6.2	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**130**		**28**		**25**		2.5	U	**1.2**	J	6.2	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	12	UJ	5	UJ	**4.8**	J	250	UJ	**6**	J	25	UJ	5	UJ	5	UJ	12	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**790**		**22**		**22**		2.5	U	2.5	U	**6.2**	**U**
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**480**		**71**		**13**		2.5	UJ	2.5	U	6.2	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**37**	J	**1.5**	J	12	U	2.5	U	2.5	U	6.2	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	1.2	U	0.5	U	0.5	U	25	U	0.5	U	**0.9**	J	0.5	U	0.5	U	1.2	U
Toluene	5	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	2.5	U	12	U	2.5	U	2.5	U	6.2	U
Trichloroethene	5	5[b]	µg/l	0.5	UJ	1.2	UJ	0.5	UJ	**0.54**		25	U	0.5	U	2.5	U	**18**		**0.24**	J	**0.59**	J
Vinyl Chloride	5	2	µg/l	1	U	2.5	U	1	U	**0.08**	J	50	U	1	U	5	U	**0.33**	J	1	U	**210**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**43**	J	2.5	U	12	U	2.5	U	2.5	U	6.2	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	120	U	**1**	J	12	U	2.5	U	2.5	U	6.2	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**43**	J	**1**	J	12	U	2.5	U	2.5	U	6.2	U
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	12	UJ	5	UJ	5	UJ	250	UJ	5	UJ	25	UJ	5	UJ	5	UJ	12	UJ
Total VOC	NC	NC	µg/l	**51**	J	**16**	J	**1.7**	J	**9.02**	J	**5542**	J	**316.8**	J	**77**	J	**34.33**	J	**7.64**	J	**416.79**	J
Total CVOC	NC	NC	µg/l	2.5	U	6.2	U	2.5	U	**0.62**	J	50	U	2.5	U	**0.9**	J	**34.33**	J	**0.24**	J	**410.59**	J
Total CBTEX	NC	NC	µg/l	2.5	U	6.2	U	2.5	U	2.5	U	**783**	J	**36.4**	J	**25**		2.5	U	**1.2**	J	6.2	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	HW-6		HW-8		MW-101S		MW-101S		MW-101S		MW-102S		MW-102S		MW-102S		MW-103S		MW-103S	
			Sample Date	10/19/2017		03/16/2017		03/14/2017		10/19/2017		03/14/2017		03/14/2017		10/19/2017		10/19/2017		03/14/2017		10/17/2017	
			Sample Type	N		N		N		N		FD		N		N		FD		N		N	
			Sample Depth (feet bgs)	6 - 16		6 - 16		8 - 18		8 - 18		8 - 18		9 - 14		9 - 14		9 - 14		8 - 18		8 - 18	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**0.34**	**J**	0.5	U	**0.56**	**J**	**1.4**	**J**	**0.62**		**2.7**		**0.24**	**J**	**0.22**	**J**	0.5	U	**0.44**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	1.2	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U	1	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**180**		2.5	U	**67**		**240**		**71**		**470**		**44**		**45**		**10**		**70**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**2.1**	**J**	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**180**	**J**	2.5	U	**67**		**240**		**71**		**470**		**44**		**45**		**10**		**70**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	620	U	1200	U	250	U	620	U	250	U	250	U	250	U	500	UJ
Acetone	50	50	µg/l	5	UJ	5	UJ	12	UJ	25	UJ	5	UJ	12	UJ	5	UJ	5	UJ	5	UJ	10	U
Benzene	1[a]	1	µg/l	**0.16**	**J**	0.5	U	1.2	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U	1	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	1.2	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U	1	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	5	U	10	U	2	U	5	U	2	U	2	U	2	U	4	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	1.2	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U	1	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	12	UJ	25	UJ	5	UJ	12	UJ	5	UJ	5	UJ	5	UJ	10	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	2.5	U	6.2	UJ	12	U	2.5	U	6.2	UJ	2.5	U	2.5	U	2.5	U	5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	UJ	2.5	U	6.2	U	12	UJ	2.5	U	6.2	U	2.5	UJ	2.5	UJ	2.5	U	5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	1.2	U	2.5	U	**0.19**	**J**	1.2	U	0.5	U	0.5	U	0.5	U	1	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**170**		**510**		**180**		**150**		**30**		**30**		**60**		**180**	
Vinyl Chloride	5	2	µg/l	**250**		1	U	**0.75**	**J**	**2.3**	**J**	**0.84**	**J**	**1.8**	**J**	**0.16**	**J**	**0.15**	**J**	1	U	**0.17**	**J**
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	5	U	12	UJ	25	UJ	5	U	12	UJ	5	UJ	5	UJ	5	U	10	UJ
Total VOC	NC	NC	µg/l	**432.6**	**J**	5	U	**238.31**	**J**	**753.7**	**J**	**252.65**	**J**	**624.5**	**J**	**74.4**	**J**	**75.37**	**J**	**70**		**250.61**	**J**
Total CVOC	NC	NC	µg/l	**432.44**	**J**	2.5	U	**238.31**	**J**	**753.7**	**J**	**252.65**	**J**	**624.5**	**J**	**74.4**	**J**	**75.37**	**J**	**70**		**250.61**	**J**
Total CBTEX	NC	NC	µg/l	**0.16**	**J**	2.5	U	6.2	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U	5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-104S		MW-104S		MW-105S		MW-105S		MW-106D		MW-106D		MW-106D		MW-106S		MW-106S		MW-107S	
			Sample Date	03/14/2017		10/18/2017		03/15/2017		10/17/2017		03/15/2017		10/17/2017		03/15/2017		03/15/2017		10/17/2017		03/15/2017	
			Sample Type	N		N		N		N		N		N		FD		N		N		N	
			Sample Depth (feet bgs)	9 - 14		9 - 14		8 - 18		8 - 18		24 - 34		24 - 34		24 - 34		10 - 15		10 - 15		9 - 19	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Deep		Deep		Deep		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	1	U	0.5	U	0.5	U	0.5	U	**11**	**J**	**3**		**7.9**	**J**	**0.28**	**J**	**0.21**	**J**	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1	U	0.5	UJ	0.5	U	0.5	UJ	25	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	5	U	**1**	**J**	2.5	U	2.5	U	**3000**		**1600**		**2500**		**26**		**11**		**7.8**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	**1.2**	**J**	100	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	5	U	**1**	**J**	2.5	U	2.5	U	**3000**		**1600**	**J**	**2500**		**26**		**11**		**7.8**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	500	U	250	U	250	U	250	U	12000	U	250	UJ	10000	U	250	U	250	U	250	U
Acetone	50	50	µg/l	10	UJ	5	UJ	5	UJ	5	UJ	250	UJ	5	UJ	200	UJ	5	UJ	5	UJ	5	UJ
Benzene	1[a]	1	µg/l	1	U	0.5	U	0.5	U	0.5	U	25	U	**0.59**		20	U	0.5	U	**0.71**		0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	1	U	0.5	U	0.5	U	0.5	U	25	U	0.5	U	20	U	0.5	U	0.5	U	**2.2**	
Bromoform	50[d]	50[d]	µg/l	4	U	2	U	2	U	2	U	100	U	2	U	80	U	2	U	2	U	**0.99**	**J**
Butylbenzene, n-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	**0.76**	**J**	**0.75**	**J**	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	**1.8**	**J**
Dibromochloromethane	50[d]	50[d]	µg/l	1	U	0.5	U	0.5	U	0.5	U	25	U	0.5	U	20	U	0.5	U	0.5	U	**2.3**	
Ethylbenzene	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10	UJ	5	UJ	5	UJ	5	UJ	250	UJ	5	UJ	200	UJ	5	UJ	5	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	5	UJ	2.5	U	2.5	U	2.5	U	120	UJ	2.5	U	100	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	**1.7**	**J**	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	1	U	0.5	U	0.5	U	**0.2**	**J**	25	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**93**		**130**		**0.22**	**J**	**0.77**		**73**		**3.4**		**62**		**43**		**13**		**18**	
Vinyl Chloride	5	2	µg/l	2	U	1	UJ	1	U	1	UJ	**3000**		**2300**		**2500**		**3.6**		**6.4**		1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	120	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	10	UJ	5	UJ	5	U	5	UJ	250	UJ	5	UJ	200	UJ	5	U	5	UJ	5	U
Total VOC	NC	NC	µg/l	**93**		**131**	**J**	**0.22**	**J**	**0.97**	**J**	**6084**	**J**	**3908.19**	**J**	**5169.9**	**J**	**77.84**	**J**	**32.07**	**J**	**33.09**	**J**
Total CVOC	NC	NC	µg/l	**93**		**131**	**J**	**0.22**	**J**	**0.97**	**J**	**6084**	**J**	**3907.6**	**J**	**5069.9**	**J**	**72.88**	**J**	**30.61**	**J**	**25.8**	
Total CBTEX	NC	NC	µg/l	5	U	2.5	U	2.5	U	2.5	U	25	U	**0.59**		20	U	2.5	U	**0.71**		2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-107S		MW-108S		MW-108S		MW-108S		MW-108S		MW-109D		MW-109S		MW-110D		MW-110D		MW-111D	
			Sample Date	10/19/2017		03/15/2017		10/19/2017		03/15/2017		10/19/2017		10/17/2017		03/16/2017		03/14/2017		10/19/2017		03/14/2017	
			Sample Type	N		N		N		FD		FD		N		N		N		N		N	
			Sample Depth (feet bgs)	9 - 19		7 - 17		7 - 17		7 - 17		7 - 17		28 - 38		7 - 12		28 - 38		28 - 38		32 - 42	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Shallow		Deep		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1000	U	500	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1000	U	500	U	**0.42**	**J**
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**3.2**		**4.6**		**3.4**		**4.6**		**0.99**	**J**	2.5	U	**23000**		**30000**		**1.7**	**J**
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**3.2**		**4.6**		**3.4**		**4.6**		**0.99**	**J**	2.5	U	**23000**		**30000**		**1.7**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	250	U	250	U	250	UJ	250	U	500000	U	250000	U	250	U
Acetone	50	50	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	UJ	10000	UJ	5000	UJ	5	UJ
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1000	U	500	U	**6**	
Bromodichloromethane	50[d]	50[d]	µg/l	**1.4**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1000	U	500	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	**0.89**	**J**	2	U	2	U	2	U	2	U	2	U	2	U	4000	U	2000	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Chloroform	7[a]	7	µg/l	**1.1**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	**1.6**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1000	U	500	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	10000	UJ	5000	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	2.5	U	2.5	U	2.5	UJ	2.5	U	2.5	U	2.5	UJ	5000	UJ	2500	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	UJ	2.5	U	2.5	UJ	2.5	U	2.5	UJ	2.5	U	2.5	U	5000	U	2500	UJ	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	**0.29**	**J**	**0.48**	**J**	**0.3**	**J**	**0.48**	**J**	0.5	U	**0.26**	**J**	1000	U	500	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**26**		**22**		**24**		**22**		**0.4**	**J**	0.5	U	**120000**		**78000**		0.5	U
Vinyl Chloride	5	2	µg/l	1	U	1	U	1	U	1	U	1	U	**0.15**	**J**	1	U	**430**	**J**	**500**	**J**	**11**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	2500	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	5	U	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	10000	UJ	5000	UJ	5	U
Total VOC	NC	NC	µg/l	**4.99**	**J**	**29.49**	**J**	**27.08**	**J**	**27.7**	**J**	**27.08**	**J**	**1.54**	**J**	**0.26**		**143430**	**J**	**108500**	**J**	**19.12**	**J**
Total CVOC	NC	NC	µg/l	2.5	U	**29.49**	**J**	**27.08**	**J**	**27.7**	**J**	**27.08**	**J**	**1.54**	**J**	**0.26**		**143430**	**J**	**108500**	**J**	**12.7**	**J**
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	5000	U	500	U	**6**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-111D		MW-112S		MW-112S		MW-113D		MW-114S		MW-114S		MW-115D		MW-116S		MW-117S		MW-117S	
			Sample Date	10/18/2017		03/15/2017		10/18/2017		03/15/2017		03/15/2017		10/18/2017		03/15/2017		03/15/2017		03/15/2017		10/18/2017	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	32 - 42		6 - 16		6 - 16		29 - 39		8 - 13		8 - 13		35 - 40		8 - 13		6 - 16		6 - 16	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Deep		Shallow		Shallow		Deep		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**0.76**	J	2.5	U	2.5	U	2.5	U	**1**	J	25	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**8.9**		**1.4**	J	2.5	U	2.5	U	2.5	U	2.5	U	**1.3**	J	**22**	J	**1.9**	J
1,2-Dichloroethane	0.6[a]	0.6	µg/l	**0.35**	J	0.5	U	0.5	UJ	**0.25**	J	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**1.1**	J	2.5	U	2.5	U	**0.77**	J	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**1.1**	J	2.5	U	2.5	U	**0.77**	J	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**0.74**	J	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	250	U	250	UJ	250	U	250	U	250	U	2500	U	250	U
Acetone	50	50	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	50	UJ	5	UJ
Benzene	1[a]	1	µg/l	**2**		**1.1**		**0.3**	J	**6.4**		**0.29**	J	0.5	U	0.5	U	**0.43**	J	**11**		**0.64**	
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	20	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	**13**		**4.3**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	**1.2**	J
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	**2.2**	J	**1.3**	J	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	**28**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**710**		**51**	
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**29**		**12**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**59**		**13**	
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	50	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	**8.6**	J	**1.9**	J	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	**3.4**	
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**4.4**		**2.5**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**22**	J	**4.1**	J
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	**1.3**	J	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	**0.24**	J	**0.32**	J	0.5	U	0.5	U	5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**29**		**3**	
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**0.65**		0.5	U	**0.23**	J	0.5	U	0.5	U	0.5	U	5	U	**0.51**	
Vinyl Chloride	5	2	µg/l	**7.1**	J	1	U	1	UJ	**3.4**		1	U	1	UJ	1	U	**0.37**	J	10	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	**12**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**460**		**57**	
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**140**		**63**	
Xylenes, Total	5	5[b]	µg/l	2.5	U	**12**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**600**		**120**	
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5	UJ	5	U	5	UJ	5	UJ	5	U	5	U	50	U	5	UJ
Total VOC	NC	NC	µg/l	**10.55**	J	**109.24**	J	**24.35**	J	**11.58**	J	**3.26**	J	**0.32**	J	5	U	**3.1**	J	**1478**	J	**198.75**	J
Total CVOC	NC	NC	µg/l	**8.2**	J	2.5	U	**0.65**		**4.17**	J	**0.47**	J	**0.32**	J	2.5	U	**0.37**	J	5	U	**0.51**	
Total CBTEX	NC	NC	µg/l	**2**		**70.1**		**12.3**	J	**6.4**		**0.29**	J	2.5	U	2.5	U	**0.43**	J	**1409**		**187.64**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-118D		MW-119D		MW-119D		MW-11D		MW-12		MW-120D		MW-121D		MW-122D		MW-123D		MW-13	
			Sample Date	10/17/2017		10/16/2017		10/16/2017		10/18/2017		10/18/2017		10/16/2017		10/17/2017		10/17/2017		10/19/2017		10/17/2017	
			Sample Type	N		N		FD		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	24 - 34		22 - 32		22 - 32		35 - 45		4 - 14		28 - 38		28 - 38		22 - 32		25 - 35		8 - 18	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Shallow		Deep		Deep		Deep		Deep		Shallow	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-01		OU-01		OU-03		OU-03		OU-03		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**320**		**15**	**J**	**14**	**J**	0.5	U	0.5	U	0.5	U	0.5	U	**0.58**		**330**		0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	**1.8**	**J**	20	U	20	U	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	200	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**180000**		**4000**		**4000**		2.5	U	**37**		**0.9**	**J**	2.5	U	**56**		**59000**		**5.5**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	5000	U	**120**		**110**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**180000**		**4100**		**4100**		2.5	U	**37**		**0.9**	**J**	2.5	U	**56**		**59000**		**5.5**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	2500	UJ	10000	U	10000	U	250	U	250	U	250	U	250	U	250	UJ	100000	U	250	U
Acetone	50	50	µg/l	50	UJ	200	UJ	200	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	2000	UJ	5	UJ
Benzene	1[a]	1	µg/l	**44**		20	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.21**	**J**	200	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	5	U	20	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	200	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	20	U	80	U	80	U	2	U	2	U	2	U	2	U	2	U	800	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Chloroform	7[a]	7	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	5	U	20	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	200	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	50	UJ	200	UJ	200	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	2000	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	UJ	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	25	U	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	**10**		20	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	200	U	0.5	U
Toluene	5	5[b]	µg/l	**28**		100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**54000**		**370**		**360**		**0.18**	**J**	**18**		**0.7**		**0.3**	**J**	**360**		**160000**		**22**	
Vinyl Chloride	5	2	µg/l	**9500**		**180**		**180**		**4.8**	**J**	1	UJ	1	U	1	U	**1.4**		**4400**		**1.3**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	**11**	**J**	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	**8.8**	**J**	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	**20**	**J**	100	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	1000	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	50	UJ	200	UJ	200	UJ	5	UJ	5	UJ	5	UJ	5	UJ	5	UJ	2000	UJ	5	UJ
Total VOC	NC	NC	µg/l	**243923.6**	**J**	**4685**	**J**	**4664**	**J**	**4.98**	**J**	**55**		**1.6**	**J**	**0.3**	**J**	**418.19**	**J**	**223730**		**28.8**	
Total CVOC	NC	NC	µg/l	**243830**		**4685**	**J**	**4664**	**J**	**4.98**	**J**	**55**		**1.6**	**J**	**0.3**	**J**	**417.98**		**223730**		**28.8**	
Total CBTEX	NC	NC	µg/l	**91.8**	**J**	20	U	20	U	2.5	U	2.5	U	2.5	U	2.5	U	**0.21**	**J**	200	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-14D		MW-14S		MW-15D		MW-15D		MW-15S		MW-16D		MW-18S		MW-19D		MW-19S		MW-20	
			Sample Date	10/18/2017		10/18/2017		10/18/2017		10/18/2017		10/18/2017		10/18/2017		03/15/2017		10/17/2017		03/14/2017		10/19/2017	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	40 - 50		10 - 20		34 - 44		34 - 44		10 - 20		36 - 46		5 - 15		34 - 44		9 - 19		6.5 - 11.5	
			Water Bearing Zone (WBZ)	Deep		Shallow		Deep		Deep		Shallow		Deep		Shallow		Deep		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	**220**	J	**200**	J	0.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	UJ	0.5	U	500	UJ	500	UJ	0.5	UJ	0.5	UJ	1.2	U	0.5	UJ	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**2.4**	J	**76000**		**77000**		**1**	J	2.5	U	**65**		2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**2.4**	J	**76000**		**77000**		**1**	J	2.5	U	**65**		2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250000	U	250000	U	250	U	250	U	620	U	250	U	250	U	250	U
Acetone	50	50	µg/l	5	UJ	5	UJ	5000	UJ	5000	UJ	5	UJ	5	UJ	12	UJ	5	UJ	5	UJ	5	UJ
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	500	U	500	U	0.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	500	U	500	U	0.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2000	U	2000	U	2	U	2	U	5	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	500	U	500	U	0.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5000	UJ	5000	UJ	5	UJ	5	UJ	12	UJ	5	UJ	5	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	UJ	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	UJ	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	UJ
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	500	U	500	U	0.5	U	0.5	U	1.2	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**14**		**15000**		**16000**		**5.6**		0.5	U	**190**		**0.51**		**0.49**	J	0.5	U
Vinyl Chloride	5	2	µg/l	**7.7**	J	1	U	**4100**	J	**4000**	J	1	UJ	**0.31**	J	**0.34**	J	**21**	J	**0.22**	J	**0.17**	J
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	5	UJ	5	UJ	5000	UJ	5000	UJ	5	UJ	5	UJ	12	UJ	5	UJ	5	U	5	UJ
Total VOC	NC	NC	µg/l	**7.7**	J	**16.4**	J	**95320**	J	**97200**	J	**6.6**	J	**0.31**	J	**255.34**	J	**21.51**	J	**0.71**	J	**0.17**	J
Total CVOC	NC	NC	µg/l	**7.7**	J	**16.4**	J	**95320**	J	**97200**	J	**6.6**	J	**0.31**	J	**255.34**	J	**21.51**	J	**0.71**	J	**0.17**	J
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	500	U	500	U	2.5	U	2.5	U	6.2	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
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Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-21D		MW-21D		MW-22D		MW-23S		MW-24S		MW-25D		MW-25S		MW-26S		MW-26S		MW-27S	
			Sample Date	03/14/2017		10/19/2017		10/17/2017		10/17/2017		10/17/2017		10/19/2017		10/19/2017		03/16/2017		10/19/2017		10/19/2017	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	31.5 - 41		31.5 - 41		32.5 - 42		5 - 14.5		5 - 14.5		31 - 41		7 - 17		5 - 15		5 - 15		10 - 20	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Shallow		Shallow		Deep		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-03		OU-01		OU-01		OU-03		OU-03		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	500	U	100	U	**1.2**	**J**	0.5	U	1.2	U	0.5	U	0.5	U	50	U	10	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**12**		2.5	U	2.5	U	**3900**		**2800**		**14**	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	500	U	100	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	50	U	10	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**79000**		**16000**		**190**		2.5	U	6.2	U	2.5	U	**21**		250	U	50	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**79000**		**16000**		**190**		2.5	U	6.2	U	2.5	U	**21**		250	U	50	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**2.8**	**J**	2.5	U	2.5	U	**1100**		**660**		2.5	U
1,4-Dioxane	0.35[a,d]	0.35[dj]	µg/l	250000	U	50000	U	1200	U	250	U	620	U	250	U	250	U	25000	U	5000	U	250	U
Acetone	50	50	µg/l	**5000**	**J**	1000	UJ	25	UJ	5	UJ	12	UJ	5	UJ	5	UJ	500	UJ	100	UJ	5	UJ
Benzene	1[a]	1	µg/l	500	U	100	U	2.5	U	0.5	U	**0.55**	**J**	0.5	U	0.5	U	50	U	10	U	0.5	U
Bromodichloromethane	50[d]	50[dj]	µg/l	500	U	100	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	50	U	10	U	0.5	U
Bromoform	50[d]	50[dj]	µg/l	2000	U	400	U	10	U	2	U	5	U	2	U	2	U	200	U	40	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	**15**	**J**	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Chloroform	7[a]	7	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Dibromochloromethane	50[d]	50[dj]	µg/l	500	U	100	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	50	U	10	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**41**		2.5	U	2.5	U	**240**	**J**	**270**		2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**34**		2.5	U	2.5	U	**70**	**J**	**82**		**9.6**	
Methyl Ethyl Ketone	50[d]	50[dj]	µg/l	5000	UJ	1000	UJ	25	UJ	5	UJ	12	UJ	5	UJ	5	UJ	500	UJ	100	UJ	5	UJ
Naphthalene	NC	10[dj]	µg/l	2500	UJ	500	U	12	U	2.5	U	**8.7**		2.5	U	2.5	U	250	U	**74**	**J**	**4.5**	
n-Propylbenzene	5[a,b]	5[b]	µg/l	2500	U	500	UJ	12	U	2.5	U	**7.6**		2.5	UJ	2.5	UJ	**510**		**390**	**J**	**7.8**	**J**
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	500	U	100	U	2.5	U	0.5	U	1.2	U	0.5	U	0.5	U	50	U	10	U	0.5	U
Toluene	5	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	6.2	U	2.5	U	2.5	U	250	U	50	U	2.5	U
Trichloroethene	5	5[b]	µg/l	500	U	100	U	**700**		0.5	U	1.2	U	0.5	U	**82**		50	U	10	U	0.5	U
Vinyl Chloride	5	2	µg/l	**40000**		**16000**		**2.8**	**J**	1	U	2.5	U	1	U	1	U	100	U	20	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**670**		2.5	U	2.5	U	**480**		**440**		2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**14**		2.5	U	2.5	U	250	U	50	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2500	U	500	U	12	U	2.5	U	**680**		2.5	U	2.5	U	**480**		**440**		2.5	U
2-Hexanone	50[d]	50[dj]	µg/l	5000	UJ	1000	UJ	25	UJ	5	UJ	12	UJ	5	UJ	5	UJ	500	UJ	100	UJ	5	UJ
Total VOC	NC	NC	µg/l	**124000**	**J**	**32000**		**894**	**J**	5	U	**790.65**	**J**	5	U	**103**		**6550**	**J**	**4731**	**J**	**35.9**	**J**
Total CVOC	NC	NC	µg/l	**119000**		**32000**		**894**	**J**	2.5	U	6.2	U	2.5	U	**103**		50	U	50	U	2.5	U
Total CBTEX	NC	NC	µg/l	500	U	500	U	2.5	U	2.5	U	**759.55**	**J**	2.5	U	2.5	U	**790**	**J**	**792**		**9.6**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-28S		MW-28S		MW-29S		MW-29S		MW-30S		MW-6		MW-7		PZ-3D		PZ-5D		RW-1D	
			Sample Date	03/16/2017		10/19/2017		10/18/2017		10/18/2017		10/18/2017		10/18/2017		10/18/2017		03/16/2017		10/17/2017		03/16/2017	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	7 - 17		7 - 17		4 - 14		4 - 14		10 - 16		9.92 - 19.92		10.1 - 20.1		20 - 40		21.5 - 41.5		32 - 57	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	1.2	U	0.5	U	2.5	U	5	U	25	U	0.5	U	0.5	U	250	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	**130**		2.5	U	**13**		**13**	J	**150**		2.5	U	2.5	U	1200	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1.2	U	0.5	U	2.5	U	5	U	25	UJ	0.5	UJ	0.5	UJ	250	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	**14**		**35000**		2.5	U	**41**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	**14**		**35000**		2.5	U	**41**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	**5.3**	J	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	620	U	250	U	1200	U	2500	U	12000	U	250	U	250	U	120000	U	250	UJ	250	U
Acetone	50	50	µg/l	12	UJ	5	UJ	25	UJ	50	UJ	250	UJ	5	UJ	5	UJ	2500	UJ	5	U	5	UJ
Benzene	1[a]	1	µg/l	1.2	U	0.5	U	**21**		**21**		25	U	0.5	U	0.5	U	**82**	J	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	1.2	U	0.5	U	2.5	U	5	U	25	U	0.5	U	0.5	U	250	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	5	U	2	U	10	U	20	U	100	U	2	U	2	U	1000	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	1.2	U	0.5	U	2.5	U	5	U	25	U	0.5	U	0.5	U	250	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	**11**		2.5	U	**1500**		**2000**		**2100**		2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	**36**		2.5	U	**160**		**160**		**41**	J	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	12	UJ	5	UJ	25	UJ	50	UJ	250	UJ	5	UJ	5	UJ	2500	UJ	5	UJ	5	UJ
Naphthalene	NC	10[d]	µg/l	**24**	J	**1.6**	J	**22**		**21**	J	**91**	J	2.5	U	2.5	U	1200	UJ	2.5	U	2.5	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	**38**		2.5	UJ	**58**	J	**59**	J	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	12	U	25	U	120	U	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	1.2	U	0.5	U	2.5	U	5	U	25	U	0.5	U	0.5	U	250	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	6.2	U	2.5	U	**7.6**	J	**11**	J	120	U	2.5	U	2.5	U	1200	U	2.5	U	**1.9**	J
Trichloroethene	5	5[b]	µg/l	1.2	U	0.5	U	**1.2**	J	**2.1**	J	25	U	**2.6**		**7.1**		**3800**		**0.38**	J	**0.22**	J
Vinyl Chloride	5	2	µg/l	2.5	U	1	U	5	U	10	U	50	UJ	1	UJ	1	UJ	**2400**		**4.1**		**2.5**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	**930**		**1300**		**6900**		2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	6.2	U	2.5	U	**300**		**380**		**51**	J	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	6.2	U	2.5	U	**1200**		**1700**		**7000**	J	2.5	U	2.5	U	1200	U	2.5	U	2.5	U
2-Hexanone	50[d]	50[d]	µg/l	12	UJ	5	UJ	25	UJ	50	UJ	250	UJ	5	UJ	5	UJ	2500	UJ	5	UJ	5	UJ
Total VOC	NC	NC	µg/l	**244.3**	J	**1.6**	J	**3012.8**	J	**3967.1**	J	**9333**	J	**2.6**		**21.1**		**41282**	J	**4.48**	J	**45.62**	J
Total CVOC	NC	NC	µg/l	6.2	U	2.5	U	**1.2**	J	**2.1**	J	50	U	**2.6**		**21.1**		**41200**		**4.48**	J	**43.72**	J
Total CBTEX	NC	NC	µg/l	**47**		2.5	U	**2918.6**	J	**3872**	J	**9092**	J	2.5	U	2.5	U	**82**	J	2.5	U	**1.9**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-1S		RW-1S		RW-2D		RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-5S		RW-6D	
			Sample Date	02/02/2017		09/14/2017		02/02/2017		08/08/2017		02/02/2017		08/08/2017		02/02/2017		08/08/2017		03/16/2017		02/02/2017	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	10.5 - 16		10.5 - 16		27 - 42		27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5		7 - 10			
			Water Bearing Zone (WBZ)	Shallow		Shallow		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**2.5**		**0.28**	**J**	**27**		**14**	**J**	0.5	U	0.5	U	0.5	U	**0.59**		0.5	U	**71**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**9.4**		2.5	U	**20**		250	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	2	U	0.5	U	12	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**730**		**91**		**3100**		**3100**		**4.2**		**31**		2.5	U	**37**		2.5	U	**20000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**3.1**	**J**	2.5	U	**33**	**J**	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**730**	**J**	**91**		**3100**	**J**	**3100**		**4.2**		**31**		2.5	U	**37**		2.5	U	**20000**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**5.5**		2.5	U	**4.7**		250	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	1000	U	250	U	6200	U	10000	U	250	U	250	U	250	U	250	U	250	U	25000	U
Acetone	50	50	µg/l	20	U	5	U	120	U	200	U	5	U	5	U	5	U	5	U	5	UJ	**19000**	
Benzene	1[a]	1	µg/l	2	U	0.5	U	**9.5**	**J**	**6.4**	**J**	0.5	U	0.5	U	**4.8**		**1.4**		0.5	U	**68**	
Bromodichloromethane	50[d]	50[d]	µg/l	2	U	0.5	U	12	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U
Bromoform	50[d]	50[d]	µg/l	8	U	2	U	50	U	80	U	2	U	2	U	2	U	2	U	2	U	200	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**1.6**	**J**	2.5	U	2.5	U	250	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**1.1**	**J**	2.5	U	2.5	U	250	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**2.2**	**J**	**1.2**	**J**	2.5	U	250	U
Chlorobenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
Chloroform	7[a]	7	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
Dibromochloromethane	50[d]	50[d]	µg/l	2	U	0.5	U	12	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U
Ethylbenzene	5	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**4.5**		2.5	U	**0.76**	**J**	250	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**6**		**1**	**J**	2.5	U	250	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	20	U	5	U	120	U	200	U	5	U	5	U	5	U	5	U	5	UJ	500	U
Naphthalene	NC	10[d]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**2.7**		2.5	U	2.5	U	250	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**14**		2.5	U	**2.3**	**J**	250	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	2	U	0.5	U	12	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U
Toluene	5	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U
Trichloroethene	5	5[b]	µg/l	**350**		**26**		**2000**		**1800**		**5.4**		**14**		**0.92**		**56**		0.5	U	**12000**	
Vinyl Chloride	5	2	µg/l	**31**		**6**		**1300**		**540**		**0.77**	**J**	**2**		1	U	**1.6**		1	U	**4500**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**8.6**		2.5	U	**1.2**	**J**	250	U
Xylene, o-	5[a,b]	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**0.97**	**J**	2.5	U	2.5	U	250	U
Xylenes, Total	5	5[b]	µg/l	10	U	2.5	U	62	U	100	U	2.5	U	2.5	U	**9.6**	**J**	2.5	U	**1.2**	**J**	250	U
2-Hexanone	50[d]	50[d]	µg/l	20	U	5	U	120	U	200	U	5	U	5	U	5	U	5	U	5	UJ	500	U
Total VOC	NC	NC	µg/l	**1116.6**	**J**	**123.28**	**J**	**6469.5**	**J**	**5460.4**	**J**	**10.37**	**J**	**47**		**62.29**	**J**	**98.79**	**J**	**31.46**	**J**	**55639**	
Total CVOC	NC	NC	µg/l	**1116.6**	**J**	**123.28**	**J**	**6460**	**J**	**5454**	**J**	**10.37**	**J**	**47**		**0.92**		**95.19**		2.5	U	**36571**	
Total CBTEX	NC	NC	µg/l	2	U	2.5	U	**9.5**	**J**	**6.4**	**J**	2.5	U	2.5	U	**24.87**	**J**	**2.4**	**J**	**1.96**	**J**	**68**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2017
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-6D		VP-6D		VP-6S		VP-8D	
			Sample Date	08/08/2017		10/19/2017		03/16/2017		03/14/2017	
			Sample Type	N		N		N		N	
			Sample Depth (feet bgs)			29.5 - 39.5		18.3 - 23.8		20 - 39	
			Water Bearing Zone (WBZ)	Deep		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units								
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**42**	**J**	0.5	U	0.5	U	50	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	50	U	0.5	U	0.5	U	50	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**16000**		2.5	U	2.5	U	**3900**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**16000**		2.5	U	2.5	U	**3900**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	25000	U	250	U	250	U	25000	U
Acetone	50	50	µg/l	**5600**		5	UJ	5	UJ	500	UJ
Benzene	1[a]	1	µg/l	**44**	**J**	0.5	U	0.5	U	50	U
Bromodichloromethane	50[d]	50[d]	µg/l	50	U	0.5	U	0.5	U	50	U
Bromoform	50[d]	50[d]	µg/l	200	U	2	U	2	U	200	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Chlorobenzene	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Chloroform	7[a]	7	µg/l	250	U	2.5	U	2.5	U	250	U
Dibromochloromethane	50[d]	50[d]	µg/l	50	U	0.5	U	0.5	U	50	U
Ethylbenzene	5	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	500	U	5	UJ	5	UJ	500	UJ
Naphthalene	NC	10[d]	µg/l	250	U	2.5	U	**2.5**	**U**	250	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	250	U	2.5	UJ	2.5	U	250	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	50	U	0.5	U	0.5	U	50	U
Toluene	5	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Trichloroethene	5	5[b]	µg/l	**5400**		**0.28**	**J**	0.5	U	50	U
Vinyl Chloride	5	2	µg/l	**4300**		1	U	1	U	**21000**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Xylene, o-	5[a,b]	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
Xylenes, Total	5	5[b]	µg/l	250	U	2.5	U	2.5	U	250	U
2-Hexanone	50[d]	50[d]	µg/l	500	U	5	UJ	5	UJ	500	UJ
Total VOC	NC	NC	µg/l	**31386**	**J**	**0.28**	**J**	**2.5**		**24900**	
Total CVOC	NC	NC	µg/l	**25742**	**J**	**0.28**	**J**	2.5	U	**24900**	
Total CBTEX	NC	NC	µg/l	**44**	**J**	2.5	U	2.5	U	50	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2018
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-101S		MW-104S		MW-106D		MW-106D		MW-106D		MW-108S		MW-108S		MW-108S		MW-109D		MW-109D	
			Sample Date	11/14/2018		11/14/2018		03/20/2018		11/14/2018		11/14/2018		03/19/2018		11/14/2018		11/14/2018		03/19/2018		11/14/2018	
			Sample Type	N		N		N		N		FD		N		N		FD		N		N	
			Sample Depth (feet bgs)	8 - 18		9 - 14		24 - 34		24 - 34		24 - 34		7 - 17		7 - 17		7 - 17		28 - 38		28 - 38	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Deep		Deep		Deep		Shallow		Shallow		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**0.18**	**J**	0.5	U	**28**		**56**		**56**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	25	U	50	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**26**		2.5	U	**5600**		**7900**		**7700**		**9.2**		**5.8**		**5.8**		2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	**40**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**26**		2.5	U	**5600**		**7900**		**7700**	**J**	**9.2**		**5.8**		**5.8**		2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	UJ	12000	UJ	25000	UJ	12000	UJ	250	UJ	0.142	U	0.144	U	250	UJ	0.15	U
Acetone	50	50	µg/l	5	U	5	U	250	U	500	U	250	U	5	U	5	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	**13**	**J**	**24**	**J**	**23**	**J**	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	25	U	50	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	100	U	200	U	100	U	2	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	UJ
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	25	U	50	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	250	U	500	U	250	U	5	U	5	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	**0.27**	**J**	**0.26**	**J**	25	U	50	U	25	U	**0.26**	**J**	**0.31**	**J**	**0.33**	**J**	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**75**		**100**		**1400**		**5500**		**5400**		**33**		**28**		**28**		0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	**0.2**	**J**	1	U	**390**	**J**	**290**		**270**		1	UJ	1	U	1	U	1	UJ	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	120	U	250	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**101.65**	**J**	**100.26**	**J**	**7431**	**J**	**13770**	**J**	**13489**	**J**	**42.46**	**J**	**34.11**	**J**	**34.13**	**J**	5	U	5	U
Total CVOC	NC	NC	µg/l	**101.65**	**J**	**100.26**	**J**	**7418**	**J**	**13746**		**13466**	**J**	**42.46**	**J**	**34.11**	**J**	**34.13**	**J**	2.5	U	2.5	U
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	**13**	**J**	**24**	**J**	**23**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2018
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-110D		MW-110D		MW-117S		MW-118D		MW-118D		MW-118D		MW-119D		MW-119D		MW-120D		MW-120D	
			Sample Date	03/20/2018		11/15/2018		11/13/2018		03/21/2018		11/15/2018		03/21/2018		03/20/2018		11/14/2018		03/19/2018		11/15/2018	
			Sample Type	N		N		N		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	28 - 38		28 - 38		6 - 16		24 - 34		24 - 34		24 - 34		22 - 32		22 - 32		28 - 38		28 - 38	
			Water Bearing Zone (WBZ)	Deep		Deep		Shallow		Deep		Deep		Deep		Deep		Deep		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	500	U	**170**	J	0.5	U	1000	U	**410**	J	**300**	J	**12**	J	**13**	J	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	500	U	500	U	0.5	U	1000	U	1000	U	500	U	20	U	25	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**24000**		**26000**		2.5	U	**180000**		**200000**		**180000**		**5000**		**5400**		2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	**95**	J	**97**	J	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**24000**		**26000**		2.5	U	**180000**		**200000**		**180000**		**5100**	J	**5500**	J	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250000	UJ	250000	UJ	0.144	U	500000	UJ	**0.418**		250000	UJ	10000	UJ	12000	UJ	250	UJ	250	UJ
Acetone	50	50	µg/l	5000	U	5000	U	5	U	10000	U	10000	U	5000	U	200	U	250	U	5	U	5	U
Benzene	1[a]	1	µg/l	500	U	500	U	0.5	U	1000	U	1000	U	500	U	20	U	25	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	500	U	500	U	0.5	U	1000	U	1000	U	500	U	20	U	25	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2000	U	2000	U	2	U	4000	U	4000	U	2000	U	80	U	100	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	500	U	500	U	0.5	U	1000	U	1000	U	500	U	20	U	25	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5000	U	5000	U	5	U	10000	U	10000	U	5000	U	200	U	250	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	500	U	500	U	0.5	U	1000	U	1000	U	500	U	20	U	25	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**120000**		**140000**		0.5	U	**47000**		**52000**		**47000**		**320**		**400**		**0.56**		0.5	U
Vinyl Chloride	5	2	µg/l	**350**	J	**440**	J	1	UJ	**5800**	J	**8800**		**5900**	J	**340**	J	**370**		1	UJ	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2500	U	2500	U	2.5	U	5000	U	5000	U	2500	U	100	U	120	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**144350**	J	**166610**	J	5	U	**232800**	J	**261210.4**	J	**233200**	J	**5767**	J	**6280**	J	**0.56**		5	U
Total CVOC	NC	NC	µg/l	**144350**	J	**166610**	J	2.5	U	**232800**	J	**261210**	J	**233200**	J	**5767**	J	**6280**	J	**0.56**		2.5	U
Total CBTEX	NC	NC	µg/l	500	U	500	U	2.5	U	5000	U	5000	U	500	U	20	U	25	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2018

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-121D		MW-121D		MW-122D		MW-122D		MW-123D		MW-123D		MW-13		MW-13		MW-16D		MW-20	
			Sample Date	03/19/2018		11/14/2018		03/20/2018		11/13/2018		03/20/2018		03/20/2018		03/20/2018		11/13/2018		11/14/2018		11/15/2018	
			Sample Type	N		N		N		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	28 - 38		28 - 38		22 - 32		22 - 32		25 - 35		25 - 35		8 - 18		8 - 18		36 - 46		6.5 - 11.5	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Deep		Shallow		Shallow		Deep		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	5	U	5	U	**410**	**J**	**390**	**J**	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	5	U	5	U	500	U	1000	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**90**		**96**		**87000**		**83000**		**0.99**	**J**	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	**90**		**96**		**87000**		**83000**		**0.99**	**J**	2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	UJ	2500	UJ	2500	UJ	250000	UJ	500000	UJ	250	UJ	250	UJ	250	UJ	250	UJ
Acetone	50	50	µg/l	5	U	5	U	50	U	50	U	5000	U	10000	U	5	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	5	U	5	U	500	U	1000	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	5	U	5	U	500	U	1000	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	20	U	20	U	2000	U	4000	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	5	U	5	U	500	U	1000	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	50	U	50	U	5000	U	10000	U	5	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	5	U	5	U	500	U	1000	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**1100**		**990**		**140000**		**140000**		**1.6**		0.5	U	0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	1	UJ	1	U	**0.96**	**J**	**0.86**	**J**	**6600**	**J**	**6400**	**J**	1	UJ	1	UJ	**0.41**	**J**	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	25	U	25	U	2500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	5	U	5	U	**1190.96**	**J**	**1086.86**	**J**	**234010**	**J**	**229790**	**J**	**2.59**	**J**	5	U	**0.41**	**J**	5	U
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	**1190.96**	**J**	**1086.86**	**J**	**234010**	**J**	**229790**	**J**	**2.59**	**J**	2.5	U	**0.41**	**J**	2.5	U
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	5	U	5	U	500	U	5000	U	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2018
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-23S		MW-25D		MW-26S		MW-26S		MW-27S		MW-30S		RW-1S		RW-1S		RW-1S		RW-2D	
			Sample Date	11/13/2018		11/13/2018		11/13/2018		11/13/2018		11/13/2018		11/14/2018		05/09/2018		11/14/2018		11/15/2018		05/09/2018	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	5 - 14.5		31 - 41		5 - 15		5 - 15		10 - 20		10 - 16		10.5 - 16		10.5 - 16		10.5 - 16		27 - 42	
			Water Bearing Zone (WBZ)	Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	**1.4**		**1.1**	J	--		**30**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**4500**	J	**2400**	J	**3.1**		**900**		6.2	U	6.2	U	--		120	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	1.2	U	1.2	U	--		25	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	**400**		**360**		--		**6300**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	**1.8**	J	6.2	U	--		120	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	**400**	J	**360**		--		**6300**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**840**		**800**		2.5	U	**180**	J	6.2	U	6.2	U	--		120	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	UJ	6200	UJ	5000	UJ	250	UJ	25000	UJ	620	U	620	U	0.153	U	12000	U
Acetone	50	50	µg/l	5	U	5	U	120	U	100	U	5	U	500	U	12	U	12	U	--		250	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	1.2	U	1.2	U	--		25	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	1.2	U	1.2	U	--		25	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	50	U	40	U	2	U	200	U	5	U	5	U	--		100	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	1.2	U	1.2	U	--		25	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	**230**		**220**		2.5	U	**7600**		6.2	U	6.2	U	--		120	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**130**		**130**		**2.2**	J	**200**	J	6.2	U	6.2	U	--		120	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	120	U	100	U	5	U	500	U	12	U	12	U	--		250	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	**81**		**85**		2.5	U	**730**		6.2	U	6.2	U	--		120	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**610**		**590**		**1.7**	J	**140**	J	6.2	U	6.2	U	--		120	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	1.2	U	1.2	U	--		25	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	250	U	6.2	U	6.2	U	--		120	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	12	U	10	U	0.5	U	50	U	**230**	J	**260**		--		**940**	J
Vinyl Chloride	5	2	µg/l	1	UJ	1	UJ	25	UJ	20	UJ	1	UJ	100	U	**20**		**14**		--		**1500**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**440**		**430**		2.5	U	**24000**		6.2	U	6.2	U	--		120	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	**120**	J	6.2	U	6.2	U	--		120	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	**440**		**430**		2.5	U	**24000**	J	6.2	U	6.2	U	--		120	U
Total VOC	NC	NC	µg/l	5	U	5	U	**6831**	J	**4655**	J	**7**	J	**33870**	J	**653.2**	J	**635.1**	J	--		**8770**	J
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	62	U	50	U	2.5	U	50	U	**653.2**	J	**635.1**	J	--		**8770**	J
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	**800**		**780**		**2.2**	J	**31920**	J	6.2	U	6.2	U	--		25	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2018
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D		RW-6D		VP-6S	
			Sample Date	11/14/2018		05/09/2018		11/14/2018		05/09/2018		11/14/2018		05/09/2018		11/14/2018		11/13/2018	
			Sample Type	N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5						18.3 - 23.8	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Shallow		Deep		Deep		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**15**		0.5	U	0.5	U	0.5	U	0.5	U	**52**		**51**	J	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U	100	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**3000**		**24**		**24**		**7.8**		**5.4**		**13000**		**22000**		2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**18**	J	2.5	U	2.5	U	**0.79**	J	2.5	U	250	U	500	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**3000**	J	**24**		**24**		**8.6**	J	**5.4**		**13000**		**22000**		2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	6200	U	250	U	250	U	250	U	250	U	25000	U	50000	U	250	UJ
Acetone	50	50	µg/l	120	U	5	U	**1.9**	J	5	U	**3.3**	J	**6900**		**380**	J	**3.2**	J
Benzene	1[a]	1	µg/l	**5**	J	0.5	U	0.5	U	**0.54**		**0.16**	J	**57**		**42**	J	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U	100	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	50	U	2	U	2	U	2	U	2	U	200	U	400	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**1.5**	J	**1.1**	J	250	U	500	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Chloroform	7[a]	7	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U	100	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	120	U	5	U	5	U	5	U	5	U	500	U	1000	U	5	U
Naphthalene	5[a,b]	NC	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	50	U	100	U	0.5	U
Toluene	5	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**2400**		**30**	J	**35**		**6.1**	J	**8.1**		**16000**	J	**7200**		**0.31**	J
Vinyl Chloride	5	2	µg/l	**410**		**2.3**		**0.84**	J	**3.3**		**2.9**		**3600**		**2400**		1	UJ
Xylene, m- & p-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	250	U	500	U	2.5	U
Total VOC	NC	NC	µg/l	**5848**	J	**56.3**	J	**61.74**	J	**20.03**	J	**20.96**	J	**39609**	J	**32073**	J	**3.51**	J
Total CVOC	NC	NC	µg/l	**5843**	J	**56.3**	J	**59.84**	J	**17.99**	J	**16.4**		**32652**	J	**31651**	J	**0.31**	J
Total CBTEX	NC	NC	µg/l	**5**	J	2.5	U	2.5	U	**0.54**		**0.16**	J	**57**		**42**	J	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-051		DPT-052		DPT-053		DPT-054		DPT-055		DPT-055		DPT-057		DPT-058		DPT-059		DPT-060	
			Sample Date	09/11/2019		09/11/2019		09/11/2019		09/16/2019		09/16/2019		09/16/2019		09/12/2019		09/12/2019		09/12/2019		09/12/2019	
			Sample Type	N		N		N		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	12 - 14		12 - 14		10 - 12		10 - 12		10 - 12		10 - 12		10 - 12		10 - 12		10 - 12		10 - 12	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-03		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	100	U	2.5	U	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	20	U	0.5	U	1	U	1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	**240**		2.5	U	**6.7**		**330**		2.5	U	2.5	U	**1600**		2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	20	U	0.5	U	1	U	1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	100	U	**0.73**	**J**	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	100	U	2.5	U	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	100	U	**0.73**	**J**	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	**59**	**J**	2.5	U	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	10000	U	250	U	500	U	500	U	250	U	250	U	5000	U	250	U	250	U	250	U
Acetone	50	50	µg/l	200	U	10	U	14	U	10	U	5	U	5	U	100	U	5.3	U	14	U	6.4	U
Benzene	1[a]	1	µg/l	20	U	**2.4**		**12**		1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	20	U	0.5	U	1	U	1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	80	U	2	U	4	U	4	U	2	U	2	U	40	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	100	U	2.5	U	5	U	5	U	2.5	U	2.5	U	**18**	**J**	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	100	U	2.5	U	**6.4**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	100	U	2.5	U	**1.4**	**J**	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	100	U	2.5	U	**1.8**	**J**	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	100	U	2.5	U	5	U	5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	20	U	0.5	U	1	U	1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	**4100**		**2.4**	**J**	**180**		5	U	2.5	U	2.5	U	**55**		2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	**130**		2.5	U	**41**		**6.9**		2.5	U	2.5	U	**250**		2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	200	U	5	U	10	U	10	U	5	U	5	U	100	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	**170**		2.5	U	**4.9**	**J**	**10**		2.5	U	2.5	U	**380**		2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	**76**	**J**	2.5	U	**11**		**30**		2.5	U	2.5	U	**570**		2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	100	U	2.5	U	**7.5**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	20	U	0.5	U	1	U	1	U	0.5	U	0.5	U	10	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	**30**	**J**	2.5	U	**20**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	20	U	0.5	U	1	U	**0.45**	**J**	**0.35**	**J**	**0.32**	**J**	10	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	40	U	1	U	2	U	2	U	1	U	1	U	20	U	1	U	1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	**13000**		**6.6**		**470**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	**910**		2.5	U	**86**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	**14000**		**6.6**		**560**		5	U	2.5	U	2.5	U	50	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**18715**	**J**	**12.13**	**J**	**848.7**	**J**	**377.35**	**J**	**0.35**	**J**	**0.32**	**J**	**2873**	**J**	5.3	U	5	U	6.4	U
Total CVOC	NC	NC	µg/l	40	U	**0.73**	**J**	5	U	**0.45**	**J**	**0.35**	**J**	**0.32**	**J**	50	U	2.5	U	2.5	U	2.5	U
Total CBTEX	NC	NC	µg/l	**18170**	**J**	**11.4**	**J**	**809**		**6.9**		2.5	U	2.5	U	**305**		2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-060		DPT-061		DPT-062		DPT-063		DPT-064		DPT-065		MW-101S		MW-101S		MW-104S		MW-106D	
			Sample Date	09/12/2019		09/12/2019		09/13/2019		09/11/2019		09/11/2019		09/11/2019		11/06/2019		11/06/2019		11/06/2019		11/05/2019	
			Sample Type	FD		N		N		N		N		N		N		FD		N		N	
			Sample Depth (feet bgs)	10 - 12		10 - 12		10 - 12		10 - 12		10 - 12		10 - 12		8 - 18		8 - 18		9 - 14		24 - 34	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	2	U	10	U	1.2	U	**0.88**	J	**0.71**	J	0.5	U	**38**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**64**		**72**		**45**	J	**5.8**	J	5	U	5	U	2.5	U	120	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	2	U	10	U	1.2	U	1	U	1	U	0.5	U	25	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	**180**		**160**		2.5	U	**7100**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	**180**		**160**		2.5	U	**7100**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**5.8**	J	**15**	J	6.2	U	5	U	5	U	2.5	U	120	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	1000	U	5000	U	620	U	500	U	500	U	250	U	12000	U
Acetone	50	50	µg/l	6.6	U	7.3	U	5	U	20	U	100	U	12	U	**3.4**	J	**2.9**	J	**2.5**	J	250	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	**0.22**	J	**0.78**	J	10	U	**3.1**		1	U	1	U	0.5	U	**11**	J
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	2	U	10	U	1.2	U	1	U	1	U	0.5	U	25	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	8	U	40	U	5	U	4	U	4	U	2	U	100	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**5.4**		10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**2.8**		10	U	50	U	**2.9**	J	5	U	5	U	2.5	U	120	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	2	U	10	U	1.2	U	1	U	1	U	0.5	U	25	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	**140**		**110**		**960**		**75**		5	U	5	U	2.5	U	120	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**31**		**90**		**72**		**15**		5	U	5	U	2.5	U	120	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	U	20	U	100	U	12	U	10	U	10	U	5	U	250	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	**35**		**4.5**	J	**18**	J	**6.5**		5	U	5	U	2.5	U	120	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**30**		**40**		**31**	J	**2.1**	J	5	U	5	U	2.5	U	120	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	6.2	U	5	U	5	U	2.5	U	120	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	2	U	10	U	1.2	U	1	U	1	U	**0.32**	J	25	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	10	U	50	U	**430**		5	U	5	U	2.5	U	120	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**0.49**	J	2	U	10	U	**0.45**	J	**310**		**270**		**80**		**120**	
Vinyl Chloride	5	2	µg/l	1	U	1	U	**0.09**	J	4	U	20	U	2.5	U	**1.2**	J	**1**	J	1	U	**740**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**110**		**740**		**5400**		**350**		5	U	5	U	2.5	U	120	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**5.1**		**23**		**210**		**93**		5	U	5	U	2.5	U	120	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	**120**		**760**		**5600**		**440**		5	U	5	U	2.5	U	120	U
Total VOC	NC	NC	µg/l	6.6	U	7.3	U	**424.1**	J	**1086.08**	J	**6751**	J	**983.85**	J	**495.48**	J	**434.61**	J	**82.82**	J	**8009**	J
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	**0.58**	J	4	U	50	U	**0.45**	J	**492.08**	J	**431.71**	J	**80.32**	J	**7998**	
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	**286.32**	J	**963.78**	J	**6642**		**966.1**		5	U	5	U	2.5	U	**11**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-108S		MW-109D		MW-110D		MW-112S		MW-117S		MW-117S		MW-118D		MW-119D		MW-120D		MW-120D	
			Sample Date	11/05/2019		11/05/2019		11/05/2019		09/17/2019		09/18/2019		11/06/2019		11/06/2019		11/07/2019		11/05/2019		11/05/2019	
			Sample Type	N		N		N		N		N		N		N		N		N		FD	
			Sample Depth (feet bgs)	7 - 17		28 - 38		28 - 38		6 - 16		6 - 16		6 - 16		24 - 34		22 - 32		28 - 38		28 - 38	
			Water Bearing Zone (WBZ)	Shallow		Deep		Deep		Shallow		Shallow		Shallow		Deep		Deep		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	2.5	U	2.5	U	5000	U	100	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	500	U	0.5	U	0.5	U	0.5	U	**420**	J	**17**	J	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**3.3**		2.5	U	5000	U	100	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	500	U	0.5	U	0.5	U	0.5	U	1000	U	20	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**9.5**		2.5	U	**26000**		2.5	U	2.5	U	2.5	U	**240000**		**6000**		2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	2.5	U	2.5	U	5000	U	**130**		2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**9.5**		2.5	U	**26000**		2.5	U	2.5	U	2.5	U	**240000**		**6100**		2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**0.9**	J	2.5	U	5000	U	100	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250000	U	250	U	250	U	250	U	500000	U	10000	U	250	U	250	U
Acetone	50	50	µg/l	5	U	5	U	5000	U	5	U	5	U	**2.8**	J	10000	U	200	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	500	U	**0.36**	J	**0.43**	J	0.5	U	1000	U	20	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	500	U	0.5	U	0.5	U	0.5	U	1000	U	20	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2000	U	2	U	2	U	2	U	4000	U	80	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**0.74**	J	2.5	U	5000	U	100	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	**1.4**	J	**1.3**	J	2.5	U	5000	U	100	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	**1.8**	J	2.5	U	2.5	U	5000	U	100	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	2.5	U	2.5	U	5000	U	100	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2500	U	2.5	U	2.5	U	2.5	U	5000	U	100	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	500	U	0.5	U	0.5	U	0.5	U	1000	U	20	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**20**		2.5	U	5000	U	100	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	**1.6**	J	**15**		2.5	U	5000	U	100	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5000	U	5	U	5	U	5	U	10000	U	200	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	2500	U	**2.4**	J	**3.3**		2.5	U	5000	U	100	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**6.2**		2.5	U	5000	U	100	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	2.5	U	2.5	U	5000	U	100	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	**0.4**	J	0.5	U	500	U	0.5	U	0.5	U	0.5	U	1000	U	20	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**2**	J	2.5	U	5000	U	100	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**23**		0.5	U	**120000**		**0.45**	J	0.5	U	0.5	U	**63000**		**420**		0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	1	U	1	U	**390**	J	**0.12**	J	1	U	1	U	**10000**		**440**		1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**120**		2.5	U	5000	U	100	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**18**		2.5	U	5000	U	100	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2500	U	2.5	U	**140**		2.5	U	5000	U	100	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**32.9**	J	5	U	**146390**	J	**8.13**	J	**191.17**	J	**2.8**	J	**313420**	J	**7007**	J	5	U	5	U
Total CVOC	NC	NC	µg/l	**32.9**	J	2.5	U	**146390**	J	**0.57**	J	2.5	U	2.5	U	**313420**	J	**7007**	J	2.5	U	2.5	U
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	500	U	**1.96**	J	**175.43**	J	2.5	U	5000	U	20	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-121D		MW-122D		MW-124S		MW-13		MW-16D		MW-18		MW-20		MW-23S		MW-23S		MW-24S	
			Sample Date	11/06/2019		11/05/2019		09/17/2019		11/05/2019		11/07/2019		11/06/2019		11/06/2019		11/05/2019		11/05/2019		09/18/2019	
			Sample Type	N		N		N		N		N		N		N		N		FD		N	
			Sample Depth (feet bgs)	28 - 38		22 - 32		5 - 15		8 - 18		36 - 46		5 - 15		6.5 - 11.5		5 - 14.5		5 - 14.5		5 - 14.5	
			Water Bearing Zone (WBZ)	Deep		Deep		Shallow		Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-01		OU-01		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.2	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	25	U	**390**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**15**	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.2	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**110**		6.2	U	2.5	U	2.5	U	**18**		2.5	U	2.5	U	2.5	U	6.2	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**110**		6.2	U	2.5	U	2.5	U	**18**		2.5	U	2.5	U	2.5	U	6.2	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**4**	**J**
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	2500	U	620	U	250	U	250	U	250	U	250	U	250	U	250	U	620	U
Acetone	50	50	µg/l	**3**	**J**	50	U	12	U	5	U	**2.5**	**J**	**2.6**	**J**	**2.2**	**J**	5	U	5	U	12	U
Benzene	1[a]	1	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.84**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.2	U
Bromoform	50[d]	50[d]	µg/l	2	U	20	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	5	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	25	U	**3**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	25	U	**5.1**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	25	U	**2**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Chloroform	7[a]	7	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.2	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	25	U	**5**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	25	U	**33**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**29**	
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	50	U	12	U	5	U	5	U	5	U	5	U	5	U	5	U	12	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	25	U	**60**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**6.5**	
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	25	U	**76**		2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**6.8**	
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	25	U	**2**	**J**	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	5	U	1.2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.2	U
Toluene	5	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**880**		1.2	U	0.5	U	0.5	U	**38**		0.5	U	0.5	U	0.5	U	1.2	U
Vinyl Chloride	5	2	µg/l	1	U	**0.96**	**J**	2.5	U	1	U	**0.43**	**J**	1	U	1	U	1	U	1	U	2.5	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	**0.82**	**J**	2.5	U	2.5	U	**510**	
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	6.2	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	25	U	6.2	U	2.5	U	2.5	U	2.5	U	**0.82**	**J**	2.5	U	2.5	U	**510**	
Total VOC	NC	NC	µg/l	**3**	**J**	**990.96**	**J**	**576.1**	**J**	5	U	**2.93**	**J**	**58.6**	**J**	**3.02**	**J**	5	U	5	U	**572.14**	**J**
Total CVOC	NC	NC	µg/l	2.5	U	**990.96**	**J**	6.2	U	2.5	U	**0.43**	**J**	**56**		2.5	U	2.5	U	2.5	U	6.2	U
Total CBTEX	NC	NC	µg/l	2.5	U	5	U	**38**	**J**	2.5	U	2.5	U	2.5	U	**0.82**	**J**	2.5	U	2.5	U	**539.84**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-25D		MW-26S		MW-26S		MW-27S		MW-27S		MW-28S		MW-29S		MW-29S		MW-30S		MW-30S	
			Sample Date	11/05/2019		09/18/2019		11/05/2019		09/16/2019		11/05/2019		09/17/2019		09/18/2019		09/18/2019		09/17/2019		11/06/2019	
			Sample Type	N		N		N		N		N		N		N		FD		N		N	
			Sample Depth (feet bgs)	31 - 41		5 - 15		5 - 15		10 - 20		10 - 20		7 - 17		4 - 14		4 - 14		10 - 16		10 - 16	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**3800**		**3200**		**0.98**	**J**	2.5	U	**2**	**J**	**120**		**120**		**120**		**410**	
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**440**		**340**		2.5	U	2.5	U	2.5	U	**16**	**J**	**15**	**J**	**8.5**		**84**	**J**
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	6200	U	6200	U	250	U	250	U	250	U	2500	U	2500	U	620	U	12000	U
Acetone	50	50	µg/l	**35**		120	U	120	U	5	U	5	U	5	U	50	U	50	U	12	U	250	U
Benzene	1[a]	1	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	**19**		**19**		**3.6**		25	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
Bromoform	50[d]	50[d]	µg/l	2	U	50	U	50	U	2	U	2	U	2	U	20	U	20	U	5	U	100	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	**2.3**	**J**	120	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	**3.4**	**J**	120	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
Chloroform	7[a]	7	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	**130**		**290**		2.5	U	2.5	U	2.5	U	**2000**		**2200**		**440**		**3800**	
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**130**		**110**		**1.2**	**J**	2.5	U	**3.3**		**170**		**170**		**48**		**120**	
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	120	U	120	U	5	U	5	U	5	U	50	U	50	U	12	U	250	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	**92**		**91**		2.5	U	2.5	U	2.5	U	**83**		**90**		**77**		**240**	
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	**530**		**460**		**0.71**	**J**	2.5	U	**2**	**J**	**68**		**68**		**29**		**73**	**J**
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
Toluene	5	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	25	U	25	U	6.2	U	120	U
Trichloroethene	5	5[b]	µg/l	0.5	U	12	U	12	U	0.5	U	0.5	U	0.5	U	5	U	5	U	1.2	U	25	U
Vinyl Chloride	5	2	µg/l	1	U	25	U	25	U	1	U	1	U	1	U	10	U	10	U	2.5	U	50	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	**120**		**230**		2.5	U	2.5	U	2.5	U	**2700**		**2600**		**390**		**10000**	
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	**130**		**130**		**18**		**100**	**J**
Xylenes, Total	5	5[b]	µg/l	2.5	U	**120**		**230**		2.5	U	2.5	U	2.5	U	**2800**		**2700**		**410**		**10000**	**J**
Total VOC	NC	NC	µg/l	**35**		**5242**		**4721**		**2.89**	**J**	5	U	**7.3**	**J**	**5306**	**J**	**5412**	**J**	**1139.8**	**J**	**14827**	**J**
Total CVOC	NC	NC	µg/l	2.5	U	62	U	62	U	2.5	U	2.5	U	2.5	U	5	U	5	U	6.2	U	50	U
Total CBTEX	NC	NC	µg/l	2.5	U	**380**		**630**		**1.2**	**J**	2.5	U	**3.3**		**5019**		**5119**		**899.6**		**14020**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-31S		RW-1S		RW-1S		RW-2D		RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D	
			Sample Date	09/17/2019		02/05/2019		08/08/2019		02/05/2019		08/08/2019		02/05/2019		08/08/2019		02/05/2019		08/08/2019		02/05/2019	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	10 - 15		10.5 - 16		10.5 - 16		27 - 42		27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5			
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	2.5	U	**0.45**	**J**	**0.46**	**J**	**24**		**13**	**J**	0.5	U	0.5	U	0.5	U	**0.55**		**62**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	**48**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	2.5	U	0.5	U	1	U	10	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	12	U	**100**		**210**		**4100**		**4700**		**32**		**5.3**		**6.3**		**110**		**15000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	12	U	2.5	U	5	U	**28**	**J**	120	U	2.5	U	2.5	U	2.5	U	**3**		500	U
1,2-Dichloroethene, Total	NC	NC	µg/l	12	U	**100**		**210**		**4100**	**J**	**4700**		**32**		**5.3**		**6.3**		**110**		**15000**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	**11**	**J**	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	1200	U	250	U	500	U	5000	U	12000	U	250	U	250	U	250	U	250	U	50000	U
Acetone	50	50	µg/l	25	U	5	U	10	U	100	U	250	U	5	U	5	U	5	U	5	U	1000	U
Benzene	1[a]	1	µg/l	**3.6**		0.5	U	1	U	**8.3**	**J**	25	U	0.5	U	0.5	U	0.5	U	0.5	U	**57**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	2.5	U	0.5	U	1	U	10	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U
Bromoform	50[d]	50[d]	µg/l	10	U	2	U	4	U	40	U	100	U	2	U	2	U	2	U	2	U	400	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	**1.7**	**J**	2.5	U	500	U
Chlorobenzene	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Chloroform	7[a]	7	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Dibromochloromethane	50[d]	50[d]	µg/l	2.5	U	0.5	U	1	U	10	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U
Ethylbenzene	5	5[b]	µg/l	**870**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	**32**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	25	U	5	U	10	U	100	U	250	U	5	U	5	U	5	U	5	U	1000	U
Naphthalene	5[a,b]	NC	µg/l	**48**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	**16**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	2.5	U	0.5	U	1	U	10	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U
Toluene	5	5[b]	µg/l	12	U	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Trichloroethene	5	5[b]	µg/l	2.5	U	**79**		**180**		**3300**		**19**	**J**	**39**		**22**		**9**		**58**		**26000**	
Vinyl Chloride	5	2	µg/l	5	U	**8.1**		**0.85**	**J**	**660**		**560**		**1.4**		1	U	**0.8**	**J**	**2.7**		**2400**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	**1500**		2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Xylene, o-	5[a,b]	5[b]	µg/l	**4.2**	**J**	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Xylenes, Total	5	5[b]	µg/l	**1500**	**J**	2.5	U	5	U	50	U	120	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U
Total VOC	NC	NC	µg/l	**2532.8**	**J**	**187.55**	**J**	**391.31**	**J**	**8120.3**	**J**	**5292**	**J**	**72.4**		**27.3**		**17.8**	**J**	**174.25**		**43519**	**J**
Total CVOC	NC	NC	µg/l	5	U	**187.55**	**J**	**391.31**	**J**	**8112**	**J**	**5292**	**J**	**72.4**		**27.3**		**16.1**	**J**	**174.25**		**43462**	**J**
Total CBTEX	NC	NC	µg/l	**2409.8**	**J**	2.5	U	5	U	**8.3**	**J**	25	U	2.5	U	2.5	U	2.5	U	2.5	U	**57**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2019
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	RW-6D	
		Sample Date	08/08/2019	
		Sample Type	N	
		Sample Depth (feet bgs)		
		Water Bearing Zone (WBZ)	Deep	
		Operable Unit (OU)	OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units		
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	500	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**76**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	500	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	100	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**28000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	500	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**28000**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	500	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	50000	U
Acetone	50	50	µg/l	1000	U
Benzene	1[a]	1	µg/l	**41**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	100	U
Bromoform	50[d]	50[d]	µg/l	400	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	500	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	500	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	500	U
Chlorobenzene	5[a,b]	5[b]	µg/l	500	U
Chloroform	7[a]	7	µg/l	500	U
Dibromochloromethane	50[d]	50[d]	µg/l	100	U
Ethylbenzene	5	5[b]	µg/l	500	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	500	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	1000	U
Naphthalene	5[a,b]	NC	µg/l	500	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	500	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	500	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	100	U
Toluene	5	5[b]	µg/l	500	U
Trichloroethene	5	5[b]	µg/l	**4500**	
Vinyl Chloride	5	2	µg/l	**2000**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	500	U
Xylene, o-	5[a,b]	5[b]	µg/l	500	U
Xylenes, Total	5	5[b]	µg/l	500	U
Total VOC	NC	NC	µg/l	**34617**	**J**
Total CVOC	NC	NC	µg/l	**34576**	**J**
Total CBTEX	NC	NC	µg/l	**41**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2020

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-101S		MW-101S		MW-104S		MW-106D		MW-108S		MW-109D		MW-110D		MW-117S		MW-118D		MW-119D	
			Sample Date	10/28/2020		10/28/2020		10/29/2020		10/29/2020		10/28/2020		10/28/2020		10/29/2020		10/28/2020		10/29/2020		10/28/2020	
			Sample Type	N		FD		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	8 - 18		8 - 18		9 - 14		24 - 34		7 - 17		28 - 38		28 - 38		6 - 16		24 - 34		22 - 32	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Deep		Shallow		Deep		Deep		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**8**	J	**5.5**	J	0.5	U	**18**	J	0.5	U	0.5	U	**120**		0.5	U	**460**	J	**9.4**	J
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	12	U	10	U	0.5	U	25	U	0.5	U	0.5	U	120	U	0.5	U	1000	U	20	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**1900**		**1700**		2.5	U	**8700**		**6.4**		2.5	U	**27000**		2.5	U	**270000**		**3600**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	**120**	
1,2-Dichloroethene, Total	NC	NC	µg/l	**1900**		**1700**		2.5	U	**8700**		**6.4**		2.5	U	**27000**		2.5	U	**270000**		**3700**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	6200	U	5000	U	250	U	12000	UJ	250	U	250	U	62000	UJ	250	U	500000	U	10000	U
Acetone	50	50	µg/l	120	U	100	U	5	U	250	UJ	5	UJ	5	UJ	**360**	J	5	UJ	10000	U	200	UJ
Benzene	1[a]	1	µg/l	12	U	10	U	0.5	U	25	U	0.5	U	0.5	U	120	U	0.5	U	1000	U	20	U
Bromodichloromethane	50[d]	50[d]	µg/l	12	U	10	U	0.5	U	25	U	0.5	U	0.5	U	120	U	0.5	U	1000	U	20	U
Bromoform	50[d]	50[d]	µg/l	50	U	40	U	2	U	100	U	2	U	2	U	500	U	2	U	4000	U	80	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Chlorobenzene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Chloroform	7[a]	7	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Dibromochloromethane	50[d]	50[d]	µg/l	12	U	10	U	0.5	U	25	U	0.5	U	0.5	U	120	U	0.5	U	1000	U	20	U
Ethylbenzene	5	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	**2**	J	5000	U	100	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	**12**		5000	U	100	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	120	U	100	U	5	U	250	U	5	UJ	5	UJ	1200	U	5	UJ	10000	U	200	UJ
Naphthalene	5[a,b]	NC	µg/l	62	UJ	50	UJ	2.5	UJ	120	UJ	2.5	UJ	2.5	UJ	620	UJ	2.5	UJ	5000	UJ	100	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	**4.7**		5000	U	100	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	12	U	10	U	**0.24**	J	25	U	**0.38**	J	0.5	U	120	U	0.5	U	1000	U	20	U
Toluene	5	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Trichloroethene	5	5[b]	µg/l	**3200**	J	**2800**	J	**75**	J	**110**	J	**17**	J	0.5	UJ	**33000**	J	0.5	UJ	**70000**	J	**320**	J
Vinyl Chloride	5	2	µg/l	**17**	J	**15**	J	1	U	**2000**		1	U	1	U	**580**		1	U	**15000**		**280**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	**10**		5000	U	100	U
Xylene, o-	5[a,b]	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	2.5	U	5000	U	100	U
Xylenes, Total	5	5[b]	µg/l	62	U	50	U	2.5	U	120	U	2.5	U	2.5	U	620	U	**10**		5000	U	100	U
Total VOC	NC	NC	µg/l	**5125**	J	**4520.5**	J	**75.24**	J	**10828**	J	**23.78**	J	5	U	**61060**	J	**28.7**	J	**355460**	J	**4329.4**	J
Total CVOC	NC	NC	µg/l	**5125**	J	**4520.5**	J	**75.24**	J	**10828**	J	**23.78**	J	2.5	U	**60700**	J	2.5	U	**355460**	J	**4329.4**	J
Total CBTEX	NC	NC	µg/l	62	U	50	U	2.5	U	25	U	2.5	U	2.5	U	620	U	**24**	J	5000	U	20	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2020

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-120D		MW-120D		MW-121D		MW-122D		MW-123D		MW-13		MW-15D		MW-16D		MW-20		MW-21D	
			Sample Date	10/28/2020		10/28/2020		10/28/2020		10/28/2020		10/29/2020		10/28/2020		10/29/2020		10/28/2020		10/29/2020		10/29/2020	
			Sample Type	N		FD		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	28 - 38		28 - 38		28 - 38		22 - 32		25 - 35		8 - 18		34 - 44		36 - 46		6.5 - 11.5		31.5 - 41	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Shallow		Deep		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-03		OU-03		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	**1.6**	**J**	500	U	0.5	U	**42**		0.5	U	1	U	**42**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**16**		500	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	2.5	U	500	U	0.5	U	25	U	0.5	U	1	U	100	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**260**		**58000**		2.5	U	**8000**		2.5	U	5	U	**26000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	**50**	**J**	2.5	U	5	U	**170**	**J**
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**260**		**58000**		2.5	U	**8100**	**J**	2.5	U	5	U	**26000**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**6.6**		500	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	1200	U	250000	UJ	250	U	12000	UJ	250	U	500	U	50000	U
Acetone	50	50	µg/l	5	U	5	U	5	UJ	25	UJ	5000	UJ	5	UJ	250	UJ	5	U	10	U	1000	UJ
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	2.5	U	500	U	0.5	U	25	U	0.5	U	1	U	100	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	2.5	U	500	U	0.5	U	25	U	0.5	U	1	U	100	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	10	U	2000	U	2	U	100	U	2	U	4	U	400	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	2.5	U	500	U	0.5	U	25	U	0.5	U	1	U	100	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**220**		500	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**46**		500	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	UJ	25	UJ	5000	U	5	UJ	250	U	5	U	10	U	1000	UJ
Naphthalene	5[a,b]	NC	µg/l	2.5	UJ	2.5	UJ	2.5	UJ	12	UJ	2500	UJ	2.5	UJ	120	UJ	2.5	UJ	5	UJ	500	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**14**		500	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	2.5	U	500	U	0.5	U	25	U	0.5	U	1	U	100	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Trichloroethene	5	5[b]	µg/l	0.5	UJ	0.5	UJ	0.5	UJ	**660**	**J**	**94000**	**J**	**0.29**	**J**	**940**	**J**	0.5	UJ	**0.49**	**J**	**4000**	**J**
Vinyl Chloride	5	2	µg/l	1	U	1	U	1	U	**1**	**J**	**4300**		1	U	**4300**		**0.3**	**J**	2	U	**7800**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**580**		500	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	5	U	500	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	12	U	2500	U	2.5	U	120	U	2.5	U	**580**		500	U
Total VOC	NC	NC	µg/l	5	U	5	U	5	U	**922.6**	**J**	**156300**	**J**	**0.29**	**J**	**13332**	**J**	**0.3**	**J**	**883.09**	**J**	**38012**	**J**
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**922.6**	**J**	**156300**	**J**	**0.29**	**J**	**13332**	**J**	**0.3**	**J**	**0.49**	**J**	**38012**	**J**
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	500	U	2.5	U	25	U	2.5	U	**846**		500	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2020
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-22D		MW-23S		MW-23S		MW-25D		MW-26S		MW-27S		MW-30S		RW-1S		RW-1S		RW-2D	
			Sample Date	10/29/2020		10/28/2020		10/28/2020		10/28/2020		10/28/2020		10/28/2020		10/29/2020		05/21/2020		10/27/2020		05/21/2020	
			Sample Type	N		N		FD		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	32.5 - 42		5 - 14.5		5 - 14.5		31 - 41		5 - 15		10 - 20		10 - 16		10.5 - 16		10.5 - 16		27 - 42	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-01		OU-01		OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**2.5**		0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	**3.2**	**J**	**15**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	10	U	**19**		**20**		2.5	U	**3900**		2.5	U	2.5	U	2.5	U	25	U	62	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	2	U	0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	5	U	12	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**440**		2.5	U	2.5	U	2.5	U	62	U	2.5	U	**1.1**	**J**	**15**		**1000**		**3500**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	**20**	**J**
1,2-Dichloroethene, Total	NC	NC	µg/l	**440**		2.5	U	2.5	U	2.5	U	62	U	2.5	U	**1.1**	**J**	**15**		**1000**		**3500**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	10	U	**3**		**3.1**		2.5	U	**110**		2.5	U	2.5	U	2.5	U	25	U	62	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	1000	U	250	U	250	U	250	UJ	6200	U	250	U	250	U	250	U	2500	U	6200	U
Acetone	50	50	µg/l	20	UJ	5	UJ	5	UJ	5	UJ	120	UJ	5	UJ	5	U	5	U	50	UJ	120	U
Benzene	1[a]	1	µg/l	2	U	0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	5	U	**5.8**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	2	U	0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	5	U	12	U
Bromoform	50[d]	50[d]	µg/l	8	U	2	U	2	U	2	U	50	U	2	U	2	U	2	U	20	U	50	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	10	U	**0.94**	**J**	**0.98**	**J**	2.5	U	62	U	2.5	U	**1.9**	**J**	2.5	U	25	U	62	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	**1.5**	**J**	2.5	U	25	U	62	U
Chlorobenzene	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
Chloroform	7[a]	7	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
Dibromochloromethane	50[d]	50[d]	µg/l	2	U	0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	5	U	12	U
Ethylbenzene	5	5[b]	µg/l	10	U	**2**	**J**	**2**	**J**	2.5	U	**160**		2.5	U	**2.6**		2.5	U	25	U	62	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	10	U	**5.8**		**6.1**		2.5	U	**130**		2.5	U	**8.6**		2.5	U	25	U	62	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	20	UJ	5	UJ	5	UJ	5	U	120	UJ	5	UJ	5	U	5	U	50	UJ	120	U
Naphthalene	5[a,b]	NC	µg/l	10	UJ	**4.8**	**J**	**4.9**	**J**	2.5	UJ	**64**	**J**	2.5	UJ	2.5	UJ	2.5	U	25	UJ	62	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	10	U	**6.7**		**7**		2.5	U	**600**		2.5	U	**3**		2.5	U	25	U	62	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	2	U	0.5	U	0.5	U	0.5	U	12	U	0.5	U	0.5	U	0.5	U	5	U	12	U
Toluene	5	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	2.5	U	2.5	U	25	U	62	U
Trichloroethene	5	5[b]	µg/l	**720**	**J**	0.5	UJ	0.5	UJ	0.5	UJ	12	UJ	0.5	UJ	**1**	**J**	**51**		**610**		**1600**	
Vinyl Chloride	5	2	µg/l	**7.4**		1	U	1	U	1	U	25	U	1	U	1	U	1	U	10	U	**500**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	10	U	**1**	**J**	**0.93**	**J**	2.5	U	**31**	**J**	2.5	U	**4.4**		2.5	U	25	U	62	U
Xylene, o-	5[a,b]	5[b]	µg/l	10	U	2.5	U	2.5	U	2.5	U	62	U	2.5	U	**1.8**	**J**	2.5	U	25	U	62	U
Xylenes, Total	5	5[b]	µg/l	10	U	**1**	**J**	**0.93**	**J**	2.5	U	**31**	**J**	2.5	U	**6.2**		2.5	U	25	U	62	U
Total VOC	NC	NC	µg/l	**1169.9**	**J**	**43.24**	**J**	**45.01**	**J**	5	U	**4995**	**J**	5	U	**25.9**	**J**	**66**		**1613.2**	**J**	**5640.8**	**J**
Total CVOC	NC	NC	µg/l	**1169.9**	**J**	2.5	U	2.5	U	2.5	U	62	U	2.5	U	**2.1**	**J**	**66**		**1613.2**	**J**	**5635**	**J**
Total CBTEX	NC	NC	µg/l	2	U	**8.8**	**J**	**9.03**	**J**	2.5	U	**321**	**J**	2.5	U	**17.4**	**J**	2.5	U	5	U	**5.8**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2020

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D		RW-6D	
			Sample Date	10/27/2020		05/21/2020		10/27/2020		05/21/2020		10/27/2020		05/21/2020		12/22/2020	
			Sample Type	N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5					
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units														
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**14**		0.5	U	0.5	U	**0.48**	J	**2.1**	J	**36**	J	**59**	J
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	10	U	0.5	U	0.5	U	0.5	U	5	U	100	U	100	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**2700**		**24**		**18**		**160**		**1400**		**10000**		**11000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**22**	J	2.5	U	2.5	U	**2.2**	J	**7.1**	J	500	U	500	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**2700**	J	**24**		**18**		**160**	J	**1400**	J	**10000**		**11000**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	5000	U	250	U	250	U	250	U	2500	U	50000	U	50000	U
Acetone	50	50	µg/l	100	UJ	5	U	5	UJ	**2.7**	J	50	UJ	1000	U	1000	U
Benzene	1[a]	1	µg/l	**5.5**	J	0.5	U	0.5	U	0.5	U	5	U	**38**	J	**42**	J
Bromodichloromethane	50[d]	50[d]	µg/l	10	U	0.5	U	0.5	U	0.5	U	5	U	100	U	100	U
Bromoform	50[d]	50[d]	µg/l	40	U	2	U	2	U	2	U	20	U	400	U	400	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Chlorobenzene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Chloroform	7[a]	7	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Dibromochloromethane	50[d]	50[d]	µg/l	10	U	0.5	U	0.5	U	0.5	U	5	U	100	U	100	U
Ethylbenzene	5	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	100	UJ	5	U	5	UJ	5	U	50	UJ	1000	U	1000	U
Naphthalene	5[a,b]	NC	µg/l	50	UJ	2.5	U	2.5	UJ	2.5	U	25	UJ	500	U	500	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	10	U	0.5	U	0.5	U	0.5	U	5	U	100	U	100	U
Toluene	5	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Trichloroethene	5	5[b]	µg/l	**1400**		**20**		**12**		**140**		**12**		**20000**		**20000**	
Vinyl Chloride	5	2	µg/l	**490**		**0.69**	J	**1.1**		**5**		**350**		**1200**		**1600**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Xylene, o-	5[a,b]	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Xylenes, Total	5	5[b]	µg/l	50	U	2.5	U	2.5	U	2.5	U	25	U	500	U	500	U
Total VOC	NC	NC	µg/l	**4631.5**	J	**44.69**		**31.1**		**310.38**		**1771.2**	J	**31274**	J	**32701**	J
Total CVOC	NC	NC	µg/l	**4626**	J	**44.69**		**31.1**		**307.68**		**1771.2**	J	**31236**	J	**32659**	J
Total CBTEX	NC	NC	µg/l	**5.5**	J	2.5	U	2.5	U	2.5	U	5	U	**38**	J	**42**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2021

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-101S		MW-101S		MW-102S		MW-103S		MW-104S		MW-106D		MW-108S		MW-109D		MW-110D		MW-117S	
			Sample Date	10/07/2021		10/07/2021		10/05/2021		10/05/2021		10/06/2021		10/06/2021		10/05/2021		10/05/2021		10/05/2021		10/06/2021	
			Sample Type	N		FD		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	8 - 18		8 - 18		9 - 14		8 - 18		9 - 14		24 - 34		7 - 17		28 - 38		28 - 38		6 - 16	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Shallow		Deep		Deep		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**2.3**	J	**1.8**	J	**0.61**	J	5	U	0.5	U	**22**	J	0.5	U	0.5	U	**280**		0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	5	U	2.5	U	1	U	5	U	0.5	U	50	U	0.5	U	0.5	U	200	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**800**		**630**		**150**		**80**		2.5	U	**10000**		**7.3**		2.5	U	**48000**		2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**800**		**630**		**150**		**80**		2.5	U	**10000**		**7.3**		2.5	U	**48000**		2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	2500	U	1200	U	500	U	2500	U	250	U	25000	U	250	U	250	U	100000	U	250	U
Acetone	50	50	µg/l	50	U	25	U	10	U	50	U	5	U	500	U	5	U	5	U	2000	U	5	U
Benzene	1[a]	1	µg/l	5	U	2.5	U	1	U	5	U	0.5	U	50	U	0.5	U	0.5	U	**78**	J	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	5	U	2.5	U	1	U	5	U	0.5	U	50	U	0.5	U	0.5	U	200	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	20	U	10	U	4	U	20	U	2	U	200	U	2	U	2	U	800	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Chloroform	7[a]	7	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	5	U	2.5	U	1	U	5	U	0.5	U	50	U	0.5	U	0.5	U	200	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	**0.71**	J
Isopropylbenzene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	**2.2**	J
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	50	U	25	U	10	U	50	U	5	U	500	U	5	U	5	U	2000	U	5	U
Naphthalene	5[a,b]	NC	µg/l	25	U	12	U	5	U	25	U	2.5	UJ	250	U	2.5	U	2.5	U	1000	U	2.5	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	5	U	2.5	U	1	U	5	U	**0.41**	J	50	U	**0.5**		0.5	U	200	U	0.5	U
Toluene	5	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**1000**		**770**		**280**		**1500**		**49**		50	U	**150**		0.5	U	**36000**		**2.5**	
Vinyl Chloride	5	2	µg/l	**6**	J	**4.8**	J	**0.93**	J	10	U	1	U	**1200**		1	U	1	U	**1100**		1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	**2.5**	
Xylene, o-	5[a,b]	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	25	U	12	U	5	U	25	U	2.5	U	250	U	2.5	U	2.5	U	1000	U	**2.5**	
Total VOC	NC	NC	µg/l	**1808.3**	J	**1406.6**	J	**431.54**	J	**1580**		**49.41**	J	**11222**	J	**157.8**		5	U	**85458**	J	**7.91**	J
Total CVOC	NC	NC	µg/l	**1808.3**	J	**1406.6**	J	**431.54**	J	**1580**		**49.41**	J	**11222**	J	**157.8**		2.5	U	**85380**		**2.5**	
Total CBTEX	NC	NC	µg/l	5	U	2.5	U	5	U	5	U	2.5	U	50	U	2.5	U	2.5	U	**78**	J	**5.41**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2021

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-118D		MW-119D		MW-120D		MW-121D		MW-122D		MW-122D		MW-13		MW-16D		MW-18		MW-20	
			Sample Date	10/06/2021		10/06/2021		10/05/2021		10/05/2021		10/07/2021		10/07/2021		10/06/2021		10/06/2021		10/05/2021		10/06/2021	
			Sample Type	N		N		N		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	24 - 34		22 - 32		28 - 38		28 - 38		22 - 32		22 - 32		8 - 18		36 - 46		5 - 15		6.5 - 11.5	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Deep		Shallow		Deep		Shallow		Shallow	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**620**	J	**14**	J	0.5	U	0.5	U	**2.1**		**1.7**	J	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	**1.8**	J	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1200	U	25	U	0.5	U	0.5	U	1.2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**290000**		**4600**		2.5	U	2.5	U	**510**		**490**		2.5	U	2.5	U	**18**		2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	6200	U	**140**		2.5	U	2.5	U	**3.4**	J	**3.2**	J	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**290000**		**4700**		2.5	U	2.5	U	**510**	J	**490**	J	2.5	U	2.5	U	**18**		2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	620000	U	12000	U	250	U	250	U	620	U	1000	U	250	U	250	U	250	U	250	U
Acetone	50	50	µg/l	12000	U	250	U	5	U	5	U	12	U	20	U	5	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	1200	U	25	U	0.5	U	0.5	U	1.2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	1200	U	25	U	0.5	U	0.5	U	1.2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	5000	U	100	U	2	U	2	U	5	U	8	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	1200	U	25	U	0.5	U	0.5	U	1.2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	12000	U	250	U	5	U	5	U	12	U	20	U	5	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	6200	UJ	120	UJ	2.5	U	2.5	U	6.2	U	10	U	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	1200	U	25	U	0.5	U	0.5	U	1.2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**120000**		**320**		0.5	U	0.5	U	**440**		**570**		**0.72**		0.5	U	**130**		**0.31**	J
Vinyl Chloride	5	2	µg/l	**20000**		**320**		1	U	1	U	**1.2**	J	**1.1**	J	1	U	**0.29**	J	1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	6200	U	120	U	2.5	U	2.5	U	6.2	U	10	U	2.5	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**430620**	J	**5394**	J	5	U	5	U	**956.7**	J	**1066**	J	**2.52**	J	**0.29**	J	**148**		**0.31**	J
Total CVOC	NC	NC	µg/l	**430620**	J	**5394**	J	2.5	U	2.5	U	**956.7**	J	**1066**	J	**0.72**		**0.29**	J	**148**		**0.31**	J
Total CBTEX	NC	NC	µg/l	6200	U	25	U	2.5	U	2.5	U	6.2	U	2	U	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2021
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-23S		MW-25D		MW-25S		MW-26S		MW-27S		MW-30S		MW-30S		RW-1S		RW-1S		RW-2D	
			Sample Date	10/05/2021		10/05/2021		10/05/2021		10/05/2021		10/05/2021		10/06/2021		10/06/2021		03/17/2021		07/22/2021		03/17/2021	
			Sample Type	N		N		N		N		N		N		FD		N		N		N	
			Sample Depth (feet bgs)	5 - 14.5		31 - 41		7 - 17		5 - 15		10 - 20		10 - 16		10 - 16		10.5 - 16		10.5 - 16		27 - 42	
			Water Bearing Zone (WBZ)	Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	**0.25**	J	0.5	U	**14**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	**4300**		2.5	U	**58**		**33**		2.5	U	2.5	U	50	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	0.5	U	0.5	U	10	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**18**		100	U	2.5	U	25	U	12	U	**74**		**47**		**2700**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	**28**	J
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	**18**		100	U	2.5	U	25	U	12	U	**74**		**47**		**2700**	J
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	**100**		2.5	U	**11**	J	**5.7**	J	2.5	U	2.5	U	50	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	620	U	10000	U	250	U	2500	U	1200	U	250	U	250	U	5000	U
Acetone	50	50	µg/l	5	U	**2.8**	J	12	U	200	U	5	U	50	U	25	U	**1.9**	J	5	U	**47**	J
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	0.5	U	0.5	U	**6.6**	J
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	0.5	U	0.5	U	10	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	5	U	80	U	2	U	20	U	10	U	2	U	2	UJ	40	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	0.5	U	0.5	U	10	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	**110**		2.5	U	**1100**		**570**		2.5	U	2.5	U	50	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	**160**		2.5	U	**41**		**31**		2.5	U	2.5	U	50	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	12	U	200	U	5	U	50	U	25	U	5	U	5	U	100	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	6.2	U	**95**	J	2.5	U	**30**		**20**		2.5	U	2.5	U	50	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	**670**		2.5	U	**23**	J	**18**		2.5	U	2.5	U	50	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	1.2	U	20	U	0.5	U	5	U	2.5	U	0.5	U	0.5	U	10	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	25	U	12	U	2.5	U	2.5	U	50	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**310**		20	U	0.5	U	**3.7**	J	**2.1**	J	**19**		**34**		**2500**	
Vinyl Chloride	5	2	µg/l	1	U	1	U	2.5	U	40	U	1	U	10	U	5	U	**5**		**3.5**		**480**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	**2700**		**1400**		2.5	U	2.5	U	50	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	**35**		**20**		2.5	U	2.5	U	50	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	6.2	U	100	U	2.5	U	**2700**		**1400**		2.5	U	2.5	U	50	U
Total VOC	NC	NC	µg/l	5	U	**2.8**	J	**328**		**5435**	J	5	U	**4001.7**	J	**2099.8**	J	**101.15**	J	**84.5**		**5775.6**	J
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	**328**		40	U	2.5	U	**3.7**	J	**2.1**	J	**98.25**	J	**84.5**		**5722**	J
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	6.2	U	**270**		2.5	U	**3876**		**2021**		2.5	U	2.5	U	**6.6**	J

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2021
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D		RW-6D	
			Sample Date	07/22/2021		03/17/2021		07/22/2021		03/17/2021		07/22/2021		03/17/2021		07/22/2021	
			Sample Type	N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5					
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units														
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**19**		0.5	U	**0.55**		0.5	U	**0.32**	J	**64**	J	**44**	J
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U	120	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**2900**		**1.9**	J	**29**		**2.8**		**48**		**13000**		**12000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	**24**	J	2.5	U	2.5	U	2.5	U	**6.8**		500	U	620	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**2900**	J	**1.9**	J	**29**		**2.8**		**55**		**13000**		**12000**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	6200	U	250	U	250	U	250	U	250	U	50000	U	62000	U
Acetone	50	50	µg/l	120	U	**2.5**	J	5	U	**2.2**	J	5	U	**470**	J	1200	U
Benzene	1[a]	1	µg/l	**5.8**	J	0.5	U	0.5	U	**2.7**		0.5	U	**48**	J	120	U
Bromodichloromethane	50[d]	50[d]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U	120	U
Bromoform	50[d]	50[d]	µg/l	50	UJ	2	U	2	UJ	2	U	2	UJ	400	U	500	UJ
Butylbenzene, n-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**0.92**	J	2.5	U	500	U	620	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**1.4**	J	2.5	U	500	U	620	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**1.9**	J	2.5	U	500	U	620	U
Chlorobenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
Chloroform	7[a]	7	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
Dibromochloromethane	50[d]	50[d]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U	120	U
Ethylbenzene	5	5[b]	µg/l	62	U	2.5	U	2.5	U	**1**	J	2.5	U	500	U	620	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**6.4**		2.5	U	500	U	620	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	120	U	5	U	5	U	5	U	5	U	1000	U	1200	U
Naphthalene	5[a,b]	NC	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**9.6**		2.5	U	500	U	620	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	12	U	0.5	U	0.5	U	0.5	U	0.5	U	100	U	120	U
Toluene	5	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
Trichloroethene	5	5[b]	µg/l	**2200**		**3.5**		**44**		**5**		**63**		**26000**		**23000**	
Vinyl Chloride	5	2	µg/l	**540**		1	U	**4.4**		**0.76**	J	**4.6**		**1700**		**1200**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	**6.7**		2.5	U	500	U	620	U
Xylene, o-	5[a,b]	5[b]	µg/l	62	U	2.5	U	2.5	U	2.5	U	2.5	U	500	U	620	U
Xylenes, Total	5	5[b]	µg/l	62	U	2.5	U	2.5	U	**6.7**		2.5	U	500	U	620	U
Total VOC	NC	NC	µg/l	**5688.8**	J	**7.9**	J	**77.95**		**41.38**	J	**122.72**	J	**41282**	J	**36244**	J
Total CVOC	NC	NC	µg/l	**5683**	J	**5.4**	J	**77.95**		**8.56**	J	**122.72**	J	**40764**	J	**36244**	J
Total CBTEX	NC	NC	µg/l	**5.8**	J	2.5	U	2.5	U	**16.8**	J	2.5	U	**48**	J	620	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	DPT-084		DPT-084		DPT-085		MW-101S		MW-102S		MW-103S		MW-104S		MW-106D		MW-108S		MW-109D	
			Sample Date	10/19/2022		10/19/2022		10/19/2022		10/04/2022		10/04/2022		10/04/2022		10/06/2022		10/05/2022		10/05/2022		10/04/2022	
			Sample Type	N		FD		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	29		29		32 - 35		8 - 18		9 - 14		8 - 18		9 - 14		24 - 34		7 - 17		28 - 38	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**470**	J	**470**	J	**600**		**1.4**	J	0.5	U	1	U	0.5	U	**35**		0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	500	U	500	U	200	U	2.5	U	0.5	U	1	U	0.5	U	20	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**70000**		**69000**		**78000**		**550**		**42**		**13**		**5**		**6800**		**16**		2.5	UJ
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2500	U	2500	U	**320**	J	12	U	2.5	U	5	U	2.5	U	**36**	J	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	--		--		--		**550**		**42**		**13**		**5**		**6800**	J	**16**		2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250000	U	250000	U	100000	U	1200	U	250	U	500	U	250	U	10000	U	250	U	250	U
Acetone	50	50	µg/l	5000	U	5000	U	2000	U	25	U	5	U	10	U	5	U	200	U	5	U	5	U
Benzene	1[a]	1	µg/l	500	U	500	U	**140**	J	2.5	U	0.5	U	1	U	0.5	U	**13**	J	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	500	U	500	U	200	U	2.5	U	0.5	U	1	U	0.5	U	20	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2000	U	2000	U	800	U	10	U	2	U	4	U	2	U	80	UJ	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	500	U	500	U	200	U	2.5	U	0.5	U	1	U	0.5	U	20	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5000	U	5000	U	2000	U	25	U	5	U	10	U	5	U	200	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	UJ	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	500	U	500	U	200	U	2.5	U	0.5	U	1	U	0.5	U	20	U	**0.27**	J	0.5	U
Toluene	5	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**320000**		**350000**		**210000**		**680**		**180**		**330**		**59**		**710**		**200**		0.5	UJ
Vinyl Chloride	5	2	µg/l	**1700**		**1700**		**1400**		**3.4**	J	**0.11**	J	2	U	**0.1**	J	**340**		1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2500	U	2500	U	1000	U	12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	--		--		--		12	U	2.5	U	5	U	2.5	U	100	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**392170**		**421170**		**290460**		**1234.8**	J	**222.11**	J	**343**		**64.1**	J	**7934**	J	**216.27**	J	5	U
Total CVOC	NC	NC	µg/l	**392170**		**421170**		**290320**		**1234.8**	J	**222.11**	J	**343**		**64.1**	J	**7921**	J	**216.27**	J	2.5	U
Total CBTEX	NC	NC	µg/l	500	U	500	U	**140**		2.5	U	2.5	U	5	U	2.5	U	**13**	J	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2022
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-110D		MW-117S		MW-118D		MW-119D		MW-120D		MW-120D		MW-121D		MW-122D		MW-122D		MW-13	
			Sample Date	10/05/2022		10/06/2022		10/05/2022		10/06/2022		10/05/2022		10/05/2022		10/05/2022		10/05/2022		10/05/2022		10/06/2022	
			Sample Type	N		N		N		N		N		FD		N		N		FD		N	
			Sample Depth (feet bgs)	28 - 38		6 - 16		24 - 34		22 - 32		28 - 38		28 - 38		28 - 38		22 - 32		22 - 32		8 - 18	
			Water Bearing Zone (WBZ)	Deep		Shallow		Deep		Deep		Deep		Deep		Deep		Deep		Deep		Shallow	
			Operable Unit (OU)	OU-03		OU-01		OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**190**	J	0.5	U	**270**		**14**		0.5	U	0.5	U	0.5	U	**1.4**		**0.78**	J	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	**0.7**	J
1,2-Dichloroethane	0.6[a]	0.6	µg/l	200	U	0.5	U	250	U	10	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**36000**		2.5	U	**280000**		**3900**		2.5	U	2.5	U	2.5	U	**140**		**140**		**8.2**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	1000	U	2.5	U	1200	U	**140**		2.5	U	2.5	U	2.5	U	5	U	**1.4**	J	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**36000**		2.5	U	**280000**		**4000**		2.5	U	2.5	U	2.5	U	**140**		**140**	J	**8.2**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	100000	U	250	U	120000	U	5000	U	250	U	250	U	250	U	500	U	500	U	250	U
Acetone	50	50	µg/l	2000	U	5	U	2500	U	100	U	5	U	5	U	5	U	10	U	10	U	5	U
Benzene	1[a]	1	µg/l	**140**	J	0.5	U	250	U	10	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	200	U	0.5	U	250	U	10	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	800	U	2	U	1000	U	40	U	2	U	2	U	2	U	4	UJ	4	UJ	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
Chloroform	7[a]	7	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	200	U	0.5	U	250	U	10	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	**3**	
Isopropylbenzene	5[a,b]	5[b]	µg/l	1000	U	**0.93**	J	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	2000	U	5	U	2500	U	100	U	5	U	5	U	5	U	10	U	10	U	5	U
Naphthalene	5[a,b]	NC	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	UJ	5	UJ	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	200	U	0.5	U	250	U	10	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U
Toluene	5	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**140000**	J	0.5	U	**67000**		**280**		0.5	U	0.5	U	0.5	U	**490**		**500**		**38**	
Vinyl Chloride	5	2	µg/l	**580**		1	U	**7700**	J	**270**	J	1	U	1	U	1	U	**0.73**	U	**0.76**	U	**0.15**	J
Xylene, m- & p-	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	**9.3**	
Xylene, o-	5[a,b]	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	1000	U	2.5	U	1200	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	**9.3**	
Total VOC	NC	NC	µg/l	**176910**	J	**0.93**	J	**354970**	J	**4604**	J	5	U	5	U	5	U	**632.13**		**642.94**	J	**59.35**	J
Total CVOC	NC	NC	µg/l	**176770**	J	2.5	U	**354970**	J	**4604**	J	2.5	U	2.5	U	2.5	U	**632.13**		**642.94**	J	**46.35**	J
Total CBTEX	NC	NC	µg/l	**140**	J	**0.93**	J	250	U	50	U	2.5	U	2.5	U	2.5	U	5	U	5	U	**12.3**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2022

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-16D		MW-18		MW-20		MW-23S		MW-25D		MW-25S		MW-26S		MW-27S		MW-30S		MW-7DD	
			Sample Date	10/06/2022		10/04/2022		10/05/2022		10/04/2022		10/04/2022		10/04/2022		10/04/2022		10/04/2022		10/05/2022		10/05/2022	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	36 - 46		5 - 15		6.5 - 11.5		5 - 14.5		31 - 41		7 - 17		5 - 15		10 - 20		10 - 16		90 - 100	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-01		OU-01		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	62	U	6.2	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	12	U	1.2	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**4400**		2.5	U	**980**		6.2	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	12	U	1.2	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**4.3**		2.5	U	2.5	U	2.5	U	**6.4**		25	U	2.5	U	62	U	**25**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	62	U	6.2	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**4.3**		2.5	U	2.5	U	2.5	U	**6.4**		25	U	2.5	U	62	U	**25**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**35**		2.5	U	**230**		6.2	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	250	U	250	U	250	U	2500	U	250	U	6200	UJ	620	U
Acetone	50	50	µg/l	5	U	5	U	5	U	5	U	5	U	5	U	50	U	5	U	120	U	12	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	12	U	1.2	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.2**	J	5	U	0.5	U	12	U	1.2	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	2	U	2	U	20	U	2	U	50	U	5	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**22**	J	2.5	U	62	U	6.2	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**28**		2.5	U	62	U	6.2	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	62	U	6.2	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	62	U	6.2	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**1.1**	J	25	U	2.5	U	62	U	6.2	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	12	U	1.2	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**1.2**	J	2.5	U	2.5	U	**150**		2.5	U	**4000**		6.2	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**1.1**	J	2.5	U	2.5	U	**160**		2.5	U	**250**		6.2	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	U	5	U	5	U	5	U	50	U	5	U	120	U	12	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	2.5	U	**0.87**	J	2.5	U	2.5	U	**150**	J	2.5	U	**680**		6.2	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**810**		2.5	U	**170**		6.2	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	**15**	J	2.5	U	62	U	6.2	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	12	U	1.2	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	62	U	6.2	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**44**		**0.74**		0.5	U	0.5	U	**79**		**4**	J	0.5	U	12	U	**350**	
Vinyl Chloride	5	2	µg/l	**0.61**	J	1	U	1	U	1	U	1	U	1	U	10	U	1	U	25	U	**0.46**	**U**
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	25	U	2.5	U	**11000**		6.2	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**5.9**		2.5	U	2.5	U	25	U	2.5	U	**120**		6.2	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**5.9**		2.5	U	2.5	U	25	U	2.5	U	**11000**		6.2	U
Total VOC	NC	NC	µg/l	**0.61**	J	**48.3**		**0.74**		**9.07**	J	5	U	**86.7**	J	**5774**	J	5	U	**17430**		**375.46**	
Total CVOC	NC	NC	µg/l	**0.61**	J	**48.3**		**0.74**		2.5	U	2.5	U	**85.4**		**4**	J	2.5	U	62	U	**375.46**	
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**8.2**	J	2.5	U	2.5	U	**310**		2.5	U	**15370**		6.2	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2022

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-1S		RW-1S		RW-2D		RW-2D		RW-2S		RW-2S		RW-3S		RW-3S		RW-6D		RW-6D	
			Sample Date	04/05/2022		10/04/2022		04/05/2022		10/04/2022		04/05/2022		10/04/2022		04/05/2022		10/04/2022		04/05/2022		10/04/2022	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	10.5 - 16		10.5 - 16		27 - 42		27 - 42		10 - 15.5		10 - 15.5		9 - 13.5		9 - 13.5					
			Water Bearing Zone (WBZ)	Shallow		Shallow		Deep		Deep		Shallow		Shallow		Shallow		Shallow		Deep		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	2.5	U	120	U	250	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**0.22**	**J**	0.5	U	**16**		**18**		**0.36**	**J**	0.5	U	**4.6**		**0.32**	**J**	**74**		**36**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	**3.3**		120	U	250	UJ
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	2.5	U	5	U	0.5	U	0.5	U	2	U	0.5	U	25	U	50	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**73**		**57**		**2700**		**2300**		**20**		**2.2**	**J**	**1200**		**39**		**10000**		**9400**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	**24**		**20**	**J**	2.5	U	2.5	U	**5**	**J**	2.5	U	**62**	**J**	250	U
1,2-Dichloroethene, Total	NC	NC	µg/l	**73**		**57**		**2700**		**2300**	**J**	**20**		**2.2**	**J**	**1200**	**J**	**39**		**10000**	**J**	**9400**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	**1.7**	**J**	120	U	250	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	1200	U	2500	U	250	U	250	U	1000	U	250	U	12000	U	25000	U
Acetone	50	50	µg/l	5	U	5	U	25	U	50	U	5	U	5	U	20	U	**16**	**J**	250	U	500	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	**6.2**		**5.5**		0.5	U	0.5	U	**2.1**		**2.4**		**35**		**24**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	2.5	U	5	U	0.5	U	0.5	U	2	U	0.5	U	25	U	50	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	10	U	20	UJ	2	U	2	U	8	U	2	U	100	U	200	UJ
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	2.5	U	120	U	250	UJ
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	2.5	U	120	U	250	UJ
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	2.5	U	120	U	250	UJ
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	2.5	U	120	U	250	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	2.5	U	120	U	250	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	2.5	U	5	U	0.5	U	0.5	U	2	U	0.5	U	25	U	50	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	**0.93**	**J**	120	U	250	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	**0.85**	**J**	120	U	250	UJ
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	25	U	50	U	5	U	5	U	20	U	**27**		250	U	500	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	**7**	**J**	**0.78**	**J**	120	U	250	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	2.5	U	120	U	250	UJ
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	UJ	2.5	U	2.5	U	10	U	2.5	U	120	U	250	UJ
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	2.5	U	5	U	0.5	U	0.5	U	2	U	0.5	U	25	U	50	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	2.5	U	120	U	250	U
Trichloroethene	5	5[b]	µg/l	**18**		**28**		**1800**		**1800**		**54**		**3.9**		**240**		**27**		**18000**		**15000**	
Vinyl Chloride	5	2	µg/l	**8.3**		**5.2**		**620**		**560**		**3.2**		1	U	**40**		**23**		**1500**		**710**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	**4.7**		120	U	250	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	**2.5**		120	U	250	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	12	U	25	U	2.5	U	2.5	U	10	U	**7.2**		120	U	250	U
Total VOC	NC	NC	µg/l	**99.52**		**90.2**		**5166.2**		**4703.5**		**77.56**		**6.1**		**1498.7**		**149.48**		**29671**		**25170**	
Total CVOC	NC	NC	µg/l	**99.52**		**90.2**		**5160**		**4698**		**77.56**		**6.1**		**1489.6**		**89.32**		**29636**		**25146**	
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	**6.2**		**5.5**		2.5	U	2.5	U	**2.1**		**11.38**		**35**		**24**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2023

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-101S		MW-102S		MW-103S		MW-104S		MW-106D		MW-108S		MW-109D		MW-110D		MW-117S		MW-118D	
			Sample Date	05/18/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/18/2023		05/18/2023	
			Sample Type	N		N		N		N		N		N		N		N		N		N	
			Sample Depth (feet bgs)	8 - 18		9 - 14		8 - 18		9 - 14		24 - 34		7 - 17		28 - 38		28 - 38		6 - 16		24 - 34	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Shallow		Shallow		Deep		Shallow		Deep		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	**1.2**		0.5	U	0.5	U	0.5	U	**31**		0.5	U	0.5	U	**200**		0.5	U	**300**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	**2.1**	J	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	1	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	0.5	U	200	U	0.5	U	250	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**400**		**35**		**6**		2.5	U	**7900**		**0.7**	J	2.5	U	**26000**		2.5	U	**250000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	**31**	J	2.5	U	2.5	U	1000	U	2.5	U	**360**	J
1,2-Dichloroethene, Total	NC	NC	µg/l	**400**		**35**		**6**		2.5	U	**7900**	J	**0.7**	J	2.5	U	**26000**		2.5	U	**250000**	J
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	500	UJ	250	UJ	250	U	250	UJ	10000	U	250	U	250	U	100000	U	250	UJ	120000	UJ
Acetone	50	50	µg/l	10	U	5	U	5	UJ	5	U	200	UJ	5	UJ	5	UJ	2000	UJ	5	U	2500	U
Benzene	1[a]	1	µg/l	1	U	0.5	U	0.5	U	0.5	U	**7.2**	J	0.5	U	0.5	U	**74**	J	**0.26**	J	250	U
Bromodichloromethane	50[d]	50[d]	µg/l	1	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	0.5	U	200	U	0.5	U	250	U
Bromoform	50[d]	50[d]	µg/l	4	U	2	U	2	U	2	U	80	U	2	U	2	U	800	U	2	U	1000	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**0.92**	J	1200	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Chlorobenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Chloroform	7[a]	7	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Dibromochloromethane	50[d]	50[d]	µg/l	1	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	0.5	U	200	U	0.5	U	250	U
Ethylbenzene	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**2.9**		1200	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**13**		1200	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	10	U	5	U	5	U	5	U	200	U	5	U	5	U	2000	U	5	U	2500	U
Naphthalene	5[a,b]	NC	µg/l	5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	100	UJ	2.5	UJ	2.5	UJ	1000	UJ	2.5	UJ	1200	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**3.5**		1200	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	1	U	0.5	U	0.5	U	**0.18**	J	20	U	**0.34**	J	0.5	U	200	U	0.5	U	250	U
Toluene	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	2.5	U	1200	U
Trichloroethene	5	5[b]	µg/l	**390**		**73**		**270**		**34**		**160**		**33**		**0.24**	J	**95000**		**0.27**	J	**82000**	
Vinyl Chloride	5	2	µg/l	**1.8**	J	**0.1**	J	1	U	1	U	**580**		1	U	1	U	**420**		1	U	**11000**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**35**		1200	U
Xylene, o-	5[a,b]	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**2.2**	J	1200	U
Xylenes, Total	5	5[b]	µg/l	5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	1000	U	**37**	J	1200	U
Total VOC	NC	NC	µg/l	**795.1**	J	**108.1**	J	**276**		**34.18**	J	**8709.2**	J	**34.04**	J	**0.24**	J	**121694**	J	**58.05**	J	**343660**	J
Total CVOC	NC	NC	µg/l	**793**	J	**108.1**	J	**276**		**34.18**	J	**8702**	J	**34.04**	J	**0.24**	J	**121620**		**0.27**	J	**343660**	J
Total CBTEX	NC	NC	µg/l	5	U	2.5	U	2.5	U	2.5	U	**7.2**	J	2.5	U	2.5	U	**74**	J	**53.36**	J	250	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2023
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-119D		MW-120D		MW-120D		MW-121D		MW-122D		MW-122D		MW-13		MW-16D		MW-18		MW-20	
			Sample Date	05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/17/2023		05/19/2023		05/17/2023		05/16/2023		05/18/2023	
			Sample Type	N		N		FD		N		N		FD		N		N		N		N	
			Sample Depth (feet bgs)	22 - 32		28 - 38		28 - 38		28 - 38		22 - 32		22 - 32		8 - 18		36 - 46		5 - 15		6.5 - 11.5	
			Water Bearing Zone (WBZ)	Deep		Deep		Deep		Deep		Deep		Deep		Shallow		Deep		Shallow		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-03		OU-03		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	**0.82**	J	**0.84**	J	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**160**		**150**		2.5	U	2.5	U	**36**		2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**1.8**	J	**1.5**	J	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**160**	J	**150**	J	2.5	U	2.5	U	**36**		2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	U	250	U	250	U	500	U	500	U	250	UJ	250	UJ	250	U	250	UJ
Acetone	50	50	µg/l	5	U	5	UJ	5	UJ	5	UJ	10	UJ	10	UJ	5	U	5	U	5	UJ	5	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	4	U	4	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	U	5	U	10	U	10	U	5	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	5	UJ	5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	**460**		**480**		0.5	U	0.5	U	**200**		**0.23**	J
Vinyl Chloride	5	2	µg/l	**9.3**		1	U	1	U	1	U	**0.68**	J	**0.67**	J	1	U	**0.54**	J	1	U	1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**9.3**		5	U	5	U	5	U	**623.3**	J	**633.01**	J	5	U	**0.54**	J	**236**		**0.23**	J
Total CVOC	NC	NC	µg/l	**9.3**		2.5	U	2.5	U	2.5	U	**623.3**	J	**633.01**	J	2.5	U	**0.54**	J	**236**		**0.23**	J
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2023

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-23S		MW-25D		MW-25S		MW-26S		MW-27S		MW-30S		MW-30S		MW-7DD		RW-1S		RW-2D	
			Sample Date	05/18/2023		05/16/2023		05/16/2023		05/18/2023		05/18/2023		05/18/2023		05/18/2023		05/19/2023		02/28/2023		02/28/2023	
			Sample Type	N		N		N		N		N		N		FD		N		N		N	
			Sample Depth (feet bgs)	5 - 14.5		31 - 41		7 - 17		5 - 15		10 - 20		10 - 16		10 - 16		90 - 100		10.5 - 16		27 - 42	
			Water Bearing Zone (WBZ)	Shallow		Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	**0.3**	J	**0.29**	J	**18**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**2900**		2.5	U	**1100**		**1200**		2.5	U	2.5	U	25	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	0.5	U	0.5	U	5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	**4.8**		25	U	2.5	U	50	U	50	U	**150**		**96**		**2500**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	**26**	
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	2.5	U	**4.8**		25	U	2.5	U	50	U	50	U	**150**		**96**		**2500**	
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**160**		2.5	U	**300**		**340**		2.5	U	2.5	U	25	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	U	250	U	2500	UJ	250	UJ	5000	UJ	5000	UJ	250	UJ	250	UJ	2500	UJ
Acetone	50	50	µg/l	5	U	5	UJ	5	UJ	50	U	5	U	100	U	100	U	**7.7**		5	U	50	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	0.5	U	0.5	U	**5.8**	
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	0.5	U	0.5	U	5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	20	U	2	U	40	U	40	U	2	U	2	U	20	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**19**	J	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**26**		2.5	U	**19**	J	**23**	J	2.5	U	2.5	U	25	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	0.5	U	0.5	U	5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**95**		2.5	U	**4900**		**5500**		2.5	U	2.5	U	25	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**160**		2.5	U	**280**		**320**		2.5	U	2.5	U	25	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	U	50	U	5	U	100	U	100	U	**6**		5	U	50	U
Naphthalene	5[a,b]	NC	µg/l	2.5	UJ	2.5	UJ	2.5	UJ	**120**	J	2.5	UJ	**500**	J	**580**	J	2.5	UJ	2.5	U	25	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**730**		2.5	U	**200**		**230**		2.5	U	2.5	U	25	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**13**	J	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	5	U	0.5	U	10	U	10	U	0.5	U	0.5	U	5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	50	U	50	U	2.5	U	2.5	U	25	U
Trichloroethene	5	5[b]	µg/l	0.5	U	0.5	U	**110**		5	U	0.5	U	**7.6**	J	10	U	**31**		**17**		**1800**	
Vinyl Chloride	5	2	µg/l	1	U	1	U	1	U	10	U	1	U	20	U	20	U	**10**		**17**		**610**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**51**		2.5	U	**14000**		**16000**		2.5	U	2.5	U	25	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	25	U	2.5	U	**190**		**240**		2.5	U	2.5	U	25	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	**51**		2.5	U	**14000**		**16000**		2.5	U	2.5	U	25	U
Total VOC	NC	NC	µg/l	5	U	5	U	**114.8**		**4274**	J	5	U	**21496.6**	J	**24433**	J	**205**	J	**130.29**	J	**4959.8**	
Total CVOC	NC	NC	µg/l	2.5	U	2.5	U	**114.8**		5	U	2.5	U	**7.6**	J	50	U	**191.3**	J	**130.29**	J	**4954**	
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	2.5	U	**306**		2.5	U	**19370**		**22060**		2.5	U	2.5	U	**5.8**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2023
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	RW-2S		RW-3S		RW-6D	
		Sample Date	02/28/2023		02/28/2023		02/28/2023	
		Sample Type	N		N		N	
		Sample Depth (feet bgs)	10 - 15.5		9 - 13.5			
		Water Bearing Zone (WBZ)	Shallow		Shallow		Deep	
		Operable Unit (OU)	OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units					
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	**0.54**		**58**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	25	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**0.77**	**J**	**410**		**14000**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	**16**		**52**	**J**
1,2-Dichloroethene, Total	NC	NC	µg/l	**0.77**	**J**	**430**		**14000**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	UJ	250	UJ	12000	UJ
Acetone	50	50	µg/l	5	U	5	U	250	U
Benzene	1[a]	1	µg/l	0.5	U	**0.98**		**30**	
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	25	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	100	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	120	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	25	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	120	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	250	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	120	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	25	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	120	U
Trichloroethene	5	5[b]	µg/l	**4.2**		**40**		**24000**	
Vinyl Chloride	5	2	µg/l	1	U	**170**		**1000**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	120	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	120	U
Total VOC	NC	NC	µg/l	**4.97**	**J**	**637.52**		**39140**	**J**
Total CVOC	NC	NC	µg/l	**4.97**	**J**	**636.54**		**39110**	**J**
Total CBTEX	NC	NC	µg/l	2.5	U	**0.98**		**30**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2024

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-13		MW-15D		MW-15S		MW-16D		MW-18		MW-22D		MW-22D		MW-23D		MW-23D		MW-23S	
			Sample Date	09/13/2024		09/17/2024		09/17/2024		09/11/2024		09/12/2024		09/18/2024		09/18/2024		09/19/2024		09/19/2024		09/12/2024	
			Sample Type	N		N		N		N		N		N		FD		N		FD		N	
			Sample Depth (feet bgs)	8 - 18		34 - 44		10 - 20		36 - 46		5 - 15		32.5 - 42		32.5 - 42		28 - 37.5		28 - 37.5		5 - 14.5	
			Water Bearing Zone (WBZ)	Shallow		Deep		Shallow		Deep		Shallow		Deep		Deep		Deep		Deep		Shallow	
			Operable Unit (OU)	OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	**12**		0.5	U	0.5	U	1.2	U	**34**		**35**		0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	2	U	0.5	U	0.5	U	1.2	U	20	U	20	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**1700**		**1.7**	**J**	2.5	U	**36**		**6200**		**6800**		2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	**18**		2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**1700**		**1.7**	**J**	2.5	U	**36**		**6200**		**6800**		2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	1000	U	250	U	250	U	620	U	10000	U	10000	U	250	U	250	U	250	U
Acetone	50	50	µg/l	5	U	20	U	5	U	5	U	12	UJ	200	U	200	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	2	U	0.5	U	0.5	U	1.2	U	**9.6**	**J**	**9.6**	**J**	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	2	U	0.5	U	0.5	U	1.2	U	20	U	20	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	8	U	2	U	2	U	5	U	80	U	80	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	2	U	0.5	U	0.5	U	1.2	U	20	U	20	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	20	U	5	U	5	U	12	U	200	U	200	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	2	U	0.5	U	0.5	U	1.2	U	20	U	20	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**42**		**9.5**		0.5	U	**930**		**6300**		**7100**		**0.19**	**J**	0.5	U	0.5	U
Vinyl Chloride	5	2	µg/l	1	U	**310**		1	U	**0.15**	**J**	2.5	UJ	**93**		**90**		**8.8**		**8.8**		1	U
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	10	U	2.5	U	2.5	U	6.2	U	100	U	100	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	5	U	**2082**		**11.2**	**J**	**0.15**	**J**	**966**		**12636.6**	**J**	**14034.6**	**J**	**8.99**	**J**	**8.8**		5	U
Total CVOC	NC	NC	µg/l	2.5	U	**2082**		**11.2**	**J**	**0.15**	**J**	**966**		**12627**		**14025**		**8.99**	**J**	**8.8**		2.5	U
Total CBTEX	NC	NC	µg/l	2.5	U	2	U	2.5	U	2.5	U	6.2	U	**9.6**	**J**	**9.6**	**J**	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2024

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-25D		MW-25S		MW-30S		MW-30S		MW-102S		MW-103S		MW-104S		MW-105S		MW-106D		MW-106S	
			Sample Date	09/12/2024		09/12/2024		09/12/2024		09/12/2024		09/12/2024		09/11/2024		09/11/2024		09/11/2024		09/19/2024		09/19/2024	
			Sample Type	N		N		N		FD		N		N		N		N		N		N	
			Sample Depth (feet bgs)	31 - 41		7 - 17		10 - 16		10 - 16		9 - 14		8 - 18		9 - 14		8 - 18		24 - 34		10 - 15	
			Water Bearing Zone (WBZ)	Deep		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Shallow		Deep		Shallow	
			Operable Unit (OU)	OU-03		OU-03		OU-01		OU-01		OU-03		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	2.5	U	12	U	12	U	**2.6**		**14**	J	0.5	U	0.5	U	**55**		**0.33**	J
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	12	U	**1000**	J	**720**	J	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	2.5	U	12	U	12	U	2.5	U	20	U	0.5	U	0.5	U	25	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	2.5	U	**34**		62	U	62	U	**1600**		**7500**		2.5	U	2.5	U	**9800**		**86**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	12	U	62	U	62	U	**6.6**	J	100	U	2.5	U	2.5	U	**51**	J	**1.1**	J
1,2-Dichloroethene, Total	NC	NC	µg/l	2.5	U	**34**		62	U	62	U	**1600**	J	**7500**		2.5	U	2.5	U	**9900**	J	**87**	J
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	12	U	**270**		**180**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	1200	U	6200	U	6200	U	1200	U	10000	U	250	U	250	U	12000	U	250	U
Acetone	50	50	µg/l	**10**		25	U	120	U	120	U	25	UJ	200	UJ	5	U	5	U	250	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	2.5	U	12	U	12	U	**0.98**	J	20	U	0.5	U	0.5	U	**20**	J	**0.66**	
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	2.5	U	12	U	12	U	2.5	U	20	U	0.5	U	0.5	U	25	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	10	U	50	U	50	U	10	U	80	U	2	U	2	U	100	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	12	U	**18**	J	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	2.5	U	12	U	12	U	2.5	U	20	U	0.5	U	0.5	U	25	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	12	U	**4300**		**3900**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	12	U	**300**		**200**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	25	U	120	U	120	U	25	U	200	U	5	U	5	U	250	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	12	U	**500**	J	**340**	J	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	12	U	**200**		**140**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	2.5	U	12	U	12	U	2.5	U	20	U	**0.34**	J	0.5	U	25	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	12	U	62	U	62	U	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Trichloroethene	5	5[b]	µg/l	0.5	U	**2000**		12	U	12	U	**1600**		**11000**		**65**		**0.4**	J	25	U	**140**	
Vinyl Chloride	5	2	µg/l	1	U	5	U	25	U	25	U	**57**	J	**110**	J	1	U	1	U	**350**		**0.89**	J
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	12	U	**14000**		**14000**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	12	U	**360**	J	**220**	J	12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	12	U	**14000**		**14000**		12	U	100	U	2.5	U	2.5	U	120	U	2.5	U
Total VOC	NC	NC	µg/l	**10**		**2034**		**20948**	J	**19700**		**3267.18**	J	**18624**	J	**65.34**	J	**0.4**	J	**10276**	J	**228.98**	J
Total CVOC	NC	NC	µg/l	2.5	U	**2034**		62	U	62	U	**3266.2**	J	**18624**	J	**65.34**	J	**0.4**	J	**10256**	J	**228.32**	J
Total CBTEX	NC	NC	µg/l	2.5	U	12	U	**18960**	J	**18320**		**0.98**	J	20	U	2.5	U	2.5	U	**20**	J	**0.66**	

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2024

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	MW-107S		MW-108S		MW-109D		MW-110D		MW-117S		MW-119D		MW-120D		MW-121D		MW-122D		MW-122D	
			Sample Date	09/18/2024		09/11/2024		09/11/2024		09/19/2024		09/12/2024		09/11/2024		09/11/2024		09/11/2024		09/12/2024		09/12/2024	
			Sample Type	N		N		N		N		N		N		N		N		N		FD	
			Sample Depth (feet bgs)	9 - 19		7 - 17		28 - 38		28 - 38		6 - 16		22 - 32		28 - 38		28 - 38		22 - 32		22 - 32	
			Water Bearing Zone (WBZ)	Shallow		Shallow		Deep		Deep		Shallow		Deep		Deep		Deep		Deep		Deep	
			Operable Unit (OU)	OU-03		OU-03		OU-03		OU-03		OU-01		OU-03		OU-03		OU-03		OU-03		OU-03	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units																				
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	2	U	0.5	U	**190**		0.5	U	**8.4**		0.5	U	0.5	U	**0.38**	**J**	**0.38**	**J**
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	2	U	0.5	U	100	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**2.4**	**J**	**13**		2.5	U	**34000**		2.5	U	**2300**		2.5	U	2.5	U	**98**		**98**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	10	U	2.5	U	**400**	**J**	2.5	U	**120**		2.5	U	2.5	U	**0.74**	**J**	**0.78**	**J**
1,2-Dichloroethene, Total	NC	NC	µg/l	**2.4**	**J**	**13**		2.5	U	**34000**	**J**	2.5	U	**2400**	**J**	2.5	U	2.5	U	**99**	**J**	**99**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	1000	U	250	U	50000	U	250	U	2500	U	250	U	250	U	250	U	250	U
Acetone	50	50	µg/l	5	U	20	UJ	5	U	1000	U	5	U	50	U	5	U	5	U	5	U	5	U
Benzene	1[a]	1	µg/l	0.5	U	2	U	0.5	U	**66**	**J**	**0.18**	**J**	**2.2**	**J**	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	2	U	0.5	U	100	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	8	U	2	U	400	U	2	U	20	U	2	U	2	U	2	U	2	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	**1**	**J**	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7[a]	7	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	2	U	0.5	U	100	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	**22**		25	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	20	U	5	U	1000	U	5	U	50	U	5	U	5	U	5	U	5	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	**4.1**		25	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	2	U	0.5	U	100	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5	5[b]	µg/l	**43**		**940**		0.5	U	**38000**		**0.32**	**J**	**130**		0.5	U	0.5	U	**18**		**18**	
Vinyl Chloride	5	2	µg/l	1	U	4	UJ	1	U	**470**		1	U	**42**		1	U	1	U	**0.5**	**J**	**0.52**	**J**
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	**2.6**		25	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	2.5	U	25	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	10	U	2.5	U	500	U	**2.6**		25	U	2.5	U	2.5	U	2.5	U	2.5	U
Total VOC	NC	NC	µg/l	**45.4**	**J**	**953**		5	U	**73126**	**J**	**30.2**	**J**	**2602.6**	**J**	5	U	5	U	**117.62**	**J**	**117.68**	
Total CVOC	NC	NC	µg/l	**45.4**	**J**	**953**		2.5	U	**73060**	**J**	**0.32**	**J**	**2600.4**		2.5	U	2.5	U	**117.62**	**J**	**117.68**	
Total CBTEX	NC	NC	µg/l	2.5	U	2	U	2.5	U	**66**	**J**	**24.78**	**J**	**2.2**	**J**	2.5	U	2.5	U	2.5	U	2.5	U

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2024

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

			Location ID	RW-1D		RW-1S		RW-2D		RW-2S		RW-3S		RW-6D	
			Sample Date	09/16/2024		09/16/2024		09/13/2024		09/13/2024		09/18/2024		09/18/2024	
			Sample Type	N		N		N		N		N		N	
			Sample Depth (feet bgs)	32 - 57		10.5 - 16		27 - 42		10 - 15.5		9 - 13.5			
			Water Bearing Zone (WBZ)	Deep		Shallow		Deep		Shallow		Shallow		Deep	
			Operable Unit (OU)	OU-01		OU-01		OU-01		OU-01		OU-01		OU-01	
Analyte	1994 ROD RAOs	2023 Amended ROD SCGs for OU-01	Units												
1,1-Dichloroethane	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
1,1-Dichloroethene	5[a,b]	5[b]	µg/l	0.5	U	**0.43**	**J**	**27**		0.5	U	0.5	U	**11**	
1,2,4-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
1,2-Dichloroethane	0.6[a]	0.6	µg/l	0.5	U	0.5	U	**0.2**	**J**	0.5	U	0.5	U	2.5	U
1,2-Dichloroethene, cis-	5[a,b]	5[b]	µg/l	**2.8**		**120**		**6200**		**0.91**	**J**	2.5	U	**2700**	
1,2-Dichloroethene, trans-	5	5[b]	µg/l	2.5	U	**0.8**	**J**	**97**		2.5	U	2.5	U	**6.1**	**J**
1,2-Dichloroethene, Total	NC	NC	µg/l	**2.8**		**120**	**J**	**6300**		**0.91**	**J**	2.5	U	**2700**	**J**
1,3,5-Trimethylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
1,4-Dioxane	0.35[a,d]	0.35[d]	µg/l	250	U	250	U	250	U	250	U	250	U	1200	U
Acetone	50	50	µg/l	5	U	5	U	5	U	5	U	5	U	25	U
Benzene	1[a]	1	µg/l	0.5	U	0.5	U	**3**		0.5	U	0.5	U	**2**	**J**
Bromodichloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U
Bromoform	50[d]	50[d]	µg/l	2	U	2	U	2	U	2	U	2	U	10	U
Butylbenzene, n-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Butylbenzene, sec-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Butylbenzene, t-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**1.5**	**J**	12	U
Chlorobenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Chloroform	7[a]	7	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Dibromochloromethane	50[d]	50[d]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U
Ethylbenzene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Isopropylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	**3.2**		12	U
Methyl Ethyl Ketone	50[d]	50[d]	µg/l	5	U	5	U	5	U	5	U	5	U	25	U
Naphthalene	5[a,b]	NC	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
n-Propylbenzene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
p-Isopropyltoluene	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Tetrachloroethene	5[a,b]	5[b]	µg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.5	U
Toluene	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Trichloroethene	5	5[b]	µg/l	**2**		**28**		**66**		**5**		**0.49**	**J**	**94**	
Vinyl Chloride	5	2	µg/l	**2.2**		**20**		**1800**		1	U	1	U	**1500**	
Xylene, m- & p-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Xylene, o-	5[a,b]	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Xylenes, Total	5	5[b]	µg/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	12	U
Total VOC	NC	NC	µg/l	**7**		**169.23**	**J**	**8193.2**	**J**	**5.91**	**J**	**5.19**	**J**	**4313.1**	**J**
Total CVOC	NC	NC	µg/l	**7**		**169.23**	**J**	**8190**		**5.91**	**J**	**0.49**	**J**	**4311.1**	**J**
Total CBTEX	NC	NC	µg/l	2.5	U	2.5	U	**3**		2.5	U	**3.2**		**2**	**J**

Appendix B. Detected Volatile Organic Compounds in Groundwater - 2016-2024
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Notes:
[a] RAO not directly listed in 1994 ROD; obtained from most recent NYSDEC Ambient Groundwater Quality Standards listed in Table 1 of 6 NYCRR Part 703.5
[b] Listed as a principal organic contaminant in 6 NYCRR Part 703.5 Table 1 Ambient Water Quality Standards, which has a standard of 5 µg/L if compound not listed elsewhere in Table 1
[c] Supplemental Soil Cleanup Objective listed in Table 1 of CP-51 (NYSDEC 2010a); these are not promulgated standards
[d] Guidance value in TOGS 1.1.1, June 1998, April 2000. or February 2023 Addendum
[e] Per TOGS 1.1.1 (1998), not regulated by the Principal Organic Contaminant Groundwater Standard of 5 ug/L, and no standard or guidance value is available
[f] Applies to sum of cis- and trans- isomers
Bold indicates detection
Exceedances of NYSDEC Remedial Action Objectives (RAOs) set forth in the 1994 Record of Decision (ROD)
Additional exceedances when compared to the 2023 Amended ROD applicable Standards, Criteria, and Guidance (SCGs)
Total chlorinated volatile organic compounds includes detections from 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-dichloroethene, trichloroethene, tetrachloroethene, and vinyl chloride
Total volatile organic compounds are calculated using the sum of detections of individual compound. If all values are non-detect then the highest reporting limit is used.
--- - Result rejected following data validation
-- = not tested
µg/l = microgram(s) per liter
bgs = below ground surface
CBTEX = cumene, benzene, toluene, ethylbenzene, and xylenes
CVOC = chlorinated volatile organic compounds
D = Result from diluted analysis
FD = field duplicate
ID = identifier
J = estimated detection
N = normal sample
NC = no promulgated criteria or guidance value
NYSDEC GWQS = New York State Department of Environmental Conservation Ambient Groundwater Quality Standards and Guidance Values (TOGS 1.1.1)
TOGS = Technical and Operational Guidance Series
U = analyte not detected
UJ = analyte not detected (estimated)
VOC = volatile organic compounds

Appendix C.
Soil Vapor and Air Monitoring Plan Data 2017 - 2021

Appendix C. Soil Vapor and Air Monitoring Data - 2017 - 2018

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

Location ID			RES1[1]	JMF-01	JMF-01	JMF-02	JMF-03	JMF-04	HH-SS-01	HH-SS-02	HH-SS-03	HH-SS-04	HH-SS-04	HH-SS-05	HH-SS-06	HH-SS-07	WMS-SE-01
Sample Date			04/19/17	11/14/18	11/14/18	11/14/18	11/14/18	11/14/18	11/15/18	11/15/18	11/15/18	11/15/18	11/15/18	11/15/18	11/15/18	11/15/18	11/16/18
Sample Type			N	N	FD	N	N	N	N	N	N	N	FD	N	N	N	N
Operational Unit			OU-02	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
Sample Type			Indoor Air	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Storm Sewer
Analyte	**NY-IAC**	**Unit**															
1,1-Dichloroethene	0.2[a]	µg/m^3	--	1.97 U	1.95 U	1.71 U	1.82 U	1.80 U	1.77 U	1.73 U	1.71 U	1.93 U	1.90 U	1.78 U	3.53 U	1.68 U	26 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	**4.76**	**6.78**	**6.22**	**4.40**	**11.2**	**8.45**	**11.8**	**6.90**	**7.33**	**4.96**	**4.64**	**2.20**	**26.0**	**6.98**	4.8 U
1,2-Dichloroethene, trans-	--	µg/m^3	--	1.97 U	1.95 U	1.71 U	1.82 U	1.80 U	1.77 U	1.73 U	1.71 U	1.93 U	1.90 U	1.78 U	3.53 U	1.68 U	11 U
Tetrachloroethene	3[b]	µg/m^3	--	**10.4**	**9.90**	2.93 U	**8.68**	**14.9**	**24.4**	**43.5**	2.93 U	**102**	**101**	**31.3**	**9.90**	**4.58**	2.3 U
Trichloroethene	0.2[a]	µg/m^3	**46.4**	**17.8**	**17.5**	**13.0**	**23.1**	**21.5**	**33.0**	**16.7**	**23.1**	**14.5**	**14.0**	**17.0**	**1320**	**473**	3.5 U
Vinyl Chloride	0.2[c]	µg/m^3	--	1.27 U	1.26 U	1.10 U	1.17 U	1.16 U	1.14 U	1.12 U	1.10 U	1.24 U	1.23 U	1.15 U	2.28 U	1.08 U	30 U

Appendix C. Soil Vapor and Air Monitoring Data - 2017 - 2018

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	WMS-SE-02	WMS-SE-03	WMS-SE-04	WMS-SE-05	WMS-SE-06	SV-01	SV-02	SV-03	SV-04	SV-06	SV-05	SV-07	SV-07	SV-08	SV-09
		Sample Date	11/16/18	11/16/18	11/16/18	11/16/18	11/16/18	12/11/18	12/11/18	12/11/18	12/12/18	12/12/18	12/12/18	12/12/18	12/12/18	12/12/18	12/12/18
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N
		Operational Unit	OU-03	-	-	-	-	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
		Sample Type	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
Analyte	**NY-IAC**	**Unit**															
1,1-Dichloroethene	0.2[a]	µg/m^3	26 U	26 U	26 U	26 U	26 U	1.80 U	1.74 U	1.80 U	1.76 U	**2.53**	1.67 U	1.79 U	1.80 U	1.73 U	1.71 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	**140**	4.8 U	**25**	4.9 U	4.9 U	1.80 U	1.74 U	1.80 U	1.76 U	1.72 U	1.67 U	**5.71 J**	**3.68 J**	1.73 U	1.71 U
1,2-Dichloroethene, trans-	--	µg/m^3	11 U	11 U	12 U	12 U	12 U	1.80 U	1.74 U	1.80 U	1.76 U	1.72 U	1.67 U	1.79 U	1.80 U	1.73 U	1.71 U
Tetrachloroethene	3[b]	µg/m^3	**0.94 J**	2.4 U	2.4 U	2.4 U	2.4 U	**16.2**	**15.7**	**390**	3.01 U	**7.05**	**16.3**	3.07 UJ	**8.88 J**	2.96 U	**3.57**
Trichloroethene	0.2[a]	µg/m^3	**94**	3.5 U	**26**	3.6 U	3.6 U	**262**	2.35 U	2.45 U	**3.27**	**44.1**	2.26 U	**18.3 J**	**7.79 J**	**2.71**	**8.81**
Vinyl Chloride	0.2[c]	µg/m^3	30 U	31 U	31 U	31 U	31 U	1.16 U	1.12 U	1.16 U	1.13 U	1.11 U	1.08 U	**2.24 J**	1.16 UJ	1.12 U	1.10 U

Appendix C. Soil Vapor and Air Monitoring Data - 2017 - 2018

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	SV-10	SV-10	SV-11	SV-12	SV-13	SV-14	SV-15	SV-16
		Sample Date	12/13/18	12/13/18	12/12/18	12/12/18	12/12/18	12/13/18	12/13/18	12/13/18
		Sample Type	N	FD	N	N	N	N	N	N
		Operational Unit	OU-01	OU-01	OU-03	OU-03	OU-03	-	-	-
		Sample Type	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
Analyte	**NY-IAC**	**Unit**								
1,1-Dichloroethene	0.2[a]	µg/m^3	1.80 U	1.80 U	1.70 U	1.71 U	1.74 U	1.70 U	1.76 U	1.76 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	**4.76 J**	**8.76 J**	1.70 U	**1.72**	1.74 U	**2.27**	**2.20**	**2.67**
1,2-Dichloroethene, trans-	--	µg/m^3	1.80 U	1.80 U	1.70 U	1.71 U	1.74 U	1.70 U	1.76 U	1.76 U
Tetrachloroethene	3[b]	µg/m^3	3.08 UJ	**35.3 J**	2.92 U	2.93 U	2.97 U	2.91 U	3.01 U	**6.63**
Trichloroethene	0.2[a]	µg/m^3	**5.75 J**	**10.5 J**	**4.77**	**6.45**	2.35 U	**4.74**	2.39 U	**111**
Vinyl Chloride	0.2[c]	µg/m^3	**3.02 J**	**6.03 J**	1.10 U	1.10 U	1.12 U	1.10 U	1.13 U	1.13 U

Appendix C. Soil Vapor and Air Monitoring Data - 2019

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	JMF-01	JMF-01	JMF-02	JMF-03	JMF-04	SV-01	SV-02	SV-03	SV-04	SV-05	SV-06	SV-07	SV-07	SV-08	SV-09
		Sample Date	11/19/19	11/19/19	11/19/19	11/19/19	11/19/19	11/19/19	11/19/19	11/20/19	11/21/19	11/20/19	11/20/19	11/21/19	11/21/19	11/20/19	11/20/19
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	FD	N	N
		Operational Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
		Sample Type	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
Analyte	**NY-IAC**	**Unit**															
1,1-Dichloroethene	0.2[a]	µg/m^3	1.62 U	1.64 U	1.89 U	1.95 U	1.86 U	1.60 U	1.61 U	1.61 U	1.61 U	1.66 U	1.62 U	1.85 U	1.70 U	1.61 U	1.77 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	**3.50**	**3.19**	**3.58**	**4.36**	**5.00**	1.60 U	1.61 U	**4.60**	1.61 U	**2.11**	1.62 U	**2.63**	**2.00**	1.61 U	1.77 U
1,2-Dichloroethene, trans-	--	µg/m^3	1.62 U	1.64 U	1.89 U	1.95 U	1.86 U	1.60 U	1.61 U	1.61 U	1.61 U	1.66 U	1.62 U	1.85 U	1.70 U	1.61 U	1.77 U
Tetrachloroethene	3[b]	µg/m^3	**4.76**	**5.02**	**10.2**	**6.24**	**6.85**	**18.3**	**16.5**	**391**	2.76 U	**11.2**	**6.41**	3.16 U	2.90 U	2.76 U	**4.47**
Trichloroethene	0.2[a]	µg/m^3	**49.4 J**	**27.0 J**	**17.1**	**20.9**	**15.8**	**399**	**3.00**	**12.4**	**5.12**	**6.40**	**9.57**	**8.60**	**7.26**	**9.67**	**5.07**
Vinyl Chloride	0.2[c]	µg/m^3	1.04 U	1.06 U	1.22 U	1.26 U	1.20 U	1.03 U	1.04 U	1.04 U	1.04 U	1.07 U	1.04 U	**1.61**	1.09 U	1.04 U	1.14 U

Appendix C. Soil Vapor and Air Monitoring Data - 2019

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	SV-10	SV-10	SV-11	SV-12	SV-14	SV-15	SV-16	WMS-SE-01	WMS-SE-02	WMS-SE-03	WMS-SE-04	WMS-SE-05	WMS-SE-06	WMS-SE-06
		Sample Date	11/20/19	11/20/19	11/20/19	11/20/19	11/21/19	11/21/19	11/21/19	11/22/19	11/22/19	11/22/19	11/22/19	11/22/19	11/22/19	11/22/19
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	N	FD
		Operational Unit	OU-01	OU-01	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	-	-	-	-	-
		Sample Type	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer	Storm Sewer
Analyte	**NY-IAC**	**Unit**														
1,1-Dichloroethene	0.2[a]	µg/m^3	1.83 U	1.76 U	1.76 U	1.76 U	1.78 U	1.82 U	1.76 U	27 U	27 U	27 U	27 U	27 U	27 U	27 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	**4.44**	**3.54**	1.76 U	1.76 U	1.78 U	1.82 U	1.76 U	5.0 U	**35**	5.0 U	**8.7**	5.0 U	5.0 U	5.0 U
1,2-Dichloroethene, trans-	--	µg/m^3	1.83 U	1.76 U	1.76 U	1.76 U	1.78 U	1.82 U	1.76 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Tetrachloroethene	3[b]	µg/m^3	3.13 U	3.01 U	3.01 U	3.02 U	3.04 U	3.11 U	**7.73**	**0.54 J**	**0.80 J**	**0.33 J**	**0.46 J**	**0.41 J**	**1.3 J**	2.4 U
Trichloroethene	0.2[a]	µg/m^3	**13.1**	**11.0**	**8.87**	**22.0**	**3.61**	2.47 U	**169**	3.6 U	**150**	3.7 U	**34**	3.6 U	**1.6 J**	**1.8 J**
Vinyl Chloride	0.2[c]	µg/m^3	**2.06**	**1.77**	1.13 U	1.14 U	1.15 U	1.17 U	1.14 U	32 U	32 U	32 U	32 U	32 U	32 U	**32 U**

Appendix C. Soil Vapor and Air Monitoring Data - 2021

2025 Remedial Investigation Work Plan

Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	HH-SS-01	HH-SS-02	HH-SS-03	HH-SS-04	HH-SS-05	HH-SS-05	HH-SS-06	HH-SS-07	HH-IA-01	HH-IA-01	HH-IA-02	HH-IA-03	HH-IA-04
		Sample Date	02/24/21	02/24/21	02/24/21	02/24/21	02/24/21	02/24/21	02/24/21	02/24/21	02/25/21	02/25/21	02/25/21	02/25/21	02/25/21
		Sample Type	N	N	N	N	N	FD	N	N	N	FD	N	N	N
		Operational Unit	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03	OU-03
		Sample Type	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Subslab Vapor	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air
Analyte	**NY-IAC**	**Unit**													
1,1-Dichloroethene	0.2[a]	µg/m^3	1.6 UJ	2.06 U	2.05 U	1.97 U	1.59 U	2.03 U	3.22 U	1.6 U	0.079 U	0.079 U	**0.23**	**0.087**	0.079 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	1.6 UJ	2.06 U	2.05 U	1.97 U	1.59 U	2.03 U	**73**	**4.24**	--	--	--	--	--
1,2-Dichloroethene, trans-	--	µg/m^3	1.6 UJ	2.06 U	2.05 U	1.97 U	1.59 U	2.03 U	**3.65**	1.6 U	0.079 U	0.079 U	0.079 U	0.079 U	0.079 U
Tetrachloroethene	3[b]	µg/m^3	**21.5 J**	**18.6**	3.5 U	**73.9**	**3.21**	3.47 U	**19.2**	2.73 U	**0.244**	**0.231**	**0.454**	**0.278**	**0.292**
Trichloroethene	0.2[a]	µg/m^3	**3.79 J**	2.79 U	2.77 U	2.67 U	**8.38**	**10**	**1540**	**354**	--	--	--	--	--
Vinyl Chloride	0.2[c]	µg/m^3	1.03 UJ	1.33 U	1.32 U	**2.94**	**1.81**	1.31 U	2.07 U	1.03 U	0.051 U	0.051 U	0.051 U	0.051 U	0.051 U

Appendix C. Soil Vapor and Air Monitoring Data - 2021

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Essex-Hope Site, Jamestown, New York, OU-03

		Location ID	HH-IA-05	HH-IA-06	HH-OA-01	HH-OA-02
		Sample Date	02/25/21	02/25/21	02/25/21	02/25/21
		Sample Type	N	N	N	N
		Operational Unit	OU-03	OU-03	OU-03	OU-03
		Sample Type	Indoor Air	Indoor Air	Outdoor Air	Outdoor Air
Analyte	NY-IAC	Unit				
1,1-Dichloroethene	0.2[a]	µg/m^3	**0.083**	**0.083**	0.079 U	0.079 U
1,2-Dichloroethene, cis-	0.2[a]	µg/m^3	--	--	--	--
1,2-Dichloroethene, trans-	--	µg/m^3	0.079 U	0.079 U	0.079 U	0.079 U
Tetrachloroethene	3[b]	µg/m^3	**0.292**	**0.332**	0.136 U	0.136 U
Trichloroethene	0.2[a]	µg/m^3	--	--	--	--
Vinyl Chloride	0.2[c]	µg/m^3	**0.051**	**0.054**	0.051 U	0.051 U

Appendix C. Soil Vapor and Air Monitoring Data - 2017 - 2021
2025 Remedial Investigation Work Plan
Essex-Hope Site, Jamestown, New York, OU-03

Notes:
[a] NY-IAC-A: NYSDOH Matrix A Indoor Air Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, updated May 2017.
[b] NY-IAC-B: NYSDOH Matrix B Indoor Air Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, updated May 2017.
[c] NY-IAC-C: NYSDOH Matrix C Indoor Air Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, updated May 2017.
[1]Offsite residential indoor air sample, residential structure has since been demolished.
µg/m^3 = microgram(s) per cubic meter
Bold indicates detection.
FD = field duplicate
ID = identifier
J = estimated detection
N = normal sample
NYSDOH = New York State Department of Health
U = analyte not detected
- = Sample location is outside of the proposed OU-03 investigation boundary
-- = no value available

Appendix D. Membrane Interface Probe Interpretation

Table D-1. Summary of Geology and Hydrogeology from MIP-HPT Investigation

Pre-Design Investigation Report

Essex-Hope Site, Jamestown, New York

	Shallow Water Bearing Zone (Sand and Gravel)							Shallow Silty Clay						Deep Water Bearing Zone (Sandy Silt)						Deep Silty Clay				
	Depth to Saturation	Bottom of Unit	Saturated	Hydraulic Conductivity (ft/day)				Bottom of Unit	Thickness	Hydraulic Conductivity (ft/day)				Bottom of Unit	Thickness	Hydraulic Conductivity (ft/day)				Thickness	Hydraulic Conductivity (ft/day)			
	(ft bgs)	(ft bgs)	Thickness (ft)	Average	Median	Minimum	Maximum	(ft bgs)	(ft)	Average	Median	Minimum	Maximum	(ft bgs)	(ft)	Average	Median	Minimum	Maximum	(ft)	Average	Median	Minimum	Maximum
MIP-16	9.6	13.6	4.0	76	76	10	130	26.7	13.1	0.4	0.1	0.1	40	45.5	18.9	10	4	0.1	40	>1.1	N/A	N/A	N/A	N/A
MIP-17	10.4	25.7	15.3	85	86	0.1	140	28.2	2.5	0.4	0.1	0.1	12	44.8	16.7	10	4	0.1	34	>1.8	0.1	0.1	0.1	0.1
MIP-19	11.5	15.1	3.55	83	92	18	150	25	10.2	0.1	0.1	0.1	0.1	>44.95	>19.8	6.9	1.9	0.1	34	N/A	N/A	N/A	N/A	N/A
MIP-20	9.5	16.8	7.3	125	150	18	150	26	9	0.1	0.1	0.1	0.1	44.1	18.4	10	10	0.1	39	>2.2	0.1	0.1	0.1	0.2
MIP-21	9.4	13.2	3.8	102	100	0.1	150	22	8.9	0.2	0.1	0.1	7.3	42.1	20.1	26	28	0.1	52	>4.2	0.8	0.1	0.1	17.0
MIP-22	8.8	16.9	8.1	101	135	0.1	150	22	5.1	0.2	0.1	0.1	9.8	44.2	22.3	23	23	0.1	55	>2.3	0.6	0.1	0.1	4.9
MIP-23	11.3	19.5	8.3	78	81	2.3	130	23	3.3	0.4	0.1	0.1	8.6	>46.6	>23.7	20	20	0.1	46	N/A	N/A	N/A	N/A	N/A
MIP-24	11.0	12.3	1.4	68	73	7.6	86	20	8.2	0.3	0.1	0.1	7.4	42.9	22.5	17	14	0.1	44	>3.4	0.1	0.1	0.1	0.1
MIP-25	9.9	12.3	2.4	78	88	0.1	110	26	13.3	0.2	0.1	0.1	18	44.1	18.6	25	26	0.1	49	>1.4	1.1	0.1	0.1	19
MIP-26	9.3	16.9	7.6	84	79	0.1	150	24	7.4	0.2	0.1	0.1	3.1	43.1	18.8	26	28	0.1	53	>5	0.1	0.1	0.1	0.1
MIP-27	11.2	21.0	9.8	74	76	2.0	100	24	2.8	0.5	0.1	0.1	5.9	44.1	20.3	23	24	0.1	50	>2.4	0.1	0.1	0.1	0.1
MIP-30	10.0	16.1	6.2	117	110	9.3	150	22	5.5	0.3	0.1	0.1	5.0	43.5	21.9	18	16	0.1	48	>4.2	0.1	0.1	0.1	0.1
MIP-31	N/A	12.0	N/A	N/A	N/A	N/A	N/A	28.5	16.5	N/A	N/A	N/A	N/A	45.0	16.5	N/A	N/A	N/A	N/A	>1.3	N/A	N/A	N/A	N/A
MIP-35	8.7	15.4	6.7	77	77	5.5	150	15	0.1	0.1	0.1	0.1	0.1	39.1	23.7	21	23	0.1	53	>7.3	1.3	0.1	0.1	31
MIP-36	9.9	14.3	4.5	61	65	2.7	76	18	4.6	1.3	0.1	0.1	15.0	39.6	20.7	18	16	0.1	48	>7	0.7	0.1	0.1	19

ft feet
bgs below ground surface
HPT hydraulic profiling tool
MIP membrane interface probe
N/A not available

Table D-2. Summary of XSD and ECD Responses from MIP-HPT Investigation

Pre-Design Investigation Report

Essex-Hope Site, Jamestown, New York

	Shallow Sand and Gravel				Shallow Silty Clay				Deep Silty Sand				Deep Silty Sand			
XSD (uV)	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum
MIP-16	37,962	38,301	35,936	39,445	40,673	38,987	37,385	92,318	49,006	35,859	31,281	145,726	N/A	N/A	N/A	N/A
MIP-17	30,375	30,213	29,679	36,012	145,368	109,180	35,096	353,175	966,335	413,984	103,763	3,978,088	112,251	112,156	110,630	114,444
MIP-19	40,015	39,598	38,530	46,236	44,975	44,633	41,658	59,358	39,623	39,216	36,775	46,083	N/A	N/A	N/A	N/A
MIP-20	21,956	21,897	21,363	22,965	24,320	24,110	22,660	27,543	520,252	202,185	27,314	3,709,525	69,763	64,852	63,326	83,163
MIP-21	30,282	29,679	28,077	35,020	43,094	34,028	29,145	112,308	472,735	429,548	101,474	2,281,258	76,229	70,193	56,459	132,756
MIP-22	31,600	30,671	30,213	59,893	33,145	31,816	30,671	41,658	443,796	183,111	30,747	4,261,910	47,542	47,686	45,015	50,356
MIP-23	29,564	29,756	28,382	38,606	35,035	34,944	32,731	41,887	216,283	130,849	30,595	1,517,533	N/A	N/A	N/A	N/A
MIP-24	26,834	26,627	26,322	29,374	28,598	28,611	27,543	31,816	139,618	63,326	27,467	1,550,340	29,546	29,756	27,467	32,044
MIP-25	36,039	36,012	35,707	38,682	35,515	35,707	33,494	37,919	34,717	34,562	33,113	36,851	34,726	34,791	34,181	35,020
MIP-26	63,438	63,097	62,105	70,040	64,634	63,860	61,571	71,108	105,599	56,841	46,541	632,725	46,959	47,304	41,200	50,356
MIP-27	37,575	37,767	35,554	40,819	46,353	46,541	35,936	59,893	66,414	38,530	32,121	453,429	34,391	33,990	33,723	35,859
MIP-30	39,019	38,987	37,233	40,590	39,830	39,598	37,385	43,641	41,025	40,819	37,538	60,427	39,223	38,606	37,690	43,641
MIP-31	34,589	34,791	32,960	35,707	34,784	34,791	33,494	36,164	34,966	34,906	33,952	36,164	35,459	35,478	35,325	35,554
MIP-35	50,671	50,584	49,440	58,519	58,863	58,863	58,519	59,206	104,778	93,921	57,985	411,466	68,363	67,484	63,097	87,970
MIP-36	112,913	50,546	37,614	599,231	3,636,226	3,856,777	623,417	5,111,850	2,516,075	3,328,044	133,518	5,189,672	141,673	137,333	130,467	162,511

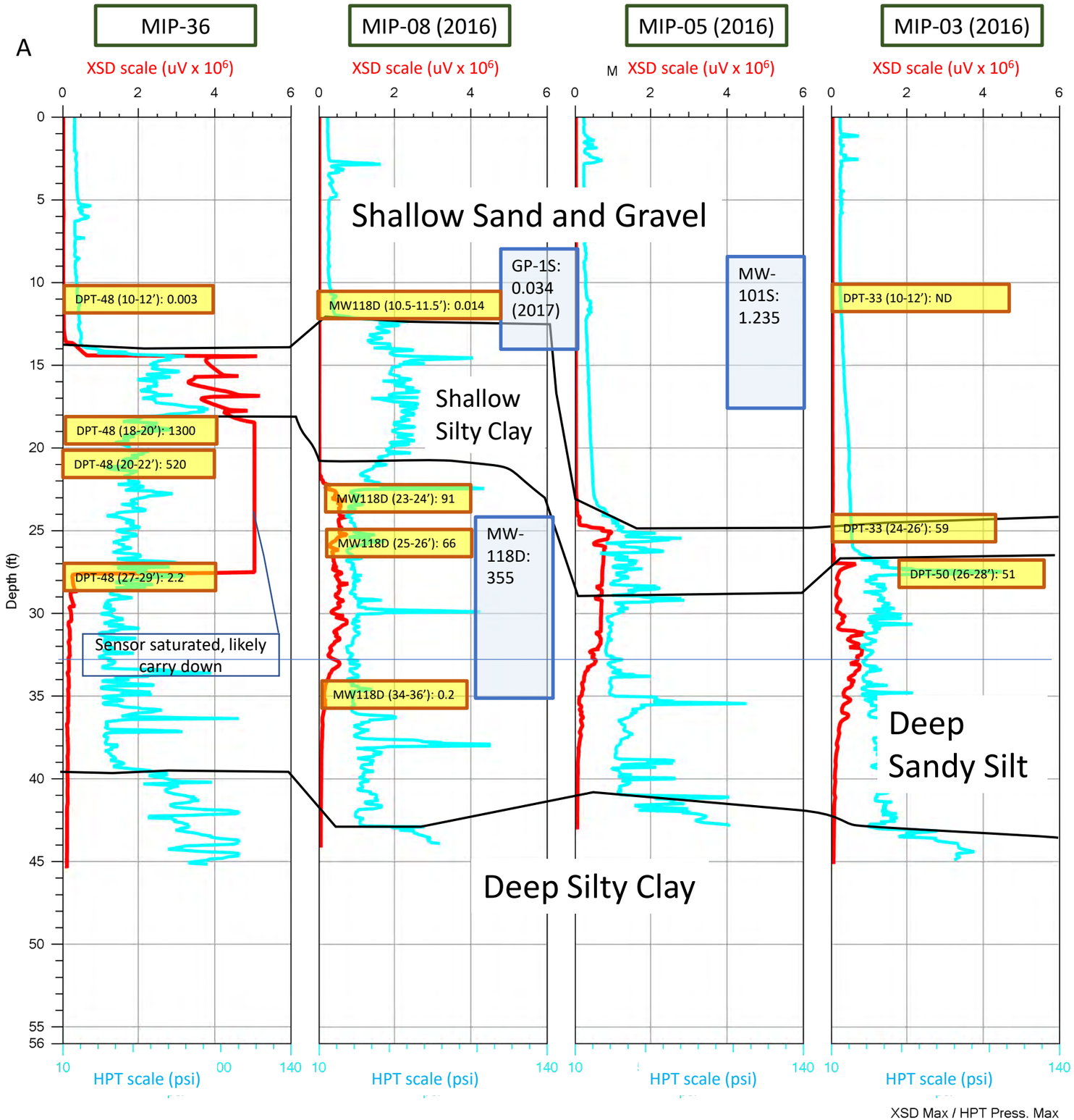
XSD - Halogen Specific Detector - oxidizes halogen compounds and liberates chlorines; independent of type of molecule

- Shading indicates a uV response greater than 200,000 uV

	Shallow Sand and Gravel				Shallow Silty Clay				Deep Sandy Silt				Deep Silty Clay			
ECD (uV)	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum
MIP-16	1,283,390	1,281,777	1,259,804	1,346,477	1,352,734	1,350,139	1,297,647	1,633,351	1,404,315	1,412,397	1,319,620	1,485,641	N/A	N/A	N/A	N/A
MIP-17	593,777	599,384	559,099	727,561	6,227,296	4,189,581	665,304	13,701,590	13,713,654	13,715,018	13,697,927	13,727,225	13,724,174	13,723,563	13,723,563	13,726,005
MIP-19	848,225	806,909	747,093	1,503,952	1,138,957	1,125,523	883,816	2,176,580	854,592	847,194	783,715	1,065,706	N/A	N/A	N/A	N/A
MIP-20	300,252	286,874	267,342	458,998	316,728	295,419	275,887	473,647	10,868,880	13,722,342	286,874	13,763,847	4,027,680	3,525,499	3,411,970	5,484,786
MIP-21	573,383	596,942	373,547	789,819	746,469	511,490	384,533	5,222,327	12,431,874	13,705,253	2,370,678	13,712,577	3,637,999	3,449,812	2,600,177	7,026,582
MIP-22	344,113	300,302	294,198	1,632,130	437,315	389,416	334,483	755,638	8,448,202	13,713,798	332,041	13,721,122	1,609,470	1,597,950	1,557,665	1,718,802
MIP-23	453,755	450,453	424,818	990,020	719,109	705,588	587,176	1,079,134	4,938,551	2,542,802	471,206	13,675,955	N/A	N/A	N/A	N/A
MIP-24	337,665	322,275	316,172	477,310	395,138	396,741	329,600	595,721	4,418,719	1,413,617	328,379	13,689,383	490,463	488,907	471,206	538,346
MIP-25	570,315	559,099	552,995	911,893	646,490	631,123	615,253	817,896	676,741	672,628	648,213	739,769	668,538	667,745	665,304	676,290
MIP-26	64,849	61,037	57,985	93,463	69,662	66,874	59,893	96,286	53,936	51,576	47,456	78,280	47,008	47,075	46,388	48,067
MIP-27	517,867	494,400	458,998	935,087	1,494,077	1,615,650	827,662	2,253,487	1,393,980	611,591	554,216	12,740,868	558,306	557,878	555,437	561,541
MIP-30	346,651	318,613	299,081	629,902	504,576	495,011	329,600	719,016	414,197	366,222	321,055	1,340,373	370,015	366,222	352,794	430,921
MIP-31	1,000,192	1,092,563	598,163	1,289,102	644,553	646,992	609,149	668,966	643,489	642,109	625,019	668,966	626,240	626,240	623,798	628,681
MIP-35	1,981,890	1,917,783	1,893,368	3,328,959	2,888,272	2,888,272	2,850,429	2,926,115	4,319,767	2,757,652	2,181,463	13,837,092	2,184,836	2,122,868	1,978,820	2,733,238
MIP-36	2,120,738	286,874	281,991	13,685,720	13,689,798	13,689,383	13,684,500	13,699,148	13,727,108	13,728,446	13,695,486	13,750,420	13,752,436	13,752,861	13,746,758	13,757,744

ECD - Electron Capture Detector - identifies chlorinated hydrocarbons; more sensitive than XSD, preferentially more sensitive to more highly chlorinated compounds (PCE and TCE); has smaller range than XSD (can saturate more easily); has more difficulty identifying daughter compounds than XSD

N/A - not applicable (no data)



Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

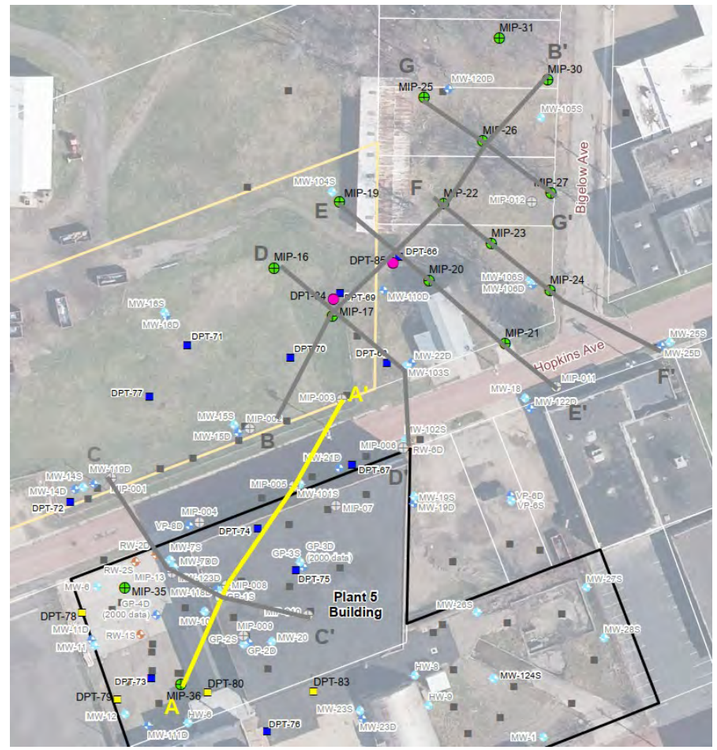


Figure D-1
MIP Cross-Section – A-A'
2022 Pre-design Investigation Report
Jamestown, New York

Jacobs

B

MIP-17 | MIP-20 | MIP-22 | MIP-26 | MIP-30

B'

XSD scale (uV x 10^6)

Depth (ft)

Shallow Sand and Gravel

Shallow Silty Clay

Deep Sandy Silt

Deep Silty Clay

DPT-69 (5-6'): ND

DPT-69 (22-23'): ND

DPT-69 (28-29'): 273

DPT-69 (31-32'): 18

DPT-69 (38-39'): ND

DPT-69 (42.5-43.5'): ND

DPT-84 (29-32'): 421

DPT-66 (2-3'): ND

DPT-66 (22-23'): ND

DPT-66 (29-30'): 285

DPT-66 (33-34'): 343

DPT-66 (35-36'): 12

DPT-66 (47-48'): 0.001

MW-110D: 177

DPT-85 (32-35'): 290

HPT scale (psi)

XSD Max / HPT Press. Max

Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

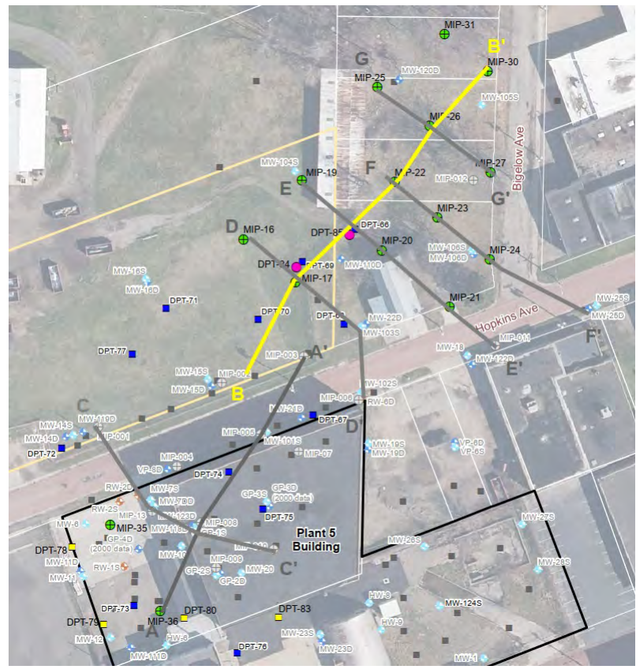


Figure D-2
Plume Axis MIP Cross-Section – B-B'
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs

C

C’

MIP-01 (2016)

MIP-13 (2016)

MIP-08 (2016)

MIP-10 (2016)

XSD scale (uV x 10^6)

HPT scale (psi)

Depth (ft)

Shallow Sand and Gravel

Shallow Silty Clay

Deep Sandy Silt

Deep Silty Clay

DPT-28 (9-11’): ND

DPT-28 (11-13’): ND

DPT-28 (14-16’): ND

MW-14S: 0.016 (2017)

MW-119D: 4.6

DPT-07 (18-19’): 0.842

DPT-07 (22-23’): 360

MW-123D: 156.3 (2020)

DPT-07 (33-34’): 51

DPT-07 (34-36’): 87

MW118D (10.5-11.5’): 0.014

GP-1S: 0.034 (2017)

MW118D (23-24’): 91

MW118D (25-26’): 66

MW-118D: 355

MW118D (34-36’): 0.2

MW-20: 0.0007

DPT-50 (10-12’): 0.0005

DPT-50 (18-20’): 0.0008

DPT-50 (22-24’): 19

DPT-50 (27-28’): 5.5

XSD Max / HPT Press. Max

Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

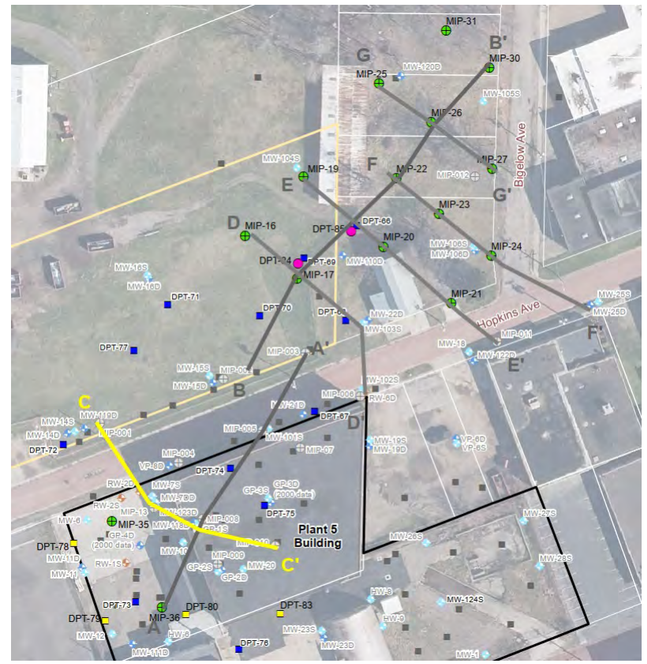


Figure D-3
MIP Cross-Section C-C’
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs

D

D’

MIP-16

MIP-17

MIP-06

XSD scale (uV x 10^6)

XSD scale (uV x 10^6)

XSD scale (uV x 10^6)

0 2 4 6

0 2 4 6

0 2 4 6

Shallow Sand and Gravel

Shallow Silty Clay

Deep Sandy Silt

Deep Silty Clay

Depth (ft)

0 5 10 15 20 25 30 35 40 45 50 55 56

DPT-68 (2-3’): ND

DPT-69 (5-6’): ND

DPT-69 (22-23’): ND

DPT-69 (28-29’): 273

DPT-84 (29-32’): 421

DPT-69 (31-32’): 18

DPT-69 (38-39’): ND

DPT-69 (42.5-43.5’): ND

MW-103S: 0.343

DPT-69 (28-29’): 9.6

DPT-69 (32-33’): 10

DPT-69 (35-36’): 0.011

DPT-69 (39-40’): ND

MW-22D: 1.167 (2020)

MW-102S: 0.222

RW-6D: 25

10 50 100 140

HPT scale (psi)

10 50 100 140

HPT scale (psi)

HPT scale (psi)

10 50 100 140

psi

XSD Max / HPT Press. Max

Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

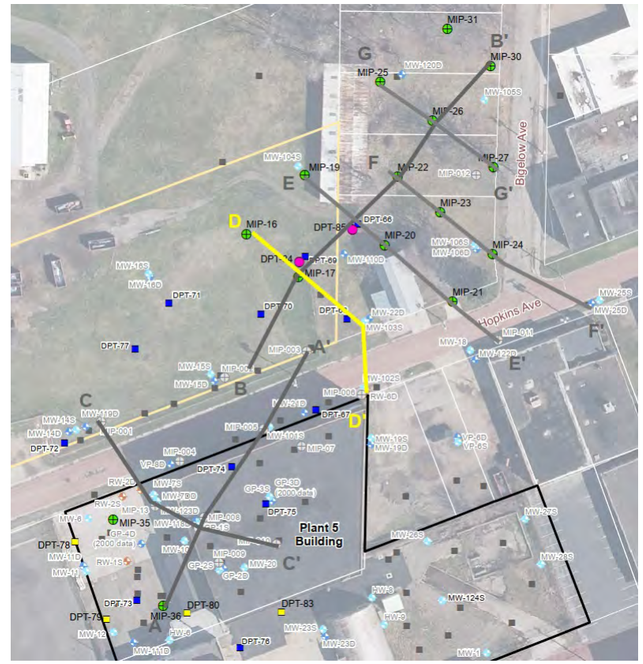


Figure D-4
MIP Cross-Section D-D’
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs

E

MIP-19

MIP-20

MIP-21

MIP-11 (2016)

E’

XSD scale (uV x 10^6)

XSD scale (uV x 10^6)

XSD scale (uV x 10^6)

XSD scale (uV x 10^6)

Depth (ft)

Shallow Sand and Gravel

Shallow Silty Clay

Deep Sandy Silt

Deep Silty Clay

MW-104S: 0.064

DPT-66 (2-3’): ND

DPT-66 (22-23’): ND

DPT-66 (29-30’): 285

DPT-66 (33-34’): 343

DPT-66 (35-36’): 12

DPT-66 (47-48’): 0.001

MW-110D: 177

DPT-85 (32-35’): 290

MW-18: 0.048

MW-122D: 0.631

HPT scale (psi)

HPT scale (psi)

HPT scale (psi)

psi

XSD Max / HPT Press. Max

Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

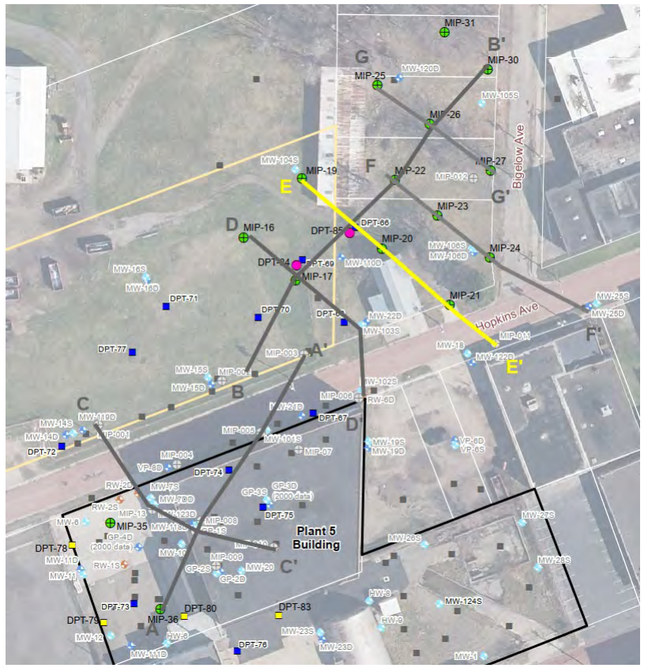
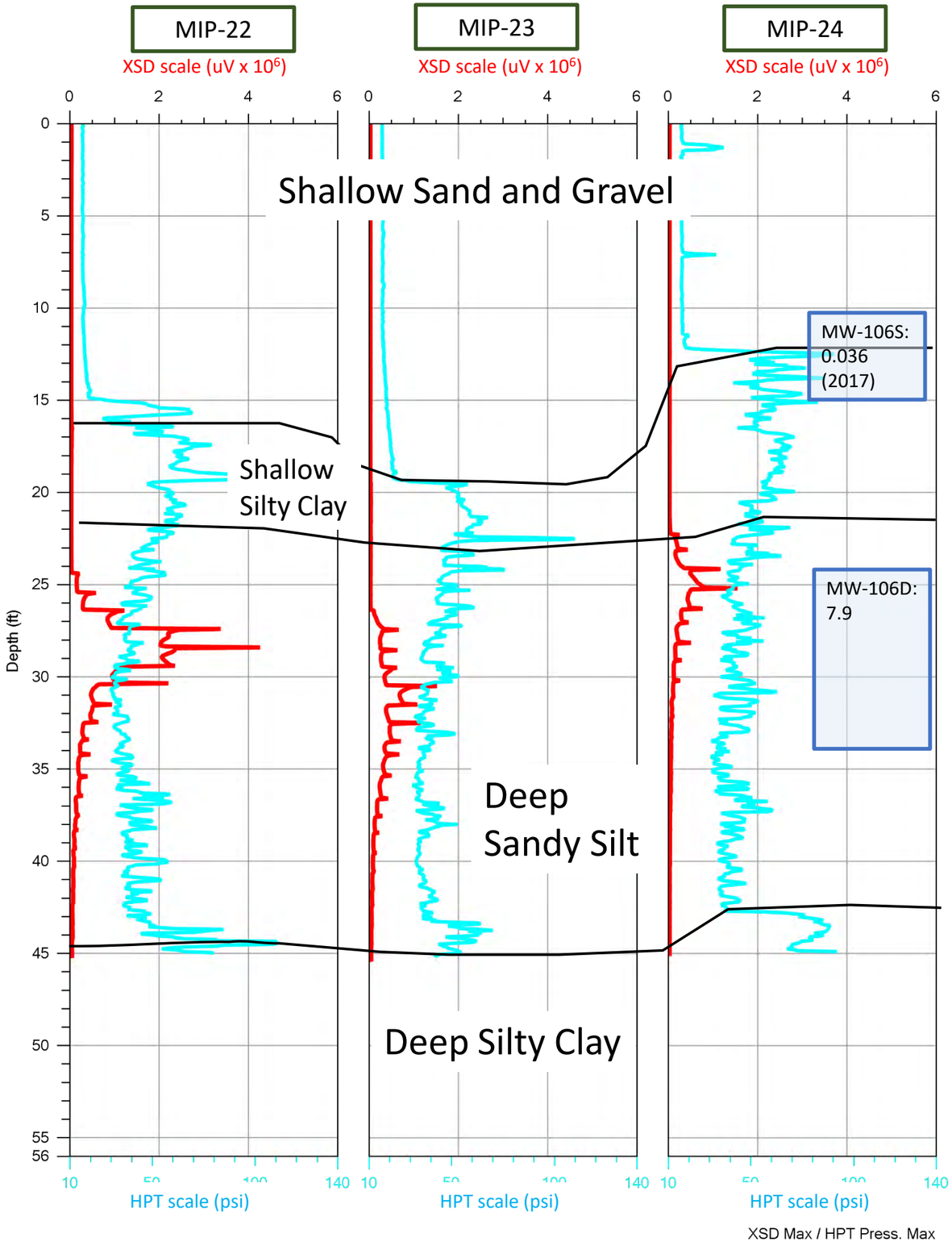


Figure D-5
MIP Cross-Section E-E’
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs

F



South of Hopkins

F'

MW-25S:
0.085

MW-25D:
<0.003

Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

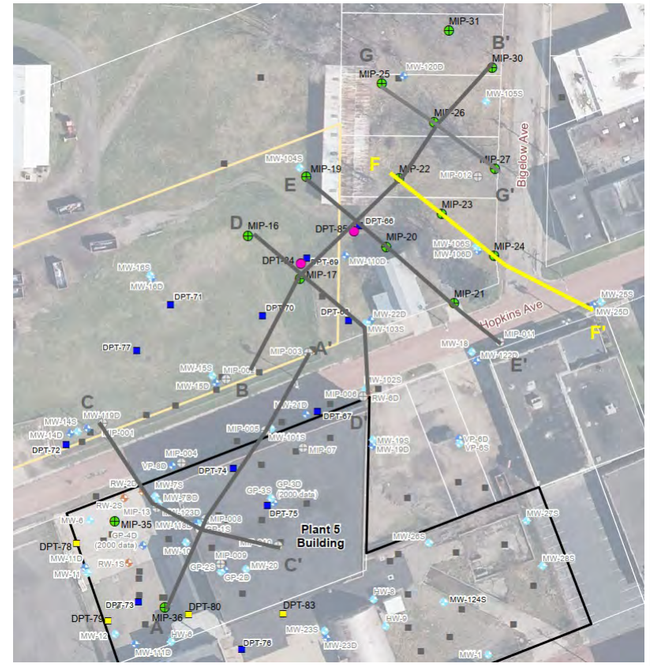
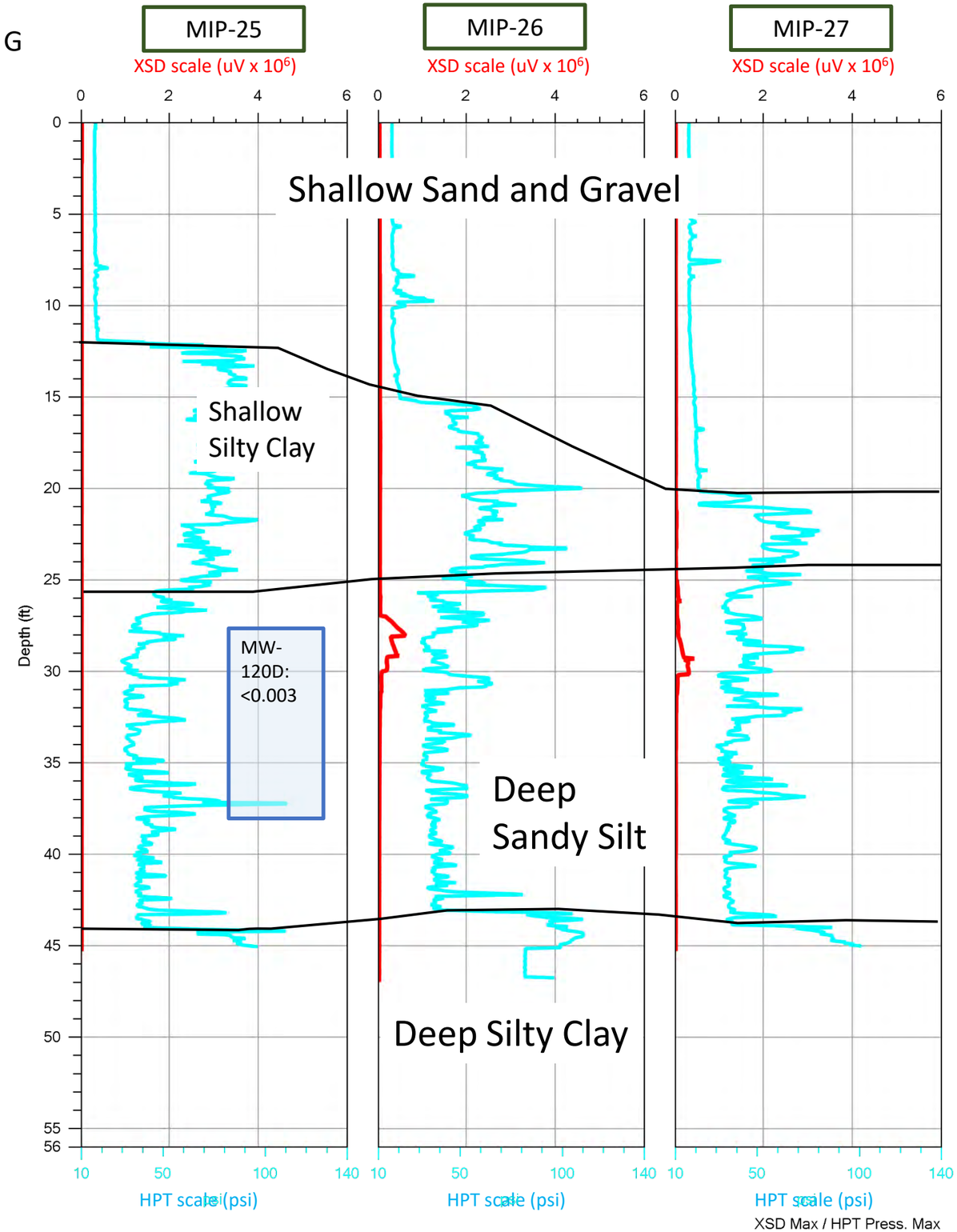


Figure D-6
MIP Cross-Section F-F'
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs



Legend

Blue Text Boxes:
Groundwater total chlorinated VOC concentrations in milligrams/Liter (2022 unless otherwise noted)
Text boxes extend across screened interval

Yellow Text Boxes:
Soil total chlorinated VOC concentration in milligrams/kilogram
Text boxes extend across sampled interval

Red lines = XSD maximum response (uV)
Blue lines = HPT max pressure (psi)

Black lines indicate contact between geologic units

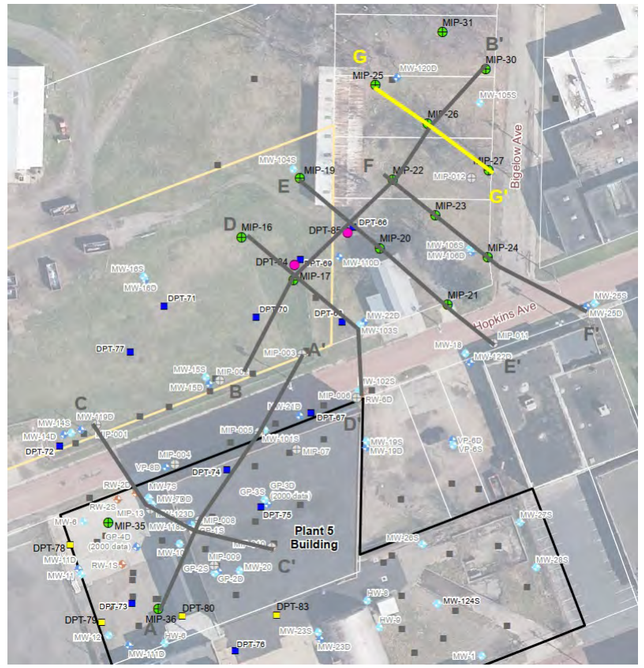


Figure D-7
MIP Cross-Section G-G'
2022 Pre-Design Investigation Report
Jamestown, New York

Jacobs

Appendix E.
NYSDEC SPILLS Database Search

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

ACTION MEMORANDUM RV2

DATE: 4/24/23

SUBJECT: Request for a Ceiling Increase, 12-month exemption, and $2 million exemption at the Allen Street Development Superfund Site, Town of Jamestown, Chautauqua County, New York

FROM: Terry Kish, On-Scene Coordinator
Removal Action Branch

Digitally signed by Terry Kish
Date: 2023.04 21 09 31:18 -04'00'

THRU: Joseph D. Rotola, Chief Removal Action Branch

Rotola, Joe

Digitally signed by Rotola, Joe
Date: 2023.04 24 06 59:54 -04'00'

Pat Evangelista, Director
TO: Superfund and Emergency Management Division

Site ID#: A2AG

I. PURPOSE

The purpose of this Action Memorandum is to request a ceiling increase, a $2 million exemption, and a 12–month exemption for additional removal activities (RV2) at the Allen Street Development Superfund Site (Site), located at 1061-1071 Allen Street, Town of Jamestown, Chautauqua County, New York, under the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§9601-9675 (CERCLA), also known as the Superfund law. The objective of the RV2 removal activities is to address the threat posed to the public by the release of friable asbestos and other hazardous substances that was caused by a catastrophic fire at the Site on November 16, 2022. A $250,000 verbal authorization of funding, of which $200,000 was for mitigation contracting, was granted by the Director of the Superfund and Emergency Management Division (SEMD) on November 18, 2022, for emergency removal activities (RV1) at this Site, and is memorialized in an Action Memorandum dated January 6, 2023. The total funding increase requested in this Action Memorandum is $3,000,000, of which, $2,300,000 is from the Regional Removal Advice of Allowance for mitigation contracting. If approved, the new total project ceiling will be increased to $3,250,000, of which $2,500,000 is for mitigation contracting.

Conditions at the Site continue to meet the criteria for removal action under CERCLA and Section 300.415(b) of the National Contingency Plan (NCP), 40 C.F.R 300.415(b).

The Site is not on the National Priorities List (NPL) and there are no nationally significant or precedent-setting issues associated with the removal activities. EPA Headquarters was consulted on this Action Memorandum because the ceiling increase request is greater than $2 million.

II. SITE CONDITIONS AND BACKGROUND

The Superfund Enterprise Management System identification number for the Site is NYN000204315. This removal action is considered time-critical.

A. Site Description

1. Removal Site Evaluation (RSE)

The Allen Street Development Superfund Site includes the location of a former furniture manufacturing facility previously operated by the Crawford Furniture Company (Crawford) which filed for Chapter 11 bankruptcy in March 2012. As part of the bankruptcy proceedings, Crawford's assets, including the property located at 1061-71 Allen Street, Jamestown, New York (Property) as well as the contents within the Property, were liquidated via auction. The Property, which contained raw materials for the manufacture of furniture including drums of coatings, finishes and solvents, was acquired by Allen Street Development, LLC (Property Owner).

Based on vandalism, deterioration of on-Site structures, ease of access to interior spaces, and use by trespassers and squatters, the City expressed concerns to the Property Owner throughout 2021 and 2022. In April 2021, the Jamestown Department of Development issued a Notice to Vacate Order for the Property. On June 8, 2021, after the City of Jamestown and its environmental consultant discussed the potential cleanup of the Site with the EPA Region 2 Brownfields Program, the City subsequently requested that the EPA Removal Program evaluate the Site for a potential CERCLA removal action. This referral is included as Attachment 1.

EPA conducted an RSE of the Site commencing with the review of information provided by the City of Jamestown. On June 18, 2021, EPA conducted a Site visit and observed numerous 55-gallon drums, discarded automotive and airplane batteries, high-pressure cylinders, paints and adhesives, containers labeled "hazardous waste," potential asbestos-containing pipe wrap, unknown liquids in vials, propane tanks, and used hydraulic oils. Portions of the facility were collapsing due to years of neglect and the first two floors of the structure were densely packed with airplane parts such as first-class seats, galley carts, kitchen components, engine covers, nose cones, restrooms, wing covers and overhead bins. Other floors within the structure contained raw materials and partially

processed wood furniture components from former operations at the Site involving the manufacture and distribution of wood furniture, including tables, bed frames, headboards and dressers. During the inspection, a representative of the Property Owner agreed to initiate efforts for the removal of waste and management of debris.

On December 20, 2021, EPA notified the Property Owner of its status as a potentially responsible party (PRP) for the Site. EPA requested a response regarding the Property Owner's willingness and capability to perform removal activities at the Site. EPA received a verbal response from the Property Owner on January 10, 2022, indicating a willingness to address on-Site containers.

On January 20, 2022, EPA facilitated a Site visit with representatives of the Property Owner and the City's police department, fire department, Mayor's Office, Department of Development, Department of Public Works, Building and Zoning Code Enforcement, as well as the New York State Department of Environmental Conservation (NYSDEC). During the visit, it was observed that some exterior scrap metal and vehicles had been removed, but no materials from inside the buildings were removed. Conditions inside the structures appeared to have deteriorated since the June 2021 visit, with additional structural collapses observed and items more disorganized than before. Personnel were able to inspect numerous containers throughout the interior space. EPA's Superfund Technical Assistance and Response Team (START) prepared an inventory of containers that were accessible within the interior of the on-Site structures. Due to adverse weather conditions, an inventory of containers located outside was not performed.

In addition to the container inventory, EPA and the START contractor performed an assessment for the presence of asbestos-containing material (ACM) throughout the accessible interior spaces of the Site. Thermal system insulation (TSI) pipe wrap was observed throughout the facility in various states of deterioration. Pipe wrap was observed intact throughout a majority of the intact buildings; however, pipe wrap was also observed leading into collapsed structures, flaking in some areas, and significantly deteriorated in other locations. TSI was labeled with warning stamps indicating the material contained asbestos. Four samples of TSI were collected and confirmed to contain asbestos ranging from 31-58% chrysotile and/or amosite asbestos. Approximately 1,850 linear feet of asbestos-containing pipe wrap were observed to be present inside the facility. Several hundred square feet of gray fiber board was also present. Two samples of the fiber board were analyzed and confirmed to contain 25% and 33% chrysotile asbestos.

On January 21, 2022, EPA and the START contractor collected samples from interior containers located throughout the Site. Results indicated the presence of numerous volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and heavy metals, in particular acetone, toluene, and chromium. Several of these containers were found to be in deteriorating condition and staged inappropriately. Between January 2022 and July 2022, EPA provided

oversight of a voluntary removal action performed by the Property Owner, where most of the containers were removed from the Site. In August 2022, EPA identified additional containers on-Site including 55-gallon drums of corrosive material, 5-gallon pails of paints and adhesives, and compressed gas cylinders. Additionally, in August 2022, the Property Owner informed EPA that it consulted with an asbestos abatement contractor to perform an asbestos survey of the facility. The Property Owner indicated that its consultant's samples of roofing material indicated the presence of asbestos; however, details regarding the amount of material, type of asbestos and quantity of asbestos were not provided to EPA. The Property Owner later failed to meet self-imposed deadlines for the timely removal of containers and addressing ACM at the Site. The Asbestos Survey is included as Attachment 2.

On November 16, 2022, a fire broke out at the facility that consumed most of the on-Site structures over the course of several days. When the fire was fully extinguished, a significant amount of debris containing ACM exposed to the environment remained. The fate of other containers including a drum marked corrosive, that was identified by EPA in August, could not be ascertained following the fire. The Site is located adjacent to an active railroad line and operating businesses.

The sampling results, along with field observations made by the EPA OSC during and following the fire, indicated that conditions at the Site meet the criteria for an emergency removal action under CERCLA, as provided in Section 300.415(b)(2) of the NCP. EPA activated an Emergency and Rapid Response Services (ERRS) contractor on November 21, 2022, to initiate the RV1 emergency removal action. The RV1 scope of work included installation of temporary fencing and warning signs around the debris to limit Site access. The fence installation was completed on November 29, 2022. EPA received a supplemental request from the City of Jamestown on December 5, 2022, requesting that EPA consider the Site for additional removal activities to address building debris and remaining structures comingled with asbestos and potentially other hazardous substances. EPA also received a referral from NYSDEC on March 27, 2023, requesting that EPA consider the Site for a time-critical removal action to address asbestos at the Site. These referrals are included in Attachment 1.

2. Physical location

The Site is located at 1061-1071 Allen Street (42.108480°/ -79.210850°) in the City of Jamestown, Chautauqua County, New York, 14701-2327. The Site includes one 2.1-acre parcel of land that is identified on the Chautauqua County tax map as parcel number 371.13-4-29.1. The Site is located in a commercial and light industrial area of the City. To the north is an active railroad line that leads to the historic center of Jamestown. The Site is bounded to the west by an undeveloped parcel of land and to the south by Allen Street, beyond which is a parking area and maintenance garage leased by the Jamestown Department of Education. A furniture manufacturing factory is located to the east of the Site. The

nearest residence is located in a residential neighborhood approximately 0.13 miles to the south-southeast. According to the 2010 Census Data, approximately 1,038 people live within a half-mile radius of the Site and approximately 6,394 people live within a one-mile radius of the Site. A Site location map is included as Attachment 3.

An Environmental Justice (EJ) screening of the Site indicates that the surrounding area has an above average probability for environmental justice concerns. The screening was done using EPA's EJ Screen which provides a nationally consistent dataset and summarizes EJ Indexes which includes Environmental Indicators, Pollution Sources, and Socioeconomic Indicators. The EJ screening for this Site reported several of the EJ Indexes well above the 50th percentile range for New York State, and the United States, with some of the EJ indicators reported at greater than the 75th percentile. The higher the percentile, the more likely a community is disproportionately burdened by environmental harms and risks. For additional information on EJ Screen please visit https://www.epa.gov/ejscreen to learn more about its uses and its results, reports, limitations, and caveats.

3. Site characteristics

The Site is a former furniture manufacturing facility, the owner/operator of which filed for bankruptcy in March 2012. The Property was acquired at a bankruptcy auction by Allen Street Development, LLC which utilized much of the space to store a variety of items including airplane components. It also leased space in other areas of the Property. After initially agreeing to mitigate the hazardous waste remaining on-Site from past operations and the asbestos existing in the facility structures, the Property Owner ceased mitigation efforts in the summer of 2022. A fire occurred at the facility on November 16, 2022, that reduced the structures to rubble and debris that is contaminated with asbestos. On November 21, 2022, EPA initiated an emergency removal action, RV1, that included the installation of temporary fencing around the perimeter of the debris pile to reduce direct contact with and further disturbance of the asbestos-contaminated debris. The RV1 Action Memorandum is included as Attachment 4.

This RV2 Action Memorandum proposes additional EPA removal activities at this Site.

4. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

Substantial quantities of ACM were documented to be present in the buildings at the Site. Sample results of TSI pipe wrap indicated friable amosite asbestos as high as 4% and friable chrysotile asbestos as high as 33%. Sample results of the fiber board indicated friable chrysotile asbestos as high as 25%. These samples were collected inside of the building prior to the fire on November 16, 2022.

The Site is a "facility" under Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). The hazardous substance asbestos that was confirmed to be inside of the building prior to the fire and now exists exposed to the elements in the debris on-Site constitutes a "release" or threat of release under Section 101(22) of CERCLA, 42 U.S.C. § 9601(22). Sampling and analysis conducted at the Site by EPA identified the following CERCLA hazardous substance as defined in 40 CFR Table 302.4.

Hazardous Substance	Clean Air Act § 112	Clean Water Act § 307(a)
Asbestos	X	X

Friability is the ease with which ACM can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure. The degree of friability of the ACM determines the potential for fibers to be released into the air. The ACM inside the building has been rendered more friable as a result of the fire, increasing the probability of it being released into the air, threatening the surrounding community.

5. National Priority List (NPL) status

At the time of this removal action, the Site is not on the NPL, and there are no plans to propose the Site for inclusion on the NPL.

6. Maps, pictures, and other graphic representations

Attachment 3 includes Site Location and Site Layout Figures.

B. Other Actions to Date

1. Previous actions

Allen Street Development, LLC acquired the Property through bankruptcy auction in April 2012. Since that time, the Property has seen little productive use, mostly being used for storage. The City of Jamestown became concerned about continued vandalism and deterioration of on-Site structures and, in 2021, issued a Notice to Vacate Order for the Property. On June 8, 2021, after the City and its environmental consultant discussed the Site with the EPA Region 2 Brownfields Program, the City requested that the EPA Removal Program perform an RSE.

EPA visited the Site with Mr. Richard Rusiniak, a representative of the Property Owner, and performed an initial assessment of both the exterior and interior of structures on-Site where it was deemed safe to do so. EPA observed several conditions of concern, including that the rooftops over dilapidated portions of the Site structures had collapsed, ACM may be present at the Site, and deteriorated containers labeled as "hazardous waste" or labeled as exhibiting characteristics of hazardous waste, such as flammable or corrosive, were present both indoors and

outdoors at the Site. Between July and October 2021, EPA attempted to contact Mr. Rusiniak via telephone calls and email to discuss the need to address conditions present at the Site. Mr. Rusiniak failed to respond or continue communications with EPA. On December 20, 2021, EPA notified the Property Owner of its status as a PRP for the Site. On January 10, 2022, the PRP indicated a willingness to address on-Site containers.

Between January and July 2022, EPA oversaw the Property Owner's removal of various compressed gas cylinders, 55-gallon drums and 5-gallon pails from the Site. However, after July 2022, the Property Owner failed to continue with mitigation efforts. On November 16, 2022, a fire broke out at the Site and consumed most of the on-Site structures.

2. Current actions

EPA initiated the RV1 emergency removal activities on November 21, 2022. The RV1 removal activities included the installation of temporary chain link fence to reduce direct contact with the asbestos-contaminated debris and posting of signs warning of on-Site hazards. The temporary fencing has been effective in limiting Site access. However, these measures will require continued inspection and maintenance and will become less effective over time.

The purpose of this Action Memorandum is to address the threat associated with hazardous substances, pollutants and contaminants, including asbestos, at the Site due to the damage caused by the November 2022 fire. The mitigation efforts proposed include demolition of the remaining structures contaminated with CERCLA hazardous substances and disposal of asbestos-contaminated debris. EPA estimates that approximately 5,000 to 7,000 tons of asbestos-contaminated debris will be generated in the course of the removal activities.

C. State and Local Authorities' Role

1. State and local actions, to date

On January 20, 2022, EPA facilitated an on-Site tour with representatives of the Property Owner, NYSDEC, and the City's police department, fire department, Mayor's Office, Department of Development, Department of Public Works, and Building and Zoning Code Enforcement. While these parties have remained engaged in the mitigation of this Site, EPA has taken on the primary role for the Site cleanup.

On December 5, 2022, the City of Jamestown formally requested EPA consider the Site for a CERCLA time-critical removal action based on the potential release of hazardous substances, including asbestos, from the Site.

2. Potential for continued state/local response

There are no actions planned or being taken by any state or local government agencies to address hazardous substances present at the Site.

III. THREATS TO PUBLIC HEALTH, OR WELFARE, OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

The release and threat of future releases of asbestos, a CERCLA-designated hazardous substance, to the environment is ongoing. Asbestos is a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and is listed in Table 302.4 of the NCP. Sample results of TSI pipe wrap indicated friable amosite asbestos as high as 44% and friable chrysotile asbestos as high as 33%. Sample results of the fiber board indicated friable chrysotile asbestos as high as 25%. These samples were collected inside of the building prior to the fire on November 16, 2022.

Asbestos mainly affects the lungs and the membrane that surrounds the lungs. Breathing high levels of asbestos fibers over an extended duration may result in scar-like tissue in the lungs and in the pleural membrane (lining) that surrounds the lung. This disease is called asbestosis. People with asbestosis have difficulty breathing and in severe cases heart enlargement. Asbestosis is a serious disease and can eventually lead to disability and death.

Breathing lower levels of asbestos may result in changes called plaques in the pleural membranes. Pleural plaques can occur in workers and sometimes in people living in areas with high environmental levels of asbestos. The effects on breathing from pleural plaques by itself are not usually serious, but higher exposure can lead to a thickening of the pleural membrane that may restrict breathing.

As a result of the release or threat of release of asbestos fibers to the atmosphere, the conditions at the Site meet the criteria for a CERCLA removal action as described in the NCP, 40 CFR 300.415(b)(2). The following criteria are directly applicable to the threats that exist at the Site:

(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants, or contaminants.

There is a threat to human health posed by the ACM present at the Site. Friable asbestos-containing insulation and wall board were identified by EPA during its January 20, 2022, assessment sampling event. The Property Owner also conducted an asbestos survey that, in addition to the ACM identified by EPA, confirmed the presence of asbestos-containing roofing at the Site. There is also a

potential threat associated with containers of hazardous substances observed to remain onsite during EPA's August 2022 inspection.

Prior to installation of a fence along the perimeter of the Site, local officials reported that the Property was frequented by trespassers. In addition to inhaling asbestos fibers at the Site, persons entering the Site could disturb the asbestos-contaminated debris that remains on-Site, which may then be tracked off the Site into public areas and/or released into the air.

The ACM inside the building has been rendered more friable as a result of the fire, increasing the probability of it being released into the air, and threatening the surrounding community. Once in the environment, the asbestos fibers exist as stable mineral fibers and will persist and do not readily break down further.

(iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

Prior to the fire which occurred on November 16, 2022, EPA had identified the presence of a drum marked corrosive liquid along with unknown compressed gas cylinders and numerous containers of waste believed to be paints and solvents which were awaiting disposal. It is unclear if these wastes were consumed in the fire or if they remain on Site and are now commingled with building debris. Continued exposure to the elements and potential vandalism may result in the release of these hazardous substances. Also, these hazardous substances are not in a temperature-controlled environment and have been subject to the winter temperatures. These containers could freeze and subsequently expand and break, leading to a release during thaw periods.

(v) Weather conditions that may cause hazardous substances, or pollutants, or contaminants to migrate or be released.

ACM is present in the post-fire debris and is subject to weathering as a result. Weathering causes the matrix that binds the asbestos fibers together to be broken down, releasing the fibers into the environment. Once in the environment, the asbestos fibers exist as stable mineral fibers and will persist and do not readily break down further. The fire-damaged structures and remaining debris at the Site contains weathered ACM. High winds traveling through the Site may cause asbestos fibers to be entrained in the air increasing the likelihood of being carried off Site. The recent fire and efforts to extinguish it have resulted in nearly all of the buildings being reduced to rubble. As a result, the materials that were once in the interior of the buildings are now exposed to the environment and weathering. Wind may carry asbestos fibers onto surrounding properties, potentially exposing neighboring residents, workers and customers. Asbestos fibers that become entrained in the air have the potential to travel even further from the source.

(vi) The availability of other appropriate federal or state response mechanisms to respond to the release.

EPA is the only government agency capable of taking timely and appropriate action to respond to the threat posed by the presence of hazardous substances at the Site.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response activities selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

Section 104(c) of CERCLA limits federal removal actions under CERCLA to 12 months and $2 million unless the criteria are met for an exemption. The immediate risks to human health, welfare, and the environment posed by the contamination at this Site warrant 12-month and $2 million emergency exemptions, as discussed below.

A. Emergency Exemption

The duration of the planned removal action will likely exceed the 12-month and $2 million statutory limits for removal actions. Conditions at the Site meet the criteria for an emergency exemption under Section 104(c) of CERCLA. There are immediate risks to public health and the environment, and continued response actions are immediately required to prevent, limit, or mitigate the release or threat of release of hazardous substances at the Site. The release or threat of release of hazardous substances from the contents of the buildings involved in the recent fire is the subject of this removal action and warrants exemption from the 12-month and $2 million statutory limits.

1. There is an immediate risk to public health, or welfare, or the environment;

The presence of friable asbestos on-Site poses an immediate risk to public health, welfare, or the environment. The ACM has been damaged by fire, water, and exposure to the weather. As the ACM breaks down, asbestos fibers are liberated from the materials of which they were originally a component. Once in the environment, the asbestos fibers exist as stable mineral fibers that are not easily broken down further by weathering and may become entrained in wind currents being carried onto surrounding properties, potentially exposing neighboring residents, workers, and customers.

According to the 2010 Census Data, approximately 1,038 people live within a half-mile radius of the Site and approximately 6,394 people live within a one-mile radius of the Site.

2. Continued response actions are immediately required to prevent, limit, or mitigate an emergency; and

Asbestos is present and commingled throughout remaining structures and building debris at the Site. Additionally, containers with corrosive liquids and compressed gas cylinders are also likely buried within the fire-related debris. Left unattended and exposed to natural weathering, the potential for asbestos fibers to migrate from the Site and for the containers of hazardous waste to release remains unmitigated. These conditions will result in the potential for further releases of asbestos fibers from the building to adjacent commercial and residential areas.

3. Assistance will not otherwise be provided on a timely basis.

No other government entity, or responsible party, can provide assistance to mitigate the public health threats on a timely basis at the Site. The OSC conducted outreach with the City of Jamestown and NYSDEC officials following the fire. Both entities indicated insufficient resources to take action to clean up the Site.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. <u>Proposed Actions</u>

1. Proposed action description

The funding requested in this Action Memorandum is necessary to mitigate the threats posed by the release or threatened release of asbestos and containers with hazardous substances that could impact public health and the environment through direct contact and inhalation. To mitigate the threat posed by the Site, EPA plans to perform controlled demolition, decontamination of building materials, and disposal of asbestos and asbestos-contaminated debris. The removal will also include the mitigation of threats associated with containers and compressed gas cylinders with hazardous substances that are, or are anticipated to be, present at the Site.

The removal activities include the following:

- Maintain the perimeter chain link fence installed under the RV1 action to deter access onto the Site.
- Development of a project demolition work plan.
- Development of an Asbestos Project Design in accordance with New York State Department of Labor (NYSDOL) requirements.
- Development of a Community Air Monitoring Plan.

- Establishment of project support facilities including utilities, project offices, personnel decontamination facilities, staging areas, etc.
- Delineation of work zones and establishment of containment barriers as appropriate and to the extent practicable in accordance with the project design to limit the migration of asbestos.
- Abatement of ACM from within areas safely accessible to workers.
- Demolition of on-Site buildings as needed to address the threat associated with asbestos and/or other hazardous substances found at the Site.
- Establishment and maintenance of containment barriers to cover asbestos-contaminated debris, in the event that off-Site disposal is delayed.
- Removal and off-Site disposal of asbestos-contaminated debris.
- Investigation of areas where historic releases of hazardous substances may have occurred.
- Evaluation and disposal of containers potentially containing hazardous substances that may be discovered while addressing asbestos-contaminated debris at the Site.
- Segregation and decontamination of scrap metal, masonry, and other materials for recycling.
- Off-Site disposal of any additional hazardous substances, pollutants or contaminants, identified within the buildings.
- Evaluation and mitigation, of potential physical hazards exposed during the removal action.

Disposal of hazardous substances will comply with the Off-Site Rule, 40 CFR 300.440. No post-removal site controls are anticipated.

2. Contribution to remedial performance

The response measures documented in this Action Memorandum will address the threats to the public health from direct contact with asbestos and other hazardous substances. These activities would contribute to any long-term response action with respect to the release or threat of release of asbestos at the Site. No long-term response action is anticipated at this time.

3. Applicable or Relevant and Appropriate Requirements (ARARs)

Any ARARs within the scope of the removal activities will be met to the extent practicable given the exigencies of the situation. Federal ARARs for this removal action include the Clean Air Act National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61 – Subpart M. Other ARARs include the Resource Conservation and Recovery Act ("RCRA") and Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York ("12 NYCRR Part 56"), also known as Industrial Code Rule 56. Additional ARARs may be identified by New York State in response to a request for ARARs from EPA by letter dated February 21, 2023. If such ARARs were to result in the need to alter the selected response activities, such change would be addressed in a subsequent decision document.

5. Project schedule

Field activities are expected to commence within two months of approval of this Action Memorandum. Weather conditions and the availability of disposal facilities may cause the project to extend beyond one year.

B. Estimated Costs

The estimated costs for the completion of this project are summarized below.

Direct Extramural Costs	Total Funding Authorized in the Action Memorandum Signed on January 6, 2023	Proposed Ceiling Increase	Proposed New Ceiling Amounts
Total Cleanup Contractor Cost (Includes 20% Contingency)	$200,000	$2,300,000	$2,500,000
Removal Support Team, Extramural Costs	$50,000	$200,000	$250,000
Subtotal, Extramural Costs	$250,000	$2,500,000	$2,750,000
Extramural Cost Contingency	$0	$500,000	$500,000
Total, Removal Action Project Ceiling	$250,000	$3,000,000	$3,250,000

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the proposed actions described in this Action Memorandum are not implemented, the threats posed by the Site will persist. The threat posed by asbestos present at the Site represents a significant threat to human health and the environment. If no actions are taken, trespassers could continue to come into direct contact with asbestos, and the asbestos on-Site will continue to weather and deteriorate leading to the release and/or potential release of asbestos fibers into the environment.

VIII. OUTSTANDING POLICY ISSUES

There are no known outstanding policy issues associated with the Site at the present time.

IX. ENFORCEMENT

EPA, NYSDEC, and City of Jamestown worked collaboratively with the Property Owner to safely and effectively remove some of the hazardous substances identified on the Site. EPA notified the Property Owner of its status as a PRP for the Site on December 20, 2021. Between January and July 2022, EPA monitored the Property Owner's efforts to remove various compressed gas cylinders, 55-gallon drums and 5-gallon pails from the Site. However, after July 2022, the Property Owner failed to complete the removal of hazardous substances from the buildings. In November 2022, a fire destroyed the majority of the buildings that contained ACM and miscellaneous containers potentially containing hazardous substances. In January 2023, the OSC sent a letter to the Property Owner providing notice of the asbestos hazard associated with the debris remaining at the Site, the applicable federal and state laws that govern handling asbestos-contaminated debris, and informing the Property Owner that EPA has commenced planning to undertake further response activities to address the hazards posed by the Site. EPA recommended that, based on the above, the owner refrain from entering the Site, disturbing debris, or removing and material from the Site until further notice from EPA.

ENFORCEMENT COST ESTMATE

The total EPA cost for this removal action, based on full-cost accounting practices that will be eligible for cost recovery, is estimated to be $4,965,975, and was calculated as follows:

COST CATEGORY	AMOUNT
Direct Extramural cost	$3,250,000
Direct Intramural Cost	$125,000
Subtotal Direct Costs	$3,375,000
Indirect costs (2023 Indirect Regional Cost Rate 46.83%)	$1,580,513
Estimated EPA Costs eligible for Cost Recovery*	$4,955,513

*This estimate includes direct costs, which include direct extramural costs and direct intramural costs. Indirect costs are calculated based on and estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with full cost accounting methodology which became effective on October 2, 2000. These estimates do not include prejudgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of the removal action. The estimates are for illustrative purposes only and their use in this Action Memorandum may not be relied upon by any third party as binding upon EPA. Neither the lack of a total cost estimate nor deviation of actual costs from this estimate will affect the United States' right to cost recovery.

IX. RECOMMENDATION

This decision document represents the selected removal activities for the Allen Street Development Site, located at 1061-1071 Allen Street in the City of Jamestown, Chautauqua County, New York. This document has been developed in accordance with CERCLA and is not inconsistent with the NCP. This decision is based on the administrative record for this decision document.

The total funding authorized to date for this Site is $250,000, of which $200,000 is for mitigation contracting. The increase requested by this Action Memorandum is $3,000,000, of which $2,300,000 is from the Regional removal Advice of Allowance for mitigation contracting. If approved, the new total project ceiling will be increased to $3,250,000, of which $2,500,000 is for mitigation contracting.

There are sufficient monies in the Advice of Allowance to fund the project.

I recommend your approval of the proposed ceiling increase and $2 Million and 12-month exemption. Please indicate your formal authorization for the removal action at the Allen Street Development Site, as per current Delegation of Authority, by signing below.

APPROVAL: Pat Evangelista Digitally signed by Pat Evangelista Date: 2023 04.24 14:24:39 -04'00' _____

Pat Evangelista, Director
Superfund and Emergency Management Division

DISAPPROVAL: _____

Pat Evangelista, Director
Superfund and Emergency Management Division

cc: (after approval is obtained)
P. Evangelista, SEMD-D
E. Wilson, SEMD-DD
J. Prince, SEMD-DD
J. Rotola, SEMD-RAB
D. Harkay, SEMD-RAB
B. Grealish, SEMD- RAB
T. Lieber, ORC-NYCSB
V. Capon, ORC-NYCSB
R. Ng, ORC-NYCSB
M. Mears, PAO
M. Basile, PAO
B. Schlieger, 5104A
K. Hale, NYSDEC
B. Lewinski, NYSDEC

Attachment 1

City of Jamestown Referral – June 8, 2021
City of Jamestown Referral – December 5, 2022
NYSDEC Referral - March 27, 2023

CITY OF
JAMESTOWN
Development Office

Crystal D. Surdyk
Director

June 8, 2021

Joe Rotola
Chief, Removal Action Branch
United States Environmental Protection Agency
Edison, New Jersey 08837

Re: 1061 Allen Street, Jamestown, New York
EPA Removal Site Evaluation Request

Dear Mr. Rotola:

The City of Jamestown has been made aware of the EPA's Removal Program through discussions with one of our environmental consultants. We have prepared this letter to request the EPA's involvement to perform a site evaluation to determine the eligibility of the property located at 1061 Allen Street, Jamestown, NY (Site) for a removal action under CERCLA.

Historical records indicate that the Site has been developed and used for industrial uses since 1883. Sanborn maps from 1903 and 1930 have confirmed the historical presence of a furniture manufacturing facility on the property. The 1930 Sanborn has also noted multiple spray booths, coal bins, and potential above ground tanks on the property. It is not clear as to the entire list of substances used on the property; however, a 2007 NYSDEC Air Permit on the Site notes the volatile organic compounds (VOCs) xylene and toluene, as well as a wax dip tank containing unidentified furniture finishing liquid on the parcel.

The current owner of the facility, Allen St Dev, LLC, has recently abandoned the parcel and allowed the deterioration of the onsite buildings to accelerate, leading to multiple unsafe structures. In April 2021, the Jamestown Department of Development issued a Notice to Vacate to the current owner because of the state of the building. Aerial drone footage has discovered a caved in roof on one of the onsite buildings as well as an apparent large trash dumping area on the rear of the property. The property has been tax delinquent since 2018.

Based on the age and use of the building, it is likely that asbestos is present throughout many portions of the structure. The recent collapse of the roof in multiple locations has caused concern that friable asbestos is being released, impacting nearby businesses and residents.

Recent complaints of unwanted activities within the onsite building have also caused significant concerns. Jamestown Police have been called to the Site multiple times due complaints of vandalism and apparent squatters. Because the Site has been vacant for so many years, with lack of security, concerns of fires started on the property have further heightened the City's worries of the parcel.

Edward A. Sundquist
Mayor

Department of Development
200 East Third Street, Jamestown, NY 14701
Phone: **716-483-7541** • Fax: **716-483-7772** • www.jamestownny.gov

664925

CITY OF
JAMESTOWN
Development Office

Crystal D. Surdyk
Director

Based upon over a century of manufacturing uses on the property and the likely presence of containers of furniture manufacturing related fluids, a fire may not only destroy the onsite buildings but has the potential to cause greater damage through explosion of volatile materials and possible releases to the environment. For this reason, we have concerns for the safety of our first responders and nearby businesses and residents should a fire occur at the property.

The City's finances are stretched thin and we are unable to adequate assess the condition of the building and hazardous likely within the buildings. Our inability to further act on the parcel has led to this request of EPA's involvement through the Removal Program.
Any assistance in tackling this dangerous situation would be greatly appreciated.

Please do not hesitate to contact me at (716) 483-7659 to discuss this Site further.

Sincerely,

Crystal D. Surdyk
Director of Development
City of Jamestown, New York

Edward A. Sundquist
Mayor

Department of Development

200 East Third Street, Jamestown, NY 14701

Phone: **716-483-7541** • Fax: **716-483-7772** • **www.jamestownny.gov**

CITY OF
JAMESTOWN
Development Office

Crystal D. Surdyk
Director

December 5, 2022

Joe Rotola
Chief, Removal Action Branch
United States Environmental Protection Agency
Edison, New Jersey 08837

Re: 1061 Allen Street, Jamestown, New York
EPA Removal Site Evaluation Request

Dear Mr. Rotola:

As you may recall, the City of Jamestown reached out to you in June 2021, with a request for EPA's involvement in performing a site evaluation to determine the eligibility of the former Crawford Furniture Factory property located at 1061 Allen Street, Jamestown, NY (Site) for a removal action under CERCLA. I would like to thank you for providing the mechanism that allowed for the EPA to provide a swift response to my initial request. I believe you are also now aware that the property was destroyed by a massive fire on November 16, 2022.

Given the more than a century of manufacturing uses associated with the Allen Street property and the known presence of acetone, toluene, chromium and asbestos, and due to the continued threat of the release of these hazardous substances, expeditious removal action is crucial to protect the health and safety of the public. As anticipated, the fire destroyed most of the buildings that made up the complex, and it is likely that volatile materials including asbestos were released into the environment posing a threat to the safety of our first responders as well as nearby businesses and residents. Additionally, each day that the debris, which is suspected to be amalgamated with asbestos and other hazardous chemicals as previously mentioned, sits unmitigated, a potential harmful threat remains.

The owner of the site had been working with EPA representatives on the voluntary removal of hazardous materials that were located throughout the site at the time of the fire. The City of Jamestown, via the Department of Development, had also been engaged with the property owner through code enforcement actions dating back to 2018. The owner had been issued 19 court appearance summons' over the course of the past 14 months and was due in court on Friday, November 18, 2022 with an expectation that he would present a NYSDOL approved variance petition to perform a controlled partial demolition of one of the building complex structures due to the imminent danger of collapse the structure poses and the asbestos abatement required.

When the City initially reached out with a request for EPA assistance in performing a removal action, we were doing so in an attempt to proactively avoid a catastrophe of this magnitude for our community. We had just suffered a similar incident at the Jamestown Royal Upholstery Factory a few weeks prior to my letter requesting assistance. The Jamestown Royal fire was approximately one third the size of the Crawford Furniture fire and it depleted three years reserves of City resources to perform the cleanup.

Edward A. Sundquist
Mayor

Department of Development
200 East Third Street, Jamestown, NY 14701
Phone: **716-483-7541** • Fax: **716-483-7772** • **www.jamestownny.gov**

It is anticipated that the cleanup necessary at the Allen Street site will be far beyond what the City of Jamestown has resources to manage, therefore we find ourselves once again, humbly requesting assistance from the EPA to perform a removal action in order to protect neighboring businesses, residents and adjacent communities. The City's lack of the financial resources to further act on the parcel has led to this request of EPA's continued involvement through the Removal Program.

The City, specifically the Department of Development, has developed a close working relationship with EPA representatives and have coordinated cleanup efforts for more than a year. Though the outcomes we had hoped and worked to achieve were disrupted by this devastating fire, our collective efforts have been successful in removing several drums, containers and cylinders of hazardous materials from the site prior to the fire, and likely preventing an even larger and more disastrous fire event.

It is the position of the City that the owner of the property should and will continue to be held liable and accountable for the increasingly hazardous condition and the remediation of the property and we will continue to pursue satisfactory relief utilizing every legal option and tool that we have available to us. It is our hope that we can continue with a coordinated effort with the EPA to pursue the property owner with every legal means possible.

Should you wish to discuss this matter please do not hesitate to contact me on my direct line at (716) 483-7659 or on my cell at (716) 697-3782.

Kind Regards,

Crystal D. Surdyk

Crystal Surdyk
Director of Development
City of Jamestown, New York

cc. Mayor Edward A. Sundquist
Elliot Raimondo, Corporation Counsel

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

Transmitted via email only

March 27, 2023

Mr. Pat Evangelista
Division Director
Superfund and Emergency Management Division
USEPA Region II
290 Broadway, 19th Floor
New York, NY 10007-1866

Re: NYSDEC Spill # 2207006
Fire at Former Furniture Manufacturer
1061 Allen Street, Jamestown, NY 14701

Dear Mr. Evangelista:

The New York State Department of Environmental Conservation (DEC) hereby requests the United States Environmental Protection Agency (EPA) to perform a time-critical removal action of the asbestos containing material (ACM) at the above referenced site.

The DEC was notified by the City of Jamestown that the building had been completely engulfed by fire, resulting in the destruction of the major portion of the facility. DEC hereby requests that EPA demolish the remaining structure, decontaminate recyclable materials, manage/dispose of containerized waste materials, and dispose of asbestos and asbestos-containing debris as soon as circumstances permit.

This request is being made under CERCLA, 42 U.S.C.A. §§ 9601, et seq. and the National Contingency Plan, 40 C.F.R. Part 300, which allows the U.S. EPA to respond to and recover costs incurred in response to releases or threats of releases of pollutants and contaminants as deemed necessary in EPA's sole discretion to abate an imminent and substantial endangerment to public health or welfare or the environment at the location stated above.

To ensure that DEC is prepared to respond to inquiries concerning this action, please provide my office with a copy of any fact sheet or public notice related to this action prior to release.

The Department appreciates EPA's consideration of this referral. Any questions or requests for additional information regarding this site should be directed to Kevin Hale of DEC at (518) 469-9050. Please copy Bill Ottaway, Bureau of Technical Support, at william.ottaway@dec.ny.gov, on project-related Pollution/Situation Reports.

NEW YORK STATE | Department of Environmental Conservation

Sincerely,

Andrew Guglielmi

Andrew Guglielmi, Director
Division of Environmental Remediation

ec: J. Rotola
D. Harkay
J. Brown
M. Cruden
C. Staniszewski
B. Ottaway

Attachment 2

Property Owner Asbestos Survey

August 2022

ACS, Inc.

ASBESTOS SAMPLING

Location:

Vacant
1061 Allen
Jamestown NY

Conditions as of August 2022

Prepared For:

Property Owner

Prepared by:

Advance Contracting Services
PO Box 986
Grand Island NY 14072
advancedcss1976@gmail.com

NYSDOL Asbestos License # 115026

ACS, Inc.

Advanced Contracting Services, was retained to perform asbestos sampling.

The purpose of the sampling was to determine the presence, location and quantity of ACM (asbestos containing materials), at the above referenced location. As defined by the property owners specific scope of work for the project. This survey includes the following:

- *Identification of suspect asbestos containing materials.*
- *Sampling and analysis of suspect materials.*
- *Identification of the location, approximate quantity, friability of confirmed asbestos containing materials.*

ASBESTOS CONTAINING MATERIALS (ACM)

Polarized Light Microscopy (PLM) and, where required, Transmission Electron Microscopy (TEM) revealed asbestos in the following analyzed samples

Homogeneous Material	Approximate Quantity and Location of ACM		Friability	Asbestos
Drywall			*No*	*No*
Drywall			*No*	*No*
Drywall			*No*	*No*
Widow Caulk			*No*	*No*
Roof			*No*	*No*
Roof			*No*	*No*
Roof	*TBD*		*No*	*Yes*
Pipe Insulation	*1850lf*	*Previous sampling by EPA*	*Yes*	*Yes*

Laboratory Analysis Performed By: Paradigm Environmental NYS DOH ELAP# 11195
Sampling Preformed By: Advanced Contracting NYS Asbestos Contractor # 115026

GENERAL CONDITIONS OF INSPECTION

Any reported quantities found in this report, if applicable, are field approximations of materials in accessible areas only and should be field verified prior to abatement. This report is not designed to serve as a specification for abatement. Please, find enclosed the laboratory analytical results and chain of custody documentation.

Any included laboratory results, if applicable, are submitted pursuant to ACS Services current terms and conditions of sale, including the company's standard

warrant and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted.

This report is based on the condition and contents present at the above referenced location at the time of inspection.


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

RAJ S CHOPRA
CLASS(EXPIRES)
() INSP(04/23)

US FOIA (b)(6)

MUST BE CARRIED ON ASBESTOS PROJECTS


NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

MS. AMY L. DEMBSKI
PARADIGM ENVIRONMENTAL SERVICES
1430-B MILLERSPORT HIGHWAY
WILLIAMSVILLE, NY 14221

NY Lab Id No: 11958

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material — Item 198.1 of Manual
EPA 600/M4-82-020

Asbestos in Non-Friable Material-PLM — Item 198.6 of Manual (NOB by PLM)

Asbestos in Non-Friable Material-TEM — Item 198.4 of Manual

Serial No.: 61620


New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Advanced Contracting Services, Inc.
P.O. Box 986
Grand Island, NY 14072

FILE NUMBER: 22-407808
LICENSE NUMBER: 407808
LICENSE CLASS: FULL
DATE OF ISSUE: 05/27/2022
EXPIRATION DATE: 05/31/2023

Duly Authorized Representative - Raj Chopra

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) accumulation of lack of responsibility on the part of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This holder verifies that all persons employed by the licensee in an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Ann Phillips, Director
For the Commissioner of Labor

56-11.5 Controlled Demolition with Asbestos in Place.

(a) **Air Sampling and Analysis.** Air sampling and analysis on an asbestos project conducted under this Section shall be conducted in accordance with the requirements of Subpart 56-4 of this Part.

(1) In addition to the requirement of Subpart 56-4.9(b-c), air monitoring within the work areas shall be conducted daily during abatement and cleaning activities. If more than one (1) shift daily is required to accomplish the work, air monitoring within the work area during abatement shall beperformed on each shift, preferably at mid-shift timing.

(b) **Asbestos to Remain During Demolition.** A building/structure may be demolished with asbestos material in place, as per the requirements of this

Section, when the following condition is met:

(1) **Building/Structure is Condemned.** A building or structure may be ruled structurally unsafe by a licensed Professional Engineer, Registered Architect, Building Inspector, Fire Inspector or other official of competent jurisdiction. The official shall attest to the condition of the building/structure in writing. A copy of the condemnation letter shall be attached to the project notification mailed to the Department of Labor and a copy shall be posted at the work site.

(c) **Controlled Demolition Procedures.** The following controlled demolition procedures shall be followed:

(1) **Project Size.** Unless the size of the project can be positively quantified it shall be deemed to be a Large project. The maximum fee shall accompany the notification.

(2) **Regulated Abatement Work Area.** The entire demolition area shall be considered the regulated abatement work area. This area shall be enclosed within a barrier to prevent unauthorized entry. Signage on this barrier shall be in accordance with Section 56-7.4. Orange construction fence or snow fence is acceptable for this purpose. For outdoor regulated abatement work areas, all adjacent building openings within twenty-five (25) feet of the outermost limit of the disturbance shall be sealed with two (2) layers of six (6) mil fire retardant plastic sheeting, and the exterior asbestos project regulated abatement work area shall extend a minimum of twenty-five (25') feet from the outermost limit of the disturbance.

(3) **Entrance or Exit.** Entrance or exit of all persons and equipment shall be through one (1) designated and controlled "access way" in the barrier or fence, which shall provide a means of egress from the regulated abatement work area.

(4) **Decontamination Areas.** All decontamination areas shall be within the regulated abatement work area. An equipment decontamination area shall be cordoned off within the worksite for cleaning of heavy equipment, i.e., backhoes, excavators, loaders, etc. The ground surface in this decontamination area shall be banked on the sides to confine the contaminated wastewater.

(5) **Equipment Decontamination.** Equipment shall be decontaminated prior to exiting the regulated abatement work area, utilizing a pressure wash system, after which all exposed surfaces inside and out shall be wet wiped. The surface below the equipment shall be scraped or cleaned of any residual asbestos contamination. This material shall be removed and disposed of as asbestos contaminated material.

(6) **Wet Methods.** No dry disturbance or removal of ACM, PACM or asbestos material shall be permitted.

(7) **Debris.** All debris generated by the demolition shall be considered to be asbestos contaminated waste (to be disposed of as RACM), except for

(8) **Wetted Demolition Waste.** The demolition waste shall be wetted on a continuous basis, that is, prior to, during and subsequent to its actual collection and removal. Fog nozzles or similar type of equipment shall be used to perform the wetting.

(9) **Wetted Piles of Waste.** Piles of waste not actively being worked on, i.e. piles being added to or portions being removed or piles left over extended periods of time, shall be covered with at least one layer of six (6) mil polyethylene to retain its moisture level and to prevent fiber release.

(10) **Wastewater.** Wastewater shall be confined within the controlled demolition regulated abatement work area. All wastewater shall be collected by means of trenching or ditches and directed into a holding tank. Disposal of such wastewater shall be in accordance with applicable laws and regulations. After wastewater has dissipated, the earth surface below the trenches and holding tank shall be scraped and any residual asbestos contamination removed and disposed of as asbestos contaminated waste.

(11) **Pending Disposal.** All demolition waste shall be placed in hard wall,closed containers or vehicles with at least two (2) layers of fire retardant six (6) mil plastic sheeting draped loosely over the sides of the load to facilitate being wrapped over the top of the load and sealed air tight prior to transport from the site. Dumpsters shall be considered to be hard wall containers. There shall be no visible emissions or water leakage from these containers.

(12) **Contaminated Earth Surfaces.** The earth surface below the rubble and or contamination areas shall be scraped clean of any residual asbestos contamination. This material shall be removed and disposed of as asbestos contaminated waste.

(13) **Final Cleaning and Clearance Procedures.** Final clean-up and clearance procedures for abatement shall comply with Section 56-9, except that only one stage of cleaning (final) is to be performed. Lockdown encapsulant use is not required.

(14) **Final Waste Removal From the Site.** The requirements of Subpart 56- 10 shall apply, after all asbestos project regulated abatement work areas have been satisfactorily cleared.

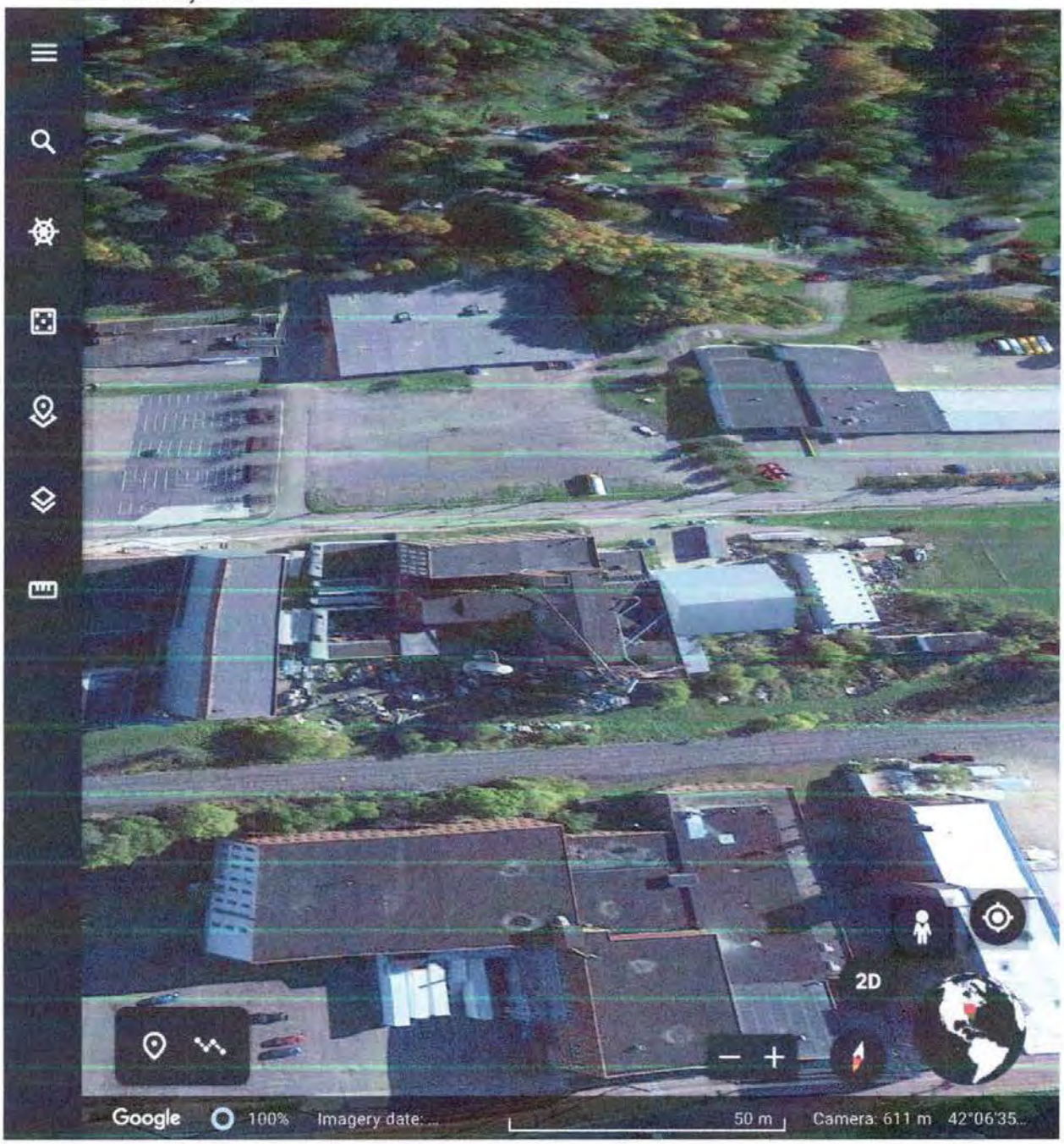
ACS, Inc.

SITE CONDITIONS

	Pipe Insulation
	Collapsed Roof
	Wood Flooring

PO Box 986 Grand Island NY 14072 (716) 480-2125 *advancedcss1976@gmail.com*

ACS, Inc.



PO Box 986 Grand Island NY 14072 (716) 480-2125 *advancedcss1976@gmail.com*

PARADIGM
ENVIRONMENTAL SERVICES, INC.

1430-B Millersport Hwy., Williamsville, NY (Office) 716-775-5777

PLM & TEM BULK ASBESTOS ANALYSIS REPORT

via NYSDOH ELAP Method 198.1, 198.4 and 198.6

Client: Advanced Contracting Services
Location: 1061 Allen Street

Job No: 1501-22B

Sample Date: 8/10/2022 **Sample Received Date:** 8/11/2022

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
1	12391	Drywall	Gray Fibrous Drywall	None Detected	0%		Not Required	N/A	Cellulose 10%	90%
2	12392	Drywall	Gray Fibrous Drywall	None Detected	0%		Not Required	N/A	Cellulose 10%	90%
3	12393	Drywall	Gray Fibrous Drywall	None Detected	0%		Not Required	N/A	Cellulose 10%	90%
4	12394	Caulk	Gray Caulk	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
5	12395	Roof	Black Roof	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
6	12396	Roof	Black Roof	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
7	12397	Roof	Black Roof	Chrysotile 4.8%	4.8%	√	Not Required	N/A	None Detected	95.2%

KEY TO NOB COLUMN SYMBOLS

No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
Ø denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
K denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.**
N/A - Not Applicable
Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763

ELAP ID No.: 11955

PLM Date Analyzed: 8/15/2022
PLM Analyst: A. Maciejewski
Microscope: *Olympus BH-2 #241709*

TEM Date Analyzed: 8/12/2022
TEM Analyst: A. Maciejewski
Microscope: *Hitachi 600 AB*

Laboratory Results Approved By:
Asbestos Technical Director or Designee Andrew Maciejewski

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. New York State Department of Health Environmental Laboratory Program (ELAP) requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This report relates ONLY to the items received by the lab. This report must not be used to claim product endorsement by NYS ELAP or any agency of the U.S. Government. Quality control data (including 95% limits and laboratory or analysts' accuracy and precision) is available upon request.

1501-22B

ACS
PO Box 986 Grand Island NY 14072
(716) 480-2125 advancedcss1976@gmail.com

ASBESTOS ANALYSIS REQUEST AND CHAIN OF CUSTODY

1061 Allen St.
Location

Rica
Client

24hr (48hr) 72hr 5day

Sample #	Material Description	Quantity	Location	Lab Use
1	Dry wall			12391
2	Dry wall			392
3	Drywall			393
4	Caulk / Glazing			394
5	Roof			395
6	Roof			396
7	Roof			397
8				
9				
10				
11				
12				
13				
14				
15				

Comments /Special Instructions

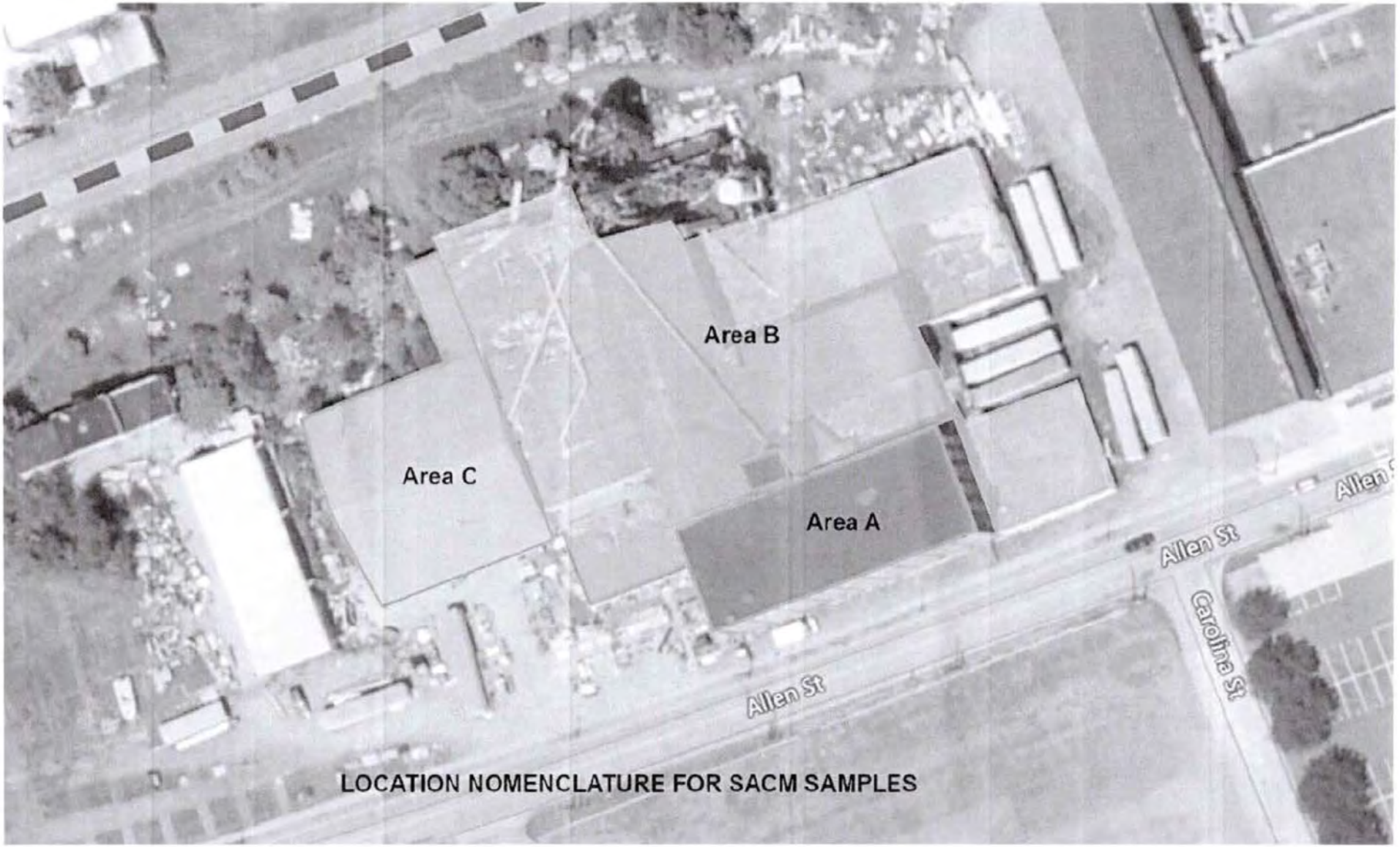
Sampled by	date	time	Received by	date	time
	8-10-22			8/11/22	0700DB

T V Sample Number	P001-BULK001-01	P001-BULK002-01	P001-BULK003-01	P001-BULK004-01	P001-BULK005-01	P001-BULK006-01
e Date	1/20/2022	1/20/2022	1/20/2022	1/20/2022	1/20/2022	1/20/2022
e Matrix	Bulk SACM	Bulk SACM	Bulk SACM	Bulk SACM	Bulk SACM	Bulk SACM
os						
ance	White	White	Gray	White Green	White	Tan
Non-Friable	Friable	Friable	Friable	Non-Friable	Friable	Friable
os Type	31% Amosite, 1% Chrysotile	29% Amosite, 29% Chrysotile	33% Chrysotile	None	44% Amosite, 1% Chrysotile	40% Chrysotile

T V Sample Number	P001-BULK007-01	P001-BULK008-01
e Date	1/21/2022	1/21/2022
e Matrix	Bulk SACM	Bulk SACM
os		
ance	Gray	White Green
Non-Friable	Friable	Non-Friable
os Type	25% Chrysotile	None

Allen Street Asbestos footage (Linear Feet)								
Location	1A	1B	2A	2B	3A	3B	4A	4B
Grey Sheet Board	0	0	0	0	150	90	20	40
TSI	200	1,000	35	55	50	200	0	10
Total per area	**200**	**1,000**	**35**	**55**	**200**	**290**	**20**	**50**
Total Linear Footage	**1850**							
Notes:								
All numbers are in Feet								



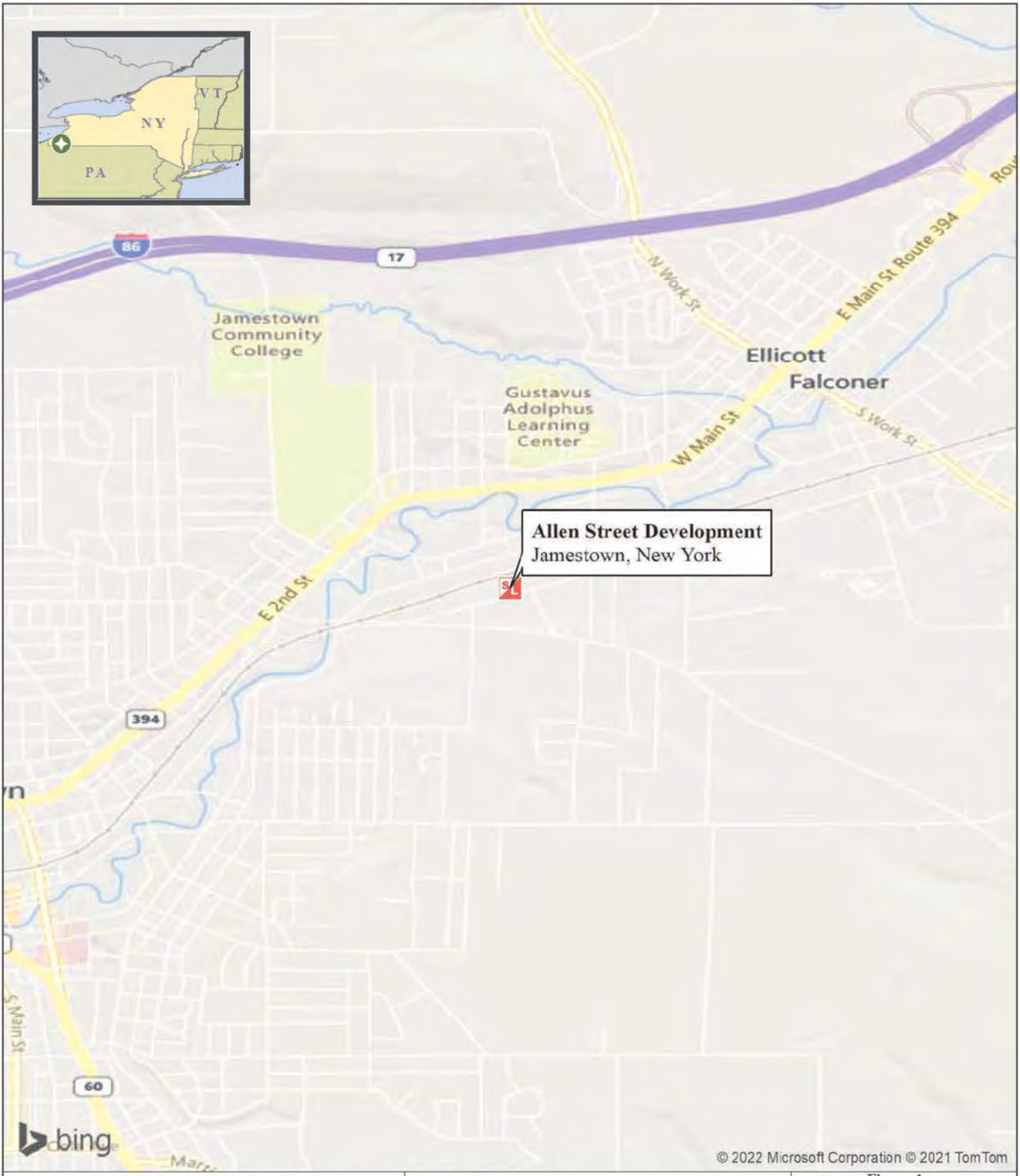


LOCATION NOMENCLATURE FOR SACM SAMPLES

Attachment 3

Figure 1 - Site Location Map

Figure 2 – Site Layout



Legend

Site Location

N

0 0.125 0.25 0.5 0.75 1 Miles

Weston Solutions, Inc.
East Division

In Association With
Eco-Risk; Avatar Environmental, LLC;
Pro-West & Associates, Inc.; On-Site Environmental, Inc.;
Sovereign Consulting, Inc.; and TechLaw Consultants, Inc.

Figure 1:
Site Location Map

Allen Street Development Site
Jamestown, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND TECHNICAL ASSESSMENT
& RESPONSE TEAM V
CONTRACT # 68HE0319D0004

DATE MODIFIED 1/1/2022

GIS ANALYST	M. LANG
EPA OSC	K. GLENN
START V SPM	D. NETH
CHARGE #	40200.031.043.3102

Y:\START_V\00430102\MXD\ALLENSTREETDEVELOPMENT_SLM.MXD



Legend

Area of Concern

N

0 25 50 100 150 200 Feet

Weston Solutions, Inc.
Federal East Division

In Association With
Eco-Risk; Avatar Environmental, LLC;
Pro-West & Associates, Inc.; On-Site Environmental, Inc.;
Sovereign Consulting, Inc.; and TechLaw Consultants, Inc.

Figure 2: Site Layout Map

Allen Street Development Site
Jamestown, New York

U S ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND TECHNICAL ASSESSMENT & RESPONSE TEAM V
CONTRACT # 68HE0319D0004

GIS ANALYST	M. LANG
EPA OSC	K. GLENN
START V SPM	D. NETH
CHARGE #	40200.031.043.3102

DATE MODIFIED: 5/23/2022

Y:\START_V\00430102\MXD\220523_ALLENSTREETDEVELOPMENT_SITELAYOUTMAP.MXD

Attachment 4

RV1 Action Memorandum

January 6, 2023

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

ACTION MEMORANDUM – RV1

DATE: 1/6/23

SUBJECT: Action Memorandum to Confirm a Verbal Authorization for the Emergency Removal Action at the Allen Street Development Site in Jamestown, Chautauqua County, New York

FROM: Keith Glenn, On-Scene Coordinator
Removal Action Branch

KEITH GLENN
Digitally signed by KEITH GLENN
Date: 2022.12.14 15:01:03 -05'00'

THRU: Joseph D. Rotola, Chief
Removal Action Branch

JOSEPH ROTOLA
Digitally signed by JOSEPH ROTOLA
Date: 2023.01.05 07:28:38 -05'00'

TO: Pat Evangelista, Director
Superfund and Emergency Management Division

Site ID: A2AG

I. PURPOSE

The purpose of this Action Memorandum is to document the verbal authorization of funding to initiate an emergency removal action (RV1) described herein for the Allen Street Development Site (Site) located in Jamestown, Chautauqua County, New York. On November 18, 2022, the U.S. Environmental Protection Agency (EPA) On-Scene Coordinator (OSC) requested and was granted verbal authorization to initiate an emergency removal action at the Site pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Authorization was granted by the Acting Director of the Superfund and Emergency Management Division (SEMD). The verbal authorization granted is for a $250,000 total project ceiling, of which $200,000 is for mitigation contracting. This is the first fund-financed removal action at the Site.

The Site is not on the National Priorities List (NPL). There are no nationally significant or precedent-setting issues associated with the proposed response activities.

II. SITE INFORMATION

A. Site Description

Site Name:	Allen Street Development (RV1)
Superfund Site ID ("SSID"):	A2AG
NRC Case Number:	1352703

CERCLIS Number:	NYN000204315
Site Location:	1061-71 Allen Street Jamestown, New York 14701
LAT/LONG:	42.10848°/ -79.21085°
Potentially Responsible Party ("PRP"):	Allen Street Development, LLC
NPL Status:	Not Listed
Removal Start Date:	November 18, 2022

B. Site Background

1. Removal Site Evaluation (RSE)

The Allen Street Development Site includes the location of a former furniture manufacturing facility previously operated by the Crawford Furniture Company (Crawford) which filed for bankruptcy in March 2012. As part of the bankruptcy proceedings, the Crawford property located at 1061-71 Allen Street, Jamestown, New York (Property) and contents within the Property were auctioned off. In July 2017, the Property and remaining contents within, including drums of suspected solvents and unfinished furniture, were acquired by Allen Street Development, LLC (Property Owner). The Site is not listed on the Superfund NPL and is not expected to be listed on the NPL.

Based on vandalism and deterioration of on-site structures, ease of access to interior spaces and use by trespassers and squatters, the City expressed concerns to the Property Owner throughout 2021 and 2022. In April 2021, the Jamestown Department of Development issued a Notice to Vacate order for the Property. On June 8, 2021, after the City and its environmental consultant discussed the Site with the EPA Region 2 Brownfields Program, the City requested that the EPA Removal Program perform a RSE due to the deteriorating conditions of the structures and historical use of VOCs, furniture dip tanks, the potential presence of asbestos and unknown materials accumulated and stored at the Site. EPA discussed this request with the New York State Department of Environmental Conservation (NYSDEC) and has kept NYSDEC appraised of all Site-related activity.

EPA conducted a RSE of the Site commencing with the review of information provided by the City of Jamestown (City). On June 18, 2021, EPA conducted a Site visit and observed numerous 55-gallon drums, discarded auto and airplane batteries, high-pressure cylinders, paints and adhesives, containers labeled "hazardous waste," potential asbestos-containing pipe wrap, unknown liquids in vials, propane tanks and used hydraulic oils. Portions of the facility were collapsing due to years of neglect and the first two floors of the structure were densely packed with airplane parts such as first-class seats, galley carts, kitchen components, engine covers, nose cones, restrooms, wing covers and overhead bins. Other floors within the structure contained raw materials and partially processed wood furniture components remaining from the past owner/operator that made and distributed wood furniture, including tables, bed frames, headboards and dressers. During the inspection, a representative of the current Property Owner agreed to initiate efforts for the removal of waste and management of debris.

On December 20, 2021, EPA notified the Property Owner of its status as a potentially responsible party (PRP) for the Site. EPA requested a response regarding the Property Owner's willingness and capability to perform removal activities at the Site. EPA received a verbal response from the Property Owner on January 10, 2022, indicating a willingness to address on-Site containers.

On January 20, 2022, EPA facilitated an on-Site tour with representatives of the Property Owner, the City police department, fire department, Mayor's Office, Department of Development, Department of Public Works and building inspector, as well as the NYSDEC. During the visit, it was observed that some exterior scrap metal and vehicles had been removed but no materials from inside the facility were removed. Conditions inside the structures appeared to have deteriorated since the June 2021 visit, with additional structural collapses observed and items more disorganized than before. Personnel were able to inspect numerous containers throughout the interior space. EPA's Superfund Technical Assistance and Response Team (START) prepared an inventory of containers that were accessible within the interior of the on-Site facility. Due to adverse weather conditions, an inventory of containers located outside was not performed.

In addition to the container inventory, EPA and the START contractor performed an assessment for the presence of asbestos-containing material (ACM) throughout the interior spaces of the Site. Thermal system insulation (TSI) pipe wrap was observed throughout the facility in various states of deterioration. Pipe wrap was observed intact throughout a majority of the facility however, pipe wrap was also observed leading to collapsed structures, flaking in some areas and significantly deteriorated in other locations. TSI was labeled with warning stamps indicating the material contained asbestos. Additional presumed ACM included gray fiber board observed in areas where furniture heating/baking processes were formerly conducted. Sample results of TSI pipe wrap indicated friable amosite asbestos as high as 44% and friable chrysotile asbestos as high as 33%. Sample results of the fiber board indicated friable chrysotile asbestos as high as 25%.

On January 21, 2022, EPA and the START contractor collected samples from interior containers located throughout the Site. Results indicated the presence of numerous volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and heavy metals, in particular acetone, toluene, and chromium. Several of these containers were found to be in deteriorating condition and staged inappropriately. Between January 2022 and July 2022, EPA provided oversight of a voluntary removal action performed by the Property Owner, where most of the containers were removed from the Site and disposed of. In August 2022, EPA identified additional containers on-Site including 55-gallon drums of corrosive material, 5-gallon pails of paints and adhesives and compressed gas cylinders. Additionally, in August 2022, the Property Owner informed EPA that it consulted with an asbestos abatement contractor to perform an asbestos survey of the facility. The Property Owner indicated that its consultant's samples of roofing material indicated the presence of asbestos however, details regarding the amount of material, type of asbestos and quantity of asbestos were not provided to

EPA. The Property Owner later failed to meet self-imposed deadlines for the timely removal of containers and addressing ACM at the Site.

On November 16, 2022, a fire broke out at the facility consuming a majority of the on-site structures. The fire continued over the course of several days and the Site now consists of debris piles containing ACM exposed to the environment. The Site is unsecured and located adjacent to an active railroad line and operating businesses, and the area is known to be frequented by vagrants. EPA responded to the fire and was on-scene November 16, 2022, while the fire was burning.

The sampling results, along with field observations made by the EPA, OSC during and following the fire, indicate that conditions at the Site meet the criteria for an emergency removal action under CERCLA, as documented in Section 300.415(b)(2) of the National Contingency Plan (NCP).

EPA activated an Emergency and Rapid Response Services (ERRS) contractor on November 21, 2022, to assist with the appropriate and timely stabilization and security of the Site.

2. Physical location and site characteristics

The Site is located at 1061-71 Allen Street (42.10848°/ -79.21085°) in the City of Jamestown, Chautauqua County, New York, 14701. The Site includes one 2.1-acre parcel of land (SBL: 371.13-4-29.1) located in a commercial and light industrial area. The Site is surrounded by additional light manufacturing and commercial properties on all sides. To the north is an active railroad line that leads to the historic center of Jamestown. The Site is bounded to the west by an undeveloped parcel of land and to the south by Allen Street, beyond which is a parking area for the Department of Education. The nearest residence is located in a residential neighborhood approximately 0.13 miles to the south-southeast. According to the 2010 Census Data, approximately 1,038 people live within a half-mile radius of the Site and approximately 6,394 people live within a one-mile radius of the Site.

City documents indicate the on-site facility dates to 1883 and was used for industrial/ commercial purposes. The Site consisted of a main four-story, brick structure with frontage along Allen Street. Attached were interconnected additional structures of various size, shape and construction, however a majority of these structures were severely impacted by the November 16th fire and have been reduced to debris piles. The facility reportedly included approximately 116,800 square feet of manufacturing space and 2,040 square feet of office space. Damage and neglect were evident in nearly all the structures prior to the fire, as windows and doors had been removed, roofs had collapsed, and walls had fallen. The northwest corner of a four-story wooden structure had partially collapsed, creating additional open exposure. The first floors of the facility were packed with debris collected from aviation, gardening and furniture interests in addition to general trash. Elevated floors were primarily used for storing remaining furniture parts for unfinished desks, bedframes, tables, chairs, and wardrobes. In addition, elevated

floors were used as squatter quarters. Three cyclones were located outside to the north and suspected to hold wood pulp, wood dust and mulched wood, reportedly used as a heating source during furniture manufacturing. These structures were also impacted by the fire.

3. Release or threatened release into the environment of a hazardous substance, pollutant, or contaminant

Analytical data from samples collected at the Site has identified the presence of friable asbestos, a CERCLA hazardous substance as defined in 42 U.S.C. § 9601(14), and a listed hazardous substance in 40 CFR Table 302.4 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Site is a facility within the meaning of 42 U.S.C. § 9601(9), and the presence of asbestos in friable form in exterior piles of building debris at the Site constitute a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

III. THREATS TO PUBLIC HEALTH WELFARE OR THE ENVIRONMENT

A. Nature of Actual or Threatened Release of Hazardous Substances, Pollutants, or Contaminants

There is an ongoing release of hazardous substances and pollutants or contaminants at the Site. Asbestos is designated as a CERCLA hazardous substance under 40 CFR Table 302.4 when friable. Friability is the ease with which a material can be crumbled, pulverized or reduced to powder when dry, by applying hand pressure. The degree of friability of the ACM determines the potential for fibers to be released into the air. Sampling and analysis conducted at the Site identified friable asbestos present in TSI pipe wrap, grey fiberboard and roofing material from various on-site structures prior to the fire. This material was never abated or removed and is presumed to be comingled with the debris piles on-site, which are exposed to the elements. The property is vacant, not secured and is subject to active trespassing and vandalism. There is a significant threat to human health for individuals who may come in contact with this uncontrolled release of friable asbestos. Additionally, there may be containers of paints and adhesives, unknown liquids in vials, propane tanks and used hydraulic oils remaining within the debris at the Site if they were not removed prior to the fire or consumed by the fire.

B. Check Applicable Factors (From 40 CFT 300.415) Which Were Considered in Determining the Appropriateness of a Removal Action

__X__ Actual or potential exposure to nearby human populations, animals or the food chain from hazardous substances, or pollutants, or contaminants [300.415(b)(2)(i)].

_____ Actual or potential contamination of drinking water supplies or sensitive ecosystems [300.415(b)(2)(ii)].

_____ Hazardous substances, or pollutants, or contaminates in drums, barrels, tanks, or other bulk storage containers, that pose a threat of release [300.415(b)(2)(iii)].

_____ High levels of hazardous substances, or pollutants, or contaminants in soils largely at or near the surface that may migrate [300.415(b)(2)(iv))].

__X__ Weather conditions that may cause hazardous substances, or pollutants, to migrate, or be released [300.415(b)(2)(v)].

_____ Threat of fire or explosion [300.415(b)(2)(vi)].

__X__ The lack of availability of other appropriate federal or State response mechanism to respond to the release [300.415(b)(2)(vii)].

_____ Other situations or factors that may pose threats to the public health or welfare of the United States or the environment [300.415(b)(2)(viii)].

IV. SELECTED REMOVAL ACTION AND ESTIMATED COSTS

A. Situation and Removal Activities, to Date

1. Current situation

On November 21, 2022, EPA activated an ERRS contractor to secure the perimeter of the Site and prevent unauthorized access and exposure to ACM.

2. Removal activities, to date

On November 16, 2022, a fire broke out at the facility and consumed a majority of the on-site structures. These structures were known to contain ACM and various containers of hazardous materials. The fire caused structures to collapse, and debris piles are located throughout the facility. It is presumed that asbestos is comingled with the debris piles. It is unknown if the Property Owner had disposed of identified containers prior to the fire.

Samples collected of building material prior to the fire indicated the presence of asbestos in TSI pipe wrap, grey fiberboard and roofing material. This material is now comingled with building debris in piles located throughout the Site. The Site is not secured, and these piles are exposed to the environment. On November 18, 2022, the City of Jamestown notified EPA that it did not have sufficient funding or resources to secure the facility. The NYSDEC is aware of the situation and has not offered to conduct a response at the Site.

On November 18, 2022, a verbal authorization was granted by the SEMD Acting Director to conduct an emergency removal action at the Site. EPA activated the ERRS contractor on November 21, 2022.

3. Enforcement

On December 20, 2021, EPA issued a Notice Letter to Allen Street Development, LLC notifying the Property Owner that EPA has determined it is a PRP.

B. Planned Removal Actions

1. Proposed action description

ERRS was activated on November 21, 2022, in efforts to secure the Site to limit access and prevent unauthorized visitors from exposure to friable asbestos. The ACM contaminated debris piles will be secured as best as possible to prevent trespassing, tampering and potential exposures and releases. Use of signage and temporary fencing will be considered. Longer-term security options (gates, fences and Jersey barriers) for the Site will be evaluated as well. ACM may be consolidated and/or stabilized at the Site using appropriate compounds for binding asbestos fibers to prevent further releases. RV1 will mitigate the direct contact threat posed by the piles of ACM waste found at the Site.

2. Contributions to remedial performance

The proposed actions will, to the extent practicable, contribute to the efficient performance of any long-term remedial action at the Site. Actions taken will be consistent with the requirement of Section 104(a)(2) of CERCLA. Currently, there are no long-term remedial actions planned for the Site.

3. Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs within the scope of the removal activities will be met to the extent practicable given the exigencies of the situation. ARARs include the Clean Air Act National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61 – Subpart M), the Toxic Substances Control Act and its implementing regulations (40 CFR Part 761), and the Resource Conservation Recovery Act and its regulations (40 CFR Parts 260-263, 268).

New York State ARARs include Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York at 12 NYCRR Part 56, also known as Rule 56 Asbestos, and 6 NYCRR Part 257.

4. Project schedule

The estimated project schedule is two weeks in duration, however subsequent activities may be performed based on weather and availability of resources.

C. Estimated Costs*

Contractor Costs (ERRS)	$200,000
Other Extramural Costs (START)	$ 50,000
Contingency Costs	$ 0
Total Removal Project Ceiling	$250,000

*EPA direct and indirect costs, although cost recoverable, do not count toward the Removal Ceiling for this removal action. Liable parties may be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA.

V. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

A delay in action or no action at this Site would increase the actual or potential threats to the public health and/or the environment. The on-Site hazardous substances present a significant threat to human health via direct contact and may migrate off-Site via weathering or tracking. The Site is unsecured with a history of use by vagrants. If no actions are taken to secure the Site, the public can come in direct contact with the hazardous substances on-site.

VI. OUTSTANDING POLICY ISSUES

There are no known outstanding policy issues associated with the Site, actions taken or proposed removal activities.

VII. APPROVALS

This decision document represents the selected removal action for this Site, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the Site meet the NCP Section 300.415(b) criteria for a removal action. This document confirms the verbal authorization provided on November 18, 2022, for the Emergency Removal Action at the Allen Street Development Site (RV1). A total project ceiling of $250,000, of which $200,000 was for mitigation contracting was verbally authorized by the Acting Director of SEMD for this RV1 action.

VIII. ENDANGERMENT DETERMINATION UNDER CERCLA SECTION 106: HAZARDOUS SUBSTANCES:

Actual or threatened releases of hazardous substances from this Site may present an imminent and substantial endangerment to public health, or welfare, or the environment.

Pat Evangelista Digitally signed by Pat Evangelista Date: 2023.01.06 09:50:50 -05'00'

Pat Evangelista, Director
Superfund and Emergency Management Division

1/6/23
Date

After Approval:
Cc: J. Prince, SEMD
E. Wilson, SEMD
J. Rotola, SEMD-RAB
D. Kodama, SEMD-RPB
M. Gregor, SEMD-RAB
B. Grealish, SEMD-RAB
C. Fitzpatrick, OPM-GCMB
R. Ng, ORC-NYSB
D. Pace, MSD
M. Mears, PAD
P. Zammit, OIG
T. Benton, START

United States Environmental Protection Agency

Site Redevelopment Profile

Allen Street Development

1061-1071 Allen Street, Jamestown, New York 14701

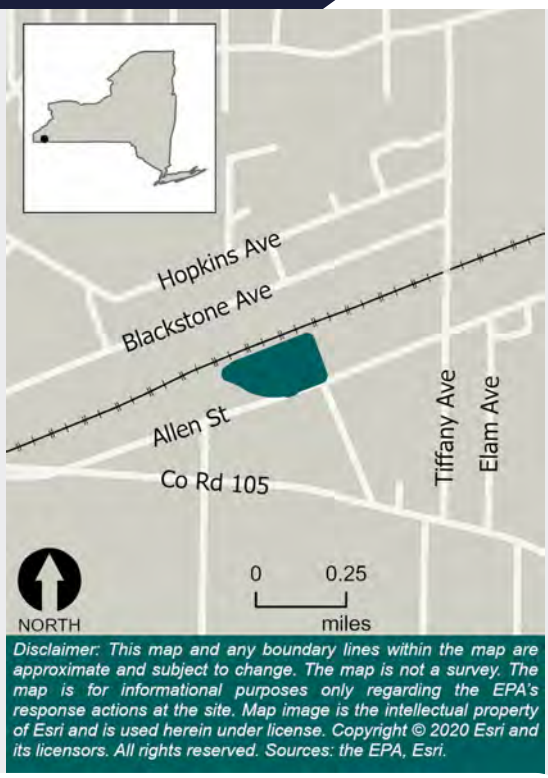


Figure 1. The location of the Allen Street Development site in New York.

Property Overview

Size
2.1-acre parcel

Current Site Uses
- The site is not in use. The city of Jamestown acquired the site property in 2024. A nearby furniture business has expressed interest in expanding onto the site.

Use Restrictions
- The EPA does not intend to place any land use restrictions on the site property.

Surrounding Population

6,074	33,249	42,848
1 MILE	3 MILES	5 MILES

An environmental justice screening indicates that the surrounding area has an above-average probability for environmental justice concerns. Several environmental justice indicators are greater than the 50th percentile for New York and the United States. Some environmental justice indicators are above the 75th percentile. The higher the percentile, the more likely a community is disproportionately burdened by environmental harms and risks.

Site History and Redevelopment Timeline

1883 to 2011
Crawford Furniture Manufacturing Corporation and its predecessors ran a furniture-manufacturing facility at the site. In August 2011, Crawford filed for bankruptcy.

April-May 2012
In April 2012, Crawford's assets, including the site property, were put up for sale as part of the bankruptcy. In May 2012, Allen Street Development, LLC bought the site property.

2021
The EPA and the city of Jamestown were concerned about the condition of structures and visited the site. The property owner agreed to perform cleanup activities with the EPA's supervision.

2022
The EPA continued to supervise the cleanup activities and determined that the site owner was not adequately performing cleanup and mitigation efforts.

September 2022
The EPA's Superfund Redevelopment Program began providing the EPA's site team and the city of Jamestown with assistance for reuse planning activities.

November 2022
There was a major fire at the site. Many structures on the site burned, which released asbestos and other hazardous substances into the environment. The EPA conducted an emergency cleanup to secure the site.

June 2023
The EPA started a cleanup action to address the release of hazardous substances, including asbestos.

2024
The city of Jamestown acquired the site property.

September 2024
The EPA finished removing asbestos and other hazardous substances.

Present
An adjacent furniture business is interested in purchasing the site property from the city of Jamestown and expanding its facilities on-site.

History and Cleanup

The 2.1-acre Allen Street Development site is in a commercial and light industrial area in Jamestown, New York. From 1883 to 2011, Crawford Furniture Manufacturing Corporation and its predecessors ran a furniture manufacturing facility at the site. Crawford filed for bankruptcy in 2011. In April 2012, Crawford's assets, including the site property, were put up for sale as part of the bankruptcy. In May 2012, Allen Street Development, LLC purchased the property to store various items, including airplane parts.

In 2021, the city of Jamestown shared concerns with Allen Street Development, LLC, about trespassing, vandalism and deterioration of structures at the site. The city worked with the EPA to address code violations at the former furniture manufacturing plant and then requested that the EPA evaluate the site for a short-term cleanup known as a removal action. During a visit, the EPA's staff saw numerous 55-gallon drums, discarded batteries, paints and adhesives, and hazardous waste containers at the site. The EPA found asbestos-containing materials inside the facility. The site owner agreed to work with the EPA to clean up and remove all hazardous waste materials. From January to July 2022, the EPA oversaw cleanup efforts. However, after July 2022, the EPA determined that the property owner was not adequately continuing to perform the cleanup. A catastrophic fire broke out at the facility in November 2022, burning the primary structures and leaving asbestos-containing materials and other hazardous substances exposed to the environment.

After the fire, the EPA stabilized and secured the property, fenced the area and posted signs. The EPA then demolished the remaining structures, removed asbestos-containing materials and addressed other hazardous substances at the site. These activities began in June 2023. The EPA finished removing contaminants in September 2024.

Redevelopment

During the cleanup actions, the EPA coordinated with the city of Jamestown and Chautauqua County on ways to support the site's return to productive use. It is in a lively commercial and industrial area in the community where nearby businesses are growing and seeking opportunities to expand. The EPA does not intend to place any land use restrictions on the site property. The city expressed interest in exploring options for acquiring the site property and promoting its reuse for industrial or commercial purposes.

With support from the EPA's Superfund Redevelopment Program, the EPA worked with the city of Jamestown on a situational assessment for the site and an evaluation of property acquisition options. The Superfund Redevelopment Program also helped the EPA's site team conduct a Prospective Purchaser Inquiry Support call with the city to discuss the site's status, federal prospective purchaser liability protections and considerations for addressing any outstanding liens. The EPA and the city coordinated these reuse planning activities throughout the EPA's cleanup activities.

In 2024, the city of Jamestown obtained a court judgment against the property owner and acquired the site property.

The EPA's Prospective Purchaser Inquiry Support Service

The Prospective Purchaser Inquiry Support Service provides comprehensive information about Superfund sites – for both short-term removal and long-term remedial sites – to prospective purchasers so they can make timely business decisions about whether to buy and redevelop site properties. The service is free of charge. The information helps prospective purchasers become good stewards of properties at existing and former Superfund sites. Through this service, the EPA makes sure people have current and accurate information about a site's cleanup status, the compatibility of proposed reuses with site cleanups, including any use restrictions, available Superfund liability protections and any EPA liens. Discussions with the EPA's staff can help clarify appropriate land uses, liability issues and protections, and timelines for proposed activities. In turn, informed purchasers can make sure that their redevelopment plans, timelines and activities are consistent with site cleanups and coordinate with the EPA to ensure the long-term protection of human health and the environment. After a Prospective Purchaser Inquiry call or meeting, the EPA may summarize the information in a comfort letter and suggest additional reuse tools.

The city met the criteria to qualify as a Bona Fide Prospective Purchaser before acquiring the property.

The EPA facilitated reuse considerations starting from the early stages of the project, coordinating with agency resources and local government. Support from the EPA's Superfund Redevelopment Program provided reuse tools to help facilitate ownership transfer. The site is now on a path to redevelopment. A local furniture business that owns the property next to the site has expressed interest in purchasing the property from the city and expanding its facilities on-site. The timely and sustained efforts of the EPA, state and local governments, and neighboring businesses show how reuse planning can support successful redevelopment projects at Superfund sites, while providing long-term economic, public health and environmental benefits to the community.

"The city of Jamestown is grateful for the EPA's partnership and assistance at the Allen Street Development site. We began working with the EPA in June 2021 to address hazardous conditions. Technical assistance through the EPA's Superfund Redevelopment Program helped us evaluate the site's future redevelopment potential. Our Urban Renewal Agency then successfully acquired part of the site. The guidance we received made it possible for us to look to a more positive future – a future that restores the site to the tax rolls, builds on the city's strong manufacturing ecosystem, and creates new business and job opportunities"

Crystal Surdyk
Director of Development, city of Jamestown

"The fact that this success is during/following a removal action highlights that reuse is an important part of the Superfund process at any and every stage and should be integrated into the cleanup mindset from the get-go."

Claudia Shuman
EPA Region 2 Superfund Redevelopment Coordinator



Figure 2. Crystal Surdyk, Director of Development for the city of Jamestown, New York, at the Allen Street Development site. The city acquired the property as a Bona Fide Prospective Purchaser. (Image used with permission of the city of Jamestown.)

Contacts

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For more information see: www.epa.gov/superfund-redevelopment

Appendix F.
Health and Safety Plan

Brief description of work	Ulity Locaàte Oversight, Drilling / Well Installation Oversight	Project #.	
Site/ Locaon` of work	Dow JMS Essex-Hope Jamestown NY	Project Name:	JMS OU-3 RI_FS
Assessed by	Rich Rathnow CIH CSP		
Review cycle	Where any significant change to work or environment occurs, a thorough review of the risk assessment must take place and a new method statement written if required.		

Perform an initial and residual risk calculaon (seąe instrucons` below). Refer to Table 1 in the PHSEP for the overall hazard/environmental impact assessment.	Initial Overall Risk Assessment Code (RAC)	6	Final Overall Risk Assessment Code (RAC)			
	Risk Assessment Code (RAC) Matrix					
	Incident Actual or Potenal` Severity Level	Probability				
		Highly Unlikely (1)	Unlikely (2)	Possible (3)	Likely (4)	Highly Likely (5)
Consider all categories in the risk assessment including injury/illness, environment, reputation, economic/material production, motor vehicle incidents (see IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work). Severity levels match the WPS ratings – 1 is lowest and 5 is highest.	5	5	10	15	20	25
	4	4	8	12	12	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
Step 1: Review each “Hazard” and “Environmental Impact” in Table 1 of the PHSEP without regard for any controls in place and indicate overall RAC in “Initial Overall Risk” box above. Refer to IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work, for the expanded risk assessment chart (review injury/illness, environment, reputation, material production and motor vehicle incident and associated probability and severity definitions).						
Step 2: Identify the RAC (probability vs. severity) as H, M, or L for each “Hazard” or “Environmental Impact” after controls are in place. Annotate the final overall highest RAC in the upper right box.						

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
General preparation	Forgotten safety equipment, no cell phone coverage, lack of emergency preparedness, untimely reporting of an injury or other incident	Check for cell phone coverage. Designate rally point and evacuaon point` (daily if working in new locaons` each day). Check daily weather report and plan activities around severe weather. Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellent, PPE as specified in HSP, water, spill kits, thermometer or stop watch for heat stress monitoring, access to shade, etc. Be sure to review the requirements for incident noficaàtion, reporting and investigation section of the HSP. Report all injuries, no matter how minor. If you are unsure whether an event should be reported, contact your RHSM. Be sure to report near misses.	1
Arrive on site			1
Complete PHSEP, AHA review Complete Pre-Task Safety Plan	Vehicle congestion, traffic flow/control, access difficulties, visibility hazards working around heavy equipment	Wear proper PPE as specified in HSP including safety glasses with side shields, hard hat, hearing protection, safety boots, work gloves, and high visibility traffic vest.	1

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessmen t Code (RAC)
Complete Drilling Self Assessment checklist (for observing drilling only)		Determine appropriate locations for drill rig and support vehicles and ensure that travel route within Bldg. are clear for travel, inspect areas for overhead obstructions or utilities. Check area for rig accessibility (i.e. clearances, solid ground). Use cones or barricades as necessary to idenfy and` control site boundaries and access.	
Confirm list of soil borings/wells to be installed / abandoned, determine locations and route to be taken.	Biological hazards Weather related issues (heat and/or cold stress) Fire	Inspect area for biological hazards. Follow the biological hazard precauons, guidelines,` and fact sheets in the HSP for ticks, rodents, spiders, snakes, poisonous plants, etc. Wear and use proper clothing and sprays to protect against ticks, mosquitoes, poison ivy, and other biological hazards. Personnel should dress appropriately for ambient temperatures which would include but not limited to dry layered clothing. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area	1

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. Check the fire extinguisher on drill rig to verify inspecon and chaàrge.	
Hazards and controls applicable to all steps of field work.	Temperature Extremes (heat)	Acclimatize to work in hot weather by working in heat and taking more frequent breaks, systemacally` building up tolerance to heat  Conduct field activities in the early morning if possible to avoid heat or inclement weather.  Having enough water onsite so that each worker can consume at a minimum, one quart per hour per shi.` Frequent reminders and/or water breaks shall be taken so that each person can consume enough water. Access to shade (i.e., blockage from direct sunlight) shall be provided and shall be reasonably close to the work area (either A/C vehicle or canopy/tarp). Workers shall be allowed to take a work-free cool down rest/recovery periods at any time when they feel the need to do so to protect themselves from overheating, or at the first sign of heat illness-related	4

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		symptoms (NOTE: if heat related symptoms are occurring, contact the RHSM). Training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacng` emergency medical services (see HSP, Temperature Extremes section). Follow the requirements for physiological monitoring as stated in the HSP. (e.g., During work in Tyvek in temperatures above 70 degrees, perform physiological monitoring—see safety plan if not wearing Tyvek for when to start monitoring) and document on the heat stress physiological monitoring form. Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress. Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe.	
	Temperature Extremes (cold)	Read and follow cold stress precautions specified in the HSP.	4

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Wear layers and ensure you're dressed adequately for site conditions. Takes breaks in a warm locaon as neạcessary and stay hydrated with warm fluids (avoid caffeine). Monitor your co-workers for signs of cold stress. Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe.	
	Ticks	Wear light colored long sleeve shirts and pants. Use repellent on exposed skin (with at least 35% DEET) if ticks/other biting insects are suspected in the area. Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product. Tape bottoms of pant legs or tuck pants into socks. Wear protective clothing such as Tyvek or Bug-out suits if cks areạ abundant in addition to controls above. Have tick removal kits accessible. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		continue field work until these controls can be implemented. See Tick Fact Sheet attached to the HSP for further precautions and controls to implement when ticks are present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse.	
	Wasps	Keep exposed skin to a minimum. Carry a kit if you have had allergic reacons in thea̧ past, and inform your supervisor and/or a buddy. Ensure that first-aid kits contain over-the-counter allergy and itch medication (e.g., Benadryl, Clarin,` etc) as well as other over-the-counter medications. If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas. If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		If you are stung, contact the occupational nurse, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (e.g., credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reacon is` severe.	
	Other biological hazards	Refer to the HSP for controls on other biological hazards possibly present dependent on season/location, including snakes, spiders, and poisonous plants.	2
	Inclement weather	Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defences. Carry clothing appropriate for inclement weather. Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel	2

Table 1			
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		should discontinue work and seek shelter until the storm has passed. Avoid working during thunderstorms. If caught in one, seek shelter. Avoid low lying areas such as washes after rain as they can flood. Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuaon asseạmbly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.	
Mobilize to drilling, drill set up.	Driving hazards, contact, caught, and fall hazards.	Inspect the vehicle prior to departure. If driving a rental car, become familiar with the safe operaon` of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteriscs thaàn smaller vehicles. Drivers shall not use cellular phones, or other two-way communication devices while driving (including	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		hands-free devices). Pull over and park the car to make or take phone calls, text, or e-mail. Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Pracce` defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you.  If vehicle is malfunctioning, don't pull over off the road suddenly. Give the traffic behind you noce` that you are pulling off. Always wear seatbelt in vehicle, regardless of length of drive. Apply Get Out and Look (GOAL) when returning to the vehicle to prevent property damage and injury by looking for obstrucons, peạrsonnel or other items. Back slowly and use a spoeạr when view is obstructed. Personnel should stay out of the operator's blind spots while equipment if being moved and set up between borings. Wear high visibility traffic vests. Ensure that all heavy equipment has reverse alarms.	

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Remain alert and attentive to locaon of and movement of all drilling equipment. Inspect immediate work area—remove slip, trip fall hazards as feasible or mark to warn of a hazard.	
	Exertion- liing, repeaitive tasks, strains/sprains	Utilize proper lifting procedure when loading and unloading vehicles and equipment. Use mechanical means when available or necessary. Bend down at the knees and lift with your legs rather than bending and liing with your back. Do not lift and twist. Set-up field vehicle to minimize distance of travel when carrying equipment, materials, and tools. Plan route that is the most level and free from slip/trip hazards from vehicle to sample locations to use when carrying materials to and from vehicle. Work in the “power zone” (power zone for liing or working is close to the body, between mid-thigh and mid-chest height. This zone is where arms and back can li theai most with the least amount of effort) and reduce kneeling or reaching above shoulder height. Use material handling devices. Use mechanical means or a buddy.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Use the Lifting evaluation form to evaluate liing of samples/coolers. Involve HSM if repetitively liing or lifting over long distances. Use partner to assist in li of heaà vy equipment, be aware of pinch points when using truck lift gates, lì with legs not your back. Tie down all loads securely (rope, bungee cords, load bars) Wear leather gloves, as necessary, when loading equipment JACOBS HILL personnel shall not lift more than 40 pounds. Get a buddy or use mechanical lifting/handling devices.	
Hand clear soil boring location to assure no underground improvements (if appropriate and necessary). (Hand dig to 5 feet bgs in areas where suspected utilities may be but not showing on utility surveys.)	Contact, Exposure, Exertion Hazards Striking or coming into contact with buried or overhead utilities may potenally eạxpose personnel to hazards including high voltage, electricity, natural gas, industrial wastewater, and raw sewage. Hot Soil	Hand clear slowly, do not force through soil may contact/break underground lines (“soft dig” technologies recommended). If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact client or project representative—locaon may have to be moved. Wear proper PPE: safety glasses with side shields, hard hat, safety boots, leather gloves, high visibility traffic vest, chemical resistant over-gloves, if necessary.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Slowly hand clear and use a balanced stance with feet shoulder width apart to avoid back, neck, and wrist strain. Take turns to avoid fatigue. Wear ANSI level 3 gloves for contact with tooling used in heated soil	
Open or cut concrete / asphalt well pad	Contact, Caught, Fall Hazards.	Wear proper PPE as specified in HSP including safety glasses with side shields, hard hat, hearing protection, safety boots, work gloves, high visibility traffic vest. Proper use of equipment (i.e. concrete saw, core drill, etc.) - make sure all kill switches, blade guards, are funconing` properly and correctly positioned.  During cutting activies be` aware of flying debris; wear a face shield if necessary. Bend down at the knees and lift with your legs rather than bending and liing with` your back.	2
Begin Drilling to install wells as necessary including hollow-stem auger or sonic drilling techniques.	Exposure to loud noise, flying debris, dust, chemical contaminaon, aànd entanglement with rotang equipment.`	Inspect all equipment daily prior to use. Subcontractor to document daily inspections. Do not allow the drill rig to be running when the driller is not present.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
	Exposure to overhead suspended loads	If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact client or project representative—locaon` may have to be moved. Stay away from moving rotating parts (i.e. augers, drill drive shaft) Personnel shall not wear loose fitting clothing to avoid the potential for entanglement with rotating equipment. Do not attempt to operate drill unless emergency shut-down is necessary. Know site contaminants for the site. Air monitoring will be performed in breathing zone in accordance with site HSP. Acon leạvels will be followed in site HSP. If COCs of site aren't addressed in the HSP, contact the HSM. Wear proper PPE: clear safety glasses with side shields inside Bldg, hard hat, safety boots, high visibility safety vest, leather and/or chemical resistant gloves, hearing protection, if necessary, and coveralls or tyvek if there is potential for contacting potentially contaminated soil or water.	

Table 1			
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		Personnel conducting oversight dueạs shall wear hearing protection if it is not possible to communicate with another person standing next to you using your normal voice. Stay away from drilling operaons while` drilling in place (overhead hazards, line of fire) If necessary to keep personal clothing clean, or if in areas with potential contamination, personnel shall wear Tyvek to minimize contact with contaminated dust/soil that may be generated during drilling activities. Use good housekeeping practices, keeping the work area clear of trip hazards Ensure water does not accumulate in the drilling area. Designate a specific area to place all soil cungs, try` to place the cungs in` a locaon thaảt is outside of the general work flow Do NOT stand beneath suspended loads. Verify that travel route for rig has sufficient ramp/dunnage to prevent damage to cables and/or they are LO/TO	

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Utilize faceshield within 10' of DPT during core barrel removal If handling steel sample sleeve or hot tooling prior to cooldown utilize ANSI level 3 gloves at minimum. Do not handle w/o unless temp has been confirmed by thermometer to be less than 110 degrees Fahrenheit. Perform air monitoring in breathing zones during advancement and retrieval of core Ensure that driller is slowly removing the core to allow equilibrium to prevent steam / GW ejection from borehole. Ensure water generated in ice bath is draining and not submerging sample cores Ensure that tool mfg. requirements are being adhered to for tool used to open sample sleeves. If using a powered cutting tool, the sleeve should be secured such that a person's hands are not in the line of fire. In the event of a minor burn Cool the burn. Immediately immerse the burn in cool tap water or apply cold, wet compresses. Do this for about 10 minutes or until the pain subsides. Cover area with	

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		nonstick, sterile bandage. Notify WorkCare if Jacobs employee.	
	Drilling hazards, utilities strike, injury to personnel by rotating augers, unauthorized personnel	Demarcate both areas of the drilling work area (origin point and point where auger will come out). Ensure that grounding rod is installed and properly connected. Monitor sensor on tip of drill bit during drilling operations for proximity to buried electrical line. If sensor indicates underground lines stop work, evaluate the situation, and if possible hand dig to locate possible underground lines. If it is not possible to hand dig to verify locaon, Stop` work and request direction from the onsite supervisor before proceeding. During drilling operations monitor the heat sensor for the drilling tip to verify that the equipment is not overheating. If temperature exceeds normal operating parameters stop work until the cause is determined or the equipment is cooled and can operate within the approved temperature range. Keep hands and fingers away from drill bit storage rack during the feeding of the bits and mechanical bit attachment operations.	2

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		Guard or protect moving parts or restrict access. Be sure equipment is completely powered down prior to approaching.	
	Striking or coming into contact with buried or overhead utilities Pinch points Injury from improper or un level rig set-up	Check well locations for underground and overhead utilities and Bldg. equipment / overhead hazards Check intrusive locations for underground utilities. Follow the "Utilities (underground)" section of the HSP. Any deviation from the HSP must be discussed with the HSM prior to intrusive activities. Obtain work clearance or "dig" permits. Work will not proceed until approved dig permits, with all required signatures, are obtained and at the site. Perform walk-through with subcontractor of permit conditions and utility markings to verify (360 degree inspection). JACOBS protocol for underground utilities include: a background/records assessment or known utilities or other subsurface obstructions; contacng` the designated local ulity locaàng service (e.g.,` OneCall); conducting an independent field survey to locate, identify and mark utilities/obstructions; and a visual survey of the area to validate the chosen locaon (seeạ safety plan for details).	2

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		If drilling will be conducted within 5 feet of an underground utility (or when there is uncertainty about location), locations must be physically verified with non-aggressive means such as with air or water knifing, hand digging/augering. If intrusive activities are within 5 feet and parallel to a marked existing utility, the ulity locaàtion must be exposed and verified by non-aggressive methods every 100 feet (30.5 meters). Check to see if the utility can be isolated during intrusive work. Aggressive methods are never allowed within 3 feet of an identified high risk utility (ulity thaàt can't be de-energized or would cause significant impacts if damaged). Know where the kill switch is located on the drill rig in case an emergency shut-down is necessary. Observe rig mast set up, so no contact with overhead obstacles. Know voltage of overhead electrical lines so that the minimum safe distance can be determined in accordance with the overhead utilities secon of the HSP. Proper rig set up and leveling.	

Table 1			
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		Remind everyone never to leave hand tools on rig.	
	Fire/explosion/Spill Hazards associated with drill rig	Use Multi-Rae LEL/O2 monitor to check soil cung` area/point of operaon.` Have spill materials and 20-lb ABC fire exnguisher` in the area. When feasible, drillers should use best practices such as placing visqueen or other secondary type containment under rig to catch hydraulic leaks.	
Using generator/ ba. eries	Electrical hazards/shock from generator or battery Carbon monoxide Generator/noise hazard	Use GFCI and grounding rods or ground to vehicle. Place generator at extension cord length distance downwind of site. Verify all cords are in good condio n. Ensure ground is present on extension cord. Cords should be heavy duty and designed for exterior use. Ensure cords are not laying in water. Do not use gas powered generator in an enclosed area. Use equipment in compliance with manufacturer's guidelines and only for applicaons for which they were designed. Do not remove guards.	1

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		If vehicle ba eries are used, care must be taken when using 12-volt DC ba eries. Follow manufacturer instrucons f or maintenance of batteries. Follow equipment manufacturer's instruco ns for ba ery use in that equipment and or for charging. Using hearing protecon or move the gene rator away from work area.	
Groung W ell	Splash, laceraon, con tact, unprotected personnel in work area	Use of appropriate personal protec ve equipment (PPE) where required. Safety boots, hard hats, safety glasses and hearing protecon are mandato ry. Wear N95 filtering facepiece masks – when poring/mixing grout and visible dust is present. No loose-fing clothing, rings, watches, etc.; long hair to be restrained close to the head. Wear the proper gloves for the work acvity Inspect all Power/Hand tools for proper funcon and condi on Use proper handling techniques and liing techniques when working with the grout Be aware of lines and hoses under pressure, always assume there is pressure in a line	2

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		Maintain a clean work environment, clean up leaks and spills, avoid slips and trips by coning off areas with lines Ensure Personnel within 20' of pressurized lines are wearing faceshield and safety glasses	
	Hose Connecon F ailure	Visually inspect hose and connecons. Ho se should have no visible signs of cracks, wear or fa gue. Connecons on hoses should be aached by bande d clamps. Use whip check on Chicago fin gs	2
Mixing Grout	Silica Inhalaon – damage to lungs Corrosive Portland – causc burns to skin, cut, strike	While adding Portland Cement and Bentonite to the water, if dust cannot be contained, workers must wear a N95 respirator to minimize parcula te and silica exposure. Wear a N95 respirator while pung empty cement bags into a trash bag. Portland cement / grout must not contact the skin. Ensure a clean water source is nearby to flush skin if any incidental exposure occurs; immediately flush with water. *In some instances, individuals may exhibit acute sensivity t o Portland Cement / grout exposure. Any individual who has either experience with or knowledge of a preexisn g condion in r egard to contact with Portland Cement / grout must take extra precauons. Those employees must aem pt	2

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		to mig ate exposure by wearing long sleeve shirts and ulizing a do uble glove standard (nitrile glove under driller's glove). Securely hold all pressurized hoses while mixing grout to prevent recoiling. Wear faceshield and safety glasses. Cut the bag in a smooth fluid moo n cung awa y from you. When cung open t he bag of Portland Cement visually inspect adjacent area to ensure the safety knife will not accidentally damage hose or individuals working next to you while wearing cut resistant gloves	
Prepara on to mobe to next drilling locaon or lea ve site.	Contact, Caught, Exposure, Exero n Hazards	Ensure an observer is watching the lowering of the drill rig mast so no lines or overhead obstacles are contacted. Prior to lowering rig off of outriggers make sure all tools and personnel are clear of the drill rig. Bend down at the knees and li wi th your legs rather than bending and liing with your back while loading tools. Wear proper PPE (hard hat, safety glasses with side shield, hearing protecon (while rig is ope ra onal) steel toe boots, leather work gloves.	1

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		Prior to driving to next locaon mak e sure auger racks are in. While rig is moving on site have spoe rs verify clearance so no overhead obstacles are contacted and no obstacles are hit while backing. Properly remove PPE and wash hands and face, no smoking, drinking, eang i n the work area, EZ or CRZ.	
Decontaminaon of drill rig, augers, bits (as necessary, based on site contaminants)	High noise levels Injury from high water pressure Slip, trip, & fall Muscle strains –liing Ergonomic - awkward posions (bending down to pressure wash); fague Wet and/or cold stress	Follow Dow Pressure washing LCS Permit Addendum Hearing protecon r equired if noise levels may exceed 85 dBa Polycoated Tyvek or equivalent, 16-inch-high steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves will be worn, at a minimum. Inspect pressure washer before use and confirm deadman switch fully operaonal Operator will maintain a firm grip on the wand assembly when operan g the unit. The trigger will not be ed down or blocked open and the operator will not leave the equipment una ended.	1

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessmen t Code (RAC)
		The operator will ensure that hands and other body parts are never placed in front of the wand while in operaon and that the wand is never directed towards people or electrical components. Wand extension used to prevent awkward posi ons. Be aware of potenal slip and trip hazards such as wet surfaces and hoses. Ergonomic concerns such as muscle fag ue and heat stress (from wearing rain gear) may exist. Contain all decon water and dispose of properly Properly dispose of decontaminaon wa ter and PPE is designated areas. Become familiarized with the detergent (i.e. Alconox) SDS before beginning decontaminaon.	
Load Truck	Back strain - Improper liing tec hnique	Uliz e proper liing pr ocedure when loading coolers and equipment back into truck. (to avoid liing heavy/awkward coolers leave cooler on tailgate to load samples and ice into). Bend down at the knees and li wi th your legs rather than bending and liing with your back. Stay in power zone as described above	2

Table 1			
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Take down work area (cones, flags, barricades)	Traffic which includes being struck by pedestrian or other vehicles. Pedestrian traffic trying to cross work area- slips, trips, falls Damage to equipment. Injury to other personnel. Slips, trips, falls. Back strain - Improper liing tec hnique	Wear highly visible clothing such as orange reflecve traffic vests or clothing. Stay alert to surroundings and traffic (if possible move truck over to work area to reduce take down me and loading, use flashing light and truck hazard lights for added safety). Load all equipment into truck neatly. Keep work area clear of cauon tape and cords during removal of traffic control. Uliz e proper liing pr ocedure when loading traffic control equipment back into truck.	1
Depart From Site	Traffic, pedestrian, and obstacle hazards	Ensure site is clean and nothing is le behind. Drive defensively, wear your seatbelt, obey all traffic laws, and know the route to site prior to trip.	2

Equipment to be Used (List equipment, supplies, PPE, to be used during the task)	Inspecon R equirements (List inspecon r equirements, checklists to be filled out, or permits needed)	Training Required (List training and/or medical monitoring required to complete the task)	Specific Access Arrangements (if applicable)
Hand and power tools Drill rig, heavy equipment Sampling equipment/containers PID Fire exnguisher(s) Fuel storage/equipment Portable eye wash First Aid/Bloodborne pathogen/CPR kit Traffic control equipment Support vehicles Sunscreen Spill kit/materials SDS for any chemicals used onsite	Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defecv e equipment) Verify drill rig emergency shut offs are opera onal daily Calibrate CGI and PID prior to use Visual Inspeco ns of work area daily Use of applicable project self-assessment checklists Ensure cell phone has coverage and have fully charged. Determine daily rally point / evacuaon route	Dow Permit Issuer Training Dow LCS Training for Heavy Equipment Dow LCS Training for Pressure-washing OSHA 40-hour HAZWOPER inial training, current refresher, 3-day OJT, and medical clearance. Hazard Communicaon t raining, as appropriate Training on Jacobs HSP and Subcontractor's applicable AHAs Qualified subcontractor operators (for equipment such as drill rigs) Documented training on SDSs for any chemicals used (see HSP on how to document). Qualified SL-HW VO Modules as required by the Health and Safety plan	Contact HSM for training issues

Task Hazard/Impact Iden ficaon and Risk Assessment Sign-Off

Print Name	Signature	Role on Project	Date/Time

Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time

Brief descrip on of work	Soil Sampling	Project #.	
Site/ Locaon of work	Dow JMS Jamestown NY	Project Name:	Dow JMS - OU-03 Essex-Hope
Assessed by	Rich Rathnow CIH CSP		
Review cycle	Where any significant change to work or environment occurs, a thorough review of the risk assessment must take place and a new method statement wrien if required.		

Perform an inial and r esidual risk calculaon (se e instrucons belo w). Refer to Table 1 in the PHSEP for the overall hazard/environmental impact assessment.	Inial Over all Risk Assessment Code (RAC)	4	Final Overall Risk Assessment Code (RAC)			4
	Risk Assessment Code (RAC) Matrix					
	Incident Actual or Potenal Severity Level	Probability				
		Highly Unlikely (1)	Unlikely (2)	Possible (3)	Likely (4)	Highly Likely (5)
Consider all categories in the risk assessment including injury/illness, environment, reputaon, economic/material producon, mot or vehicle incidents (see IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work). Severity levels match the WPS ra ngs – 1 is lowest and 5 is highest.	5	5	10	15	20	25
	4	4	8	12	12	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
Step 1: Review each “Hazard” and “Environmental Impact” in Table 1 of the PHSEP without regard for any controls in place and indicate overall RAC in “Inial Over all Risk” box above. Refer to IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work, for the expanded risk assessment chart (review injury/illness, environment, reputaon, material producon and m otor vehicle incident and associated probability and severity definions).						

Step 2: Idenf y the RAC (probability vs. severity) as H, M, or L for each “Hazard” or “Environmental Impact” aer c ontrols are in place. Annotate the final overall highest RAC in the upper right box.				
Work Task Sequence	Hazards	**Potential Energy** Associated with Task	Hazard Controls	Risk Assessment Code
General site work	See General Site Oversight AHA for general site hazards and controls (driving, biological, inclement weather, traffic, liin g hazards, security). See Ulity Loc ate HIIRA for ulity haz ards and controls.			
Prepare for sample collec on, (subsurface samples), sign installaon	Striking or coming into contact with buried ulies ma y potenally expose personnel to hazards, including high voltage, electricity, natural gas, industrial wastewater, and raw sewage.	Electrical, Mechanical, Chemical, Moon	Check sample locaons f or underground ulies. Loca ons will be marked with white paint. Underground Services Alert will be nofi ed 48 hours before beginning work. Use proper liing pr ocedure when loading and unloading equipment into and out of vehicles. Use mechanical means when available or necessary. Bend at the knees and li with your legs rather than bending and liing with your back. Do not li and twis t.	L
Sample collecng using hand tools (i.e., hand auger and/or slide hammer soil corer)	Contact, exposure, exero n hazards	Mechanical, Radiaon, Noise, Temperature, Moon, Gr avity	Hand auger slowly. Do not force auger through soil. Be aware of pinch points when using slide hammer. Keep hands away from the impact zone. If an obstrucon is enc ountered, suspend work and determine what the	L

			obstrucon is. If it c annot be determined, contact client or project representave —work locaon ma y have to be moved. Wear proper personal protecv e equipment (PPE): safety glasses with side shields, hard hat, ear plugs (if necessary), safety boots, leather gloves, high-visibility traffic vest (if necessary), chemical resistant over-gloves, if necessary. Use a balanced stance with feet shoulder width apart to avoid back, neck, and wrist strain. Take turns to avoid fag ue. Drink plenty of water (during hot, warm, and cold weather).	
Receiving sample containers (possibly preserved)	Glass containers, broken glass, cuts to hands Handling signs Packaging material, preservav e leak	Mechanical, Chemical	Use cauon when o pening packages and removing containers. Wear proper PPE, including safety glasses with side shields or goggles, nitrile gloves, and splash protecon as necessary (apron or Tyvek).	L
Prepara on of sample containers	Handling of chemicals or spilling of chemicals on skin, clothes, or eyes	Chemical	Never leave open chemical containers una ended. Know locaon of nearest eyewash staon.	L

			Wear proper PPE, including safety glasses with side shields or goggles, nitrile gloves, and splash protecon as necessary (apron or Tyvek). Keep prepara on and pack area well-venla ted (open window). Read safety data sheet (SDS) for preservaon ma terial. Know locaon of SDS, absorbent spill cloth, and hazardous material spill kit. Do not hold sample containers on your lap when adding preservav e. Make sure caps are secure.	
Collecng soil samp les	Exposure, contact, slips, trips, falls	Mechanical, Gravity, Moon, Chemical	Wear proper PPE: safety glasses with side shields, hard hat, safety boots, and chemical resistant gloves. Wear high-visibility clothing if near traffic or heavy equipment. Maintain clean work area. Keep walkways clean and clear, and tools picked up. Use dedicated pen for logging informa on into field book to prevent potenal c ontact with contaminants following logging acvies.	L

			Handle sample jars safely. If a jar is broken, make sure cut resistant work gloves are used during cleanup. Use appropriate nonreacv e tools (plas c spoons, stainless steel trowels, etc.) to collect media from the collec on equipment. Air monitoring will be performed in the breathing zone in accordance with the Accident Prevenon Pl an (APP)/Site Safety and Health Plan (SSHP). Acon levels will be followed as outlined in the APP/SSHP. Use wet methods if COCs expected. Follow lead and arsenic mig aons measures in APP/SSHP. Wash hands aer sampling.	
Handling/backfilling sample holes with bentonite	Grout, dust Cuts Manual handling, sprains/strains	Chemical, Moon	Open bags with snips. Do not use open blade knives. Use two persons to li 50 -pound bags. Use vehicles, carts or wheelbarrows when possible when moving bags. Observe CH2M 40-pound liing limit, or follow liing equ aon in SS HP. Ensure that bentonite is kept wet when opening bags and pouring. Use weed sprayer or hose to keep bags wet.	L

			Keep upwind and adequate distance from bentonite when pouring. Wear nitrile and work gloves to handle bags. When handling bentonite, use dust spoggles if wind speed is greater than 25 mph.	
Decontaminaon of hand auger and equipment	Constue nt of concern (COC) exposure hazard Splash hazard Spills	Chemical, Gravity	Place decontaminaon buck ets on visqueen on ground or in sampling vehicle. Become familiar with the detergent (Alconox) SDS before beginning decontaminaon. Decontaminate sampling tools slowly to minimize splash hazard to oneself and/or onto ground. Be aware of poten al slip and trip hazards such as wet surfaces and hoses. Contain decontaminaon wa ter and dispose of properly. Properly dispose of decontaminaon water and PPE in designated areas. Wear appropriate PPE. Do not leave exclusion zone with PPE on.	L

			Ensure sampling equipment/tools are decontaminated prior to reuse or leaving exclusion zone.	
Handling/loading sample coolers	Lii ng hazards, back injury or strain Contact with broken glass in coolers Exposure to potenal contaminants from broken container Tape gun – sharp edge	Gravity, Mechanical, Chemical	Use proper liing pr ocedure when loading coolers and equipment back into truck. To avoid liing hea vy or awkward coolers, leave cooler on tailgate and load samples and ice into the cooler. Ensure coolers and handles are in good condion. Use mechanical means or a buddy when available or necessary. Bend at the knees and li with your legs rather than bending and liing with your back. Do not li and twis t. Use cauon when taking contents out of cooler. Inspect coolers for cks, spid ers, and broken glass. Wear leather gloves if you have to handle broken glass. Wear appropriate PPE for sample handling. To extent possible, prepare tape strips separately and apply to sample boles by hand. Break tape by pushing tape gun away from you. Ensure that your hands and legs are not in the path of the tape gun.	L

Equipment to Be Used (List equipment to be used in the work acvity .)	**Inspection Requirements** (List inspecon r equirements for the work acvity .)	Training Requirements (List training requirements, including hazard communicaon.)
Standard PPE (safety glasses, hard hat, long sleeve shirt, safety boots, high-visibility clothing) Hand and power tools Air monitoring equipment (photoionizaon detect or, dust monitor) Fire exnguishers Portable eyewash First aid/bloodborne pathogen and cardiopulmonary resuscita on (CPR) kit Sample coolers Sampling equipment Decontaminaon supplies	Inspect equipment and tools prior to each use. Calibrate air monitoring equipment prior to use. Visually inspect work area daily. Use applicable project self-assessment checklists. Inspect vehicles prior to operaon.	Occupaonal Saf ety and Health Administraon (OSHA) 40-hour Hazardous Waste Operaons and Emergency Response (HAZWOPER) inial training, current r efresher, 3-day on-the-job, and medical clearance Hazard communicaon tr aining, as appropriate Training on APP/SSHP Review APP/SSHP for new site personnel. Documented training on SDSs for chemicals used Site Safety and Health Officer (SSHO): Qualified SL-hazardous waste/SSHO training; OSHA 30-hour Heat stress training 3R

PRINT NAME SIGNATURE

Supervisor Name: _____ _____ Date/Time:_____

SL/SSHO Name: _____ _____ Date/Time:_____

Employee Name(s): _____ _____ Date/Time:_____

_____ _____ Date/Time:_____

_____ _____ Date/Time:_____

_____ _____ Date/Time:_____

_____	_____	Date/Time:_____
_____	_____	Date/Time:_____
_____	_____	Date/Time:_____
_____	_____	Date/Time:_____
_____	_____	Date/Time:_____

Brief descripon of work	Groundwater Monitoring	Project #.	
Site/ Locaon of work	Dow JMS Jamestown NY	Project Name: Valmont ISTR	Dow JMS Essex-Hope OU-03
Assessed by	Rich Rathnow, CIH, CSP		
Review cycle	Where any significant change to work or environment occurs, a thorough review of the risk assessment must take place and a new method statement wrien if requir ed.		

Perform an inial and r esidual risk calcula on (see instrucons below). Refer to Table 1 in the PHSEP for the overall hazard/environmental impact assessment.	Inial Ov erall Risk Assessment Code (RAC)			Final Overall Risk Assessment Code (RAC)		
	Risk Assessment Code (RAC) Matrix					
	Incident Actual or Potenal Severity Level	Probability				
		Highly Unlikely (1)	Unlikely (2)	Possible (3)	Likely (4)	Highly Likely (5)
Consider all categories in the risk assessment including injury/illness, environment, reputaon, e conomic/material producon, m otor vehicle incidents (see IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work). Severity levels match the WPS rang s – 1 is lowest and 5 is highest.	5	5	10	15	20	25
	4	4	8	12	12	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5

Step 1: Review each “Hazard” and “Environmental Impact” in Table 1 of the PHSEP without regard for any controls in place and indicate overall RAC in “Inial O verall Risk” box above. Refer to IB-HS-WI-0101-IB, P&PS HSE Risk Assessment and Safe System of Work, for the expanded risk assessment chart (review injury/illness, environment, reputaon, material producon and motor vehicle incident and associated probability and severity definions).
Step 2: Idenfy the RAC (probability vs. severity) as H, M, or L for each “Hazard” or “Environmental Impact” aer controls are in place. Annotate the final overall highest RAC in the upper right box.

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
Forms/Permits	Client/Program-specific Requirements	• HASP and AHA reviewed • Conduct daily Safety Briefing • Daily inspection of equipment / tools • Backing up forms, filled out and kept in vehicles at all times while on site. • Breathing zone forms filled out periodically throughout day (at least once per well) Ensure worker knows where the first aid supplies are (including first aid kit, blood-borne pathogen [BBP] kit, fire extinguisher, etc.) along with location of emergency assembly points and eye wash station (or potable water).	1
Mobilization and travel between wells	• Opening/closing doors, windows, tailgate and trunk • Pinch points • Loading/lifting objects • Driving • Parking	• Keep fingers and hands free from pinch points • Swing legs out the door when getting out of vehicle. Maintain three points of contact. Do not jump. • Make sure all equipment, coolers, emergency equipment, etc. are secured in vehicle before driving. Use tie-downs as needed. Take precautions when opening tailgate to avoid items that may have shifted during transport.	1

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
	• Backing-up • Distractions • Vehicular/pedestrian traffic • Slips, trips, and falls	• Know limitations when lifting. Greater than 40 pounds get assistance. When lifting from the trunk, lift load to the naval and keep tight to the body. Use legs if possible and not your back. Minimize twisting. • Never stand in the bed of a pick-up truck. • Practice safe driving: aim high in steering, get the big picture, keep your eyes moving, leave yourself an out, and make sure others see you • Park on flat surfaces. If parking on a slope is unavoidable, use parking brake. • Use a spotter when backing up. • Do not do the following while driving: - Use a mobile phone - Eat or drink - Take your eyes off of the road • Wear seat belt, maintain first aid kit, and inform others of travel plans. • The following precautions must be taken when working around traffic -Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc. -Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. -Wear reflective/high-visibility safety vests. -Eye protection should be worn to protect from flying debris.	

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		-Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, ice -Use traffic cones in areas of high vehicular traffic Watch out for slick/uneven surfaces. Floor mats near doors can bunch-up and become a tripping hazard. Be mindful of foot placement and your surroundings when working in changing conditions. Keep up housekeeping.	
Monitoring Well Measurement	• Improper Use of Personal Protective Equipment (PPE) • Back Strain • Pressure from wells • Exposure to contaminants /high LEL readings • Biological hazards (wasps, ticks, snakes, bees) • Overexertion	• Leather/work gloves for opening wells and nitrile gloves for handling equipment and samples. • Leather boots with slip resistant soles and ankle support required. Steel toed or safety toed boots. • ANSI Z.87 approved safety glasses/ goggles and monogoggles (do not need to be worn unless in active unit). • Hard Hat. • Side shields required on safety glasses. • Keep face shield clean. • Polycoated Tyvek® coveralls if splash potential. Must be disposed of after each sampling event-- Do not reuse. Dispose of properly in accordance with Dow protocols. • Use the proper lifting techniques: lift with legs, keep back straight, position load close to body, do not twist when lifting and get assistance with loads over 40 pounds or with awkward loads. • When opening wells, keep at arms length away. Do not place face near opening as potential hazard of J-plug striking one in the face.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		• LEL readings need to be maintained below the action level of 10% outside of the well and around it. Levels need to be maintained below action levels. Refer to HASP for action levels. Contact the HSM if levels are exceeded. • Caution will be taken for the water level meter to not contact the metal casing around the well. • Observe the area for signs of bee/wasps/snakes and be prepared to retreat if insects are nesting under well covers. Find out if field personnel are allergic to insect stings and if they have an epinephrine pen on hand if needed. Work/rest regimen. Drink plenty of fluids. Participate in biometric monitoring if temperatures exceed 70˚F or the relative humidity is high (>50%)	

Groundwater Sampling	• Repetitive motion lowering pumps • Back Strain • Poor ergonomics - Sitting/squatting during well purge • Good housekeeping to prevent slips, trips and falls • Improper Use of PPE • Field instrument calibration chemicals • Untreated groundwater • Pinch Points • Exposure to contaminants /high LEL readings • Potential for broken bottleware • Biological hazards (wasps, ticks, snakes, bees) • Overexertion	• Take breaks and stretch when setting up • Make multiple trips if needed to carry buckets, drums, or coolers. Buckets no more than 2/3-full with lids on them during transport. Two person lifts when moving coolers and drums. • Stretch before work begins, take regular breaks. Take turns. • Use the proper lifting techniques: lift with legs, keep back straight, position load close to body, do not twist when lifting and get assistance with loads over 50 pounds or with awkward loads. • Keep splash hazards to a minimum • Keep area clear of any hazards. Maintain housekeeping (i.e. hoses, debris, standing water, etc.). Be aware of placement of tubing, equipment, and poly sheeting. Store sampling equipment out of the way when it is not in use • Clean up any spills before continuing work • Leather/work gloves for opening wells and nitrile gloves for handling equipment and samples • Leather boots with slip resistant soles and ankle support required. Steel toed or safety toed • ANSI Z.87 approved safety glasses/ goggles and monogoggles (need to be worn in some active unit). • Hard Hat • Side shields required on safety glasses • Keep face shield clean if splash hazard exists. • Polycoated Tyvek® coveralls if splash potential. Must be disposed of after each sampling event-- Do not reuse. Dispose of properly in accordance with Dow protocols • Calibrate equipment prior to use and ensure it is in good working order before starting task. • Make sure all chemical containers are properly labeled and in good condition. • Work upwind when possible • Personal hygiene • No eating, drink, or smoking.	2

		• Wash hands and face after performing task, avoid hands-to-face while wearing gloves. • Review MSDS. • Review the "Site Specific Health and Safety Plan" (including the contaminants of concern [COC] table, PPE table, and air monitoring table) • Be aware of/avoid pinch points. • Allow the wells considerable time to vent prior to sampling. • Wells that have LEL readings above 10%, **inside** the well, will only use a bladder pump to sample well. The pump will be maintained at a safe distance from the well sides. • LEL readings need to be maintained below the action level of 10% outside and around wells (area around pump, battery, and water being purged). Contact the HSM if level is exceeded. • Always use gloves when picking up bottleware in a well lit and stable area. Check bottleware for any cracks or defects prior to use. • Consider surface that bottleware is placed on. Evaluate if the surface could cause the bottle to break if placed awkwardly or hard on surface. • Have baking soda onsite to neutralize any acids that could be contained in bottleware if it would happen to break. • Only pick up broken glass with a dust pan or make shift dust pan. If this is not possible use Kevlar gloves or multiple layers of leather gloves. Properly dispose of broken glass in cut resistant containers. • Have a spill kit or absorbent pads to clean up potential groundwater spills • Observe the area for signs of bee/wasps/snakes and be prepared to retreat if insects are nesting under well covers. Find out if field personnel are allergic to insect stings and if they have an epinephrine pen on hand if needed.	

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Work/rest regimen. Drink plenty of fluids. Participate in biometric monitoring if temperatures exceed 70˚F or the relative humidity is high (>50%)	
Demobilization from the work area	• Slips, trips, falls • Driving hazards when leaving the site • Lifting equipment/cooler • Untreated groundwater during equipment retrieval, decon procedures, and moving purge water from buckets to drums. • Pinch points when closing wells, loading equipment, opening/closing buckets and drums • Do not rush or become complacent	• Use the proper lifting techniques: lift with legs, keep back straight, position load close to body, do not twist when lifting and get assistance with loads over 50 pounds or with awkward loads. • Take time to assess site conditions prior to exiting site. Follow the rules of the road. Do not use cell phone or operate GPS, MP3, radio, etc. when driving. • Watch where walking, always walk on firm ground. • Maintain good housekeeping practices onsite. • Make sure all equipment, containers, coolers, emergency equipment, etc. are secured in the vehicle before driving. • Use a spotter when backing up. • Be aware of/avoid pinch points. • Wear proper hand protection for the given task. • Use necessary tools when closing wells. • Personal hygiene. • No eating, drink or smoking. • Wash hands and face after performing task. • Review MSDS. • Review the "Site Specific Health and Safety Plan" (including the COC table, PPE table, and air monitoring table.	2

Table 1			
Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Environmental Impacts (List how people or the environment may be harmed?)	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Risk Assessment Code (RAC)
		Allow people who travel long distances time to get home. Don't work 10 hours and then drive 5 additional hours.	

Equipment to be Used (List equipment, supplies, PPE, to be used during the task)	Inspecon R equirements (List inspecon r equirements, checklists to be filled out, or permits needed)	Training Required (List training and/or medical monitoring required to complete the task)	Specific Access Arrangements (if applicable)
Traffic cones, signs, and barricades Proper PPE as listed above (safety-toed boots with good tread, weather radio or other device to check weather forecasts, insulated clothing/light layers (temperature dependent), high visibility vest	Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defecv e equipment) Ensure cell phone has coverage and have fully charged baeries	OSHA 40-hour HAZWOPER inial tr aining, 3-day OJT, current 8-hour refresher and medical clearance Training on JACOBS PHSEP Hazard Communicaon training (see PHSEP for how to document) Training Modules as required by the PHSEP	

Equipment to be Used (List equipment, supplies, PPE, to be used during the task)	Inspecon R equirements (List inspecon r equirements, checklists to be filled out, or permits needed)	Training Required (List training and/or medical monitoring required to complete the task)	Specific Access Arrangements (if applicable)
High visibility vest Sunscreen Insect repellent	Determine daily rally point/evacuaon route Use applicable Self-Assessment Checklists as required per the PHSEP		

Task Hazard/Impact Iden ficaon and Risk Assessment Sign-Off			
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Total Crew Members for Task (Jacobs):		Total Crew Members for Task (Subcontractors):	

Dow Program
Electrical Safety Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General – Electrical Requirements	NOTE: Verify the following through field observation and worker interview.			
☐	Work tasks covered under a Safe Work Permit or Safe Work Procedure?				
☐	Lockout isolating devices are held in off position. Each person working under IOES places lock and tag on isolation device.				
☐	If necessary, residual energy dissipated prior to working on electrical components.				
☐	Verification of isolation has occurred (attempted to start equipment, test electrical line/equipment with testing devices- absence of voltage, etc.).				
☐	Temporary Protective Grounds or Grounding Switches are in place if required for work.				
☐	Minimum clearance distance maintained when working				

	near overhead energized electrical lines or conductors.				
Energized Electrical Work Requirements					
☐	Justification documented when energized electrical work must be conducted and approved by HSM.				
☐	Energized Electrical Work Permit completed.				
☐	PPE in place to protect against arc flash: flash suit, FRC coveralls, face shield, etc.				
☐	Arc Flash Boundary identified. Barricades and hazard signage in place to prevent potential exposure to electrical components.				
Procedure/ Safe Work Permit Requirements					
☐	Scope of work understood by all involved.				
☐	Roles and responsibilities understood (Authorized Procedure Users, Safe Work Permit Issuer, Safety Liaison, Construction Manager)				
☐	All applicable hazards addressed in Safe Work Permit or Procedure.				
☐	Complying with PPE requirements in Safe Work Permit or Procedure.				
☐	Procedures or AHAs approved by HSM.				
☐	**All Electrical procedures include:** • The scope of the task being performed.				

	• The status of the line at the start: in service or isolated. • Description of electrical hazards mitigations to address the hazards. • Location, description and position of each isolation device • Carry and completion requirements. • Hazardous steps made to stand out by using bold font or adding ⚠. • Training requirements for task. • List of specific Authorized Procedure User for this task.				
☐	Procedures or AHAs approved by HSM.				
Procedure User Authorization					
☐	Procedure users are authorized by the FWGL and this authorization is documented (preferably in LCS Excel workbook)				
Training		**NOTE: Reference FWGL LCS workbook and training database**			
☐	FWGLs, Safe Work Permit, Issuers, Safety Liaisons, Construction Managers trained initially and every three years on electrical requirements.				
☐	Authorized procedure users that use procedures on electrical components are trained initially and every three years.				

☐	Authorized procedure users indicate their training by signing off on procedure or this is otherwise documented				
☐	Qualified Persons identified and approved by Operations Lead and HSM.				
☐	Additional training identified based on task being conducted (NFPA 70E, Energized Electrical, etc.)				
	END				

NOTES:

Dow Program
Elevated Work / Fall Protection Policy
Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General - All employees	NOTE: Verify the following through field observation and worker interview.			
☐	Are all elevated work tasks covered under a Safe Work Permit or Safe Work Procedure?				
☐	For Elevated Work tasks covered under a Safe Work Permit. Has the Permit Issuer completed the Elevated Work LCS training?				
☐	For Elevated Work tasks covered under a Safe Work Procedure. Has the Authorized Procedure User completed the Elevated Work LCS training?				
☐	If Elevated Work will be covered under a Safe Work Permit, is the Elevated Work SWP Addendum completed?				
Elevated Work SWP / Procedure Elements					
☐	Does SWP / Procedure include method(s) to access elevated work area?				
☐	Does SWP / Procedure include type of fall prevention to be used?				

☐	Does SWP / Procedure include approved anchor points to be used?				
☐	Does SWP / Procedure include methods to address potential hazards of placing workers or equipment on surfaces not designed for walking or working?				
☐	Does SWP / Procedure include methods to prevent objects and equipment from falling?				
☐	Does SWP / Procedure include methods to lift and store equipment?				
☐	Does SWP / Procedure include rescue methods				
SWP Issuer Assurance					
☐	Has a pre-use checklist been completed for aerial lifts?				
☐	Has an on-site inspection been performed of life critical guards after they have been erected, modified, or removed?				
Fall Prevention					
☐	Is proper fall prevention / protection equipment being used and inspected?				
☐	Are workers using fall prevention / protection trained in the use of that equipment?				
Lifting Equipment					
☐	Does lifting equipment have proper crush protection?				
☐	Is lifting equipment equipped with controls that can be operated from the ground?				

☐	Are ladders inspected before use and appropriate for task?				
☐	Has scaffolding been properly inspected and labeled for use?				
	END				

NOTES:

Dow Program
Heavy Equipment Use/Spotting Policy
Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General - All employees	NOTE: Verify the following through field observation and worker interview.			
☐	Are all Heavy Equipment tasks covered under a Safe Work Permit or Safe Work Procedure?				
☐	For Heavy Equipment tasks covered under a Safe Work Permit. Has the Permit Issuer completed the Heavy Equipment LCS training?				
☐	For Heavy Equipment tasks covered under a Safe Work Procedure. Has the Authorized Procedure User completed the Heavy Equipment LCS training?				
☐	If Heavy Equipment will be covered under a Safe Work Permit, is the Heavy Equipment SWP Addendum completed?				
Heavy Equipment SWP / Procedure Elements					
☐	Does SWP / Procedure include Discussion of Heavy Equipment use?				
☐	Does SWP / Procedure describe the Heavy Equipment to be used?				

☐	Does SWP / Procedure include the working traffic plan anticipated for Heavy Equipment use?				
☐	Has ground surface been evaluated for suitability for the Heavy Equipment to be used?				
☐	Does SWP / Procedure include requirement of the use of a spotter?				
☐	Does SWP / Procedure include methods to address potential hazards of ground workers entering work area?				
☐	Does SWP / Procedure include methods to prevent pedestrians from entering work area inadvertently?				
☐	Does SWP / Procedure include a map of the work area to include danger areas clearly marked?				
☐	Has the operator signed off on the Heavy Equipment addendum?				
☐	Has the Spotter signed off on the Heavy Equipment addendum?				
☐	Does spotter use a Checklist?				
☐	Does SWP / Procedure include methods of communication between the Operator and the spotter?				
☐	Does SWP / Procedure include Barricade/exclusion area methods?				
SWP Issuer Assurance					
☐	Has a pre-use checklist been completed for the Heavy Equipment to be used?				

☐	Has an on-site inspection been performed of the work area to ensure proper zone demarcation?				
Heavy Equipment					
☐	Is proper Heavy Equipment being used correctly?				
☐	Are workers keeping out of the hazard zones and being controlled by an attendant				
☐	Are worker clear from Swing Radii and no-go zones?				
☐	Is Heavy Equipment moved at speeds slow enough that the spotter can keep up?				
☐	Does the operator ground heavy equipment, remove hands from controls and acknowledges workers before they enter the swing radius or no-go zones?				
☐	Is Heavy Equipment stopped when Spotter is distracted, cannot be seen, communication is lost, someone gets too close or instructed to stop by spotter?				
☐	Is Heavy Equipment properly secured after use?				
☐	Has SWP been closed at the end of the work or shift?				
	END				

NOTES:

Dow Program
Hydroblasting-Pressure Washing (HBPW) Policy Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

- **Hydroblasting → SWP (unless it is Remote Controlled Hydroblasting System (RCHS)). SWP must have secondary approver for manual hydroblasting.**
- **RCHS and work involving heat exchangers with tube plugs → Procedure**
- **Pressure washing → SWP or Procedure**
- **Hydroblasting & Pressure washing (HBPW) is not allowed on stairs or ladders**

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General - All employees	NOTE: Verify the following through field observation and worker interview.			
☐	Are all HBPW tasks covered under a SWP or Procedure?				
☐	For HBPW tasks covered under a SWP, has the Issuer completed the LCS HBPW training?				
☐	Is the HBPW SWP Addendum being used? Does the SWP require a secondary approver?				
☐	For HBPW tasks covered under a Procedure, has the authorized Procedure User completed the LCS HBPW training?				
☐	Has Procedure been approved by HSM and signed by personnel working under the Procedure?				
☐	Has the Determination Tools been used to determine the task as Hydroblasting or Pressure Washing? (based on the equipment rating, not the actual operational settings)				

Hydroblasting & Pressure Washing Procedure Elements					
☐	Does the SWP/Procedure include the work location, type of equipment being used, and work being performed?				
☐	Does the SWP/Procedure include inspections for set-up and pre-use?				
☐	Does the SWP/Procedure include determining if the work will occur in a flammable area and precautions?				
☐	Does the SWP/Procedure include the considerations of PPE for HBPW and physical and chemical agents?				
☐	Does the SWP/Procedure include Line of Fire controls and Safeguards: • Against flying debris? • Barricades with signs, tags or labeled banners to protect: - 20 ft/6 m from nozzle in all directions? - Impacted areas above and below the work? - Multiple jobs being performed in the same work area?				
☐	Does the SWP/Procedure include controls to prevent environmental impact?				
☐	Does the SWP/Procedure include initial onsite inspections by SWP Issuer and SWP Receiver for: • Pre-use inspection? • Visual inspection of equipment set-up: - Upon introduction of water into system before pressurization?				

	- After pressurization, but before performing work?				
☐	Does the SWP/Procedure include additional onsite inspections after work stoppage of 30 mins or more?				
Heat Exchangers with Tube Plugs Procedure Elements (skip if NA)					
☐	Does the Procedure include the specific equipment being used?				
☐	Does the Procedure include the steps to depressurize for both tube and shell sides?				
☐	Does the Procedure include methods that damaged or leaking tubes on exchangers have been plugged at both ends?				
☐	Does the Procedure include a positive means of isolating the opposite side of the tubes to protect personnel and equipment including U-tube type?				
☐	Does the Procedure include steps to minimize the number of people and the time that they are in the path of an exposed tube plug?				
Hydroblasting (skip if NA)					
☐	Is equipment being used in accordance with manufacturer's recommendations?				
☐	Is equipment grounded and bonded when working in a flammable area?				
☐	Is equipment equipped with a failsafe device that: • Is tested before each use? • Is protected from inadvertent operation?				

	• Is not bypassed, overridden, tied down or locked open?				
☐	Has the hydroblasting method been evaluated to be conducted in the preferred order?				
☐	Hydroblasting pre-use inspections completed for: (Policy has specific inspection requirements for each piece of equipment) • Hoses & Fittings • Lances • Anti-Withdrawal Devices (AWD) • Hydroblasting Shotgun Lances • Hydroblasting Flexible Lances • Hydroblasting Line Moleing • Hydroblasting Pumping Equipment • Depressurizing of Equipment				
☐	Has a Safety Attendant been assigned for Hydroblasting? • Monitoring the work? • Continually observing the actions of the lance operator and the conditions? • Able to maintain line of sight or have other two-way communications with lance operator and pump operator? • In the event of emergency, able to notify the lance operator and pump operator to shut down equipment and initiate emergency response				
☐	Is the proper PPE being used for Hydroblasting? o Hood o Face Shield o Monogoggles o Hearing Protection o Chemical Splash Suit o Rubberized Gloves o Metatarsal Rubber Boots (rated for the pressure used) o Additional PPE (to protect against physical and chemical agents)				

☐	Have all other hazards and LCS requirements been considered for this work? (CSE, Electrical Safety, Elevated Work/Fall Protection, IOES, etc.)				
Pressure Washing (skip if NA)					
☐	Pressure Washing pre-use inspections completed for: (Policy has specific inspection requirements for each piece of equipment) • Hoses & Fittings - Place to prevent injury or damage? - Have safety connectors (whip checks)? • Pressure Washing Pumping Equipment - Is capable of relieving pressure or excess pressure? - Is placed to minimize exposure to vents and the relief device? - Is positioned to prevent unexpected movement (chocks & blocks)?				
☐	Is the proper PPE being used for Pressure Washing? o Monogoggles o Hearing Protection (if applicable) o Rain Suit o Rubberized Gloves o Metatarsal Rubber Boots (rated for the pressure used) o Additional PPE (to protect against physical and chemical agents)				
☐	Have all other hazards and LCS requirements been considered for this work? (CSE, Electrical Safety, Elevated Work/Fall Protection, IOES, etc.)				
	END				

NOTES:

Dow Program
Isolation of Energy Sources (IOES)
Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

Requirement		Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General – IOES Requirements	NOTE: Verify the following through field observation and worker interview.			
☐	Work tasks covered under a Safe Work Permit or ES LOTO Form / Safe Work Procedure?				
☐	IOES documentation kept in designated location.				
☐	If Safe Work Permit issued, IOES SWP Addendum completed including all applicable requirements.				
☐	Each person working under IOES places lock and tag on isolation device.				
☐	Locks are also affixed with the tags.				
☐	Tags are legible, signed in blue or black ink, and identified with a unique number.				
☐	Lockout isolating devices are held in a safe position.				
☐	Stored energy has been released, discharged, and rendered safe.				

☐	Verification of isolation has occurred (attempted to start, checked lines with testing equipment, opened valve to ensure no liquid/pressure in line, etc.).				
☐	Comply with below if working under Exclusive Control: • One Authorized Procedure User conducting task. • User present continuously during task. • User is in control of isolating devices at all times.				
Procedure/ Safe Work Permit Requirements					
☐	Scope of work understood by all involved.				
☐	Roles and responsibilities understood (Authorized Procedure Users, Safe Work Permit Writer/Acceptor, Isolator, Independent Reviewer)				
☐	Isolation reviewed and documented by Independent Reviewer.				
☐	All applicable hazards addressed in Safe Work Permit or Procedure.				
☐	Complying with PPE requirements in Safe Work Permit or Procedures.				
☐	Procedures or AHAs approved by HSM and/or EM, as appropriate				
☐	**All IOES procedures include:** • The scope of the task being performed and exceptions if they apply.				

	• Location, description and position of each isolation device • Methods used to confirm equipment is safe to work on (drained, purged, etc). • Methods used to secure the isolation devices. • Any applicable methods to mitigate hazards and risk. This information may be included or referenced. • Carry and completion requirements. Hazardous steps made to stand out by using bold font or adding ⚠. • Training requirements for task. • List of specific Authorized Procedure User for this task.				
☐	Procedures or AHAs approved by HSM and/or EM, as appropriate				
Procedure User Authorization					
☐	Procedure users are authorized by the FWGL and this authorization is documented (preferably in LCS Excel workbook)				
Training		**NOTE: Reference FWGL LCS workbook and training database**			
☐	FWGLs are trained initially and every three years on this IOES requirements.				
☐	Authorized procedure users that use procedures under IOES are trained initially and every three years.				
☐	Isolators, Independent Reviewers, and Safe Work Permit Issuers are				

	trained initially and every three years on IOES requirements.				
☐	Authorized procedure users indicate their training by signing off on procedure or this is otherwise documented				
	END				

NOTES:

Dow Program
Line and Equipment Opening (LEO) Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General – LEO Requirements	NOTE: Verify the following through field observation and worker interview.			
☐	Work tasks covered under a Safe Work Permit or Safe Work Procedure?				
☐	If Safe Work Permit is issued, LEO SWP Addendum completed including all applicable requirements.				
☐	Identify break point using a tag or an individual familiar with work.				
☐	Lockout isolating devices are held in a safe position. Each person working under IOES places lock and tag on isolation device				
☐	Line preparation prior to line break: draining material, removing pressure, purging line, etc.				
☐	Verification of isolation has occurred (attempted to start equipment, opened valve to ensure no liquid/pressure in line, etc.).				
☐	Means (drain pan, bucket, etc.) present to capture any potential residual product in line during				

	break. Secondary containment in place.				
☐	Barricades in place to prevent potential exposure. Barricade Tags placed on barricades every 25 feet.				
☐	Emergency procedures reviewed. Exit routes, emergency shower, eyewash stations, etc. identified.				
Procedure/ Safe Work Permit Requirements					
☐	Scope of work understood by all involved.				
☐	Roles and responsibilities understood (Authorized Procedure Users, Safe Work Permit Issuer, Safety Liaison)				
☐	The SWP must indicate the location of the LEO.				
☐	All applicable hazards addressed in Safe Work Permit or Procedure. Include hazards associated with substance last contained in line.				
☐	Complying with PPE requirements in Safe Work Permit or Procedures (face shield required during initial break).				
☐	Air monitoring requirements (VOC, LEL, etc.) addressed and in place during work.				
☐	Procedures or AHAs approved by HSM and/or EM, as appropriate				
☐	**All LEO procedures include:** • The scope of the task being performed and exceptions if they apply.				

	• The status of the line at the start: in service, cleared, isolated. • Description of hazards related to the LEO and mitigations to address the hazards. • Methods used to prepare the line or equipment (purge, flush, etc). • Need to conduct a hazard analysis if flammable or combustible materials could be present. • Methods used to open the line or equipment. • Location, description and position of each isolation device • Carry and completion requirements. Hazardous steps made to stand out by using bold font or adding ⚠. • Training requirements for task. • List of specific Authorized Procedure User for this task.				
☐	Line Breaking and Equipment Opening Checklist completed when using a Safe Work Procedure.				
☐	Procedures or AHAs approved by HSM and/or EM, as appropriate				
Procedure User Authorization					
☐	Procedure users are authorized by the FWGL and this authorization is documented (preferably in LCS Excel workbook)				
Training		**NOTE: Reference FWGL LCS workbook and training database**			

☐	FWGLs, Safe Work Permit, Issuers and Safety Liaisons trained initially and every three years on LEO requirements.				
☐	Authorized procedure users that use procedures under LEO are trained initially and every three years.				
☐	Authorized procedure users indicate their training by signing off on procedure or this is otherwise documented				
	END				

NOTES:

Dow Program
Safe Work Permit Policy
Audit Protocol

Site/Project Name:

Date:

Person performing assessment (name/role):

Use this checklist to validate site/project implementation of the subject standard. This checklist can be used by JACOBS Safety Liaisons (SLs) and others as a self-assessment and during formal project audits.

	Requirement	Audit Result (√ in column)			Comments/Actions
		Compliant	Isolated Gaps	Systematic Gaps	
	General	NOTE: Verify the following through field observation and worker interview.			
☐	• Most current version of permit is being used.				
☐	• FWGL workbook is current and indicates authorized permit issuers by task, including LCS; RL endorsement received				
Review of permits					List/identify permits reviewed and name issuer:
☐	A permit is used for any task that is not exempt or conducted under procedure				
☐	Permit completion: • Permit is legible • Permit is complete (all sections) • Adequately reflects task • Tools and equipment adequately addressed • Issuer and receive sign-off complete • Any modifications are clear				

	• No one is working under permit that s/he issued. • Req't for any additional inspection is noted on permit and conducted • Third parties have been engaged as appropriate • Permits are issued/closed in the field by the permit issuer				
☐	LCS • Permit clearly indicates if being used b/c required due to high risk tasks or not • Permit clearly indicates LCS involved in task • Permit addendums for LCS are complete and with permit • Permit checklists for LCS are complete and with permit • If permit is used for IOES, the related isolation procedure is noted on permit • Permit issuer trained in relevant LCS				
☐	Permit Receiver • Confirms that the scope, tools and hazards of the planned work are adequately communicated to the Permit Issuer and are reflected on the SWP • Ensures that all work has stopped and equipment in safe position when permit closed. • Ensures all workers understand the permit is closed and they are not permitted to continue any work.				

☐	Permit availability • In designated location • At permitted worksite (if logistics allow, a physical copy. If logistics don't allow, original permit stays with receiver and photo or similar with issuer) • Maintained for 7 days				
Permit Closure					
☐	Issuers and receiver stop work when: • SOW or conditions change • Complete change in crew • Emergency or other problem • Permit deadline is reached • Work is complete				
Training		**NOTE: Reference FWGL LCS workbook and training database**			
☐	• FWGLs are trained initially and every three years on this policy, all LCS and on heavy equipment use.				
☐	• Authorized permit issuers are trained and authorized initially and every three years (on permit issuance and relevant LCS).				
	• Permit issuers ensure that permit receivers understand their responsibilities and permit limitations				
	END				

Dow Program HASP Addendum
Heavy Equipment and Moving Vehicle Requirements

The following are requirements in addition to JACOBS standards that relate to heavy equipment usage. Heavy equipment is defined as *large heavy-duty vehicles specifically designed for moving, lifting, or moving of materials usually associated with construction, maintenance, agriculture, and industrial sites.*

1.0 All Heavy Equipment (including drill rigs) must have a Safe Work Permit or Procedure.

2.0 The Facility / Work Group Leadership (FWGL) must authorize:
A) Safe Work Permit Issuers for Heavy Equipment Work
B) Procedure Users who follow a Heavy Equipment Work procedure

3.0 Any Heavy Equipment or Moving Vehicle that is reversing must do one of the following, in preferred order:
A. Be positioned to remove the need to back up or
B. Be equipped with back-camera, back up alarm or detection technology, or
C. Have engineering control(s) to restrict pedestrian traffic in the backing up area, or
D. Have a dedicated spotter.

4.0 All moving equipment that is not in a controlled operating zone or reversing, requires a spotter. For each project, this assessment and decision is delegated to the HSM. Spotter requirements are established in the HASP and approved by the HSM. The FWGL is overall accountable for the planning and execution of all work at their site.

5.0 Heavy Equipment Safe Work Permits and Procedures must include:
A. Work Area location
B. Methods to control heavy equipment movement and pedestrian traffic within the Work Area
C. Confirmation of suitable ground conditions for heavy equipment:
    - Before starting up heavy equipment, and
    - When ground conditions change
D. Danger zone location(s) which include, but are not limited to:
    a. Blind spots,
    b. Areas of limited visibility,
    c. Swing radius,
    d. Travel path,
    e. Beneath suspended loads,
    f. Overhead hazards,
    g. Working around excavation areas,

    h. Within close proximity to moving equipment, and
    i. Fall radius of a bed that is dumping material

E. Methods to restrict access to the Danger Zone(s)
F. Methods for the heavy equipment operator and workers to maintain continuous visual communication within the Danger Zone(s)
G. Blind Spot location(s) created by:
    - Heavy equipment
    - Equipment in the Work Area
    - Materials involved in the task
H. Methods for the heavy equipment operator and workers to maintain continuous communication within the Blind Spot(s)

6.0 Operators of moving vehicles and heavy equipment must:

A. Maintain continuous visual communication with workers in the Danger Zone(s)
B. Maintain continuous communication with workers in the Blind Spot(s)
C. Drive slower than the Spotter can walk
D. Stop immediately if:
    - Visual communication with workers in the Danger Zone(s) is lost
    - Continuous communication with the workers in the Blind Spot(s) is lost
    - The Spotter cannot be seen
    - Instructed to stop by the Spotter
    - Another person comes too close to heavy equipment or moving vehicle
    - The Spotter or Operator is distracted

7.0 Workers must:

A. Only enter the danger zone while heavy equipment is operating by exception and only if:
    a. Technology is not available to perform the heavy equipment work without a worker in the danger zone, and
    b. The FWGL or delegate approves the exception
B. Maintain continuous visual communication with the heavy equipment operator in the danger zone
C. Not enter the blind spot unless maintaining continuous communication with the heavy equipment operator while in the blind spot

8.0 Spotters must:

A. Wear high visibility clothing or alternative warning technology
B. Maintain communication with the operator
C. Position self to enable the operator to maintain visual communication
D. Never cross into the path of a moving vehicle
E. Maintain a safe distance from moving vehicles in operation
F. Keep the route and blind spots free of people who don't need to be there
G. Not enter blind spots

H. Never ride on a vehicle while it is moving
I. Stop the moving vehicle and heavy equipment operator if:
    - The vehicle is moving faster than walking pace
    - Other hazards exist

9.0 The FWGL must be trained on Heavy Equipment requirements before they authorize SWP Issuers and Procedure Users to do work.

10.0 The following workers must be trained on this standard before they perform their role and every 3 years:
A. SWP Issuers for Heavy Equipment
B. Heavy Equipment procedure users

11.0 Heavy Equipment operators must be trained initially before they perform their role on:
A. Their responsibilities in this standard, and
B. The equipment they are operating

12.0 Spotters must be trained on their duties before they perform their role. This training, at minimum, must include review of the Spotter Checklist before spotting task starts. This checklist is included in the HASP for all projects requiring spotters. After initial review, the spotter checklist will be used at the frequency established in the HASP.

13.0 Traffic plans (including pedestrian segregation) need to be identified, documented, and implemented where there is potential for multiple heavy equipment vehicles and/or heavy equipment/pedestrian presence in the same area.

Traffic plans can be scaled for the project's complexity. At minimum, operators, spotters and others in the work zone must understand the traffic patterns, established travelways and walkways, signals, alarms and other management controls. The work zone must be controlled to prevent unintended access of individuals. The use of physical barricades and signage must be reviewed and established as part of project planning and set-up and prior to the use of heavy equipment.

14.0 Excavator Attachments

NOTE: IF AN EXCAVATOR ATTACHMENT IS COMPRESSED WITHIN THE EXCAVATOR BUCKET, THE POTENTIAL EXISTS THAT IT COULD PRESS AGAINST THE BUCKET TEETH, DISLODGING THE TEETH AS A DANGEROUS PROJECTILE.

A. Where possible, hydraulic thumbs are preferred over manual thumbs (i.e., minimizes human interaction and error).
B. When using manual thumbs, the following must be verified before starting work with the equipment. Verify the following:
    - correctly mounted on excavator,
    - appropriate length, and

- teeth alignment does not pose hazard for task.

C. Where possible, utilize a thumb that is the same manufacturer as the excavator. This could avoid the issues identified above.

D. When using a manual thumb, ensure thumb cannot fall into bucket during thumb adjustment (i.e., by use of dunnage or other physical means. **This must be addressed in subcontractor submittals (SOPs, AHAs, etc.).**

E. Emphasize importance of bucket being grounded and controls locked before workers approach the excavator.

JACOBS

Jacobs-Dow Program	Issued: 03/23
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1.0 PURPOSE AND SCOPE

This policy provides the minimum procedures to be followed in the areas of Hydroblasting & Pressure Washing operations to prevent incidents.

This policy applies to all employees and subcontractors performing work in operations covered by the Jacobs HSE Program.

2.0 APPLICABILITY

These requirements apply to all pressurized water activities meeting the flow/pressure criteria, including but not limited to:

- Automated and manual industrial cleaning
- Sewer cleaning
- Hydro excavation
- paint preparation
- water cutting
- fixed automated systems and portable semi-automated systems for vessel cleaning
- car washes
- dust abatement systems
- aerators

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The **determination tool** is provided to determine the flow/pressure criteria to classify the work as either hydroblasting or pressure washing. See section 12

3.0 EXEMPTIONS

- Fixed, permanent installations of nozzles that spray water or other liquids into the atmosphere without the presence of an operator manipulating the spray nozzle.
- Spray nozzles that are fixed to vehicles used for cleaning surfaces (e.g. street cleaners) without the presence of an operator manipulating the spray nozzle.

4.0 RESPONSIBILITIES

Management, staff, employees, and subcontractors are responsible to follow the requirements addressed in this procedure.

5.0 ROLES AND RESPONSIBILITIES

Health and Safety Manager	The Health and Safety Manager (HSM) provides ongoing health and safety technical guidance and support to the project within the HSM's assigned area of responsibility. The HSM approves Health and Safety Plan and amendments to those plans. The HSM will serve as the Secondary Approver for manual hydroblasting activities.
Procedure User	The Procedure User is authorized by the FWGL to work under a procedure when conducing Hydroblasting & Pressure Washing activities and is required to be trained in this standard for hydroblasting and pressure washing requirements.
Safety Liaison	The Safety Liaison (SL) is authorized by the FWGL to implement the project Health and Safety Plan and has been trained in this standard. The SL also oversees subcontractor's Hydroblasting & Pressure Washing activities.
Safe Work Permit Issuer	The Safe Work Permit Issuer is authorized by the FWGL to issue safe work permits for Hydroblasting & Pressure Washing activities, has been trained in this standard, and safe work permit training before being authorized to issue safe work permits. When issuing a safe work permit, an Activity Hazard Analysis (AHA) is also required. The Issuer should ensure that an approved AHA is being used.
Facility Work Group Leader	The Facility Work Group Leader (FWGL) will authorize Safe Work Permit Issuers for Hydroblasting & Pressure Washing, Procedure Users that follow a Hydroblasting & Pressure Washing procedure. The FWGL will be trained initially and every three years on this standard for hydroblasting and pressure washing requirements.

6.0 DEFINITIONS

Abrasive Shroud	Protects the inner hose from excessive wear due to use on rough or harsh surfaces, thereby increasing the working life of the hose. This type of shroud is commonly constructed of PVC or similar material.
Anti-Withdrawal Device (AWD)	A mechanical safety device physically attached to the equipment being cleaned and used to prevent the flexible lance from being able to unintentionally fully withdraw from the equipment being cleaned.
Blast Bag	A containment device designed to contain the effluent from the cleaning of heat exchangers and piping.
Failsafe	Causing a piece of machinery or other mechanism to revert to a safe condition in the event of a breakdown, malfunction, or need to shut down immediately e.g., a valve or switch that will immediately stop high-pressure water flow on a hydroblasting lance. A failsafe device is also known as a “Dead Man Switch”
Flexible Lance Operation	Clearing of a line using a jet nozzle and a flexible hose. Typically used for cleaning exchanger tubes and small diameter piping.
Flexgun	Allows flex lancing of heat exchangers without the need for the operator to handle the lance. The flexgun moves the lance in and out at a constant speed, ensuring consistent cleaning.
Fully Automated Remotely Controlled Hydroblasting System	Systems where there is no manual interaction while performing hydroblasting, workers are out of the barricade area while operating equipment, and there is a remotely controlled system.
Hand-Held Rigid Lance	Rigid lance with hand guard and safety shroud to cover high pressure connection to use with the proper Anti-Withdrawal Device (AWD) to unplug hard tubes.
High Pressure	High Pressure (HP) is hydroblasting services (Less than 20,000 psig or 1379 bar).
Hydroblasting	Water spray activities using Industrial Hydroblasting equipment are defined as “hydroblasting” even though pressure and flow may be adjusted. If using Residential equipment, activities are defined as “hydroblasting” based on equipment pressure and flow. The DETERMINATION TOOL is provided to determine if the work is either Hydroblasting or Pressure Washing.
Hydro Excavation	Use of high-pressure water spray along with a vacuum truck to perform excavations and boreholes in the soil.
Industrial Equipment	Industrial hydroblasting equipment is generally sold under the names “hydroblasting equipment”, “water cutting equipment”, “water jetting equipment”, or “water blasting equipment”. These high-pressure systems, designed for industrial applications, are typically capable of generating 5,000 psi or more.

Lancing	Hydroblasting with a rigid or flexible lance and nozzle combination that are then inserted into and retracted from the interior of a pipe or tube bundle. Lancing includes the water cutting head and nozzle combination used to slice into metal or other materials.
Lancing Operator	A worker that operates a hand-held lance, flex lance, or semi-automated equipment for hydroblasting or pressure washing system.
Line Moleing	Cleaning a line using a self-propelling jet nozzle (mole) and a flexible hose.
Manual Hydroblasting	Operator hand held high-pressure bearing components that are under pressure are manually manipulated. Examples include hydroblasting, shotgunning, (flex) lancing, line moleing, etc.
Manual Lancing	Operation in which the equipment is operated manually or semi-automatically; the operator is in close proximity to the water jet to complete the task. See Flexible Lance Operation, Flexgun, Hand-held Rigid Lance, and Shotgun Lancing for specific examples.
Maximum Allowable Working Pressure (MAWP)	Maximum allowable working pressure (MAWP) is the maximum pressure at which the weakest point of the equipment, system, or a vessel can handle at a specific temperature when in normal operation.
Non-Slip Surface	A surface that is designed or engineered to prevent a slipping, skidding, or movement.
Pressure Washing	Water spray activities using Industrial Hydroblasting Equipment should not be defined as Pressure Washing even though pressure and flow may be adjusted. If using Residential Equipment, activities are defined as Pressure Washing based on equipment pressure and flow. The DETERMINATION TOOL is provided to determine if the work is either Hydroblasting or Pressure Washing
Pump Operator	A worker that operates the pumping equipment that pressurizes hydroblasting or pressure washing system.
Recirculated Water (Spent)	Reuse of the water from the cleaning process. The water filtered to remove solids before it is sent to the high-pressure pumping unit.
Recirculated Water (Clean)	Diversion of clean water in a closed loop back to the high-pressure pumping unit. Many high-pressure pumping units have the capability to recirculate the clean dump water back to the feed tank rather than dumping it on the ground, which conserves water and reduces any environmental impact.
Remotely-Controlled (In Situ) Hydroblasting System (RCHS)	Fixed hydroblasting systems that are integrated into the operating equipment. The systems are covered by operating procedures and operated solely by the production workers. These systems are also referred to as “In Situ” which means in position or in place.
Residential	Equipment that is generally sold under the names “pressure washer” or “power washer”. These washing systems are designed to generate

Equipment	less than 5,000 psi. Such systems are sold in the form of portable equipment intended for light commercial or home use and can be purchased at home improvement or hardware stores.
Safety Attendant	A worker trained on the set-up and operations of the equipment being used, the emergency shut-down procedure, and emergency response to an equipment failure or unplanned even (Injury/Illness, area emergency, etc.). The safety attendant may perform the duties of the Pump Operator provided the line of sight or other continuous, two-way communication is maintained during the work with the lance operator.
Safety (Burst) Shroud	An external covering designed to protect the operator and surrounding equipment from hose and fitting failure. Safety shrouds are designed to withstand a hose rupture at 1.5 times the operating pressure.
Semi-Automated Remotely Controlled Hydroblasting	Systems where workers are performing within barricaded area, are using equipment manually, but do not interact with the hydroblasting components. (Hose feeding systems, Floor Cleaners).
Shotgun Lancing	Use of a lance and a configuration of jets on the end of the lance where it can be manipulated in all planes and also where the operator is not shielded from the jet stream.
Snorkel	An extension used to make up the difference (or close the gap) between the Anti-Withdrawal Device (AWD) and the equipment being cleaned.
Stinger	Rigid, pipe normally made of stainless steel at the nozzle end of a flexible lance or line mole. The length of the extension is 1.5 times the diameter of the pipe, drain, or sewer being cleaned to prevent the nozzle to return.
Ultra-High Pressure (UHP)	Ultra-High Pressure (UHP) is hydroblasting services (Greater than 20,000 psig or 1379 bar)
Water Cutting	Water stream at a high pressure and/or flow to slice into equipment and structures made of metal or other materials, such as granite, concrete, or plastic. Garnet abrasive is often mixed with the water stream to enhance cutting efficiency.

7.0 GENERAL REQUIREMENTS

- Hydroblasting must have a Safe Work Permit (SWP), unless it is a Remotely Controlled (In Situ) Hydroblasting System (RCHS), and the SWP must be approved by a Secondary Approver for manual hydroblasting activities.
- RCHS and work involving heat exchangers with tube plugs must have a procedure.
- Pressure washing must have a SWP or a procedure.
- The following is not allowed:
    - Manual hydroblasting in a confined space.
    - Hydroblasting and pressure washing work on stairs and ladders

8.0 SAFE WORK PERMITS / PROCEDURE REQUIREMENTS

8.1. Hydroblasting and pressure washing SWPs and procedures must include:

A. Location of the equipment to be worked on and the work to be performed
B. The type of hydroblasting or pressure washing equipment to be used
C. Equipment set-up and pre-use inspections
D. Precautions for performing low energy hot work in a flammable area
E. The personal protective equipment considering the following:
    - Hazards associated with hydroblasting and pressure washing
    - Hazards of physical and chemical agents
F. Line of Fire controls and safeguards including:
    - Guards to protect workers from flying debris
    - Barricades with signs, tags, or labeled banners that protects:
        - 20 feet / 6 metres from the nozzle in all directions
        - Impacted areas above and below the work, and
        - Multiple jobs being performed in the same work area
G. Controls to prevent environmental impact
H. An initial on-site inspection by the SWP Issuer and the SWP Receiver that includes:
    - Pre-use inspection
    - Visual inspection of equipment set-up:
        - Upon introduction of water int the system before pressurization
        - After pressurization, but before performing work
I. Additional on-site inspection after each work stoppage of 30 minutes or more
J. Specifics for working on heat exchangers with tube plus must also include:
    - The specific equipment used,
    - Steps to depressurize for both tube and shell sides
    - Methods that damaged or leaking tubes on exchangers have been plugged at both ends
    - A positive means of isolating the opposite side of the tubes to protect personnel and equipment including U-tube type, and
    - Steps to minimize the number of people and the time that they are in the path of an exposed tube plugs.

8.2. Hydroblasting and pressure washing equipment must be:

A. Use according to the manufacturer’s recommendations
B. Grounded and bonded when working in a flammable area
C. Equipped with a failsafe device that:
    - Is tested before each use
    - Is protected from inadvertent operation
    - Is never bypassed, overridden, tied down, or locked open

9.0 HYDROBLASTING REQUIREMENTS

9.1. Evaluation of Method

Evaluate ways to conduct the hydroblasting work in the following preferred order:

A. Remotely controlled (In Situ) hydroblasting system (RCHS), or

B. Fully automated remotely-controlled hydroblasting system, or

C. Semi-automated remotely-controlled hydroblasting system, or

D. Manual hydroblasting equipment, if approved by the HSM.

Hydroblasting equipment must be reviewed, approved and on the Industrial Cleaning/ Hydroblasting Technology List (see Attachment 1) prior to use.

9.2. Hydroblasting pre-use inspection must include (where applicable):

A. Hoses & Fittings:

- Are placed to prevent injury or damage
- Are labeled with:
  - A unique identification tag
  - The Maximum Allowable Working Pressure (MAWP)
  - The maximum working temperature
  - A serial number (if not used as the identification number)
- Have safety connectors (whip checks) to minimize hose slack and to withstand fitting failures
- Used for Ultra High Pressure (UHP) services (> 20,000 psig or 1379 bar) have:
  - Equipment fittings with weep holes to provide warning of an inadequate seal
  - Safety shrouds installed from the pumping unit to the failsafe operating valve
- Used for Non-UHP service, has a burst pressure 2.5 times MAWP
- Comply with pressure testing according to the manufacturer's recommendations or applicable government requirements, whichever is more stringent
- Comply with service testing and certification testing at the frequency outlined in the table below and the documentation includes:
  - Manufacturer's stated MAWP and maximum working temperature
  - Test pressure and test date
  - Name of the person performing the test
  - Serial number

Operation System	Test Type	Frequency

Manual & Semi-automated remotely-controlled hydroblasting	Service Test	Quarterly
Manual & Semi-automated remotely-controlled hydroblasting	Certification Test	Annual
Fully automated remotely-controlled hydroblasting	Certification Test	Annual
RCHS (In Situ)	As defined by maintenance strategy	As defined by maintenance strategy

B. Lances:

- Are equipped with orifice openings to minimize backward thrust if they are hand-held lances other than shotgun lances.

C. Anti-Withdrawal Devices (AWD):

- Anti-Withdrawal Device (AWD) is installed with a gap of less than 1 inch (2.5 cm) for line moleing and flexible lance operations to prevent nozzle reversal.

D. Hydroblasting Shotgun Lances:

- Are at least 66 inches / 1.7 meters long
- Are at least 48 inches / 1.2 meters long from the nozzle tip to the nearest trigger
- Have a trigger guard
- Have a dual-trigger type failsafe operating valves in a confined space
- Have a safety shroud that is at least 6 feet (1.8 meters) long

E. Hydroblasting Flexible Lances:

- Are remotely operated when possible
- Have a stinger that is attached that is a minimum 18 inches (46 cm) long to the end of the hose and nozzle
- Have clear markings that are 18 inches (46 cm) from the end of the hose and nozzle if this is not possible

F. Hydroblasting Line Moleing:

- Has a foot pedal (fail safe device) and a stinger installed between the nozzle and the hose to protect the worker when manually operated
- Have a stinger attached that is a minimum 1.5 times the diameter of the tube or pipe being cleaned

G. Hydroblasting Pumping Equipment:

- Capable of safely relieving excess pressure
- Capable of measuring the pressure of the system
- Placed to minimize exposure to vents and the relief device

- Positioned to prevent unexpected movement (e.g., chocks & blocks)
- Inspected at a minimum every 3 months including documentation of the test date and MAWP of the relief device

H. Depressurizing of Equipment

- The equipment being worked on is depressurized prior to performing hydroblasting.

9.3. Safety Attendant During Hydroblasting

A Safety Attendant must be present during hydroblasting except for RCHS and must do all of the following:

A. Monitor the work.

B. Continually observe the actions of the lance operator and conditions.

C. Maintain line of sight or other two-way communication with lance operator and pump operator.

D. In the event of emergency, notify the lance operator and the pump operator to shut down the equipment and initiate emergency response.

9.4. Personal Protective Equipment

Workers within 20 feet / 6 metres of hydroblasting must wear the following personal protective equipment:

A. Hood

B. Face Shield

C. Monogoggles

D. Hearing Protection

E. Chemical Splash Suit

F. Rubberized Gloves

G. Metatarsal Rubber Boots rated for the pressure being used

10.0 PRESSURE WASHING REQUIREMENTS

10.1. Pressure washing pre-use inspection must include the following:

A. Hoses and Fittings:
- Are placed to prevent injury or damage
- Have safety connectors (whip checks) to minimize hose slack and to withstand fitting failures

B. Pressure Washing Pumping Equipment is:
- Capable of relieving pressure excess pressure
- Placed to minimize exposure to vents and the relief device
- Positioned to prevent unexpected movement (e.g., chocks & blocks)

10.2. Personal Protective Equipment

Workers within 20 feet / 6 metres of pressure washing must wear the following personal protective equipment:

A. Monogoggles
B. Rain Suit
C. Rubberized Gloves
D. Metatarsal Rubber Boots rated for the pressure being used

11.0 TRAINING

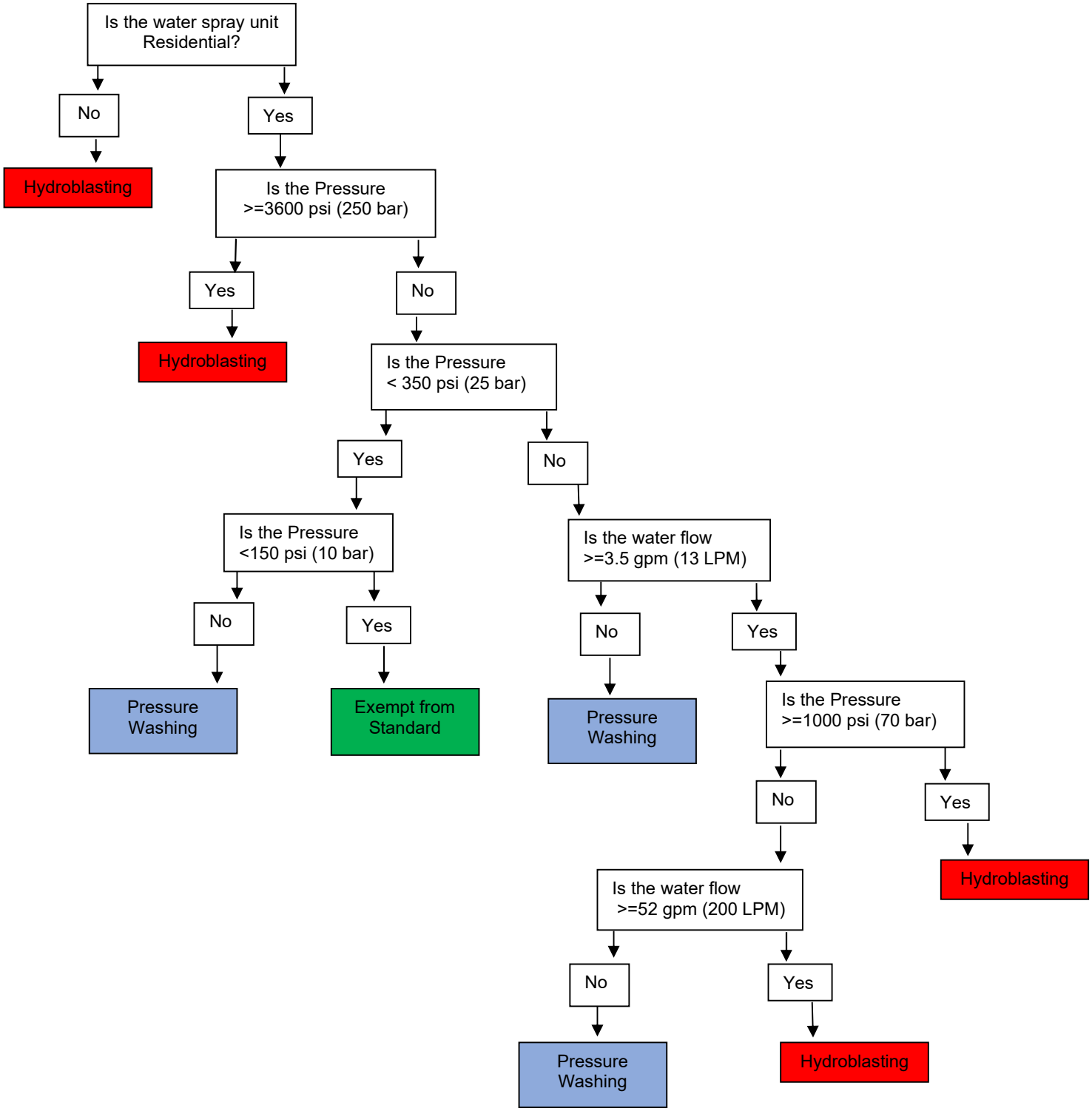
- FWGL must be trained on this standard before authorizing:
  - SWP Issuers for Hydroblasting or Pressure Washing
  - Procedure Users that use Hydroblasting or Pressure Washing procedures
- HSM must be trained on this policy before acting as secondary approver.
- Procedure Users must be trained on this standard before they perform their role, when new or modified equipment is introduced
- Hydroblasting and pressure washing operators must be trained on their responsibilities before they perform their role and when new or modified equipment is introduced.
- Safety Attendants must be trained on their responsibilities before they perform their role.
- The following people must be trained on this standard before they perform their role and every 3 years:
  - SWP Issuers
  - Secondary Approvers
  - Procedure Users

12.0 HYDROBLASTING AND PRESSURE WASHING DETERMINATION TOOL

12.1. Flowchart 1

Hydroblasting and Pressure Washing Determination Tool

Flowchart 1



12.2. Table 1

Hydroblasting and Pressure Washing Determination Tool Table 1

Table 1. Used to determine classification of pressurized water spray activities based on pressure and flow

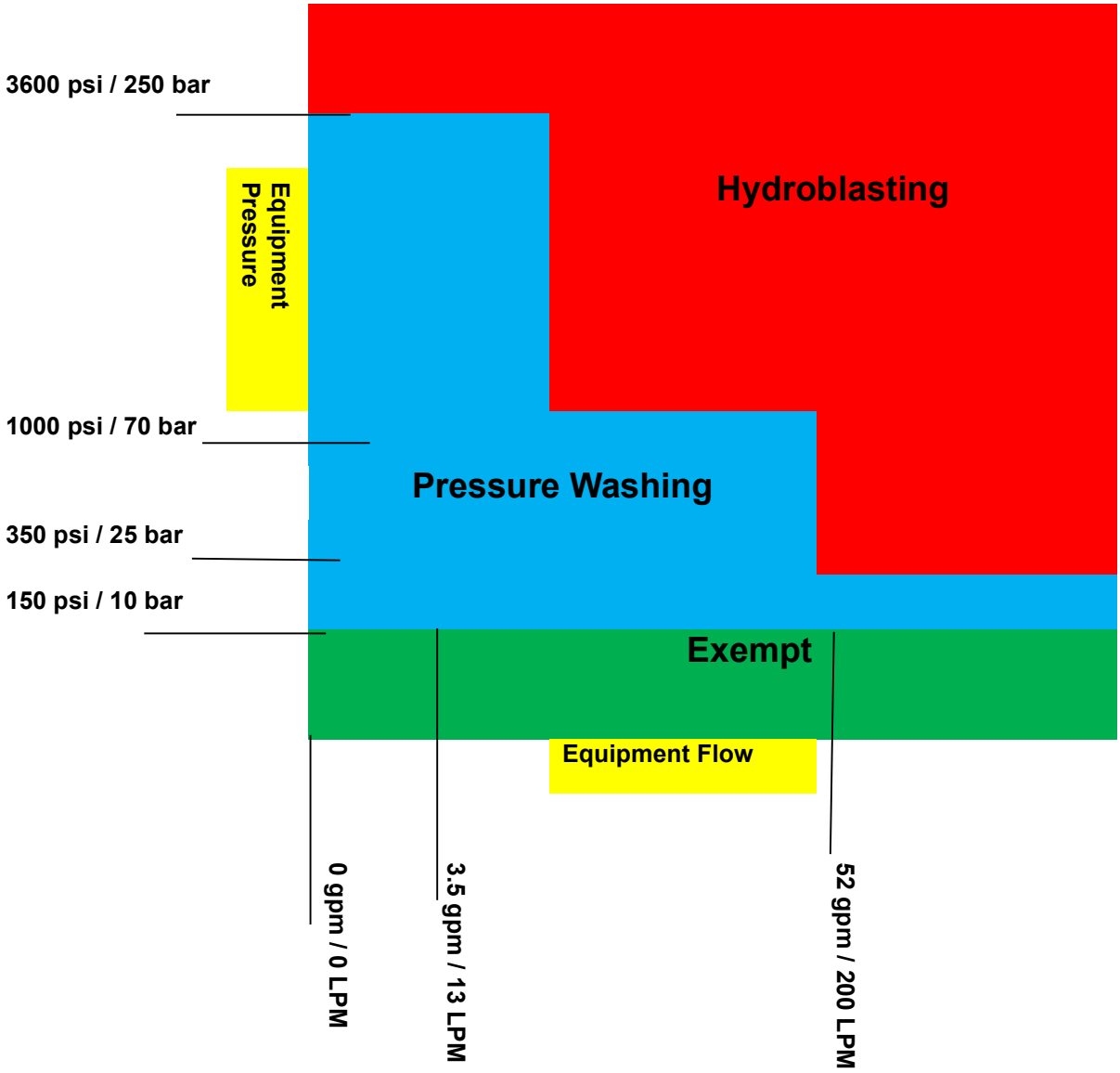
Equipment Pressure	Equipment Flow	Classification
Less than 150 psi Less than 10 bar	Less than 3.5 gpm / Less than 13 LPM	Exempt
	3.5 gpm – 51.9 gpm / 13 LPM – 199 LPM	Exempt
	52 gpm or greater / 200 LPM or greater	Exempt
150 psi – 349 psi 10 bar – 24.9 bar	Less than 3.5 gpm / Less than 13 LPM	Pressure Washing
	3.5 gpm – 51.9 gpm / 13 LPM – 199 LPM	Pressure Washing
	52 gpm or greater / 200 LPM or greater	Pressure Washing
350 psi – 999 psi 25 bar – 69.9 bar	Less than 3.5 gpm / Less than 13 LPM	Pressure Washing
	3.5 gpm – 51.9 gpm / 13 LPM – 199 LPM	Pressure Washing
	52 gpm or greater / 200 LPM or greater	Hydroblasting
1000 psi – 3599 psi 70 bar – 249.9 bar	Less than 3.5 gpm / Less than 13 LPM	Pressure Washing
	3.5 gpm – 51.9 gpm / 13 LPM – 199 LPM	Hydroblasting
	52 gpm or greater / 200 LPM or greater	Hydroblasting
3600 psi or greater 250 bar or greater	Less than 3.5 gpm / Less than 13 LPM	Hydroblasting
	3.5 gpm – 51.9 gpm / 13 LPM – 199 LPM	Hydroblasting
	52 gpm or greater / 200 LPM or greater	Hydroblasting

12.3. Figure 1

Hydroblasting and Pressure Washing Determination Tool

Figure 1

Figure 1. Used to determine classification of pressurized water spray activities based on pressure and flow. This graph provides the same information as Table 1.



13.0 ATTACHMENT 1 – DOW TECHNOLOGY LIST

The Dow Program

Jamestown Essex/Hope Site Operations

Project Health, Safety and Environment Plan

Jamestown, NY

Version 1

July 2025

The Dow Chemical Company

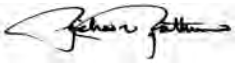


Approvals

This Project Health, Safety, and Environment Plan (PHSEP) has been written for use by Jacobs only. Jacobs claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific project and site conditions and identified scope(s) of work and must be amended if those conditions or scope(s) of work change.

By approving this PHSEP, the Project Health and Safety Lead, or Project Health and Safety Manager (HSM) certifies that the personal protective equipment has been selected based on the task hazard/impact identification and risk assessment (HIIRA).

Author: Jason Kearns/Richard Rathnow

Project Health and Safety Manager Approval: 

Project Manager Approval: Matt Gale

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Document history and status

Revision	Date	Description of Revisions	Author	Approved By/Title:
1	7/25/2025	Document Creation	Rich Rathnow	Rich Rathnow Health and Safety Manager Matt Gale Project Manager

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Project Emergency Contacts

WorkCare 24-hour Injury Care – 1-888-449-7787	
Medical Emergency—911 See local hospital information and route to hospital below.	**Non-Emergency medical Injuries** (no matter how minor) WorkCare: 1-888.449.7787 (call as soon as injury occurs)
Fire/Spill Emergency—911 Local Fire Department #: 716.483.7598 **Security & Police—911** Local Police #: 716.483.7536	**Utilities Emergency Phone Numbers** 911
Jacobs Site Manager (SM) Name: Brian Carling Phone: 215.834.5397	**Jacobs Dow Program HSE Manager** Name: Jeanne Reilly Burgess Phone: 508.280.3653
Jacobs Project Manager (PM) Name: Matt Gale Phone: 937.371.9691	**Jacobs Project Health and Safety Manager (HSM)** Name: Richard Rathnow Phone: 865.607.2197
Jacobs Safety Liaison (SL) Name: Derick Miller Phone: 989.992.8558 Name: Timothy Mihal Phone: 304.663.7997	**Jacobs Project Environmental Manager (EM)** Name: Cara McDaniels Phone: 480.399.9131
Jacobs US Security Officer Name: Keith Waddell Phone: 214.920.8327	**Jacobs Project Waste Manager (WM)** Name: Cara McDaniels Phone: 480.399.9131
Automobile Accidents **Rental**: Vehicle Accident Form required to be sent to AutoClaims@jacobs.com (see Vehicle Accident Guidance attached to this plan) **Fleet Vehicle**: Karyna Zarate 281.721.8634	**Media Inquiries Corporate Strategic Communications** Name: Lorrie Paul Crum Phone: 469.941.8845 **Human Resources Department** Submit a request through Global People Services on Jacobs Connect Workman's Compensation Claims: WCClaims@jacobs.com
Facility/Site Alarms: None	**Federal Express Dangerous Goods Shipping** Phone: 800.238.5355 **Jacobs Contact for Dangerous Goods Shipping** Name/Phone: Chris Heckler/484.661.6494 **CHEMTEL (hazardous material spills)**

WorkCare 24-hour Injury Care – 1-888-449-7787	
	Phone: 800.255.3924

Facility/Site Evacuation Route(s):

In a severe emergency, such as a large fire, explosion, or large chemical release, site evacuation may become necessary. The SL/Operator will be responsible for informing site personnel of the anticipated routes of evacuation during the initial site training. If the situation permits, the SL/Operator will ensure that all combustion equipment has been shut down. The

evacuation route and assembly area will depend upon the wind direction, topography, and the nature of the incident. Personnel will be advised to move to an upwind location at least 100 yards from any fires and/or releases and will be advised to continually monitor wind direction for changes.

If moving upwind is not possible without encountering the incident, personnel will be advised to move cross wind or downwind to a distance necessary to be out of the path of vapor releases, smoke, odors, or spills.

Once staff has evacuated to a safe distance, the SL/Operator will do the following:

- Contact emergency response personnel.
- Conduct a roll call to ensure all staff are accounted for.
- Ensure that emergency equipment and response personnel have adequate site access.
- All site personnel assembled at the designated safe evacuation area will wait for further instructions from emergency response personnel.

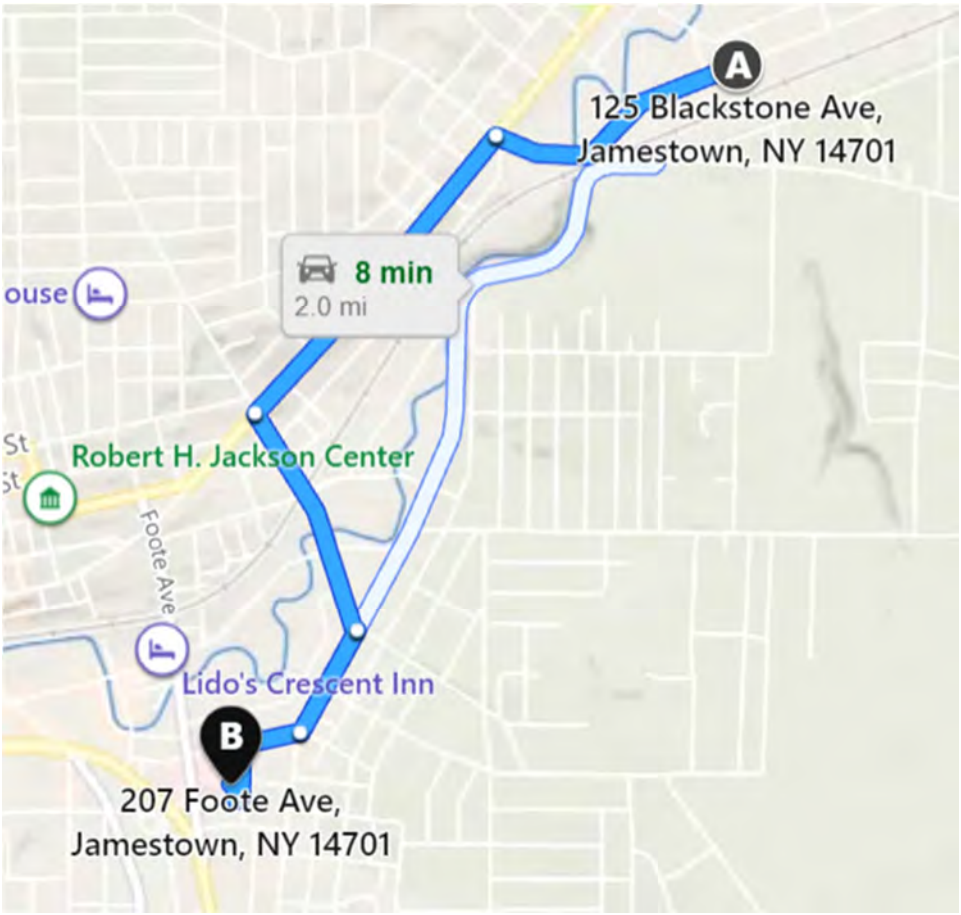
Evacuation Assembly Areas(s):

Parking lot of Hope Windows to the west and Jamestown Mattress Company to the east.

Directions and Map to Local Hospital

Local Hospital	**Local Occupational Clinic (Consult with WorkCare prior to any clinic visit)**
UPMC Chautauqua Hospital 207 Foote Avenue Jamestown, NY 14701 (716) 487-0141	**WorkCare**: 1-888-449-7787 (call as soon as injury occurs) UPMC Chautauqua Occupational Medicine Jones Memorial Health Center 51 Glasgow Avenue Jamestown, NY 14701 (716) 664-8165

1. Exit Site to LEFT and follow Hopkins Avenue to Red Light (0.2 miles)
2. Turn LEFT onto NY-394/East 2nd Street. Follow East 2nd Street to intersection with Foote Avenue (1.2 miles)
3. Turn LEFT onto Foote Avenue, Hospital on LEFT hand side (0.4 miles)



Applicability

This PHSEP applies to:

All Jacobs staff, including subcontractors and tiered subcontractors of Jacobs working on the site;

- All visitors to Jacobs construction or remediation sites in the custody of Jacobs (including, but not limited to, visitors from the Client, the Government, or the public,).
- In addition, subcontractors and tiered subcontractors shall also follow any of their company HSE programs, and site-specific PHSEPs and task hazard/impact identification and risk assessment (HIIRA) (e.g., activity or job hazard analyses). Even though this plan applies to non-Jacobs personnel as stated above, each employer is ultimately responsible for the health, safety, and well-being of their employees.

This PHSEP does not apply to the third-party contractors, their workers, their subcontractors, their visitors, or any other persons not under the direct control or custody of Jacobs.

The objective of this PHSEP is to ensure that project hazards and environmental impacts are eliminated or mitigated through the identification of hazards, environmental impacts assessment of risk and the application of effective control measures and to achieve a safe and healthy workplace for ourselves and subcontractor to whom we have a legal and moral duty of care. Further, there is a requirement to ensure that our activities are conducted in an environmentally friendly and responsible manner.

Jacobs has undertaken a structured hazard/impact identification and risk assessment process and shall implement a Safe System of Work (SSoW) for delivery of our services on this project. As part of the SSoW, this PHSEP defines the procedures and requirements for the health and safety of staff and visitors when they are physically on the work site. The work site includes the project area (as defined by the contract documents) and the project offices, trailers, and facilities thereon.

This PHSEP will be kept onsite during field activities and will be reviewed as necessary. The PHSEP will be reviewed at least annually and revised as project activities or conditions change or when supplemental information becomes available. The PHSEP adopts, by reference, the Jacobs Business Management System Global Health, Safety and Environment (HSE) and People and Places Solutions (P&PS) HSE Procedures and Work Instructions, as appropriate. In addition, applicable requirements contained in the Jacobs Federal and Environmental Services (F&ES) Field Handbook (Handbook) will be implemented. The Handbook is available as a stand-alone Handbook at the project site. The PHSEP may adopt procedures from the project Work Plan and any governing regulations. If there is a contradiction between this PHSEP and any governing regulation, the more stringent and protective requirement shall apply.

This PHSEP incorporates the regulatory requirements described in the State of California OSHA agency – Cal/OSHA Title 8 CCR, Section 3203, Injury and Illness Prevention Program (IIPP), and section 1509, Construction Injury and Illness Prevention Program and thus will be considered the respective program.

All staff and subcontractors must sign the employee sign-off form (Attached to this PHSEP) to acknowledge review of this document. Copies of the signature page will be maintained onsite by the Safety Liaison (SL).

1. General Project Information

1.1 Project Information and Background

Project Number: JMS025DW	Project/Site Name: Dow JMS
Client: Dow Chemical Company	Site Address: 125 Blackstone Avenue Jamestown, NY 14701
Date HSE Plan Prepared: 7-24-25	Date(s) of Site Work: Begin: 2025

1.2 Site Description & Access

1.2.1 Site Description

The Essex/Hope Site is located on a 4.7-acre parcel of land that is currently owned and occupied by Custom Production Manufacturing, Inc. (CPM) at 125 Blackstone Avenue in the City of Jamestown, NY. The site is located in a highly industrialized area of the city that has seen various degrees of industrial use for the past 75 years. Contamination onsite is the result of historical practices conducted at the facility as discussed in the Remedial Investigation (RI)Report dated October 1992.

There are three separate areas that are the focus of remedial action and include the North Parking Lot (NPL) Area, the former Underground Storage Tanks (UST) Area, and the former Aboveground Storage Tank/Underground Storage Tank (AST/UST) Area.

- The remedial systems at the Essex/Hope Site were designed and constructed to address impacted groundwater and soils by a combination of soil vapor extraction, air sparging, and a groundwater extraction and treatment. The original remedial action design and implementation was based upon the March 1994 Record of Decision issued by the NYSDEC and included: A groundwater remediation system consisting of an extraction well network of five (5) shallow and two (2) deep recovery wells and activated carbon groundwater treatment with onsite discharge to the local POTW.
- Soil remediation in the AST/UST and UST Areas by soil vapor extraction (SVE) for volatile organic constituents occurring above the shallow water table.
- Soil excavation in the NPL Area, conducted in September and October of 1996, to remove impacted soils in the former sump and surrounding areas.
- Air sparging in the shallow water-bearing zone of the NPL, UST and AST/UST Areas to supplement the treatment of impacted groundwater via enhanced biodegradation and volatilization of organic constituents. A SVE system was added to the NPL Area to collect volatile organic constituents volatilized from the shallow groundwater in this area.
- The remedial areas were capped with either asphalt or concrete to enhance surface water runoff and minimize infiltration.
- A network of monitoring wells across the site (as designated in the Performance Monitoring Plan) is used to measure the effectiveness of the groundwater remedial activities.

1.2.2 Site Access/Badging Requirements

Employees being badged for the first time will be escorted by an experienced person.

1.2.3 Short Service Workers (SSW)

(Reference HSE Risk Implementation, JJ-HS-WI-0101-JJ-G)

A Short Service Worker (SSW) classification applies to engaging any workers, existing, new and contracted workers, with less than six months experience in the same job type, or with their present employer for any field project work. A New Site Worker (NSW) is a worker, regardless of work experience, has been at the site for less than 30 working days. SSW/NSW present elevated risks due to potential inexperience, unfamiliarity with the site, hazards or the duties required of them, unfamiliarity with Jacobs processes and practices, or reduced exposure to Jacobs' culture.

1) SSW/NSW must complete all HSE job qualifications, training and site/project chartering before commencing work.
2) SSW/NSW must be distinctively identifiable as SSW/NSW through e.g. the use of a hardhat with a different color, colored or marked Hi-Vis vest, or other suitable system appropriate to the work activity and work clothing for the task. Consider a system that is identifiable to all and not only reliant on color.

   At this site, SSW are identified by wearing red sticker
   NSW are identified by wearing yellow sticker
3) Conditions for project team composition with SSW include:
   a) No SSW/NSW can work in the field alone
   b) Teams of less than five can have no more than one SSW/NSW
   c) Teams seeking more than 20% SSW/NSW require HSM approval
   d) Variance to these criteria require HSM approval
   e) Supervision must be assigned to SSW, and must be:
      1. Familiar with the SSW tasks, the supervisory responsibilities, and hazards with the work
      2. Familiar with HSE and project policies, procedures and any specialized actions for the work
      3. Able to recognize hazards and unsafe actions/conditions
      4. Able, willing and assertive in challenging workers who are not complying with site policy or requirements and enforcing the stop work authority
      5. An active participant in BeyondZero Observations

At the end of the established time period, the wearing of distinctive indicators is no longer required, providing that Supervision supports that the SSW/NSW understands HSE requirements and cultural expectations. Alternatively, the time period can be extended.

1.3 Description of Tasks

Below is a description of the tasks covered by this plan. Any additions or changes in scope will require a revision to this PHSEP; see Change Management below.

Scope of work covered by this PHSEP includes:

- Mobilization and Demobilization
- Utility Locate and Survey
- Soil Sampling
- Groundwater Monitoring
- Monitoring Well Installation
- Well Development
- Groundwater Sampling
- Surveying

1.4 Change Management

Changes to this PHSEP shall be documented and approved by the HSM for the project. The following are examples of changes that may require a revision to the plan:

- Change in staff listed by name in this plan;
- New subcontractor to perform work;
- New chemicals brought to site for use;
- Change in scope or addition of new tasks;
- Change in contaminants of concern (COCs) or change in concentrations of COCs;
- New hazards or hazards not previously identified that are not addressed in this PHSEP; and
- New environmental impacts or environmental impacts not previously identified that are not addressed in this PHSEP.

1.5 Changes to Project Health, Safety and Environment Plans

Changes to the PHSEP shall be documented and accepted by using the Health and Safety Field Change Request (FCR) form) or by resubmitting a revised PHSEP for acceptance. A revised PHSEP should be produced when several changes using FCRs have been issued. The Project Manager (PM) and HSM shall be responsible for the review and acceptance of the FCR, and the HSM will maintain an FCR log of approved changes. FCRs are not required for safety-related changes that a Safety Liaison (SL) or HSM would normally make in the field, such as upgrade or downgrade to PPE within pre-established action levels, expansion or reduction of work control zones based on air monitoring results, and similar changes made within the operating parameters of the PHSEP. The field copy of the PHSEP shall be kept up to date by annotating the appropriate section to indicate that an FCR is in effect; copies of FCRs should be kept with the PHSEP. The FCR number must be referenced in the PHSEP and available for review.

2. Management of Subcontractors to Jacobs

The Project Manager subcontracting any field or site-based work activity will take reasonably practicable steps to ensure that our subcontractor is competent and able to carry out work safely before they start work. Specific details are listed in the HSE Field Handbook-Dow

2.1 Subcontractor HSE Chartering Meeting

(Reference P&PS Work Instruction, IB-HS-WI-0520, Health, Safety, and Environmental Requirements for Subcontractors)

A subcontractor HSE chartering meeting shall be held with subcontractors performing field work on the project. The purpose of the meeting is to discuss and agree on key HSE requirements on a project, and to emphasize and reinforce expectations for subcontractor HSE performance. The target audience includes key project staff with HSE responsibilities (e.g., PM, HSM, SL, EM FTL) and key subcontractor staff (e.g., project manager, supervisors, designated field HSE contact, drill team leads, foreman). The subcontractor crew members should attend if available. The meeting should be held prior to mobilization with enough time to ensure that HSE issues identified can be addressed prior to the start of work. The meeting can be held over the phone or in person depending on project needs. An example of an agenda is the “Site Work HSE Pre-Start Meeting Agenda”. Project HSE Objective Targets and Indicators

All project personnel and its visitors are to strive to meet the project specific HSE goals outlined in the HSE Field Handbook. Additional targets should be considered and defined for projects with a field component that are scheduled to last more than 12 months.

3. Dow Program Requirement

Dow Life Critical Standards (LCS) apply to Active and Legacy sites. Active sites, Dow implements the requirements. At legacy sites, they are incorporated into Jacobs management system.

3.1 Legacy Site Requirements

- All tasks at Dow legacy sites (those sites where Dow no longer has active operations nor staff presence) will be covered under:
    - Jacobs Dow Program Procedure Use Policy (PUP)
    - Jacobs Dow Program Safe Work Permit (SWP) Standard
    - The Exempt Task List (AHAs or HIIRA, PTSP or POWRA and STAC will still apply).

  Additional information is available in the HSE Field Handbook-Dow

- Facility Work Group Leaders (FWGL) are responsible to authorize the team members as Permit Issuers and Procedure Users. The authorization must be documented for the site and should be shared with the Remediation Leader (RL). The nominated team members will be trained on these policies.

3.1.1 Jacobs Dow Program Procedure Use Policy (PUP)

(Reference Jacobs Dow Program Procedure Use Policy_V5-October 2024 and Jacobs Dow Program Legacy Site Procedure Template V3 October 2024)

The following Procedures will be used for this project:

- Groundwater Sampling
- Drilling Oversight/Soil Logging/Soil Sampling

3.1.2 High risk specific tasks or Life Critical Standards (LCS) have additional requirements. See the Jacobs Dow Program Procedure Use Policy and the specific LCS addenda or policy for requirements. These may require additional approvals, these tasks are:

LCS	JACOBS has…
Safe Work Permit Policy	Program Policy Safe Work Permit Procedure Template
Procedure Use Policy	
Hydroblasting/Pressure Washing	Program Policy Permit Addendum
Line and Equipment Opening (LEO)	
Energized Electrical Work	
Confined Space Entry (CSE)	HASP Addendum Permit Addendum
Elevated Work/Fall Protection	
Hot Work	
Isolation of Energy Sources (IOES)	
Heavy Equipment	

3.1.3 Jacobs Dow Program Safe Work Permit (SWP) Standard

(Reference Jacobs Dow Program Legacy Site Safety Work Permit Policy V4 – December 2024 and Jacobs Dow Program Legacy Site SWP Form V5)

The Jacobs Dow Program Safe Work Permit (SWP) Standard applies to all Jacobs work at Dow ER&R Legacy Sites, including work performed by subcontractors and lower-tier subcontractors.

- To accept a Dow Safe Work Permit and to ensure that the hazards of the work, area and/or equipment have been reviewed with the Personnel Issuing a Safe Work Permit and understood.
- To ensure that the hazards of the work, area and/or equipment have been reviewed with all personnel working under the Dow Safe Work Permit and understood.
- To notify the Personnel Issuing a Dow Safe Work Permit of any changing conditions or if he/she will be leaving the work site.
- To maintain the Dow Safe Work Permit and any additional permits and/or checklists at the work site.
- To ensure that any additional requirements, permits and/or checklists that are needed based upon the scope of the work are appropriately addressed.
- To sign-off the Safe Work Permit upon closure.

3.1.3.1 SWP is ALWAYS required for:

• Confined Space Entry (CSE)	• Hot Tap
• Crane Critical Lifts	• High Energy Hot Work Flammable Areas
• Diving Operations	• Hot line and equipment opening (Hot LEO) if associated with high or moderate risk procedure
• Electrical Work - Class A1- energized electrical work - Lift equipment near uninsulated or bare power lines - SW-1 switching	• Fall Protection - removing or modifying permanent fall prevention - erecting, removing or moving life critical guards - erecting, dismantling and using suspended work platforms - using a crane for suspended work - using rope access
• Excavation	• Hydroblasting, except remotely controlled hydroblasting systems
• Exchangers – exposed tube plugs	• Small unmanned aerial systems
• Explosive Devices	• When requested by the person doing the work

3.1.4 Exempt Task List

Dow has approved a general exempt task list which covers all legacy sites. Sites may identify additional site-specific exempt tasks and may augment these standard task lists by creating and maintaining a site-specific exempt task list and obtaining approvals. Approvals will be completed by the Project Health & Safety Manager (HSM), the Facility Work Group Leader (FWGL), and the Jacobs Dow Program HSE Manager (in that order) and endorsed by the Dow Remediation Leader (RL).

If a task is exempt from permitting and procedures, there is still a requirement for a HIIRA (formally an AHA) to be completed along with review/approval from the Project HSM. Refer to the HSE Field Handbook or the appropriate policy for the standard list of procedure exempt list.

3.1.4.1 Safe Work Permit and Procedure Exempt List (Standard List)

Safe Work Permit Exempt Tasks	Procedure Exempt Tasks
Driving on-site	Driving on-site
Site walks/tours to visually observe activities and conditions, without using tools or any specialty equipment required.	Office work
Reporting to site offices/trailers for meetings	Site walks/tours to visually observe activities and conditions, without using tools or any specialty equipment required
Office work	Moving portable equipment around site, excluding activities requiring spotting
Housekeeping	Receipt of routine deliveries from suppliers/vendors from companies like FedEx, UPS, Ice delivery, small parts delivery, etc. (not including deliveries requiring "off-loading")
Portable toilet delivery/servicing/collection	Using water hoses and utility sink for filling containers and washing equipment
Site forklift use by trained operator for routine lifting	Kitchen/Breakroom food preparation and stocking
Visual monitoring valves and gauges, collecting readings	Routine shop work with only unpowered hand tools
Moving mobile equipment around the site	Routine Custodial/Janitorial Work, excluding any high hazard tasks
Receipt of routine deliveries from suppliers/vendors (i.e. deliveries like FedEx, UPS, Ice delivery, small parts). Deliveries that involve significant off-loading such as heavy loads, loads of awkward dimensions, offloading requiring equipment beyond a dolly would require a SWP	Unhooking/hooking batteries to charger
Routine grass cutting and light landscaping, including use of weed whacker. This is work conducted on a reoccurring frequency by knowledgeable workers using equipment that is typical of a residential or small commercial setting. NOTE: Use of heavy landscaping equipment by specialized contractors not familiar with the site requires a permit or approved procedure. For example, using heavy equipment to clear an area on a one-time basis is not routine. Similarly, pesticide application or large tree removal, does not fit this exemption and requires a permit.	De-icing tasks, snow shoveling, applying ice melt
Routine lawn care equipment maintenance and repair (oil changes, etc.)	Electrically qualified person resetting a circuit breaker of 120V or less

3.1.5 Hot Work

Hot Work: Requirements are based on classification of work into low or high energy hot work and designation of work areas as restricted, flammable, general or exempt.

- **High Energy Ignition Source** (High Energy Hot Work): Includes activities that generate open flames and/or sparks and activities that could provide an ignition source after an immediate removal of the energy supply (for example: welding, cutting, grinding metals, fired heaters, etc.)
- **Low Energy Ignition Source** (Low Energy Hot Work): Includes activities that generate heat or have the potential to generate sparks and activities that generally do not provide an ignition source after a removal of the energy supply (for

example: electrical/battery operated tools, non-intrinsically safe portable equipment - including mobile phones and pagers, cameras, abrasive blasting, air driven tools, soldering irons, internal combustion engines and motor vehicles, extension cords, or the use of hand tools that could generate sparks - like chisels and hammer wrenches, etc.)

3.1.6 Isolation of Energy Sources

Isolation of energy Sources: Required when work on or servicing equipment could result in exposure to energy sources including chemical, electrical, thermal, mechanical, springs, pneumatic, hydraulic, pressure, gravity, and radiation. All people doing work under the isolation of energy sources (Red Tag Isolation) shall have control of all isolating devices (shall have the control over the removal of any and all Red Tags associated with their work). One or more of the following shall be used for the isolation of energy sources:

- A Master Red Tag System (uses an operations Red Tag controlled by all people doing work under the isolation).
- An Individual Red Tag System (uses personal Red Tags, each controlled by an individual person doing work under the isolation).
- An Energy Control Operating Procedure.

3.1.7 Confined Space Entry

Confined Space Entry: Required when any part of body breaks the plane of an opening to a confined spaced. All Confined Space Entries shall have:

- A Safe Work Permit
- A Confined Space Entry Permit
- A Confined Space Entry Operating Procedure

3.1.8 Pressure Washing and Hydroblasting

Pressure Washing and Hydroblasting: Required when pressure washing (mechanically sprayed water at >150 psig) and hydroblasting. Pressure Washing requires either a Pressure Washing Operating Procedure or a Safe Work Permit. When a Safe Work Permit is used, the pressure washing crew must complete the Dow Pressure Washing Checklist.

3.1.9 Line & Equipment Opening

Line & Equipment Opening: Required for any line or equipment opening attached to a Dow process (including sampling ports). A L&EO Checklist, either by itself or as part of the Safe Work Permit shall be used to identify and document the potential hazards and safeguards of a line or equipment opening.

There are specific training requirements for:

- People who prepare and/or conduct line or equipment openings.
- People who Issue Safe Work Permits for line or equipment openings.

3.1.10 Electrical Safe Work Practices

Electrical Safe Work Practices: Requires training commensurate with task when working on or near energized electrical equipment.

3.1.11 Other

Other requirements may include site-specific indoctrination or orientation training, basic safety orientation training, background checks, etc.

3.2 Daily Safety Meetings and Point of Work Risk Assessments

Daily safety meetings are a means to coordinate project HSE activities and review HSE performance on a regular basis. Daily safety meetings are to be held with all project personnel in attendance, including subcontractors, to review the hazards, controls, and task HIIRAs that apply for each day's activities, as well as any environmental impacts, requirements and/or best management practices. Site supervisors/Field Team Leads (FTL) shall lead the daily safety meeting. Everyone involved in the day's work needs to participate and sign a sign-in form to show they've attended the meeting.

Point of Work Risk Assessments (POWRAs) (previously known as Pre-Task Safety Plans) shall be completed to focus on those hazards and environmental impacts posed by their specific work, taking into account field conditions and/or hazards at the point of work. If a POWRA shows an unacceptable level of risk, field crew shall contact the PM and HSM.

At active Dow sites, the safety meeting will be documented on the Safety Briefing Record and each individual would complete a STAC, ICard, or equivalent, as dictated by the site.

At legacy Dow sites, there may be different situations;

- One Jacobs person on the site – complete a POWRA
- Only Jacobs personnel on the site – complete a POWRA together. If a person from the group is working alone, they may also do a POWRA for just their work.
    - If working under a Procedure, they would complete the POWRA
    - If working under a SWP they would also need the briefing form that accompanies the SWP
- Jacobs and Subcontractors on the site – The entire group would hold a safety meeting and complete a Safety Briefing Form. Individual crews would be issued their SWP plus the corresponding Safety Briefing Form (included as part of the permit). Subcontractors may also have their company tool to complete as well. Crews conducting exempt tasks would complete the POWRA.

4. Project Organization and Responsibilities

A full description of responsibilities, including Employee Responsibilities and Authority, can be found in the Handbook, "Roles and Responsibilities."

4.1 Client

Contact Name:	Abe Northrup - Dow Chemical Company RL
Phone:	

4.2 Jacobs

Site Manager	
SM Name:	**Brian Carling**
Office:	**PHL**
Telephone number:	**610.384.0747**
Cellular Number:	**215.834.5397**

Dow Program HSE Manager	
Name:	**Jeanne Burgess**
Office:	**BOS**
Telephone number:	
Cellular Number:	**508-280-3653**

Project Manager	
PM Name:	**Matt Gale**
Office:	**BOS**
Telephone number:	
Cellular Number:	**617.901.4859**

Project Manager	
PM Name:	
Office:	
Telephone number:	
Cellular Number:	

Health and Safety Manager	
HSM Name:	**Rich Rathnow**
Office:	**KNV**
Telephone number:	**865-607-2197**
Cellular Number:	**865-607-2197**

Environmental Manager	
EM Name:	**Cara McDaniels**
Office:	**PHX**
Telephone number:	
Cellular Number:	**480-399-9131**

Designated Project Executive	
DPE Name:	**Tom Loniewski**
Office:	**DET**
Telephone number:	
Cellular Number:	**517.202.3951**

Safety Liaison	
SL Name:	**BT Thomas**
Office:	**ATL**
Telephone number:	
Cellular Number:	**404 626 7215**

Safety Liaison	
SL Name:	
Office:	
Telephone number:	
Cellular Number:	

Safety Liaison	
SL Name:	
Office:	
Telephone number:	
Cellular Number:	

4.3 Subcontractors

Subcontractor:	**Parratt Wolff**
Contact Name:	**Sean Pepling**
Contact Number:	**315.437.1429 (ofc);**
Scope:	**Well Installation Well Development**

Subcontractor:	**GPRS**
Contact Name:	**Mark Bartlett**
Contact Number:	**419.843.9804**
Scope:	**Utility Clearance**

Subcontractor:	**Pace Analytical**
Contact Name:	
Contact	
Scope:	

Subcontractor:	**Rogers Land Survey**
Contact Name:	**Cindy Rogers**
Contact Number:	**716.665.2828**
Scope:	**Surveying**

Subcontractor:	
Contact Name:	
Contact	
Scope:	

Subcontractor:	
Contact Name:	
Contact Number:	
Scope:	

Subcontractor:	
Contact Name:	
Contact Number:	
Scope:	

Subcontractor:	**PRM**
Contact Name:	
Contact Number:	
Scope:	

4.4 Client Contractors

Subcontractor:	**Ross Environmental Services**
Contact Name:	**Harold Blunt**
Contact Number:	**440.748.5895**
Scope:	**Removal of wood blocks, site grading, removal of fluids from system**

Subcontractor:	
Contact Name:	
Contact Number:	
Scope:	

This PHSEP does not cover contractors that are contracted directly to the client or the owner. Jacobs is not responsible for the health and safety or means and methods of the client contractor's work, and we must never assume such responsibility through our actions (such as advising on health and safety issues).

4.5 Task Management Requirements / Subcontractor Oversight

Task	Subcontractor Oversight			HAZWOPER Related Task	Legacy Sites			Active Sites	
	Continuous	Effective	NA		Procedure	Permit	Exempt	Permit Required	AOP
Mobilization/Demobilization		X		N		X		NA	NA
Surveying		X		N			X	NA	
Monitoring Well Installation Well Development	X			Y		X		NA	NA
Waste Management		X		Y		X		NA	NA
Analytical Services		X		N			X		

5. Task Hazard/Impact Identification and Risk Assessment

(See P&PS Work Instruction IB-HS-WI-0101-IB, P&PS Risk Assessment and Safety System of Work)

As part of the SSoW, in the Dow Program, a hazard identification and environmental impact risk assessment (HIIRA) must be undertaken for all tasks performed by Jacobs and their subcontractors. If working under a SWP or if the task is exempt, a HIIRA is required. When working under a procedure a separate HIIRA is not required as it is incorporated into the document.

A task hazard/impact identification (Table 1) has been completed for this project. Specific project tasks are listed in Table 1 with a designation of who could be affected by the hazards associated with the task; Jacobs, subcontractor, or both. Visitors and members of the public, when on or near the site, will be assumed to be affected by the same hazards and impacts as Jacobs or subcontractor personnel. Initial risk and residual risk associated with the hazards identified below shall be documented in the task HIIRA form or the procedure. Visitors that are trained and qualified to enter the work area must be escorted and briefed on the hazards they may be exposed to by reviewing applicable portions of the PHSEP and task HIIRAs.

The SSoW to mitigate these hazards includes:

- The hazard control sections listed in this plan (or referred to in the Handbook) The operating procedure or task HIIRA for each project task listed in Table 1; and
- The POWRA performed by the workers prior to performing the task.
- Subcontractors will have accepted AHA/JSA or procedures

Jacobs' task HIIRAs for the tasks below are referenced to this plan. Jacobs' subcontractors are required to submit a similar SSoW (e.g., job or activity hazard analyses, HSE plan, procedure) specific to their scope of work for acceptance by Jacobs HSM prior to the start of work. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed requires an updated to be prepared and reviewed by Jacobs.

Table 1: Project Tasks and Associated Hazards and Environmental Impacts

Associated Hazard Section / Project Activity	Mobilization/ Demobilization	Utility Clearance	Groundwater Sampling	Soil Sampling	Decontamination	Waste Management	Well Development	Monitoring Well Installation	Surveying
Bloodborne Pathogens	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Chemical Storage	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Driving Safety	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S

Associated Hazard Section / Project Activity	Mobilization/ Demobilization	Utility Clearance	Groundwater Sampling	Soil Sampling	Decontamination	Waste Management	Well Development	Monitoring Well Installation	Surveying
Electrical Safety	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Field Vehicles	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Fire Prevention	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
General Practices and Housekeeping	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Hazard Communication	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Lighting	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Manual Lifting	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Personal Hygiene	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Personal Security	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Shipping and Transportation of Hazardous Waste			J	J		J	J	J	
Substance Abuse	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Aerial Lifts									
Benzene			J	J,S		J	J,S	J,S	
Compressed Gas Cylinders			J	J,S		J	J,S	J,S	
Drum and Portable Tank Handling			J	J,S	J	J	J	J,S	
Drum Sampling Safety				J,S		J	J,S	J,S	
Energized Electrical Work									
Fall Protection									

Associated Hazard Section / Project Activity	Mobilization/ Demobilization	Utility Clearance	Groundwater Sampling	Soil Sampling	Decontamination	Waste Management	Well Development	Monitoring Well Installation	Surveying
Forklifts Operations				J,S		J	J,S	J,S	
Groundwater Sampling/Water Level Measurements			J,S	J					
Hand and Power Tools	J,S	S	J	J,S		J	S	J,S	
Lockout /Tagout Activities									
Pressurized Lines/Equipment				J,S	S		J,S	J,S	
Process Safety Management									
Stairways and Ladders									
Welding and Cutting									
Working around Material Handling Equipment						J,S	J,S	J,S	
Working Alone			J		J	J			
Noise		J,S		J,S			J,S	J,S	J,S
Ultraviolet Light exposure (sunburn)	J,S	J,S	J	J,S	J,S	J	J,S	J,S	J,S
Temperature Extremes	J,S	J,S	J	J,S	J,S	J	J,S	J,S	J,S
Bees and Other Stinging Insects	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S
Mosquito Bites	J,S	J,S	J	J,S	J	J	J,S	J,S	J,S

J – Hazard identification applicable to Jacobs personnel
S – Hazard identification applicable to Subcontractor personnel
* For activities above identified as Critical Risks, refer to Jacobs Global Work Instruction JJ-HS-WI-0303-JJ, *Critical Risk Management,* the Critical Risk Awareness Booklet, and the Critical Risk Awareness Guide for Managers and Supervisors. For Environmental Aspects, refer to P&PS Work Instruction IB-HS-WI-0101-IB, *Risk Assessment and Safe System of Work,* Table 9.4.** If potable water injection becomes necessary during operations, contact the Environmental Manager prior to this activity.

6. Hazards and Controls

(See P&PS Work Instruction IB-HS-WI-0101-IB, P&PS Risk Assessment and Safety System of Work)

Safe work practices and hazard control measures to reduce or eliminate potential hazards as identified in Table 1 are stated in the Handbook, Sections 7-10, the associated Jacobs Procedure, Work Instruction, or Guideline, and/or are addressed in task HIIRAs. Any additional project-specific control measures, or those hazards requiring additional emphasis, are identified in the following sections.

Always consult the appropriate Procedures or Work Instruction referenced in the hazard sections to ensure all requirements are implemented. All employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. Jacobs employees and subcontractors who do not understand any of these provisions should contact the HSM for clarification prior to commencing with work.

A POWRA or other tools shall be performed, depending upon the situation, at the start of each shift or when conditions significantly change. Implement the StepBack process (see Handbook) throughout the duration of the task.

6.1 General Hazards and Controls

6.1.1 Hand and power tool use

- Inspect all tools before each use. Do not use damaged or modified tools.
- Use the appropriate tool for the job.
- Personnel must be trained in the proper use of hand tools.
- All power tools will be energized through GFCI.
- Inspect all extension cords to be use prior to use. Ensure all extension cords are grounded (three-prong).
- Make sure all safety guards are in place.
- Do not use open-bladed knives (e.g., leatherman, pocket knives). If a bladed tool is needed, contact the HSM to amend this HIIRA
- Warm-up and stretch before using hand tools.
- Wear gloves to prevent blisters, take breaks.

6.1.2 Accessing and opening Well

- Review the Jacobs Groundwater Sampling HIIRA and procedures for hazards and controls
- Know the limitations of all hand tools. Use socket wrench and, if necessary, bolt cutters to remove old, rusty locks.
- Stand up-wind of well when opening lid and keep head/face out of the “line of fire.” Well may be pressurized and the cap could pop off.
- Wear leather gloves if necessary to avoid sharp edges or pinch points. Leather gloves should be worn when using the socket wrench to open the well cover to prevent skin from scraping the surface.

6.2 Project-Specific Life Critical Standards (LCS)

Dow Legacy sites will follow all Jacobs-Dow Program Life Critical Standards and applicable requirements.

The following LCS apply to this project:

- Heavy Equipment
- Hydroblasting-Pressure Washing
- Energized Electrical

6.3 Project-Specific additional requirements (non-LCS)

6.3.1.1 Power Line Safety

It must be determined whether equipment operations including assembly/disassembly, positioning, and crane operation (including traveling with a load) will occur in proximity to power lines within 20 feet (6.1 meters) for line voltage up to 350 kilo volts (kV), and within 50 feet (15.2 meters) for line voltage between 350 kV to 1000 kV. For power lines over 1000 kV, the distance must be determined by the utility/operator or qualified registered professional engineer in electrical power transmission and distribution.

If equipment operations are within proximity of aforementioned distances to power lines, one of the following options must be implemented to prevent encroachment and electrocution:

- Option 1: Deenergize and ground the power. Confirm from the utility/operator that the power line has been deenergized and visibly grounded at the worksite
- Option 2: If the voltage is not determined, ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet (6.1m) by:
    - Conduct a planning meeting with the operator and other workers in the area to review the actions that will be taken to prevent encroachment and electrocution.
    - Use non-conductive tag lines.
    - Erect and maintain an elevated warning line, barricade or line of signs in view of the operator, either with flags or other high-visibility markings at 20 feet (1.6m) from the power line. A spotter must be used when the operator does not have clear line of sight to the elevated warning line.
    - To prevent encroachment, the operator can use a proximity alarm, or position a dedicated spotter with visual aids to demarcate the encroachment and constant communication access to the operator.

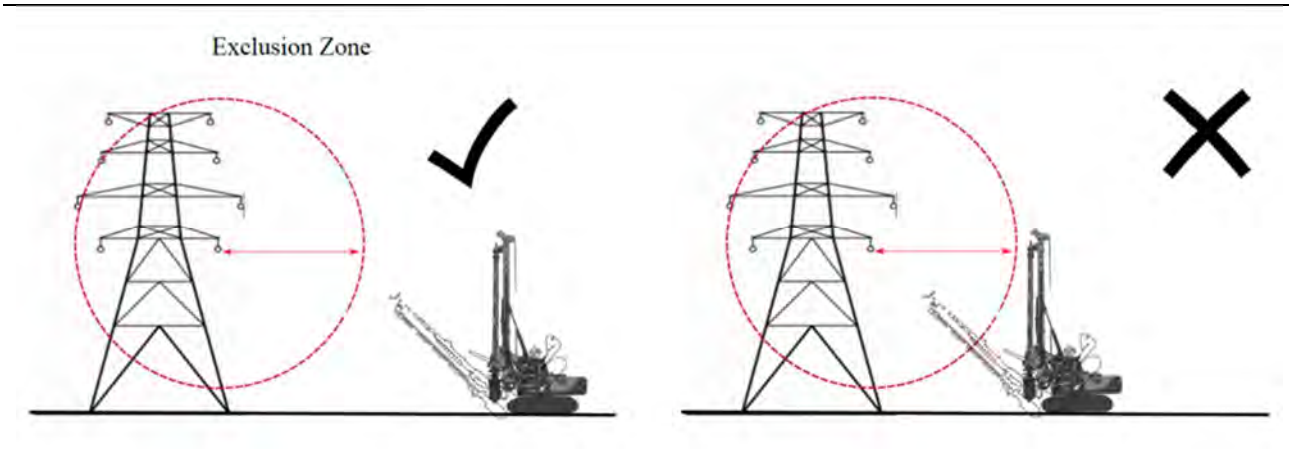
If the line voltage can be determined, and if any part of the equipment, line load or load (including rigging and lifting accessories) would encroach within that specified distance listed in Table 1, then the requirements listed in Option 2 must be implemented.

Table 6-1. Minimum Clearance Distances

MINIMUM DISTANCES FROM POWERLINES – per Jacobs Utility Avoidance Work Instruction

Powerlines Nominal System Kv	Minimum Required Distance ("exclusion zone"), Feet (Meters)
0-350	20 (6.1)
351-500	25 (7.6)
501 - 1000	45 (13.7)
Over 1000	Established by utility owner/operator or by a professional engineer in electrical power transmission/distribution

(These distances have been determined to eliminate the potential for arcing based on the line voltage.)



For equipment traveling within 20 feet (6.1m), under or near power lines without a load, the clearance distances described in Table 6-2 must be maintained and the following actions implemented.

- A dedicated spotter is assigned during equipment travel, positioned to effectively gauge the clearance distance, and is in continuous communication with the operator.
- During equipment travel, the boom/mast and support system are sufficiently lowered to ensure clearance distances are maintained, along with taking into consideration of the effects of speed and terrain.

Table 6-2. Minimum Clearance Distances While Traveling with No Load

Voltage (nominal, kV, alternating current)	Minimum Clearance – Feet (meters)
Up to 0.75	4
Over 0.75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1000	20
Over 1000	Established by the utility owner/operator or by a qualified registered professional engineer in electrical power transmission and distribution

6.3.2 Drilling Safety

Below are the hazard controls and safe work practices to follow when working around or performing drilling. Ensure the requirements below are followed.

- For interior drilling the rig travel path shall be verified and spotter used when in motion / mast raising & lowering. Exhaust will be exited from the building and CO monitored by the driller. No visible dust will be generated by drill rig action. Noise and vibration will be monitored per work plan. Any unusual odors should be brought to attention of SL for evaluation of additional monitoring and ventilation.
- When considering drilling at sites with nearby monitoring wells, particularly in cases where drilling methods utilize pressurized fluids (air or water), consider the potential risk of hydraulic communication between the drilling location and the adjacent wells and/or other subsurface conduits.
- The drill rig is not to be operated in inclement weather.

- The driller is to verify that the rig is properly leveled and stabilized before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The driller is not to drive the rig with the mast in the raised position.
- The driller must check for overhead power lines before raising the mast. Maintain a minimum distance of 10 feet (3 meters) between mast and overhead lines (<50 kV) and an additional 0.4 inches for every 1 kV over 50kV. Verify the voltage of nearby overhead power lines to determine the minimum distance.
- All drilling sites must be evaluated for potential contamination by consulting with the client, reviewing historic data related to properties' past owners and uses, prior investigation reports or through vendor services.
- If unexpected contamination is discovered during drilling operations, all activities must immediately stop and the FES SC/SL or PM shall be immediately notified. Work shall not recommence until authorized by the FES PM.
- If contamination is suspected or confirmed at the drilling site, the following must be implemented:
    - The standard hazardous materials/hazardous waste clause is included in our contract with the client and in our subcontract agreements
    - The drilling subcontract work plans address appropriate disclosure of potential contamination, any required training (e.g., HAZWOPER) and the requirement to plan for unexpected contamination. The subcontractor work plan and submittals are reviewed for appropriate licenses, certifications, permits, training, sampling and analytical, waste characterization, and waste management, including accumulation, transport and disposal.
- Personnel should stand clear before rig startup.
- The driller is to verify that the rig is in neutral when the operator is not at the controls.
- Become familiar with the hazards associated with the drilling method used (cable tool, air rotary, hollow-stem auger, etc.).
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts.
- Do not smoke or permit other spark-producing equipment around the drill rig.
- The drill rig must be equipped with a kill wire or switch, and all personnel are to be informed of its location.
- Be aware and stand clear of heavy objects that are hoisted overhead. Ensure any components subject to load bearing are rated and not shop-made.
- The driller is to verify that the rig is properly maintained in accordance with the drilling company's maintenance program.
- The driller is to verify that all machine guards are in place while the rig is in operation.
- The driller is responsible for housekeeping (maintaining a clean work area).
- The drill rig should be equipped with at least one fire extinguisher.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig, and stay as far away as possible. Notify emergency personnel immediately.
- Use the drilling self-assessment checklist to evaluate drilling operations.

6.3.3 Pressure Washing Operations

Below are the hazard controls and safe work practices to follow when working around or performing pressure washing.

- Pressure washing is an LCS policy controlled activity. A permit is required unless determined by HSM to be an exempt process. The SL must coordinate with the HSM to determine Pressure Washing or Hydroblasting permit requirements.
- Only trained, authorized personnel may operate the high-pressure washer.
- Follow manufacturer's safety and operating instructions.
- Do not operate pressure washer on stairs or ladders.
- Inspect pressure washer before use and confirm deadman trigger/failsafe device is fully operational.
- The wand must always be pointed at the work area.
- The trigger should never be tied down.
- Never point the wand at yourself or another worker.
- The wand must be at least 42 inches (1.1 meter) from the trigger to the tip and utilize greater than 10 degree tips.
- The operator must maintain good footing.
- Non-operators must remain a minimum of 20 feet from the operator.
- No unauthorized attachment may be made to the unit.
- Do not modify the wand.
- All leaks or malfunctioning equipment must be repaired immediately, or the unit taken out-of-service.
- Workers within 20 feet of pressure washing activities must wear polycoated Tyvek suit or equivalent, 16-inch-high steel-toed or metatarsal (rated for the pressure being used) rubber boots, safety mono-goggles, hard hat with face shield, hearing protection and inner and outer nitrile gloves at a minimum.

6.3.4 Earthmoving/Heavy Equipment

Below are the hazard controls and safe work practices to follow when working around or operating heavy equipment. Ensure the requirements below are followed.

- FES authorizes only those employees qualified by training or previous experience to operate material handling equipment.
- FES employees must be evaluated prior to operating earthmoving equipment by a FES earthmoving equipment operator evaluation designated person. This evaluation will be documented on an Earthmoving Equipment evaluation form.
- Heavy equipment operators are prohibited from using any wireless device while operating equipment. Equipment must be stopped before using devices such as two way radios or cell phones. If a wireless device is required for a certain operation, the PM and RHSM must authorize the wireless use on a case by case basis and make sure limitations are addressed in the project safety plan.
- Equipment must be checked at the beginning of each shift to ensure the equipment is in safe operating condition and free of apparent damage. The check should include: service brakes, parking brakes, emergency brakes, tires, horn, back-up alarm, steering mechanism, coupling devices, seat belts and operating controls. All defects shall be corrected before the equipment is placed in service. Documentation of this inspection must be maintained onsite at all times (use the Earthmoving Equipment Inspection form if operated by FES).
- Equipment must be on a stable foundation such as solid ground or cribbing; outriggers are to be fully extended.
- Equipment must not be used to lift personnel; loads must not be lifted over the heads of personnel.
- Equipment, or parts thereof, which are suspended must be substantially blocked or cribbed to prevent shifting before personnel are permitted to work under or between them. All controls shall be in a neutral position, with the motors stopped and brakes set.

- Equipment which is operating in reverse must have a reverse signal alarm distinguishable from the surrounding noise or a signal person when the operators view is obstructed.
- When equipment is used near energized power lines, the closest part of the equipment must be at least 10 feet (3 meters) from the power lines less than 50 kilovolts (kV). Provide an additional 4 feet (1.2 meters) for every 10 kV over 50 kV. A person must be designated to observe clearances and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All overhead power lines must be considered to be an energized until the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Underground utility lines must be located before excavation begins; refer to the Utilities (underground) section.
- Operators loading and unloading from vehicles are responsible for seeing that vehicle drivers are in the vehicle cab or in a safe area.
- The parking brake shall be set whenever equipment is parked; wheels must be chocked when parked on inclines.
- When not in operation, the blade or bucket must be blocked or grounded; the master clutch must be disengaged when the operator leaves the cab. When equipment is unattended, power must be shut off, brakes set, blades or buckets landed and shift lever in neutral.

6.3.5 Public / Client Safety

Due to the fact that this work involves work in assessable areas, emphasis must be placed on warning and directing unauthorized personnel to remain adequate distance from work areas. Work areas will be clearly demarcated and durable, weatherproof signs will be posted to indicate no authorized entry.

Should unauthorized personnel inadvertently enter the work area, site personnel shall cease all work until the unauthorized person is escorted out of the work area.

Emergency power cutoff to ISTT system upon entry to treatment field will be tested as necessary to ensure effectiveness.

6.4 Environmental Aspects, Impacts and Controls

Reference project environmental management plan (EMP) or work instructions.

7. Required Permits

(See Jacobs Global Work Instruction JJ-HS-WI-0305-JJ, Safe Work Permits)

Safe work permits are used as a work control process for defined hazardous activities. The use of work permits may be required by clients or as a result of task risk assessment.

Safe work permits are mandatory for the following types of operations (others based on client or other requirements may be needed as well):

(This is just a reference tool to show all of the permits)

Dow Specific SWP (see Dow specific requirements)	Jacobs Specific SWP (see Jacobs BMS requirements)
SWP – General	Excavation (IB-HS-WI-0333-IB) • Utility Avoidance (IB-HS-WI-0335-IB) • Permit to Dig (IB-HS-WI-0333-IB-F-01) (for hand digging, daylighting, and machine dig) • Excavation Inspections (IB-HS-WI-0333-IB-F-03
Confined Space Entry (CSE)	
Electrical Safety (Elevated Work Near Electrical Lines & Energized Electrical Work)	
Elevated Work / Fall Protection	Ground Disturbance • Utility Avoidance (IB-HS-WI-0335-IB) • Utility Verification (IB-HS-WI-0335-IB-F-01)
Heavy Equipment	
Hot Work	Lift Plan (IB-HS-WI-0345-IB) • Utility Avoidance (IB-HS-WI-0335-IB) • Lifting Plan (IB-HS-WI—0345-IB-F-01) (if Jacobs is responsible for producing lift plan) • Lifting Checklist (IB-HS-WI-0345-IB-F-02) • Lifting Equipment and Accessories Inspection Record (IB-HW-WI-0345-F-03) (if Jacobs is responsible for inspection)
Hydroblasting / Pressure Washing	
Isolation of Energy Source (IOES)	
Line and Equipment Opening (LEO)	
	Energized Electrical Work • Electrical Safety (IB-HS-WI-0344-IB) • Electrical Safety Permit (IB-HS-WI—0344-IB-F-01)

Required Permits for Project work

Permit Type	Activities/Tasks
SWP – General	Mobilization/Demobilization Utility Locate Survey In Situ Thermal Treatment (ISTT) Installation Operation & Monitoring Decommissioning Hot Soil Sampling
Ground Disturbance	Mobilization/Demobilization In Situ Thermal Treatment (ISTT) Installation Hot Soil Sampling
Heavy Equipment	Mobilization/Demobilization In Situ Thermal Treatment (ISTT) Installation Decommissioning
Hydroblasting / Pressure Washing	In Situ Thermal Treatment (ISTT) Installation Hot Soil Sampling
Isolation of Energy Sources	In Situ Thermal Treatment (ISTT) Installation System Maintenance Decommissioning
Line and Equipment Opening	System Maintenance Decommissioning
Lift Plan	In Situ Thermal Treatment (ISTT) Installation Decommissioning

Coordinate work with the project team and client's operations representative (if required) as necessary to ensure that a properly filled out work permit is issued and includes relevant supporting information:

- The hazards/impacts and limitations at the site are assessed;
- All precautions are taken and safe practices followed;
- A work area review is conducted prior to signing and authorizing work; and
- Verify by means of a signature that the work permit has been reviewed and limitations and controls measures understood

Inspect the permit and tasks to ensure the permit requirements are still being met. Immediately stop work and notify supervision if any changes in job conditions or hazards take place. Ensure the permit is closed out where required.

8. Hazard Communication

(See P&PS Work Instruction IB-HS-WI-0202-IB, Chemical Hazard Communication)

As indicated in Section 7 of the Handbook, under "Hazard Communication," the hazard communication (HazCom) coordinator (the SL or qualified designee) must perform the following (additional HazCom duties are outlined in the Handbook):

- Complete an inventory of chemicals brought on site by Jacobs using the chemical inventory form included as an attachment to this PHSEP;
- Confirm that an inventory of chemicals brought on site by subcontractors is available;
- Request or confirm locations of Globally Harmonized System (GHS) compliant (i.e., consisting of 16 sections that appear in the same order and contain uniform information regarding the chemical) safety data sheets (SDSs) from the client, contractors, and subcontractors for chemicals to which Jacobs employees potentially are exposed;
- For chemicals used by Jacobs workers, before or as the chemicals arrive onsite, obtain a SDS for each hazardous chemical, include on the chemical inventory sheet (attached to this PHSEP), and maintain SDSs in an accessible binder onsite long with the chemical inventory sheet . Ensure everyone knows where SDSs are kept;
- The six required elements of the GHS label must include the product identifier, pictograms, signal word, hazard statements, precautionary statements, and the name, address, and telephone number of the chemical manufacturer, importer or other responsible party;
- The manufacturer's original label on any incoming regulated product must not be removed or defaced. The manufacturer's label and markings must be retained on the package or container until it is sufficiently cleaned of residue and purged of vapors to remove any potential hazards;
- Ensure all secondary containers are labeled in compliance with GHS labeling requirements. If GHS compliant information has not yet been provided by the manufacturer or chemical distributor, the HCC must contact the manufacturer or chemical distributor and document in the chemical inventory when the GHS labeling information will be available, until the labeling requirement is fulfilled;
- In the United States, the container label shall be in English, although labels in other languages may be kept as well. Container labels in other languages for non-speaking English-speaking workers will be made available when specified by the client for their project site or facility;
- Give employees required chemical-specific HazCom training using the chemical-specific training form included as an attachment to this PHSEP and ensure that the GHS supplemental VO module has been completed.
- Ensure that chemical use is included in the task HIIRA.

9. Contaminants of Concern

The table below summarizes the potential contaminants of concern (COC) and their occupational exposure limit and signs and symptoms of exposure. The table also includes the maximum concentration of each COC and the associated location and media that was sampled (groundwater, soil boring, surface soil). These concentrations were used to determine engineering and administrative controls described in the "Project-Specific Hazard Controls" section of this PHSEP, as well as PPE and site monitoring requirements.

Table 3: Contaminants of Concern

Contaminant	Location and Maximum[a] Concentration (ppm)	Exposure Limits[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Acetone	GW: 678 (MW-21D)T4-W: 270 mg/kg	250 ppm	2500 ppm	Irritation to the eyes, nose, throat. Headaches, dizziness, central nervous system depression, dermatitis.	9.69
Bis-(2-ethylhexyl)phthalate (DEHP, DOP)	SB: 2800 ug/kg	5 mg/m3	5,000 Ca	Eye and mucous membrane irritant	UK
2-Butanone	T4-W: 100 mg/kg	75 ppm	3000 ppm	Irritated eyes, dizziness, vomiting	9.53
cis-1,2-Dichloroethene	GW: 185 (MW-21D) SB: SS:	200 ppm	1,000 ppm	Irritated eyes, CNS depression	10.0
Ethylbenzene	GW: 13.3 (MW-29S) SB: T4-W: 63 mg/kg SB: 2600	100 ppm	800	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
Isophorone	SB: 410	25 ppm	200	Irritation to eyes,skin, respiratory system, chest tightness, dyspnea, cough, sore throat, wheezing, pulmonary edema, bronchitis, resp. sensitizer	9.07
Lead	Tank Solids: 210 mg/kg SB: 234 mg/kg	.05 mg/m^3	100 mg/m^3	Fatigue, pallor, colic, insomnia	NA
Methylene Chloride	T4-W: 9.7 mg/kg	25 ppm	2300 ppm	Weakness, tingling & numbness, vertigo, nausea	11.35
4-Methyl-2-pentanone	TW-4: 32 mg/mk SB: 39	20 ppm	500 ppm	Irritated eyes, nose & throat, narcosis, headache	9.30
Naphthalene	SB: 140	10 ppm	250 ppm	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	8.12
Tetrachloroethene	GW: ND SB: SB: 20	25 ppm	150 Ca	Eye, nose, and throat irritation; nausea; flushed face and neck; vertigo; dizziness; sleepiness; skin redness; headache; liver damage	9.32
Toluene	GW: 0.512 (MW-29S) T3-W: 6200 mg/kg SB: 3800	20 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Trichloroethene	GW: 30 (MW-21D) SB: SB: 1.2	10 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45

1,2,4-Trimethylbenzene	SB: 2700	25 ppm	NA	Irritant to eyes, skin, nose and respiratory system, bronchitis, hypochromic anemia, headache, drowsiness, fatigue, dizziness, nausea, incoherence, vomiting, confusion, chemical pneumonia	8.27
1,3,5 Trimethylbenzene	SB: 1400	25 ppm	NA	Irritant to eyes, skin, nose and respiratory system, bronchitis, hypochromic anemia, headache, drowsiness, fatigue, dizziness, nausea, incoherence, vomiting, confusion, chemical pneumonia	8.39
Vinyl Chloride	GW: 63.4 (MW-21D) SB: SS:	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99
Xylenes	GW: 41.15 (MW-29S) T4-W: 190mg/kg SS: SB: 13,000	100 ppm	900	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water).

[b] Appropriate value of permissible exposure limit, recommended exposure limit, or threshold limit value listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "exposure limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

eV = electron volt

mg/kg = milligram per kilogram

mg/m^3 = milligrams per cubic meter

ug/m^3 = micrograms per cubic meter

Potential Routes of Exposure		
Dermal: Contact with contaminated media. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of PPE.	Inhalation: Vapors and contaminated particulates. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of respiratory protection when other forms of control do not reduce the potential for exposure.	Other: Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

10. Site Monitoring

10.1 Direct Reading Monitoring

For each task listed in the table below, perform the associated monitoring ensuring the equipment is calibrated daily (or bump tested) according to the manufacturer's recommendations.

Note: The term "calibration" is used but it may actually be a "bump test" depending on what the manufacturer requires. There is a difference between actually calibrating (manually adjusting sensors to read a value) and "bump testing" (field verification that the instrument is reading what it's supposed to.) Many equipment manufacturers now say that performing actual calibration daily can damage the sensors, so they recommend a "bump test" daily or before use to verify the instrument is reading correctly, and they state a prescribed calibration frequency requirement. Refer to the manufacturer's instrument manual on the recommended daily calibration or bump test requirements. Be sure the calibration/bump test is documented.

Use the Daily Site Monitoring Form (or equivalent) to document the calibration (or bump test) and the readings taken. Retain area monitoring readings with project records.

Personal Breathing Zone and Area Samples

Personal breathing zone and area sampling results must be sent immediately to the HSM..

Exposure records (breathing zone and personal air sampling) must be preserved for the duration of employment plus thirty years. Copies of all project exposure records (e.g., copies of Daily Site Monitoring form or field logbook pages where breathing zone readings are recorded along with associated calibration) shall be sent to the F&ES Safety Program Assistant for retention and also maintained in the project files.

Subcontractors are responsible for air monitoring and performing integrated personal sampling for their employees as documented in their PHSEP or, if permitted, according to the table below.

Table 4: Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency [b]	Calibration
PID: MultiRae PID with 10.6 eV lamp or equivalent	Intrusive Work Soil Sampling Groundwater Sampling Well Development Well Installation/Drilling	0-1 ppm >1 ppm → Pull VC tube, Stop work; Notify HSM if tube >1ppm 0-5 ppm 5-10 ppm 5-10 ppm	Level D Level D Consult HSM for Draeger tube result Level D – no VC detection Level C Level C – No VC detection Level B	Initially and periodically during tasks Checking breathing zone	Bump Test Daily Calibrate per manufacturer recommendations

Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency [b]	Calibration
		>10 ppm			
LEL Monitor: MultiRae	Intrusive WorkWell Development Well Installation/Drilling	0-10%: >10% LEL:	No explosion hazard Explosion hazard; evacuate or vent	Continuous during tasks	Bump Test Daily Calibrate per manufacturer recommendations
O2 Monitor: MultiRAE	· Intrusive Work Well Development Well Installation/Drilling	>25%[c] O_2: 20.9%[c] O_2: <19.5%[c] O_2:	Explosion hazard; evacuate or vent Normal O_2 O_2 deficient; vent or use SCBA	Initially and periodically during tasks	Bump Test Daily Calibrate per manufacturer recommendations
Hydrogen Sulfide: MultiRAE	Intrusive work Well Development Well Installation/Drilling	<1 ppm >1 ppm	Level D Stop work, implement engineering controls, if concentrations >1ppm persist, contact HSM to determine appropriate path forward, including an upgrade in respiratory protection.	Initially and periodically during tasks	Bump Test Daily Calibrate per manufacturer recommendations
Carbon Monoxide: MultiRAE	Equipment operations when doing confined work tasks	<25 ppm >25 ppm	Level D Stop work, move to fresh air, contact HSM	Initially and periodically during tasks	Bump Test Daily Calibrate per manufacturer recommendations
Detector Tubes: Vinyl Chloride	Intrusive work, Soil Sampling Groundwater Monitoring Well Development Well Installation/Drilling	0-1 ppm >1ppm	Level D Level C	Detections over 1 ppm on PID.	NA
Noise-Level Monitor: [d]	Drill Rig Operation	<85 dB(A) 85-120 dB(A) 120 dB(A)	No action required Hearing protection required Stop; re-evaluate	Initially and periodically during task	Calibrate per manufacturer recommendations

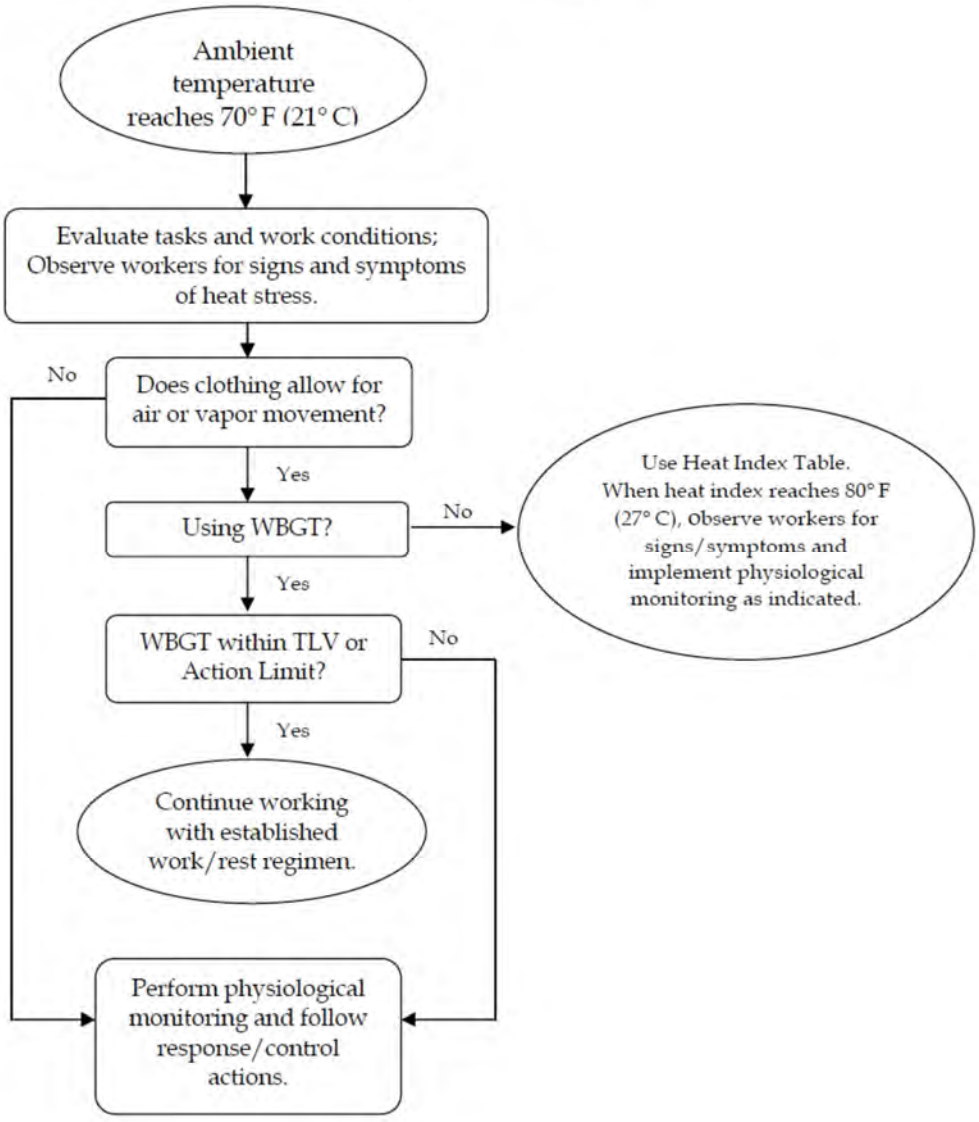
Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency [b]	Calibration
Noise-Level Monitor: [d] Voice	All Tasks	Conversations can be held at distances of 3 feet without shouting Conversations cannot be held at a distances of 3 feet without shouting	No action required Hearing protection required	Continuous During Task	Not applicable
Dust Monitor: Visual	All Tasks	No Visible Dust Visible Airborne Dust	Level D Level D. Institute Dust Suppression Techniques	Continuous During Task	Not applicable
NOTE: The GEM 2000 (or equivalent) may be used for H_2S, methane LEL, and O_2 using the action levels listed above.					
Heat Stress Monitor - Refer to Flow Chart Below ☒ Ambient Temperature ☐ WBGT ☒ Heat Index ☒ Physiological ☒ Pulse ☒ Temperature	All Tasks	Refer to the Handbook for the type of monitoring conducted.	Refer to the Handbook for the type of monitoring conducted.	When Heat Index reaches criteria.	

[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SL; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate.
[c] If the measured percent of O_2 is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O_2 action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O_2 action levels are required for confined-space entry.
[d] Noise monitoring and audiometric testing also required.

10.2 Heat Stress Monitoring Flow Chart

Use the flow chart below and refer to the applicable protocol in Section 9 of the Handbook for heat stress monitoring.

Thermal Stress Monitoring Flow Chart



11. Personal Protective Equipment

11.1 Required Personal Protective Equipment (PPE)

(See P&PS Work Instruction, IB-HS-WI-0310-IB, Personal Protective Equipment Minimum Standards and IB-HS-WI-0310-US, PPE Guidance - USA))

PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

A PPE assessment has been conducted by the HSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the HSM that approved this plan. Refer to the Handbook, Section 11, "Personal Protective Equipment," for requirements on the use, care, and maintenance of PPE.

The table below outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the HSM so this table can be updated. Task-specific PPE is also contained in task HIIRA for each task.

Ensure that all PPE is inspected prior to use and that you have been trained in its use. Ensure the PPE used fits properly. Contact the HSM if there are deficiencies or you haven't been trained on care, use, and limitations of PPE.

Table 5: PPE Requirements

Project-Specific Personal Protective Equipment Requirements[a]				
Task	Level	Body	Head	Respirator [b]
General field work outside in Support Zone Surveying Utility Clearance All tasks under presumption that contact w/contaminated media will not occur	D	Work clothes (sleeved shirt, long pants) Safety-toed Boots Gloves (leather) ANSI/ISEA 107-2010 high visibility vest	ANSI Z89.1 Hardhat [c] ANSI Z87.1 Safety glasses Hearing protection [d]	None required
Soil Sampling Groundwater Sampling Well Development Monitoring Well Installation Drilling Decontamination Waste Management	Modified D	Work clothes or Cotton coveralls ANSI/ISEA 107-2010 high visibility vest Safety-toed boots with outer rubber boot covers or Safety-toed rubber boots (can be deconned in a boot wash) Inner surgical-style nitrile Outer chemical-resistant neoprene for PCB contamination handling/exposure	ANSI Z89.1 Hardhat [c] ANSI Z87.1 Safety glasses Hearing protection [d] Face shield – within 10' of Hot Soil Sampling when cores are being removed	None required

Contact with contaminated media / vapors and as indicated by Table 3 above in the Direct Reading Instrument Monitoring Table	Level C	ANSI/ISEA 107-2010 high visibility vest Safety-toed boots with outer rubber boot covers or Safety-toed rubber boots (can be deconned in a boot wash) Inner surgical-style nitrile gloves Outer chemical-resistant Viton or Viton/Butyl Rubber gloves for contamination handling/exposure Tychem 5000 chemical resistant suits for exposure to potential contact with pipe and surrounding soil contaminants.	ANSI Z89.1 Hardhat c ANSI Z87.1 Safety glasses Hearing protection d	Full Face APR respirator with Organic Vapor cartridges Change cartridges daily or if break through is experienced
Not anticipated	Level B	ANSI/ISEA 107-2010 high visibility vest Safety-toed boots with outer rubber boot covers or Safety-toed rubber boots (can be deconned in a boot wash) Inner surgical-style nitrile gloves Outer chemical-resistant Viton or Viton/Butyl Rubber gloves for contamination handling/exposure Tychem 5000 chemical resistant suits for exposure to potential contact with pipe and surrounding soil contaminants.	ANSI Z89.1 Hardhat [c] ANSI Z87.1 Safety glasses Hearing protection [d]	Airline Respirators

Equipment decontamination if using pressure washer	Modified D with splash protection	Polycoated Tyvek® / rain suit ANSI/ISEA 107-2010 high visibility vest 16-inch-high safety-toed rubber boots (can be deconned in a boot wash) Inner surgical-style nitrile Outer chemical-resistant nitrile gloves (no PCBs) Other (specify):	ANSI Z89.1 Hardhat [c] ANSI Z87.1 Safety glasses Hearing protection [d] Face shield Mono-goggles	None required.

Reasons for Upgrading or Downgrading Level of Protection (with approval of the RHSM)	
Upgrade[f]	Downgrade
Request from individual performing tasks. Change in work tasks that will increase contact or potential contact with hazardous materials. Occurrence or likely occurrence of gas or vapor emission. Known or suspected presence of dermal hazards. Instrument action levels in the "Site Monitoring" section exceeded.	New information indicating that situation is less hazardous than originally thought. Change in site conditions that decrease the hazard. Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. Jacobs will provide PPE only to JACOBS employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to be determined by the SL.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet (1 meter) or less without shouting.
[e] See cartridge change-out schedule.
[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the RHSM, and an SL qualified at that level is present.

11.2 Respiratory Protection

(See P&PS Work Instruction, IB-HS-WI-0310-IB, Personal Protective Equipment Minimum Standards and IB-HS-WI-0310-US, PPE Guidance - USA)

Implement the following when using respiratory protection:

- Respirator use shall be limited to those activities identified in this plan. If site conditions change that alter the effectiveness of the specified respiratory protection, the HSM shall be notified to amend the written plan;
- Tight-fitting facepiece respirator users shall be clean-shaven and shall perform a user seal check before each use;
- Canisters/cartridges shall be replaced according to the change-out schedule specified in this plan. Respirator users shall notify the SL or HSM of any detection of vapor or gas breakthrough. The SL shall report any breakthrough events to the HSM for schedule upgrade;
- Respirators in regular use shall be inspected before each use and during cleaning;

- Respirators in regular use shall be cleaned and disinfected as often as necessary to ensure they are maintained in a clean and sanitary condition;
- Respirators shall be properly stored to protect against contamination and deformation;
- Field repair of respirators shall be limited to routine maintenance. Defective respirators shall be removed from service; and
- The SL or designee shall complete the Self-Assessment Checklist – Respiratory Protection included in as attachment.

12. Worker Training and Qualification

12.1 Jacobs Worker Training

(See P&PS Work Instruction, IB-HS-WI-0200-IB; HSE Training and Competency)

The Project Manager shall ensure that all employees, including subcontractor employees, have the correct training, skills and experience to undertake the tasks they are engaged in. All project staff will have the necessary licenses to drive vehicles, operate equipment and undertake specialized work as required by law.

The following training is required for Jacobs personnel working onsite, in addition to their assigned worker category training (SLHW, HWW, HWWL). Copies of training will either be available onsite, or readily available from the Jacobs e3 Learning training database system. Refer to Section 12 of the Handbook for a description of HAZWOPER-related and Safety Liaison training.

Table 7: Jacobs Required Worker Training

Required Jacobs Worker Training (Worker Category)	Jacobs Task or Equipment-Specific Training (if Jacobs personnel performing task)
☒ 40-hour HAZWOPER Training	☐ Aerial Lift Operator Training
☒ 8-hour HAZWOPER Refresher	☐ Confined Space Entry Training
☒ 3-day HAZWOPER OJT	☐ Excavation Safety Training
☒ Jacobs PHSEP Review	☐ Fall Protection (site-specific)
☒ Jacobs F&ES HSE Field Handbook	☐ Forklift Operator
☒ Jacobs task HIIRA	☒ Hazard Communication
☒ Subcontractor PHSEP	☐ On-Track Railroad Safety Training (Rail Project Safety & On-Track Safety)
☒ 10-hour OSHA Construction Safety Training	☐ NFPA 70E Training (energized electrical safety training) (refer to worker category for all applicable training needed)
☒ At least one SLHW (refer to worker category for all applicable training needed) ☒ First Aid/CPR/BBP – SL requirement	☐ Qualified Earthmoving Equipment Operator
☒ HWW (refer to worker category for all applicable training needed)	☐ Scaffold Training
☒ At least one SL-C/HW (refer to worker category for all applicable training needed)	☒ ADT Driver Training/Jacobs Permit to Drive
☐ Other (specify)	☐ Other (specify):

Table 8: Project-Specific Required Training – Jacobs

☐ 3R Munitions Safety Awareness Training	☐ Ionizing Radiation Training
☐ Arsenic Training	☐ Lead Exposure Training
☐ Asbestos Awareness Training	☐ Lockout/Tagout Training
☐ Bear Awareness Training	☒ Manual Handling Training
☐ Benzene Training	☒ Methylene Chloride Training
☐ Cadmium Training	☒ Noise (Hearing Conservation)
☐ Cal-OSHA Heat Stress Illness Prevention Training	☐ NFPA 70E Awareness for Oversight of Work
☐ Confined Space Awareness Training	☐ ARC Flash (EETW Release of Victim)
☒ Drum Handling & Management Training	☒ Respiratory Protection (Level C) Training
☒ Electrical Safety Training	☐ Respiratory Protection (Level B) Training
☐ Excavation Safety Training	☐ Stairways and Ladders
☐ Working at Heights Awareness	☒ Working Adjacent to Live Traffic
☒ Globally Harmonized System Training (HazCom)X	☒ Vinyl Chloride Training
☒ Hand Safety Training	☒ Waste Manifest Training
☐ Hydrogen Sulfide Hazard Recognition Training	☐ Other (specify)

Table 9: Dow Program Required Training – Specific to the Jacobs-Dow Program (applies to Legacy Sites only)

☒ Dow Program Charter	☒ Heavy Equipment
☒ Site Orientation	☐ Hot Work
☒ Safe Work Permit Issuer - General	☒ Hydroblasting/Pressure Washing
☐ Confined Space Entry (CSE)	☐ Isolation of Energy Sources (IOES)
☐ Electrical Safety – Elevated Work near Electrical Lines	☐ Line and Equipment Opening (LEO)
☐ Energized Electrical Work	☒ Procedure Use Policy
☐ Elevated Work/Fall Protection	

12.2 Subcontractor Worker Training

The following training is required for subcontractor personnel working onsite. Copies of training shall be available onsite.

Table 11: Subcontractor Required Worker Training

Required Subcontractor Worker Training	
☒ 40-hour HAZWOPER Training	☒ 10-hour OSHA Construction Safety Training
☒ 8-hour HAZWOPER Refresher	☐ 30-hour OSHA Construction Safety Training
☒ 8-hour HAZWOPER Supervisor	☒ Hazard Communication
☒ 3-day HAZWOPER OJT	☒ First Aid/CPR/BBP – at least 2 people
☒ Jacobs PHSEP Review	☒ Respiratory Protection Training C and B
☒ Jacobs F&ES HSE Field Handbook	☒ Respirator Training, Medical and Fit Test
☒ Subcontractor SSoW (safety plan, task HIIRA,)	☒ Site-Specific Orientation and Training
☒ Subcontractor PHSEP	☐ Other

Subcontractor Task or Equipment-Specific Training (required if performing this work)	
☐ Aerial Lift Operator Training	☐ Ladder Safety Training
☐ Asbestos Competent Person	☐ Lead Training
☐ Asbestos Training (Supervisor, Worker)	☐ Lockout/Tagout Training
☐ Confined Space Entry Training	☐ On-Track Railroad Safety Training
☐ Certified Crane Operator	☐ NFPA 70E Training (energized electrical safety training)
☐ Crane Assembly/Disassembly Competent Person	☒ Qualified Drill Rig Operator
☐ Excavation Competent Person	☒ Qualified Earthmoving Equipment Operator
☐ Demolition Competent Person	☒ Qualified Rigger
☐ Fall Protection (site-specific)	☐ Qualified Crane Signaler
☐ Flagger Training	☐ Scaffold Training
☒ Forklift Operator	☐ Other

12.3 HAZWOPER-Exempted Tasks

See section 5.5 (may need to refer to table) with a list of task which are HAZWOPER-exempt

In general, the regulation doesn't apply if:

- Workers work exclusively within uncontaminated areas of the hazardous waste site,
- Do not enter areas where hazardous waste may exist, are stored or are processed, and
- Are not exposed to health or safety hazards related to hazardous waste operations.

Note – tasks below must meet all three bulleted items above.

Task	Task
General site work that does not involve contact with or exposure to contaminated media / vapors	

13. Medical Surveillance and Qualification

The following medical surveillance is required for Jacobs and subcontractor personnel working onsite. Copies of physician's medical opinion will either be available onsite, or for Jacobs staff, readily available from the Jacobs Learning Management System database. Refer to Section 13 of the Handbook for a description of HAZWOPER, respirator user, and hearing conservation medical surveillance.

Table 13: Medical Surveillance Requirements

General Required Medical Surveillance	Job or Activity-Specific Medical Surveillance (required if performing this work)
☒ HAZWOPER Medical Clearance	☒ Noise
☒ Respirator Medical Clearance	☐ Baseline Blood Lead
	☐ Asbestos Medical Clearance
	☐ Other (specify):

Personnel or Tasks Not Requiring Medical Surveillance	
General site work that does not involve contact with or exposure to contaminated media / vapors	

14. Site Control Plan

Site control is established to prevent the spread of contamination throughout the site and to ensure that only authorized individuals are permitted into potentially hazardous areas. Task-specific control measures are listed below. Use of the Buddy System will be implemented unless a Working Alone protocol has been established and approved. See section 14 of the Handbook.

Site Control for General Work Area(s)			
☒ Perimeter fencing	Location: Around work area.	☒ Barricades	Location: As needed around work area.
☒ Signage	Location: As needed around work area.	☐ Other: _____	Location:
☐ Traffic control devices	Location:	☐ Other: _____	Location:

Location	Site Control Procedure (discuss important elements such as signs, barricades, briefings, qualifications, required supplies and equipment, sign-in/out logs, etc.)
Support Zone	The SZ is an uncontaminated area (trailers, offices, field vehicles, etc.) that will serve as the field support area for most operations. The SZ provides field team communications and staging for emergency response. Appropriate sanitary facilities and safety and emergency response equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged and decontaminated materials, or personnel with medical emergencies that cannot be decontaminated.
Contamination Reduction Zone	The CRZ is established between the EZ and the SZ, upwind of the contaminated area where possible. The CRZ provides an area for decontamination of personnel, portable handheld equipment and tools, and heavy equipment. In addition, the CRZ serves as access for heavy equipment and emergency support services.
Exclusion Zone	The EZ is where activities take place that may involve exposure to site contaminants and/or hazardous materials or conditions. This zone shall be demarcated to prevent unauthorized entry. More than one EZ may be established if there are different levels of protection to be employed or different hazards that exist in the same work area. The EZ shall be large enough to allow adequate space for the activity to be completed, including field personnel and equipment, as well as necessary emergency equipment. The EZ shall be demarcated with some form of physical barrier or signage. The physical barrier or signage shall be placed so that they are visible to personnel approaching or working in the area. Barriers and boundary markers shall be removed when no longer needed.

15. Decontamination

Refer to the Handbook, Section 15, "Decontamination," for a complete description of decontamination activities and diagrams of typical decontamination areas. Decontamination areas will be established for work in potentially contaminated areas to prevent the spread of contamination. Decontamination areas should be located upwind of the exclusion zone where possible and should consider any adjacent or nearby projects and personnel. No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones.

All contaminated material generated through the personnel and equipment decontamination processes (e.g., contaminated disposable items, gross debris, liquids, sludges) will be properly containerized and labeled, stored at a secure location, and disposed in accordance with project plans.

Type of Decon	Activity	Equipment	Process/Protocol
Personnel	When dealing with contaminated media	☒ Tubs/brushes for boot/glove wash ☒ Solids disposal bag or drum (used PPE) ☒ Liquid disposal drum (decon water)	☒ Boot wash/rinse ☒ PPE disposal (no additional decon) ☒ PPE waste area identified ☐ Other: _____
Equipment	When dealing with contaminated media	☒ Table for equipment decon/staging ☐ Decon pad for vehicles ☐ Pressure Washer ☒ PPE used during decon ☒ Decon supplies (brushes, brooms) ☒ Containers/method to capture decon water and or sludge	☒ Equipment wiped/cleaned before leaving CRZ ☐ Vehicle tires dry deconned prior to leaving site ☐ Vehicle tires washed prior to leaving site ☐ Other: _____

15.1 Decontamination During Medical Emergencies

Standard personnel decontamination practices will be followed whenever possible. For emergency lifesaving first aid and/or medical treatment, normal decontamination procedures may need to be abbreviated or omitted. In this situation, site personnel shall accompany contaminated victims to advise emergency response personnel on potential contamination present and proper decontamination procedures.

Outer garments may be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Protective clothing can be cut away. If the outer garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances or medical personnel. Outer garments can then be removed at the medical facility.

16. Communications

A primary and backup means of communication for field crews have been established as described below:

Type of Communication	Primary Means	Backup Means
Communication between field crew	☒ Voice ☐ Radio ☐ Phone	☐ Voice ☐ Radio ☒ Phone
Communication with Office crew	☐ Radio ☒ Phone	☐ Radio ☒ Phone
Communication with Fire and Emergency Services	☐ Radio ☒ Phone	☐ Radio ☒ Phone

17. Required Facilities and Equipment

(See P&PS Procedure, IB-HS-PR-0600-IB, Health and Well Being)

The following facilities and equipment are required and used for safe completion of work:

Facility	Type	Location
☐ Worker Showers/lockers	(i.e., shower trailer, client facility, etc.)	
☒ Restrooms	Facility Portable	Treatment Building Outside Work Trailer
☒ Hand washing facility/hand sanitizer	Facility Portable	Treatment Building Outside Work Trailer
☐ Supplementary Illumination		
☒ Emergency Eyewash	Portable	Work Trailer Field Vehicle Treatment Building
☐ Emergency Shower		
☒ First aid kit/supplies	Portable	Work Trailer Field Vehicle Treatment Building
☒ Fire extinguishers	ABC	ISTT System Work Trailer Field Vehicle Treatment Building
☒ Spill Kit(s)	Universal	Stored At Site Next to Work Area
☒ Potable Water	Bottled	Cooler on Site
☒ Shade/rest area	Portable	Canopy next to work area Work Trailer
☒ Heated rest area	Portable	Work Trailer Field Vehicle Treatment Building
☐ Other_____		

18. Emergency Response Plan

Personnel responsible for coordinating emergency situations during site activity are identified below. The Emergency Contacts Page and a site map showing assembly points and directions to the authorized medical facility is at the front of this plan. Documented rehearsal and critique of this plan is required at least once during the task, or more often as necessary.

Responsibility	Name	Phone Number(s)
Emergency Response Coordinator (ERC)	Derick Miller	989.992.8558
Alternate ERC	Timothy Mihal	**304.663.7997**
Type (desk or field) and frequency of rehearsal	Field	

If an emergency situation develops which requires evacuation of the work area, the following steps shall be implemented.

Evacuation Step	Methods and comments:
Notify affected workers	Use voice or cell phone to notify team of the event
Evacuate to safe location	Use field vehicles (if safe to do so) to move to safe location
Assemble and account for workers	Use Safety Briefing form (or SWP) to conduct headcount; use cell phone to communicate with team members in a different location if necessary
Notify Supervisor/Manager	Use cell phone to notify PM and EM or HSM
Complete incident report	EM or HSM to enter the incident into the Intelex System. Assistance from the PM and SL for details and the investigation.

Potential emergency situations and response actions are identified below.

In case of:	Response actions:
Injury or illness	Major Medical: FA/CPR trained personnel respond. If additional response required, contact local emergency responders and 911. Have a designee assist with guiding ambulance service to site if needed. If Jacobs P&PS employee, call WorkCare at 888-449-7787. Minor Medical: FA/CPR trained personnel respond. If Jacobs P&PS employee, call WorkCare at 888-449-7787. Transport to occupational health clinic if advised to do so.
Chemical exposure	Decon affected employee, seek medical treatment if necessary. Utilize eyewash and shower if needed. If additional response required, contact local emergency responders. If Jacobs P&PS employee, call WorkCare at 888-449-7787,
Fire or explosion	Evacuate site to designated location, call 911. Provide necessary first aid, seek treatment if necessary. For small fires, only respond to trash can size fires with site fire extinguishers.
Adverse weather	Shut down work; rally to nearest structure.

Heat Stroke	Call 911, have a designee give location and directions to ambulance service if needed. If Jacobs P&PS employee, call WorkCare at 888-449-7787.
Material spill or release	Appropriate spill response materials for all chemicals must be present at the job site. Only qualified (by training and previous experience) who have proper PPE and equipment available shall provide spill response operations, when safe to do so. Immediately identify the character, exact source, amount, and areal extent of any released materials, if safe to do so.
Active Shooter	Have a plan when working on client premises—look for at least 2 evacuation routes/points. Program emergency numbers in your phone (client emergency service numbers, HSM, PM, Supervisor, WorkCare, US Security Officer, Keith Waddell (214-920-8327). If an active shooter is on the premises follow Run, Hide, Fight: • Run: Leave belonging behind. Try to get out of the building or danger area if possible using exits. Call 911 when in a safe area and then call Keith Waddell, Security, PM and HSM. • Hide: Act quickly - Find a place, closet or office, or something to hide behind out of the vision of shooter. Lock or barricade or otherwise secure the spot if possible. Turn off lights, silence cell phones. Stay calm and quiet • Fight: Last resort! If your life is at risk—work alone as or as a group. Use improvised weapons, act aggressively, disarm or injure the shooter, commit to your actions. When law enforcement arrives – stay calm—show hands, spreading fingers. Avoid sudden movements, yelling or pointing. Allow law enforcement to do their job to control the area. Their first priority is finding the shooter. Once you are safe – be sure to notify your supervisor, the PM, and HSM of your status. The PM/Supervisor shall follow the incident reporting process, including notification in accordance with the incident reporting flowchart. HSM will complete an Intelex report.

Evacuation Signals:	**Meaning:**
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

In the event of a large quantity spill notify emergency services. Personnel discovering a spill shall (only if safe to do so):

- Stop or contain the spill immediately (if possible) or note source. Shut off the source (e.g., pump, treatment system) if possible. If unsafe conditions exist, then leave the area, call emergency services, inform nearby personnel, notify the site supervisors, and initiate incident reporting process. The SL shall be notified immediately;
- Extinguish sources of ignition (flames, sparks, hot surfaces, cigarettes);
- Clear personnel from the spill location and barricade the area;
- Use available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread;
- Use sorbent materials to control the spill at the source;
- Construct a temporary containment dike of sorbent materials, cinder blocks, bricks or other suitable materials to help contain the spill;
- Attempt to identify the character, exact source, amount, and extent of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified;
- Keep incompatible wastes separate from spilled materials area until spill cleanup is complete;
- Contact the HSM and project EM in the event of a spill or release immediately so evaluation of reportable quantity requirements and whether agency reporting is required;
- Assess possible hazards to human health or the environment as a result of the release, fire or explosion, including the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions;
- Make arrangements to manage and dispose of spilled materials and used spill control materials appropriately;
- Replace spill control materials and decontaminate/clean spill control equipment (if needed) that were used in the response; and Follow incident notification, reporting, and investigation section of this plan.

19. Incident Notification, Reporting, and Investigation

(See P&PS Work Instruction IB-HS-WI-0400-IB, P&PS Incident Reporting and Investigation)

19.1 Incident Notification

All employees and subcontractors' employees shall immediately report any incident (including "near misses,") in which they are involved or witness to their supervisor.

The Jacobs or subcontractor supervisor, upon receiving an incident report, shall inform his immediate supervisor and the Jacobs SL. The SL shall make notifications to the PM and the EM or HSM as soon as reasonably possible. The PM and the EM or HSM will make additional notifications; **some clients require notification of an incident in less than 2 hours of the event.** See the Dow incident notification flowchart at the end of this section.

The SL shall immediately verbally report the following information to the HSM and PM by phone and e-mail (an initial incident notification form is available):

- Project Name and Site Manager;
- Date and time of incident;
- Description of incident;
- Extent of known injuries or damage;
- Level of medical attention; and
- Preliminary root cause/corrective actions

If the incident was an environmental permit issue (potential permit non-compliance, other situation that result in a notice of violation) or a spill or release, contact the Project EM immediately so they can evaluate reportable quantity requirements and if subsequent agency notification is required.

In critical emergency situations (medical, natural disaster, security, civil unrest, etc.), the local emergency responders listed on the Emergency Contact Page should be the initial point of contact. If necessary, the HSM or PM may reach out to the Jacobs 24-hour Global Assistance and Response Hotline (+1-443-221-6281) for supplementary assistance.

The EM or RHSM will be notified to conduct and complete the investigation (with the assistance of the Program EHS Manager) within days and update the Intelex report. The PM and SL, as a minimum, may be asked to assist with the investigation.

19.2 Intelex and Incident Report Form

The HSM or EM shall complete an entry into the Intelex system located on JacobsConnect.. The SL shall summarize or use the P&PS Initial Incident Notification form and forward it to the HSM within 24 hours.

19.2.1 Determine the Actual Severity and Worst Potential Severity

When determining the Actual Severity and Worst Potential Severity of an incident to be included in the Intelex Report, use the severity tables in the Handbook.

19.3 WorkCare Injury Management and Return to Work (for U.S./Puerto Rico-based P&PS Jacobs Staff Only)

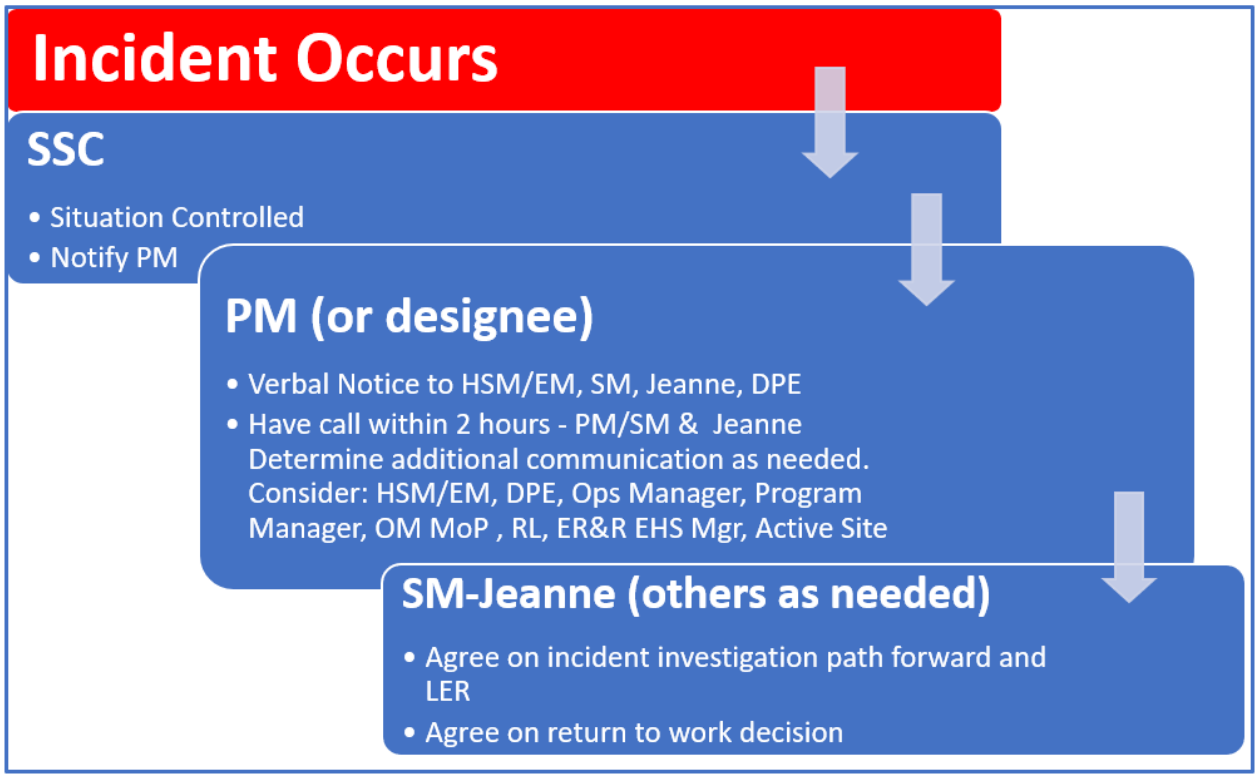
In the event of an injury, or potential injury (i.e., involvement in motor vehicle collision with no apparent injury; a puncture wound with no bleeding or apparent infection, etc.), the following actions shall be taken:

- Employee informs their supervisor.
- Employee calls the Injury Management Program toll free number **1-888-449-7787** immediately and speaks with the Occupational Injury Nurse. This number is operable 24 hours per day, 7 days a week. **Employees are encouraged to enter this phone number into their cell phones prior to starting field work.**
- Supervisor ensures employee immediately calls the Injury Management Program number. Supervisor makes the call with the injured worker or for the injured worker, if needed.
- Nurse assists employee with obtaining appropriate medical treatment, as necessary schedules clinic visit for employee (calls ahead, and assists with any necessary follow up treatment). The supervisor or SL accompanies the employee if a clinic visit is necessary to ensure that employees receive appropriate and timely care.
- SL or designee shall verbally notify the HSM and PM. The SL or designee may use the hardcopy Incident Report attached to this plan to forward to the HSM for Intelex entry. HSM completes the Intelex entry within 24 hours.
- Nurse notifies appropriate Jacobs staff by e-mail (supervisor, Health & Safety, Human Resources, Workers' Compensation).
- Nurse communicates and coordinates with and for employee on treatment through recovery.
- Supervisor and/or PM ensures suitable duties are identified and available for injured or ill workers who are determined to be medically fit to return to work on transitional duty (temporary and progressive).
- Supervisor and/or PM ensures medical limitations prescribed (if any) by physician are followed until the worker is released to full duty.

Verbal incident notification is made to both the HSE and the Operations chains to the indicated group depending on the severity, and any project, geographic, or client specific notification and reporting requirements as shown in the flowchart below (Also refer to P&PS Work Instruction IB-HS-WI-0400-IB, Incident Reporting and Investigation). The HSM will complete an Intelex report.

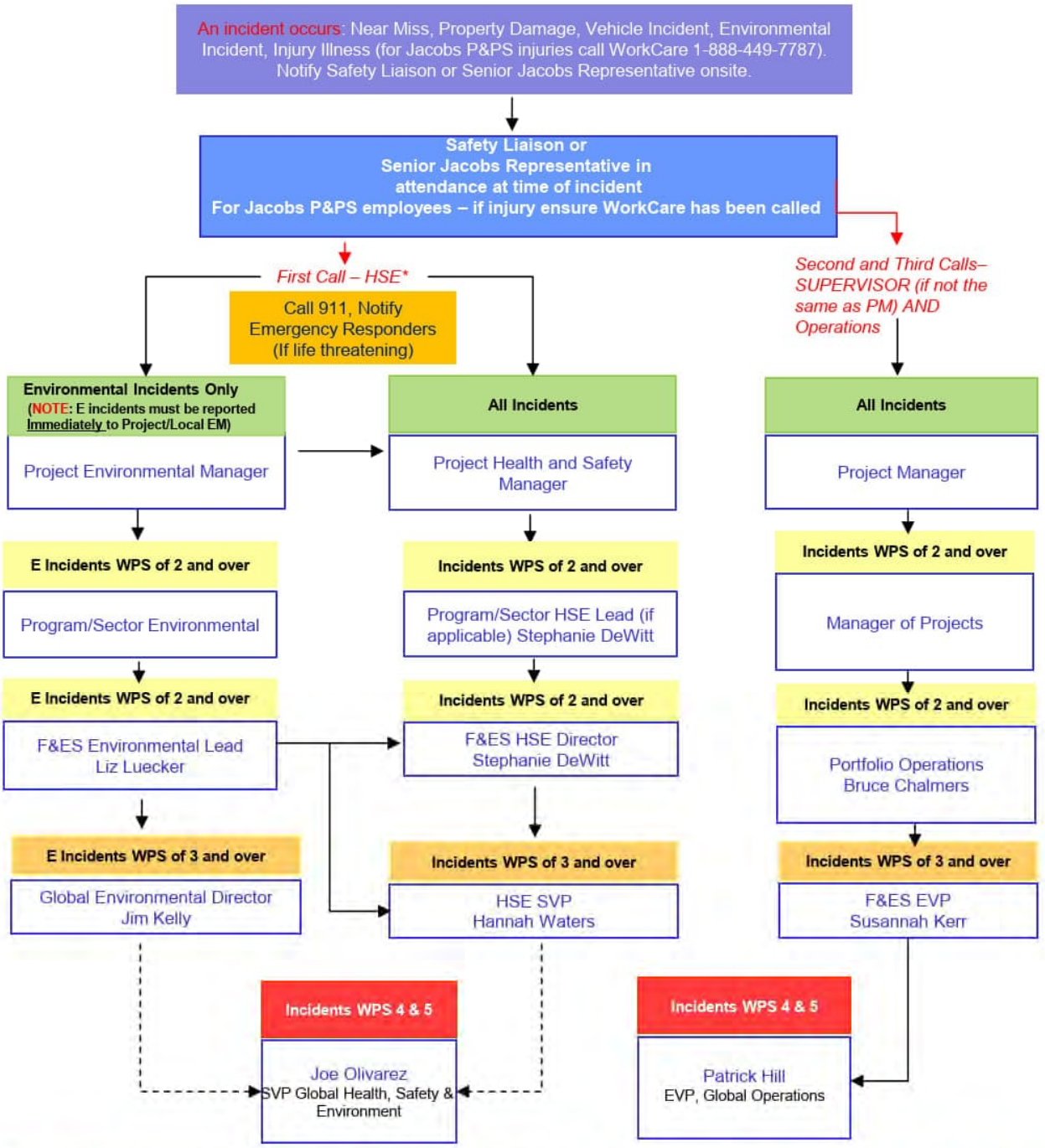
Dow Incident Notification

Follow the flowchart below for incident notification for Dow Projects



Updated Feb 2025

Jacobs F&ES Verbal Chain for Reporting all Field Incidents



* First call HSE – If the incident is an environmental incident, immediately (within 15 minutes) call the EM to ensure timely reporting to external agencies, if necessary. If any other type of incident, call the HSM as the first call.

Notes:

1. Worst Potential Severity (WPS) definitions are to be found in Global Work Instruction JJ-HS-WI-0400-JJ, HSE&S Incident Mgmg.
2. Actual 4 and 5 must be communicated to Legal and Communications by the HSE VP or GVP
3. All incidents involving Jacobs employees or a subcontractor under Jacobs control (including motor vehicle accidents, injuries, environmental incidents and near-misses) shall be reported as soon as possible **in person or by telephone**.
4. If your Project Manager is not your Line Manager, it is essential that a call is made to both.
5. Calls must be made to both the relevant HSE and operations chains. These are not alternatives.
6. Security and Sustainability Directors / VP's will be notified where appropriate by HSE&S VP / HSE VP
7. Where required by legislation, a Jacobs HSES&S Manger will make the necessary report to the enforcing authorities.

19.4 Drug and Alcohol Free Workplace

(See Jacobs Human Resource Policy PL-EB-PL-6830-PL, Drug and Alcohol-Free Workplace)

All employees, subcontractors, and other employed individuals are expected to arrive at work fit to carry out their jobs and to be able to perform duties safely without any limitations due to the use or after effects of alcohol or drugs (whether prescribed, over the counter, or illegal).

It is forbidden to be present at the workplace after consuming alcohol or drugs and/or possess and/or consume alcohol or drugs at the workplace. Signing documents such as Safety Briefing Form, SWP, etc. indicates that you are verifying you are fit to work. Any employee or subcontractor who violates these rules will not be permitted to work. Immediate supervisors are responsible for monitoring adherence to the policy.

When an employee, subcontractor or employed individual arrives at work or during the workday and a supervisor reasonably believes that they are under the influence of alcohol or drugs, the supervisor must immediately contact Human Resources in order that the person can be provided with assistance and an investigation can be undertaken.

19.5 Post-Incident Drug Testing Requirements

(See Jacobs Human Resource Procedures US-EB-PR-6830-US, Drug and Alcohol-Free Workplace Testing, Searches and Inspection)

Post-Incident Drug and Alcohol testing may be initiated by the employee supervisor, Human Resources and/or Drug and Alcohol-Free Workplace Program Administrator (DAFWPA) when any of the following occur:

- An employee experiences a work-related injury on or in Company Property/Workplace with a Worst Potential Severity of 3 (WPS 3), or greater, as described in JJ-HS-WI-0400-JJ, HSE&S Incident Management, in which the Company reasonably believes (under the reasonable suspicion provisions and processes in the reference procedure (US-EB-PR-6830)) that drug and/or alcohol use is a contributing factor.
- An employee experiences an incident resulting in property damage where the Company reasonably believes the damages are rated at least a WPS 3, resulting in a cost of over US$30,000 or greater and/or where the employee is alleged to be at fault for causing the incident.
- Any incident with a WPS 3 or greater on or in Company property/workplace (to an employee or any third parties) involving the employee's use and operation of any heavy machinery and/or where the employee is alleged to be at fault for causing the Incident leading to injury while operating a motor vehicle or equipment.
- Any work-related incident involving an employee considered to be a serious near miss event rated at least a WPS 3 that occurs in the field or in the office as reasonably determined by the Company and where the Company reasonably believes (under and following the reasonable suspicion provisions and processes in this Procedure) that drug and/or alcohol use by the employee is a contributing factor to the serious near miss.
- Other circumstances as may be appropriate, as determined by management and HR, in consultation with the DAFWPA (and Legal, as necessary).

20. Inspections, Observations, and Leadership Engagement

20.1 Inspections and Audits

Various types of inspections may be conducted, including Leadership HSE Site Visits, project activity self-assessments, Safe Behavior Observations, Agency inspections, and operational project reviews.

20.1.1 HSE Site Inspection Reports

The HSE Site Inspection Report shall be performed monthly by the PM or designee. It is available as an attachment to this plan or can be filled out electronically through the Intelex Audit Module (also available on mobile devices). If using a hard copy form, be sure to keep with the project files. Notify the HSM or EM of any findings.

20.1.2 Leadership Engagement/Site Visits

The Leadership Engagement/Site Visits form is intended to facilitate PM leadership, to provide an opportunity for PMs to mentor field staff on HSE, and to identify any big picture actions that need to be addressed. This does not take the place of a formal HSE audit. *The project PM and Managers of Project (or their designees) will conduct a minimum of 4 Leadership Engagement sessions or Site Walks to the project every year.* The form can be accessed on the Intelex database on JacobsConnect. The Leadership Engagement session or Site Walk will be documented using the Leadership Engagement tool in the Intelex Beyond Zero Observation Module. Contact your HSM if you need directions for completing the form and copy your HSM on your submittal. Examples of Leadership Engagement include leading the subcontractor chartering call, engaging with project team on matters of HSE, performing a site visit/walk to observe HSE at the project, completing a HSE Site Inspection Report, holding an HSE Stand-Down, etc.

20.1.3 Environmental Inspections

Additional environmental inspections may be required based on the scope of the project. These can include weekly hazardous waste container inspections, daily hazardous waste tank inspections, monthly oil Spill Prevention Control and Countermeasures (SPCC) inspections, and routine stormwater inspections**. Contact your Environmental Manager to determine what environmental inspections may be needed**. A separate plan (e.g., waste management, environmental, spill plan) may be appropriate and may include environmental inspection checklists; such a plan can be referenced in this section.

20.1.4 HSE Audits

HSE project audits will be determined and scheduled based on the risk profile of the project and input from the LOB or Regional BU HSE Lead. The Dow Program Project Audit Plan may be populated in the Intelex Audit Module and the Dow Program Audit Plan. Audit findings will be entered into the Audit Module (Intelex) and the Jacobs-Dow Program CATS database and findings tracked to completion.

20.2 Project Activity Self-Assessment Checklists

The following self-assessment checklists are required when the task or exposure is initiated and weekly thereafter. The checklists shall be completed by the SL or other Jacobs representative and maintained in project files.

Hand and Power Tools **PPE** **Manual Lifting**	All Tasks	Initially when these task are conducting during the project
Drilling	Drilling Activities	Initially when drilling is conducted during the project
Vehicle / Equipment Spotting PTHA Card	Backing/Spotting Heavy Equipment Operation	For daily routine backing task, this document will be reviewed weekly.
LCS- Heavy Equipment	Heavy Equipment Operation/Drilling Equipment	Prior to conducting heavy equipment/drilling operation
LCS-Hydroblasting-Pressure Washing (HBPW)	Decontamination	Initially when pressure washing is conducted during the project

20.3 Safe Behavior Observations

On the Dow Program, Safe Behavior Observations (SBOs) will be used. Project team members will complete SBOs using the EHSBO App on OMNI using their phone, a tablet or laptop computer. *SBOs will be completed by the project team at a frequency of a minimum of 1 / 100 hours worked unless additional opportunities arise*, or they are required by a subcontractor exception. The SBO will be reviewed, and interventions/observations may be entered in the Beyond Zero Observation (BZO) database on behalf of the Project Team by the reviewer.

Do not enter BZOs into the database, use the EHSBO App.

SBOs are a tool:

- That can be used for both a planned observation of behaviors or conditions in the work area;
- For improving leadership, workforce behaviors, and peer to peer communication;
- To provide positive reinforcement, correct unsafe behaviors or unsafe conditions; and
- To document something you witness outside of work hours that others can learn from.
- Not a method for reporting a near miss, or incident

20.4 Beyond Zero Observations

(Reference Jacobs Business Management System Work Instruction, JJ-HS-WI-0306-JJ, BeyondZero Observations)

BZOs are a required element of our BeyondZero Culture of Caring for Jacobs. As stated in the previous section, **The Dow Program does not use the BZO system directly** but uses the SBO app to record observations. Observations may be entered into the BZO system on behalf of the Project Team by the reviewer.

20.5 Agency Inspections

If a Federal or local agency (e.g., OSHA, local water board, EPA, Department of Environmental Quality, Ministry Of Labour) announces it will be performing inspection, either announced or unannounced, refer to the Agency Inspections document. Contact the PM, HSM and EM as soon as you receive notice.

20.6 LCS Audit Protocol

When conducting an audit of a Dow Legacy Site, if the project work includes LCS elements, the audit protocols will be used to ensure all required elements are included and being conducted as required.

Confined Space Entry Policy	Hydroblasting Pressure Washing Policy
Energized Electrical Safety	Isolation of Energy Sources (IOES)
Elevated Work Policy	Line and Equipment Opening (LEO)
Heavy Equipment Policy	Procedure Use Policy
Hot Work Policy	Safe Work Permit Policy

21. Records and Reports

Refer to the Handbook, Section 19, “Records and Reports,” for a complete description of HSE recordkeeping requirements.

22. PHSEP Induction Record

EMPLOYEE SIGNOFF FORM

By signing below, I have been instructed by the Project Manager (or their designee) in the following HSE requirements:

- Project HSE Plan
- Safe Work Methods
- General Workplace Hazards and Controls.
- I have been trained in the use of PPE
- I am aware of the project emergency procedure requirements.
- I have been introduced to the scope of work and general work locations
- I have completed an orientation of my work area with my supervisor

Project Name: Dow Jamestown ISTT Construction/Operation Project Number: JMS018DW

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

JACOBS

Dow PROGRAM SAFETY BRIEFING FORM

Project: _____ Job Location: _____ Date:_____

SOW:

Today's Work Completed Under

Permit ☐ Yes ☐ No Identify activities under SWP _____

Safe Work Procedure ☐ Yes ☐ No

If Yes, list Procedures:

Exempt Task ☐ Yes ☐ No

If Yes, list exempt tasks & hazard mgt tool used (HIIRA, AHA, PTSP, STAC, etc.):

Weather and Impact

Changes/Learnings from Previous Day

Observation (SBO) Assigned to

Safety/Tailgate Topic (attach any materials used)

Additional Notes

People working under Permit/Procedure/Exempt tasks (continue on back if needed)

*Your signature below indicates that you understand the tasks, hazards and controls for today's work and you are **FIT FOR DUTY**. Further, you acknowledge that you are empowered and expected to **STOP WORK** for any safety or compliance concern.*

NAME	SIGNATURE	DATE

Jacobs-Dow Program
Heavy Equipment Work Permit

Heavy Equipment

Doesn't Apply [ ]

1. Location of Work Area: _____

2. Method(s) to control Heavy Equipment movement and pedestrians:
   ☐ Designated areas ☐ Barricades ☐ Attendant ☐ Other

3. Ground conditions can support the Heavy Equipment ☐ Yes

4. Identify the Danger Zone location(s):
   ☐ Shown on Plan ☐ Other: _____

5. Access to Danger Zone(s) is restricted by:
   ☐ Barricades ☐ Designated Walkways ☐ Designated Roadways
   ☐ Other: _____

6. Method(s) of continuous visual communication in the Danger Zone:
   ☐ Hand Signals ☐ Lights ☐ Flags
   ☐ Other: _____

7. Identify Blind Spot location(s)
   ☐ Around Heavy Equipment ☐ Buildings
   ☐ Large piles of materials / objects
   ☐ Other: _____

8. Method(s) of continuous communication in the Blind Spots(s):
   ☐ Radios ☐ Lights ☐ Air Horns ☐ Voice
   ☐ Proximity devices ☐ Worker presence detection
   ☐ Audible Alarms ☐ Visual Alarms ☐ Vibrating Alarms
   ☐ Back-up alarms ☐ Cameras
   ☐ Spotter (least preferred option) ☐ Other: _____

EH&S Global

Hydroblasting & Pressure Washing Standard

<< Tools, Templates & Checklists

Print This Page

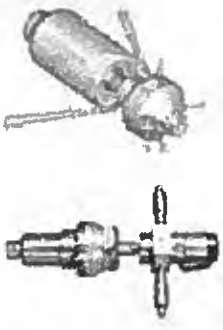
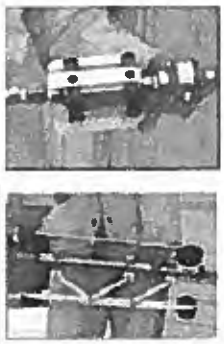
Industrial Cleaning/Hydroblasting Technology List

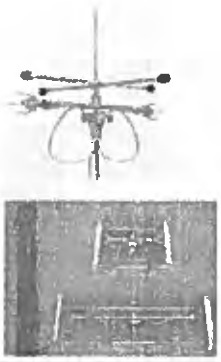
Category	Technologies	Description
Tube/Pipe Cleaning	Rigidlancing (Stifflancing)	A rigid lance which is being used to clean heat exchanger tubes. This rigid lance is connected to the high-pressure hose, on one end, and to a nozzle to the other end. Benefit of a stiff lance vs flex lance is that the internal diameter is wider and therefore gives a higher water flow It is preferred to use automated or remotely controlled indexer when performing lancing.
	Flexlancing	A flexible tube that attaches to the high-pressure hose, on one end, and to a stinger and/or a nozzle to the other end. It is preferred to use automated or remotely controlled indexer when performing lancing.
	Line Moleing	Techniques to clean lines and tubing, most common is the line mole. It is preferred to use automated or remotely controlled systems to perform line moleing (e.g. Rotating Hose Device, Rotolazer).
	Indexers	Systems that support the remotely or automatic control for flex and stiff lances.
Tank Cleaning	3D Rotating Nozzle, Robot, Manway Mounted Jetting System	Techniques to clean the inside of vessels and tanks. Where possible prevent confined space entry and manual hydroblasting or pressure washing.
Surface Cleaning	Shotgunning	The most common hydroblasting, techniques is shot gunning. A shotgun is a lance with a rigid tube and a shoulder brace When using a shotgun to clean large surface areas, the effective cleaning is conditioned by how close the tip is to the surface being cleaned is. The closer the tip is to the surface, the greater the backsplash.
Other Techniques	Hydro-Excavation, Water Cutting, Pipe Darting, Micro Inspection Camera, Sensor Monitoring of Equipment	Non hydroblasting / pressure washing industrial cleaning techniques.

⊞ Show All Pictures or ⊟ Hide All Pictures

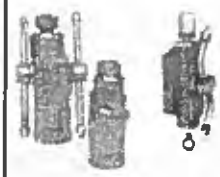
Tube/Pipe Cleaning

Equipment Name	Other Known Names	Automated	Remote Operated	Antiwithdrawal Required	Secondary Securement Required	Max Pressure	Pictures	Antiwithdrawal / Positioning / Other Pictures / All Anti-withdrawal devices must be certified by PE and effectiveness demonstrated to end user.	Comments	Reviewed	Reviewed Date
Stifflancing - Quickindexer		Yes	Yes	No	No	40K/2800 Bar	 			Yes	
Stifflancing - ATL (Horizontal)		Yes	Yes	No	No	40K/2800 Bar		 		Yes	
Stifflancing - ATL (Vertical)		Yes	Yes	No	No	40K/2800 Bar				Yes	
Stifflancing - Powerlance		Yes	Yes	No	No	20K/1400 Bar				Yes	
Stifflancing - Manual		No	No	Yes	No	40K/2800 Bar				Yes	

							 				
Flexlance - Triple Peinnemann	TLE AutoBox	Yes	Yes	Yes	No	20K/1400 Bar			This anti-withdrawal device is built-in to the (attachment) of the mechanism. This device (snorkel end) must be held 1 inch away from the tube sheet the end result is that we want to make sure that there is no possibility of the end dislodging. Following the operating discipline on setting this piece of equipment up is an important part of this device being used safely. The ani-withdrawl feature installation process is not easily seen.	Yes	4/12/2006
Flexlance - Single Automated	LTC Duraflex®, Armadillo AutoBox	Yes	No	Yes	No	20K/1400 Bar			All anti-withdrawal devices must be certified by PE	Yes	4/12/2006
Flexlance - Freelance Gun		Yes	No	Yes	No	20K/1400 Bar			Anti-withdrawal device is required to use this piece of equipment however this is not the only anti-withdrawal device. this is just one examp e of one shown. It is advised that Mechanical Engineer/Professional Engineer (SME) certify the use of this device for application usage Canada/Europe already has this as a requirement. Flexlance	Yes	4/12/2006
Flexlance - Manual		No	No	Yes	No	20K/1400 Bar			See the Standard prior to using this device. according to the Standard we should automate whenever possible	Yes	4/12/2006
2D Tool	Roto Jet Warthog	Yes	Yes	No Positioning Device Recommended	No	20K/1400 Bar			No none event with this type of device	Yes	4/12/2006
Linemole		No	No	Yes	No	20K/1400 Bar			See the Standard prior to using this device according to the Standard we should	Yes	

									automate whenever possible.		
RHD (Rotating Hose Device)	Roto-Fan	Yes	Yes	Yes	No	40K/2800 Bar				Yes	4/12/2008
Rotolazer - ATL Mounted		Yes	Yes	Yes	No	40K/2800 Bar				Yes	
Rotolazer - Free Standing		Yes	Yes	Yes	No	40K/2800 Bar				Yes	
Rotolazer - Quickindexer		Yes	Yes	Yes	No	40K/2800 Bar				Yes	
Rotomole		Yes	Yes	Yes	No	40K/2800 Bar				Yes	
Stack Cleaner		Yes	Yes	No	No	20K/1400 Bar				Yes	10/2/2016
Self Learning Automated Indexer		Yes	Yes	No	No	40K/2800 Bar			Pressurize inside the tubes to prevent damage with rolled tubes.	Yes	
XY Automate		Yes	Yes	No	No	40K/2800 Bar				Yes	9/2/2011

Tank Cleaning

Equipment Name	Other Known Names	Automated	Remote Operated	Antiwithdrawal Required	Secondary Securement Required	Max Pressure	Pictures	Antiwithdrawal / Positioning / Other Pictures / All Anti-withdrawal devices must be certified by PE and effectiveness demonstrated to end user.	Comments	Reviewed	Reviewed Date
3D Rotating Nozzle (3D Tool)	Aquamat, Torus	Yes	Yes	No Positioning Device Recommended	No	20K/1400 Bar			No none event with this type of device.	Yes	4/12/2006
Tank Cleaning Robots	H5, H6 Badger FTCN	Yes	Yes	No	No	40K/2800 Bar				Yes	9/8/2016
Manway mounted	Non-Entry Manway	Yes	Yes	No	No	0.45K/0.03 Bar				Yes	10/2/2011

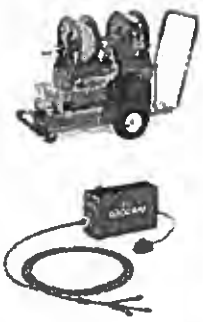
Jetting System	Canon										

Surface Cleaning

Equipment Name	Other Known Names	Automated	Remote Operated	Antiwithdrawal Required	Secondary Securement Required	Max Pressure	Pictures	Antiwithdrawal / Positioning / Other Pictures / All Anti-withdrawal devices must be certified by PE and effectiveness demonstrated to end user.	Comments	Reviewed	Reviewed Date
Hydromower		No	No	No	No	20K/1400 Bar			Set this device as low to the flooring as possible	Yes	4/12/2006
UHP - Blazervac		No	No	No	No	40K/2800 Bar				Yes	
Crawler	Spiderjet, Vertiblast,	Yes	Yes	No	Yes	40K/2800 Bar	 		Second line of protection	Yes	
Blast Track		Yes			No	40K/2800 Bar					
Mini Pad Blaster		Yes	Yes	No	No	40K/2800 Bar				Yes	1/1/2014
Pad Blaster		Yes	Yes	No	No	NA				Yes	10/2/2011
Remote Lance Worker		Yes	Yes	No	No	40K/2800 Bar				Yes	1/1/2014
Remotely Operated Hydroblasting Lance		Yes	Yes	No	No	40K/2800 Bar				Yes	11/10/2014
Shotgun		No	No	No	No	20K/1400 Bar				Yes	
Shellside Machine		Yes	Yes	No	No	10K/700 Bar				Yes	
UHP - Gyro Gun		No	No	No	No	40K/2800 Bar				Yes	
UHP - Turbo Gun		No	No	Yes	No	40K/2800 Bar				Yes	

Other Techniques

Equipment Name	Other Known Names	Automated	Remote Operated	Antiwithdrawal Required	Secondary Securement Required	Max Pressure	Pictures	Antiwithdrawal / Positioning / Other Pictures / All Anti-withdrawal devices must be certified by PE and effectiveness demonstrated to end user.	Comments	Reviewed	Reviewed Date
Soda Blasting	Baking Soda, Bio blasting,	No	No	No	No	NA			Normally running at 150 psi. Water is not used in this process. Similar to abbrasive blasting.	Yes	4/12/2006
Ice Blasting	Dry Ice, CO2	No	No	No	No	NA				Yes	4/12/2006
Slurry Blasting		No	No	No	No	10K/700 Bar				Yes	

Brushing Machine		Yes	No	No	No	NA			High rotating brush used to polish after hydroblasting to certify for IR S Water that is used is mainly for flushing mechanism to flush-out Operator must use gloves when using this equipment.	Yes	4/12/2006
Furnace Cleaning	Fired Heater Convection Section Cleaner	Yes	Yes	Yes	No	40K/2800 Bar			Remotely operated robot to clean convection sections	Yes	9/8/2016
Hydrodemolition		Yes	Yes	Yes	No	40K/2800 Bar			Provide sufficient safeguard for loosened debris for example metal plating	Yes	4/12/2006
Hydro Excavation		Yes	Yes	No	No	3.6K/250 Bar			Specific Hydroexcavation checklist available	Yes	4/12/2006
Water Cutting		Yes	Yes	No	Yes	40K/2800 Ba				Yes	
Pipe Darting	Conco Goodway Tube Darting				No	3.6K/250 Bar					
Micro Inspection Camera		No	No	NA	No	NA				Yes	
Sensor Monitoring of Equipment		Yes	Yes	NA	No	NA				Yes	

Environment, Health & Safety
Content Owners/SMEs: Miranda Li and Hans Borgt
Technical Questions: EH&S Web Request Form
Last Modified: Monday, April 02, 2018 at 8:03:49 AM
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Dow Program
Safe Work Permit Addendum V2
Hydroblasting & Pressure Washing

Hydroblasting & Pressure Washing

(Note: Before conducting hydroblasting/pressure washing, determine if there are alternate methods for performing the task that are less hazardous.)

Is this addendum for (see table below)

☐ **Pressure Washing (bold content only)** ☐ Hydroblasting

If Hydroblasting, Hydroblasting Safety Attendant Name:

_____
(not needed for RCHS)

1. If Hydro blasting, how is the Hydroblasting work being done?

☐ Remotely Controlled (in Situ) Hydroblasting System (RCHS)

☐ Fully Automated Remotely Controlled Hydroblasting System

☐ Semi-Automated Remotely Controlled Hydroblasting System

☐ Manual If used, Name of Secondary Approver

_____

2. Type of Hydroblasting Equipment used:
☐ Shotgun Lance ☐ Flexible Lance
☐ Rigid Lance ☐ Line Moling
☐ Hydroexcavation ☐ Water Cutting
☐ Other: _____

3. Type of Hydroblasting Equipment to be used is on the Industrial Cleaning/Hydroblasting Technology List? ☐ Yes ☐ No
If no, STOP. *Only technology/equipment on Industrial Cleaning Technology List can be used.*

4**. Equipment Pre-Use Inspection Complete for**:

Pressure Washing	☐ **Yes**	☐ **N/A**
General Hydroblasting	☐ Yes	☐ N/A
Flexible Lance & Line Molding	☐ Yes	☐ N/A
Shotgun Lance	☐ Yes	☐ N/A
Hydroexcavation	☐ Yes	☐ N/A
Water Cutting	☐ Yes	☐ N/A

5. Anyone within 20 feet/6 meters of hydroblasting is wearing the following PPE:
☐ Hood ☐ Face Shield ☐ Monogoggles ☐ Hearing Protection
☐ Chemical Splash Suit ☐ Rubberized Gloves
☐ Metatarsal Rubber Boots rated for the pressure being used
☐ PPE address any chemical hazards
☐ PPE addresses any physical hazards
☐ PPE address fall protection if elevated work

6. Guards to protect workers/equipment from flying debris:
☐ Cover ☐ Wall/Structure
☐ Plywood Boards ☐ Steel Plate
☐ Polycarbonate Boards ☐ Other:_____

7: Barricades with signs, tags or banners are in place
☐ 20 feet/6 meters from nozzle in all directions ☐ Yes
☐ To protect impacted areas above/below the work ☐Yes ☐N/A
☐ To protect other jobs performed in same work area ☐Yes ☐ N/A

8. Onsite inspection completed for work stoppages of 30 minutes or more to ensure equipment setup has not changed?
☐ **Yes** ☐**N/A**

9. Hydroblasting or pressure washing involves heat exchangers with tube plugs? ☐ **Yes** ☐ **No**
If yes, describe steps to depressurize both tube and shell sides:
_____

10. Methods to plug both ends of damaged or leaking tubes on exchangers
☐ Welded Plug ☐ Conical Plug ☐ Pop-and-plug ☐ N/A

11. Method(s) of isolating opposite side of tubes to protect people/equipment, including U-tube type:
☐ Position people/equipment out of LOF
☐ Steel Plate
☐ 0.75 inch / 2 cm Plywood
☐ 0.2 inch / 5 mm Polycarbonate
☐ Other: _____
☐ N/A

12. Hydroblasting / Pressure Washing Equipment will be used in a flammable area? ☐ **Yes** ☐ **No**
If yes, equipment is grounded and bonded? ☐ **Yes** ☐ **No**

13. Hydroblasting/Pressure Washing Equipment has a Fail-Safe Device? ☐ Yes ☐ NA

14. Anyone within 20 feet / 6 meters of pressure washing must wear the following personal protective equipment
☐ Monogoggles ☐ Rain Suit
☐ Rubberized Gloves
☐ Metatarsal Rubber Boots rated for the pressure being used
☐ PPE address any chemical hazards
☐ PPE addresses any physical hazards
☐ PPE address fall protection if elevated work

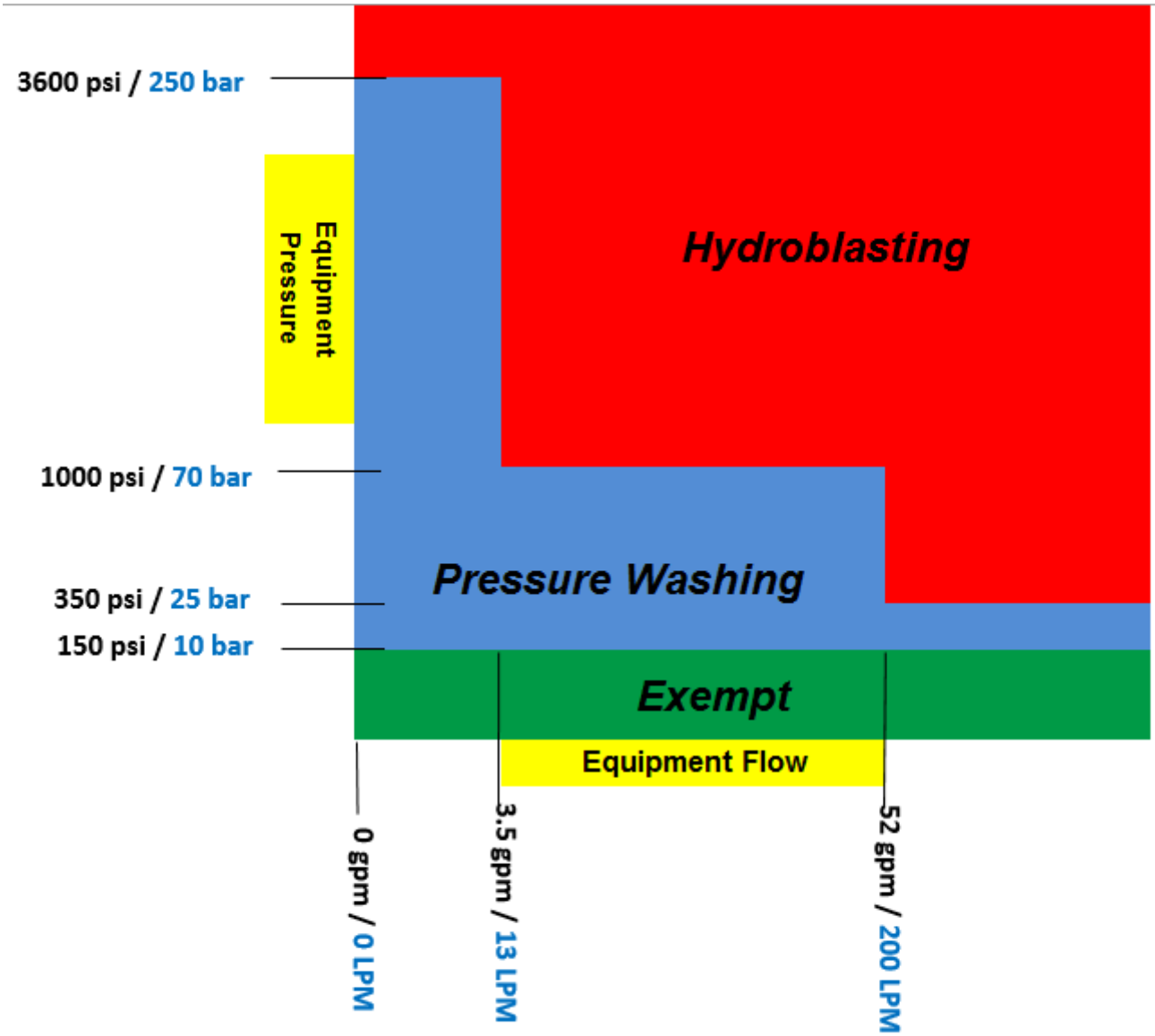


Figure 1. Used to determine classification of pressurized water

NOTE: The pressures used to determine whether hydroblasting or pressure washing is occurring are equipment ***design*** pressures. While you may operate the equipment below design pressures, that does not change the definition.

Dow Program

SWP Addendum – Extended Duration Safe Work Permit

EXTENDED DURATION SAFE WORK PERMIT (SWP)	Use this form together with the Safe Work Permit Maximum Duration is Seven (7) Days

1. Does scope of work involve a Confined Space Entry?
   ☐ Yes ☐ No If Yes, STOP – extended duration SWPs do not apply to Confined Space Entries.
2. Is the scope of work limited to a single area?
   ☐ Yes ☐ No If No, STOP – extended duration SWPs are limited to a single area.
3. Has FWGL approved use of extended permit for this work
   ☐ Yes ☐ No If No, STOP – extended duration permits require pre- approval by FWGL
4. Extended Duration SWP
   Start Date: _____
   End Date: _____

5. After completing initial safe work permit and any addenda, including above, use the table below to initiate and close permit daily.
   When closing permit, complete columns A, I and J. When opening permit, complete columns B-J.

Use Safe Work Permit Issue section (bottom Page 2) to initially activate the permit on day one.

For cancellations within work day, notate in Columns I and J reason for cancellation and capture Receiver and Issuer signatures to cancel and re-issue the permit.

Revision history

The following information documents at least the last 3 changes to this document, with all the changes listed for the last 6 months.

Date	Revised By	Changes
April 6, 2022	Jeanne Burgess	Extended day permits added to SWP policy.

Dow Program

SWP Addendum – Extended Duration Safe Work Permit

A	B	C	D	E	F	G	H	I	J
Date / Time Work Stopped *(typically end of work day/shift)*	Date / Time Work Started *(typically beginning of next work day/shift)*	Duration of Work Stoppage is > 24 hrs? [a]	Scope of Work has changed? [a]	SWP Receiver is the same SWP Receiver on Safe Work Permit Activation? [b]	At least 50% of work crew members are the same as those identified on *Safe Work Permit Activation?* [c]	On-site inspection completed with SWP Receiver	*SWP rev'd with Receiver & changes listed here or on SWP*	*SWP Receiver Signature* *Date / Time*	*SWP Issuer Signature* *Date / Time*
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes	☐ Yes		

(a) If Yes, STOP and Close Out the work permit. Extended day permitting cannot be used if work has stopped for > 24 hours.

(b) If No, STOP – Extended Duration SWP only applies if SWP Receiver has not changed.

(c) If No, STOP – Extended Duration SWP only applies if 50% of work crew has not changed.

SAFETY BRIEFING FORM + PERMIT FORM = SAFE WORK PERMIT

Permit: _____ _____ _____ Is this an Extended Duration Permit?

Date start time stop time ☐ YES ☐ NO

Scope of Work:

Change in scope Time: Change:

Revised SWP reviewed: Issuer initial _____ Receiver initial _____

Tools & Equipment identified, inspected, ready to work: Ladders, scaffolds, fall protection, heavy equipment, tools, etc.

☐ list attached

Permit is ALWAYS required

- ☐ Confined Space Entry*^!
- ☐ Critical Lifts
- ☐ Diving Operations
- ☐ Energized Electrical Work^!
  - ☐ overhead work near lines*
  - ☐ energized work/access*#
- ☐ Excavation & Underground Work
- ☐ Exchanges – work with exposed tube plugs
- ☐ Explosive devices
- ☐ Hot Tap^!
- ☐ Isolation of Energy Sources-IOES*^! (When work is performed by sub)
- ☐ Hot LEO*#!- if associated with high or moderate risk procedure
- ☐ Fall prevention*^! that consists of:
  - Removing/modifying permanent fall prevention
  - Erecting/modifying/removing life critical guards
  - Erecting/dismantling/use of suspended work platform
  - Use of a crane suspended platform
  - Rope access
  - Floating Work Platforms
- ☐ Hydroblasting*#! pressure washing is permit optional
- ☐ Requested by worker
- ☐ All Hot Work/Flammable Areas!

SWP is USED (but not ALWAYS req'd)

- ☐ Heavy Equipment*^!
- ☐ Pressure Washing*#!
- ☐ LEO*#!
- ☐ Fall prevention*^!
- ☐ Other: _____

KEY:

! LCS

**requires subject-specific permit addendum*

^ Dow program-specific HASP addendum

 # Dow Program-specific Policy

Hazards present in work

- ☐ Jacobs self-perform IOES^! – Requires Safe Work Procedure: _____
- ☐ Chemical burns/contact/splash
- ☐ Thermal Burns
- ☐ Weather; heat/cold stress
- ☐ Manual Lifting
- ☐ Heights/fall > 4' (US) 6' (global)
- ☐ Noise
- ☐ Trench, excavations/cave-ins
- ☐ Pinch points
- ☐ Cuts/abrasions
- ☐ Spills
- ☐ Overhead Electrical Lines
- ☐ Elevated loads
- ☐ Biohazards (plants, insects)
- ☐ Eye hazards/ flying projectile
- ☐ Inhalation hazard
- ☐ Water/drowning
- ☐ Fire/Explosion
- ☐ Slip/trip/fall
- ☐ Radiation
- ☐ Heavy equipment
- ☐ Aerial lifts/platforms

OTHER HAZARDS / COMMENTS:

Management System – Permit tasks addressed in	Training	Air Monitoring/ Respirator Use	Emergency Response/ Medical
☐ **HASP/FSI**	☐ **HASP & req'd trainings**	☐ **PID/FID**	☐ **First-aid kit /eye wash**
☐ **HIIRA/AHA/JHA**	☐ **EMP & req'd trainings**	☐ Detector tubes	☐ **FA-CPR trained personnel**
☐ **SOP**	☐ **HAZWOPER certs**	☐ Radiation	☐ **Route to hospital**
☐ **EMP**		☐ Personnel sampling	☐ **Evac route & assembly**
☐ SPCC Plan		☐ Respirator required	☐ **How to summon Emergency services**
		___ Half ___ Full ___ Escape	
		☐ LEL/O2	☐ Emergency shower

Fall Protection	Fire Protection	Protective Systems	Welding & Cutting
☐ Harness/lanyards	☐ Fire extinguishers/watch	☐ Sloping	☐ Cylinders secured/ capped
☐ Adequate anchorage	☐ Combustibles removed	☐ Shoring	☐ Cylinders separated/upright
☐ Guardrail system	☐ Non-spark tools	☐ Trench box	
☐ Covered opening	☐ Grounding/bonding	☐ Barricades	☐ Flash-back arrestors
☐ Fixed barricades	☐ Intrinsically safe equip	☐ Competent person	☐ No cylinders in CSE
☐ Warning system		☐ Locate buried utilities	☐ Flame retardant clothing
		☐ Daily inspections	☐ Appropriate goggles

Nearby Work	Electrical	Heat/Cold Stress	Vehicle/Traffic
☐ Impacts identified	☐ Lockout/tagout using procedure	☐ Work/rest regime	☐ Traffic control plan
☐ Notify nearby workers		☐ Rest area	☐ Barricades as needed
☐ Barricades as needed	☐ Equipment grounded	☐ Liquids available	☐ Flags
	☐ GFCI/extension cords	☐ Monitoring	☐ Signs
	☐ Power tools/cord inspected	☐ Sunscreen	☐ **360 walk around**
			☐ **Spotters when backing**

PPE	Biohazards	Inspections	Ergonomics
☐ **Hard Hat**	☐ **Local hazards discussed**	☐ Lanyards/harness	☐ **Proper body mechanics**
☐ **Eye - Glasses**	☐ Insect repellents for skin (i.e., DEET)	☐ Scaffolds	☐ **Buddy lift over 40 lbs**
☐ Eye - Goggles		☐ Heavy equipment	☐ **1,2,3 Lift**
☐ Face - Shield	☐ Insect repellents for clothing (i.e., permethrin)	☐ Ladders	☐ **Stretching/positioning**
☐ **Hand - Nitrile**		☐ Cranes and rigging	☐ **Take breaks from repetitive task**
☐ **Hand - Leather**	☐ Bug suits/Tyvek	☐ Backup alarms	
☐ Hand - Kevlar	☐ Snake chaps	☐ Kill switches	**Environmental:**
☐ Hand – Other: _____	☐ Buddy checks	☐ Hand & Power Tools	☐ **Spill kit ready**
☐ Long sleeves	☐ Awareness of allergic workers		☐ Wetland boundaries
☐ **Safety Boots**		☐ Additional work site inspection required by permit issuer: ☐ _____	☐ Protected species
☐ Coverall/Tyvek			☐ Boundaries/limits
☐ Hearing Protection			☐ Dust control
☐ Other: _____ (PFD, hi vis vest, rubber boots)			☐ Silt fence

ISSUE	*Onsite Issuance Req'd*	Name	Signature	Date	Cancelled Time & Initial	Reissued Time & Initial
	Issuer:					
	Receiver:					
	Co-signed by:					

ONSITE CLOSURE REQ'D
Closed by Issuer: _____ **Date:** _____ **Time:** _____
Closure Acknowledged by Receiver: _____ **Date:** _____ **Time:** _____

Appendix G.
Quality Assurance Project Plan

Sitewide Quality Assurance Project Plan, Essex-Hope Superfund Site

Document No.: 250722140332_d8becb44
Revision: Draft

The Dow Chemical Company

Essex-Hope State Superfund Site
The Dow Chemical Company
Jamestown, New York
July 22, 2025



Sitewide Quality Assurance Project Plan, Essex-Hope Superfund Site

Client Name:	The Dow Chemical Company		
Project Name:	Essex-Hope State Superfund Site The Dow Chemical Company Jamestown, New York		
Document No:	250722140332_d8becb44	**Project No:**	JMS025DW
Revision:	Draft	**Project Manager:**	Brian Carling
Date:	July 2025	**Prepared By:**	Jacobs
File Name:	UCC_Jamestown_QAPP_Draft_May2025_SML_jjb_20250509_BSC Review_LLF		

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Acronyms and Abbreviations

%R	percent recovery
°C	degree(s) Celsius
ASTM	ASTM International
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	chain-of-custody
Dow	The Dow Chemical Company
DQE	data quality evaluation
DQO	data quality objective
EDD	electronic data deliverable
FTL	field team leader
HASP	health and safety plan
ICP	inductively coupled plasma
ID	identification
IDW	investigation-derived waste
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LIMS	Laboratory Information Management System
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NYSDEC	New York State Department of Environmental Conservation
PDF	portable document file
pH	negative log of the hydrogen ion concentration
PM	project manager
QA	quality assurance
QAM	quality assurance manual
QAPP	quality assurance project plan

QC	quality control
QM	quality manager
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
Site	Former Essex-Hope State Superfund Site at 125 Blackstone Avenue in Jamestown, New York
SM	site manager
SOP	standard operating procedure
SOW	statement of work
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1. Project Management

The *Essex-Hope State Superfund Site Sitewide* Quality Assurance Project Plan (QAPP) provides the guidelines for investigation, remediation, operation, maintenance, and monitoring field sampling activities at the Former Essex-Hope State Superfund Site at 125 Blackstone Avenue in Jamestown, New York (the site). These activities include, but are not limited to, sampling and analyzing soil, groundwater, influent and effluent process water, indoor air and process vapor from thermal system. This QAPP addresses the following areas:

- Operational Unit 1
- Operational Unit 3
- Sitewide groundwater
- In situ thermal treatment performance monitoring

The QAPP is meant to encompass the most common data objective requirements. However, some areas may have specific requirements that may only apply to a specific phase of the project. If these specific objectives differ from the general objectives presented in this document, the differences will be addressed in the project-specific work planning documents and will supplement or supersede the requirements provided here.

This QAPP has been prepared to provide the guidelines and procedures for field activities at the site. This QAPP has been prepared in accordance with the U.S. Environmental Protection Agency's (EPA's) *Requirements for Quality Assurance Project Plans* (EPA 2001).

This document specifies the policies, objectives, organization, functional activities, and quality assurance (QA) and quality control (QC) criteria to achieve data quality objectives (DQOs) for the field sampling and analyses during each phase of investigation, remediation, and monitoring. It complements separate, project-specific work planning documents to provide a more detailed understanding of the scope of work (SOW), and additional guidance on field procedures and protocols.

1.1 Problem Definition and Background

Project-specific workplans provide the operational and environmental background for the individual areas of interest.

1.1.1 Data Quality Objectives

Project-specific sampling plans were developed to address the site-specific problem definitions and background information and to develop DQOs for each site. This section describes the DQO process.

DQOs are qualitative and quantitative statements that define the type, quality, and quantity of data necessary to support the decision-making process during project activities. The intended final use of the data forms the basis for the DQOs, which are developed before the project-specific sampling plans.

The data's credibility is strengthened by the level of the supporting QA/QC documentation. The more important the data or the resulting decision is, the more QA/QC information is needed to validate the data. This reasoning must be applied to the data for any project. The DQO process complies with EPA QA/G-4 guidance (EPA 2006) and uses the following development process:

1. **State the problem.** Concisely describe the problem to be studied.
2. **Identify the decisions.** State the decisions to be made to solve the problem.

3. **Identify inputs to the decisions.** Identify information and supporting measurements needed to make the decisions, and describe the sources of the information.
4. **Define the boundaries of the study.** Specify conditions (time periods and spatial locations).
5. **Develop a decision rule.** Define the conditions a decisionmaker will use to select alternatives, usually specified as "if/then" statements (for example, if the average concentration in soil is less than cleanup level, then the site achieves remedial action goals).
6. **Specify tolerable limits on decision errors.** Define the tolerable limits in statistical terms.
7. **Optimize the design for obtaining data.** Evaluate the results of the previous steps and develop the most resource-efficient design for data collection.

1.2 Project Task/Organization

A project team composed of Jacobs, its subcontractors (if necessary), and an analytical laboratory will be assembled for each project task. Jacobs will have overall responsibility for the sampling and monitoring activities specified in this QAPP. Most of the roles and responsibilities should be common across all projects. . Each project-specific work planning document should clearly identify the team members listed in this section.

1.2.1 The Essex-Hope Remediation Leader

The Essex-Hope remediation leader will be responsible for reviewing and approving all project memorandum statements of work and project memorandum work plans. The remediation leader will provide direction to Jacobs and serve as the primary point of contact for Essex-Hope. The remediation leader will also be accountable for overall environmental health and safety performance.

1.2.2 New York State Department of Environmental Conservation Project Manager

The New York State Department of Environmental Conservation (NYSDEC) project manager (PM) will ensure agency regulations and policies are being followed and will provide regulatory review and approval of all deliverables.

1.2.3 Site Manager

The site manager (SM) is responsible for overall project performance and coordination for the site. The SM is the first line of communication with the client and project stakeholders to keep them informed of the work progress.

1.2.4 Project Manager

The PM is responsible for supporting the client to provide quality work products within the authorized schedule and budget. The PM is also responsible for implementing the project, and is authorized to commit resources to meet project objectives and requirements. The PM's primary function is to achieve technical, financial, and scheduling objectives.

The PM will report directly to the SM and will be the main point of contact for matters concerning the field portion of the project. More specifically, the PM will complete the following tasks:

- Define project objectives and develop detailed work planning documents and the schedule.
- Establish project policies and procedures to address the project-specific needs, as well as the objectives of each task.
- Acquire and apply technical and corporate resources to meet budgetary and scheduling constraints.
- Orient field leaders and support staff regarding the project's special considerations.
- Monitor and direct other team members.
- Develop and meet ongoing project or task staffing requirements, including mechanisms to review and evaluate each task product.
- Review the work performed on each task to ensure quality, responsiveness, and timeliness.
- Review and analyze overall task performance, considering the schedule and budget.
- Represent the project team at meetings.

1.2.5 Senior Technical Consultant

The senior technical consultant) will be responsible for coordinating onsite or offsite activities to optimize remediation. They will ensure the long-term monitoring approach is technically sufficient and will serve as the liaison between the project team and subject matter experts. The senior technical consultants will have the following general responsibilities:

- Assume overall responsibility for the technical aspects of the project.
- Coordinate the technical input of the various subject matter experts.
- Provide technical reviews of deliverables.
- Provide leadership and guidance related to regulations and site strategy.

1.2.6 Subject Matter Expert

Subject matter experts are engaged in projects based on specific technical needs and have the following general responsibilities:

- Ensures technical project objectives and expectations are met.
- Conduct technical reviews of project documents.
- Assume specific responsibilities, as needed, depending on specific site needs:
  - Vapor intrusion studies —evaluating subslab vapor, soil vapor, and ambient air data, and developing the technical scope for investigations

1.2.7 Quality Manager

The quality manager (QM) is responsible for managing project-specific quality requirements, which include submittal reviews and field work event quality reviews and ensure compliance with program requirements. The QM is also responsible for the following tasks:

- Assist the PM to develop, maintain, administer, and enforce the QAPP.
- Identify project-wide quality problems and initiate, recommend, or provide corrective actions to resolve those problems. Confirm the actions are implemented and issues resolved.
- Identify and report nonconformance issues related to this QAPP. Investigate potential nonconformances and work with other team members to correct discrepancies.

- Work with senior technical consultants or the field QM (or both) so field work activities and issues are documented in reports and logbooks, as are project submittals, tests, inspections, change management decisions, and as-built conditions in accordance with this QAPP.
- Coordinate feedback from field staff to the project team for continuous improvement.
- Support or conduct project quality audits.

1.2.8 Environmental Manager

The environmental manager is responsible for managing investigation-derived waste (IDW) generated at the site. They will confirm activities comply with the project compliance tracker, coordinate waste inspections and disposal, and engage on environmental compliance matters.

1.2.9 Task Lead

The task lead reports to the PM and is responsible for evaluating the progress of the sampling activities. The task lead will communicate the progress of field activities, including deviations from the project-specific sampling plan, directly to the PM and other team members. The task lead is responsible for the following tasks:

- Provide technical guidance and consultation to the field team, as needed.
- Ensures proper QC is established and sampling procedures are followed in accordance with this QAPP.

1.2.10 Data Manager

The data manager, or their designee, is responsible for the following tasks:

- Set up and monitor sampling events for electronic field capture (if applicable), to collect sample-specific information and generate sample labels, field forms, and chains-of-custody (COCs).
- Help develop and distribute purge forms to team members so sampling can be monitored.
- Oversee uploads of the electronic field data into the project database. Review the field data for completeness and communicate anomalies, inconsistencies, or omissions to the field team.
- Track sample receipt notifications and electronic data deliverables (EDDs) from the laboratories. Review the EDDs and load them into the database; notify the project chemist when an event is ready for validation.
- Maintain project databases.
- Prepare data requests and report tables for the project team.
- Work with the PM to coordinate the production of figures and maps by appropriate staff (geographic information system, computer-aided drafting, hydrology, client deliverables solutions).
- Prepare draft data entities for review before they are submitted to the PM (or other technical staff).

1.2.11 Project Chemist

The project chemist is responsible for tracking data and overseeing data evaluation. Specific responsibilities include, but are not limited to, the following:

- Modify this QAPP to include new sampling methods or new analytical methods (or both).
- Coordinate the preparation of the laboratory statement of work.

- Coordinate with the laboratory for the delivery of sample containers, analysis of the samples, and receipt of the analytical data packages.
- Schedule and serve as the point of contact for analytical services.
- Oversee field custody and documentation procedures.
- Oversee the tracking of samples and data from field collection until results have been evaluated for use in project reporting.
- Ensures the sampling program is followed for each project.
- Perform or oversee the validation of data provided by the analytical laboratory, using guidance from the QAPP, the EPA *National Functional Guidelines for Data Validation* (EPA 2020a, 2020b), and individual method criteria.
- Ensures the validated data conform with the quality requirements of the QAPP.
- Oversee the production of result tables.
- Aids in evaluating data usability.
- Reviews preliminary data to support field decisions.
- Verifies QC of final data analytical packages for completeness.

1.2.12 Field Team Leader

The field team leader (FTL) is responsible for the following tasks:

- Provide instruction to, and coordinate activities with, field staff throughout the field work.
- Direct and participate in field work activities.
- Coordinate field and laboratory schedules.
- Confirm field activities comply with the QA/QC procedures in this QAPP, as well as site-specific plans.
- Before sampling begins, confirm field personnel are trained and qualified in sampling procedures and are familiar with the QAPP requirements.
- Confirm field personnel are aware of the field sampling frequency and schedule.
- Inspect and accept supplies and consumables.
- Coordinate sample collection, documentation, and shipments with the project chemist.
- Communicate issues to the project team.
- Identify and document nonconformance issues and corrective actions.

1.2.13 Safety Liaison

The safety liaison is responsible for confirming team members comply with the site safety requirements, and for the following tasks:

- Modify the levels of personal protection required for the field team, based on site conditions.
- Identify and post the routes to medical facilities and arrange for emergency transportation to medical facilities.
- Monitor field team members for symptoms of chemical exposures to constituents of concern, or other risks, such as heat or cold stress.

- Provide onsite emergency medical care and first aid, if necessary.

1.2.14 Field Personnel

The field personnel are responsible for the following:

- Collect and label the samples using the procedures in this QAPP.
- Complete laboratory documentation (COC forms) and field forms and check those documents for accuracy.
- Verify samples are collected, labeled, preserved, stored, and transported in compliance with this QAPP.
- Pack and ship the samples to the laboratory.

1.2.15 Contract Laboratories

The selected laboratories are responsible for analyzing samples collected during field activities. The analyses will comply with this QAPP, the laboratory's quality assurance manual (QAM), and the referenced methods. The laboratory PM or client service manager acts as a liaison between the project chemist, the field staff, and laboratory operations, and is responsible for the following:

- Receipt of sample custody from the field team members, verification of sample integrity, and transfer of sample fractions to the appropriate analytical departments.
- Coordinate sample analyses to meet project objectives.
- Prepare analytical reports.
- Review laboratory data for compliance with method requirements.
- Review QC deficiencies reported by the analytical department manager.
- Coordinate necessary changes.
- Complete data package deliverables.
- Communicate with the project chemist regarding sample, analytical, and QC issues.

1.2.16 Subcontractors

Subcontractors may be used for the activities in the QAPP and are required to read and understand this document.

1.3 Special Training Requirements/Certification

All Jacobs personnel engaged in field activities will have completed the Occupational Safety and Health Administration 40-hour health and safety training that meets the requirements of the *Code of Federal Regulations* (CFR), Title 29 Part 1910.120 and 8 CFR 5192, and will have completed a site-specific safety training orientation with the Jacobs technical or compliance managers on what requirements need to be met prior to field work. Subcontracted project personnel will read the project-specific health and safety plan. The PM or their designee (or both) will maintain documentation to demonstrate those plan requirements are followed.

Subcontracted laboratories and lower-tiered subcontracted laboratories participating in analytical services will be certified by the National Environmental Laboratory Accreditation Program and the state of New

York for the requested parameters. The laboratory managers will be responsible for ensuring personnel have been properly trained and are qualified to perform their assigned tasks.

2. Data Quality Indicators

2.1 Data Precision, Accuracy, Comparability, Completeness, and Sensitivity

Field QA/QC samples and laboratory internal QA/QC samples will be collected and analyzed to assess the data's usability. The laboratory's standard operating procedures (SOPs) provide acceptance criteria for precision and accuracy requirements for these QC samples to assess their usability. Completeness is the percentage of usable data obtained during the sampling event and its acceptance criteria are project-specific.

2.1.1 Precision

Precision is a measure of reproducibility of analytical results. It can be defined as the degree of mutual agreement among individual measurements obtained under similar conditions. Total precision is a function of the variability associated with both sampling and analysis.

Precision of laboratory analysis will be assessed by comparing the analytical results between the laboratory control sample (LCS)/laboratory control sample duplicates (LCSDs), matrix spike (MS)/matrix spike duplicates (MSDs), and laboratory duplicates. The precision of the field sampling procedures will be assessed by reviewing field duplicate sample results. The relative percent difference (RPD) will be calculated for the duplicate samples using the following equation:

$$RPD = |(S - D)/[(S + D)/2]| \times 100$$

Where:

S = First sample value (original value)

D = Second sample value (duplicate value)

A control limit of ± 30 percent for the RPD will be used for original and field duplicate concentrations greater than five times the reporting limit (RL) in air and water matrices. A control limit of ± 50 percent will be used for original and field duplicate concentrations greater than five times the RL in soil matrices. A control limit of ± two times the RL will be used for air and water and ± four times the RL for soil/sediment when concentrations are reported as less than five times the RL.

Laboratory QC limits will be used for LCS/LCSD, laboratory duplicate and MS/MSD precision criteria.

2.1.2 Accuracy

Accuracy is the degree of agreement between an observed value and a "true" value (correctness) and includes a combination of the random error (precision) and systematic error (bias) components that result from the sampling and analytical procedures. It reflects the total error associated with a measurement. A measurement is considered accurate when the reported value agrees with the true value or known concentration of the spike or standard within acceptable limits.

Accuracy of laboratory results will be assessed for compliance with the established QC criteria using the analytical results of method blanks/field blanks, reagent/preparation blanks, LCS/LCSD samples, MS/MSD samples, and surrogate spikes. The laboratory result accuracy will be assessed for compliance

with the established QC criteria described in the SOPs. The percent recovery (%R) of LCSs will be calculated using the following equation:

$$\%R = (A/B) \times 100$$

Where:

A = The analyte concentration determined experimentally from the LCS

B = The known amount of concentration in the sample

Laboratory QC limits established in the appropriate SOPs will be used.

2.1.3 Completeness

The data completeness of laboratory analyses results will be assessed for compliance with the amount of data required for decision-making. Complete data are data that are not rejected for projected use. Data qualified with qualifiers such as a "J" or a "UJ" are still deemed acceptable and can still be used to make project decisions. The completeness of the analytical data is calculated using the following equation:

$$\%\ \text{Completeness} = [(\text{Valid data obtained}) / (\text{Total data planned})] \times 100$$

The completeness goals are 95 percent for air and water matrices and 90 percent for soil.

2.1.4 Representativeness

Representativeness is the degree to which sampling data accurately and precisely represent site conditions. It depends on sampling and analytical variability, and the variability of environmental media at each site. Representativeness is a qualitative measurement of data quality.

To obtain representative data in the field, the sampling program must be designed and conducted properly to carefully consider the overall DQOs for the project. Proper location controls and sample handling are critical to obtaining representative samples.

Representative data in the laboratory are measured by assessing accuracy and precision. A laboratory will provide representative data when all the analytical systems are in control; therefore, representativeness is a redundant DQO for laboratory systems if proper analytical procedures are followed and holding times are met.

In addition, laboratories must demonstrate their staff are qualified to perform the analyses, are certified, and are proficient with analytical methods being employed.

2.1.5 Comparability

Comparability is the degree of confidence with which one dataset can be compared to another. Comparability is a qualitative measurement of data quality.

To obtain comparable data in the field, the sampling program must be designed and conducted properly to carefully consider the overall DQOs for the project. Proper location controls and sample handling are critical to obtaining comparable samples.

Comparable data in the laboratory are measured by assessing accuracy and precision. A laboratory will provide comparable data when all the analytical systems are in control; therefore, comparability is a

redundant DQO for laboratory systems if proper analytical procedures are followed and holding times are met.

2.1.6 Sensitivity

Sensitivity is defined as the method or instrument's ability to detect the constituent of concern and other target compounds at the level of interest. Appropriate sampling and analytical methods will be selected, with method detection and reporting limits (RL) that support the achievement of the preferred sensitivity and established performance criteria.

2.2 Method Detection Limits and Reporting Limits

2.2.1 Method Detection Limits

The method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Each participating laboratory will determine the MDL for each method, matrix, and analyte for each instrument that will be used to analyze samples. The MDLs will be determined initially before analyzing samples and verified at the required frequency stated in the laboratory's NELAP certification.

2.2.2 Reporting Limits

RLs should be greater than two times the calculated MDL. RLs used by the laboratory should not be greater than the objectives presented in Appendix A, with the exception of investigative-derived waste and MNA geochemical parameters, which uses the laboratory's standard RLs.

Analytes that are not detected greater than the RL will be reported as not detected at the RL and flagged "U." Detects less than the RL (but greater than the MDL) will be reported with the appropriate laboratory flag/qualifier ("J").

RLs, as well as sample results, shall be reported to two significant figures if they are less than 10, and to three significant figures otherwise. RLs shall be reported on a dry-weight basis for soil samples.

3. Data Generation and Acquisition

This section describes the procedures for sampling collection, handling, measurement activities, as well as data acquisition and management activities to support field investigations. It addresses the following aspects of measurement and data acquisition:

- Sampling process design
- Sampling method requirements
- Sample handling and custody requirements
- Analytical method requirements
- QC requirements
- Instrument and equipment testing, inspection, and maintenance requirements
- Instrument calibration and frequency
- Inspection and acceptance requirements for supplies and consumables
- Data acquisition requirements
- Field and laboratory instrument and equipment testing, inspection, and maintenance requirements
- Data management

3.1 Measurement Performance Criteria

Each measurement performance criterion is checked on several levels, as follows:

- Built-in QC standards
- Senior review
- Management controls

The measurement data will be given specific QC standards by which they must abide. If these standards are not met, the data will be qualified. The analytical data and the QC results will be checked by the bench chemist, the laboratory's QA manager, and Jacobs chemist and data validator.

3.2 Senior Review/Management Controls

Documents relating to project quality standards are drafted by and reviewed internally by Jacobs personnel with relevant technical experience. During field sampling, the FTL will supervise activities to assess whether SOPs are being followed. Specific QC checks and corrective action measures for the laboratory data are described in Appendix A and QC checks and corrective action measures for the field data are described in the project-specific plans.

3.3 Sampling Process Design and Rationale

Project-specific sampling plans will be developed following the logical process provided in EPA's *Guidance on Systemic Planning using the Data Quality Objective Process* (EPA 2006). The sampling design is a function of the matrix sampled, information about the sampling area, the type of data to be collected, and how the data are to be used.

The following media may be sampled and analyzed as part of the site activities:

- Groundwater
- Process water
- Indoor/Ambient Air

- Subslab/Process Vapor
- Soil

The project-specific work plans provide the planned sampling locations, rationale for selection, and analytical parameters for each location. They also provide the sampling and analysis requirements. The exact sample locations and the total number of samples might change from those listed in the work plans, depending on the field conditions. Formal changes in the sampling frequency or locations will be documented.

The planning and implementation procedures are designed to attain a level of standardization for various samples collected at the Essex-Hope site. To achieve this goal, field staff will follow the guidelines provided here.

3.3.1 Sample Nomenclature

A unique sample numbering system will be used to identify each sample, including duplicates and blanks. Each sample will be assigned a sample identification (ID) number. This number, which will be cross-referenced to the sample location on the COC form, will be used to track samples and report analytical results. The general sample nomenclature system is presented here:

Water/air/IDW: “sys_loc_code” + “_” + “sample_date” + “_””sample_type_code” + “_” + “matrix_code”

Soil: : “sys_loc_code” + “_” + “sample_date” + “_” + “start_depth” + “-“ + “end_depth” + “_” + “depth_unit” + “_” + “sample_type_code” + “_” + “matrix_code”

Where:

“sys_loc_code” – Sample station or location identifier of sample collection, soil boring, or well installation. Location must exist in the dt_location table in EQuIS. Examples of possible “sys_loc_code” are MW-01, A-1, SB6, etc. (there is a 20-character limit)

“sample_date” – Date string in the format of YYYYMMDD, where YYYY is the four digit year, MM is the two digit month, and DD is the two digit day; the “sample_date” may be extended to include the sampling time to give more specificity when needed in the format of hhmm, where hh is the 2-digit hour in 24-hour time and mm is the 2-digit minute

“start_depth” – Numeric values only; the starting, or upper depth, that the sample is collected from; mandatory for soil samples, optional for other sample matrix types

“end_depth” – Numeric values only; the ending, or lower depth, that the sample is collected from; mandatory for soil samples, optional for other sample matrix types

“depth_unit” – The depth unit must be in the rt_unit table in EQuIS; the unit of measurement for the “start_depth” and “end_depth”; mandatory for soil samples, optional for other sample matrix types

"sample_type_code" – The appropriate "sample_type_code" for the type of sample collection is determined from the Dow Chemical Company (Dow) valid values. Common "sample_type_code" values are listed here; if other sample types are needed, staff should contact their chemist and data manager:

AB = Ambient Conditions Blank	N = Normal Environmental Sample
EB = Equipment Blank	TB = Trip Blank
FB = Field Blank	SM = Matrix Spike (field)
FD = Field Duplicate	SMD = Matrix Spike Duplicate (field)

"matrix_code" – the appropriate "matrix_code" for the type of sample collected is determined from the Dow valid values. Common "matrix_code" values are listed here; if other matrix types are needed, staff should contact their chemist and data manager:

AA = Ambient Air	S = Solid	WG = Ground Water
AE = Air, Vapor Extraction Well Effluent	SO = Soil	WQ = Water Quality Control Matrix
AI = Indoor Air	ST = Solid Waste	WW = Waste Water
AS = Subslab Air	W = Water	

Summary of Sample Naming Process

- MW-33_202500325_N_WG represents a groundwater sample collected from MW33 on March 25, 2025.
- ISTT-S101_20250325_N_W represents a process water sample collected from sample port 101 on March 25, 2025.
- BLD32-IA01_20250325_N_AI represents an indoor air sample collected from Building 32 on March 25, 2025.
- DPT-67_20250325_2-5_FT_N_SO represents a soil sample collected from DPT-67 on March 25, 2025 at a depth of 2 to 5 feet.
- IDW_20250325_N_ST represents a solid IDW sample collected on March 25, 2025.
- IDW_20250325_N_WW represents a liquid IDW sample collected on March 25, 2025.

Field QC samples are required and should be named using the following nomenclature:

- FD01_20250325_FD_WG is the field duplicate collected on March 25, 2025.
- MW-02_20250325_SM_WG is the matrix spike collected at MW02 on March 25, 2025.
- MW-02_20250325_SMD_WG is the matrix spike duplicate collected at MW02 on March 25, 2025.
- TB01_20250325_TB_WQ is the trip blank for March 25, 2025.
- EB01_20250325_EB_WQ is the equipment blank for March 25, 2025.

3.3.2 Sampling Method Requirements

Sampling methods are described in the project-specific sampling plans. Most of the sampling methods are common to the Essex-Hope site. Detailed SOPs for the common methods have been prepared and can be found in the project-specific plans.

3.4 Sample Handling and Custody Requirements

3.4.1 Sample Handling, Preservation, Transportation, and Storage Procedures

Laboratories will provide the required sample containers for all environmental and associated QC samples. All containers will be certified as free of the analytes of concern for this project. No containers will be reused. The contract laboratory will add preservatives, if required, before shipping the sample containers to the field. Upon receipt of the samples, the laboratory will verify the adequacy of the preservation and add additional preservatives, if necessary. Adjustments made by the laboratory will be documented on the appropriate sample receipt forms and noted in the case narrative. Table 3-1 provides the analytical methods, sample containers, minimum quantities, required preservatives, and maximum holding times for select parameters. Table 3-2 provides extraction and preparatory methods.

Sample containers should be received from the laboratory pre-labeled with the preservative. The sample identification, and date and time of sampling will be entered on the label immediately after collection. The labels must be secured using clear tape to maintain the identification of each sample.

Table 3-1. Required Analytical Method, Sample Containers, Preservation, and Holding Times

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Analyses	Analytical Method[a]	Sample Matrix[b]	Container[c]	Qty	Preservative[d]	Holding Time[e]
Volatile Organic Compounds	SW-846 8260	W/IDW-L	40-mL, glass	3	HCl, pH<2, cool to 6 ºC or Cool 6°C	14 days preserved/7 days unpreserved
		S	5-g Encore Or Terracore Kit	3 3 (2 x DI and 1 x MeOH vials)	Cool 6°C	48 hours from collection to preservation, 14 days to analysis
	TO-15/TO-15 SIM	Air	1-L or 6-L Summa canister	1	None	30 days
Polychlorinated Biphenyl (PCBs)	SW-846 8082	W	100-ml amber glass	2	Cool 6°C	None
Metals (dissolved)	SW-846 6020	W	250-mL polyethylene		Field filter for dissolved; HNO_3, pH < 2 Cool 6°C Cool 6°C	6 months
Dissolved Gases	RSK-175	W	40-mL VOA vial	2	HCl, pH<2 Cool 6°C	14 days
Total Organic Carbon	SM 5310C	W	40-mL VOA	2	H_2SO_4, pH<2; Cool 4° C	28 days
Alkalinity	SM2320B	W	250-mL polyethylene	1	Cool 6°C	14 days
Anions	EPA 300.0	W	250-mL polyethylene	1	Cool 4° C	48 hours NO_3/ 28 days Cl & SO_4

Table 3-1. Required Analytical Method, Sample Containers, Preservation, and Holding Times

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Analyses	Analytical Method[a]	Sample Matrix[b]	Container[c]	Qty	Preservative[d]	Holding Time[e]
Total Dissolved Solids	SM2540C	W	500-mL polyethylene	1	Cool 6°C	7 days
Quant Array Chlorinated	QuantArray-Chlor (DNA)	W	Bio-flow filter	1	Cool 6° C	24 hours
Quant Array Bio-Geochemical	QuantArray-BGC (DNA)	W	Bio-flow filter	1	Cool 6° C	24 hours
TCLP–VOCs	SW-846 1311/ 8260	IDW-S	4-oz. glass	1	Cool 6°C	14 days to TCLP extraction/14 days to analysis
Semivolatile Organic Compounds	SW-846 8270	IDW-L	250-mL, amber glass	2	Cool 6°C	7 days to extraction/40 days to analysis
TCLP–Semivolatile Organic Compounds	SW-846 1311/8270	IDW-S	4- or 8-oz. glass	1	Cool 6°C	14 days to TCLP extraction/7days to extraction/40 days to analysis[]
Metals	SW-846 6010/7470	IDW-L	250-mL polyethylene	1 1	HNO_3, pH < 2 Cool 6°C Cool 6°C	6 months/28 days for mercury
TCLP Metals	SW-846 1311/6010 /7470	IDW-S	4- or 8-oz. glass	1	Cool 6°C	6 months/28 days mercury TCLP/6 months/28 days mercury to analysis

Table 3-1. Required Analytical Method, Sample Containers, Preservation, and Holding Times

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Analyses	Analytical Method[a]	Sample Matrix[b]	Container[c]	Qty	Preservative[d]	Holding Time[e]
pH	SM4500 H+ B/SW-846 9040	IDW-L	250-mL polyethylene	1	None	As soon as possible
	SW-846 9045	IDW-S	4-oz. glass	1		
Flashpoint/Ignitability (>200°F)	SW-846 1010/1030	IDW-L	250-mL polyethylene	1	None	30 days
		IDW-S	4-oz. glass	1		

Source: SW-846, third edition, Update III (June 1997).

[a] Method version to be coordinated with the laboratory
[b] Sample matrix: S = surface soil, subsurface soil; W = water; IDW-L = investigational-derived waste liquid; IDW-S = investigational-derived waste solid
[c] All containers will be sealed with Teflon®-lined screw caps.
[d] All samples will be stored promptly at 0-6°C in an insulated chest.
[e] Holding times are from the time of sample collection.

Notes:

Method version to be coordinated with the laboratory.
Sample container, and volume requirements will be specified by the analytical laboratory performing the tests.
Three times the required volume should be collected for samples designated as MS/MSD samples.

°C = degree(s) Celsius
> = greater than
< =less than
CL =chloride
DNA = deoxyribonucleic acid
g = gram(s)
HCl =hydrochloric acid
HNO_3 = nitric acid
L = liter(s)
MeOH = methanol
mL =milliliter(s)
NA = not applicable
NO_3 =nitrate

oz. = ounce(s)
PCB = polychlorinated biphenyl
S=soil
SM = Standard Methods
SO_4 =sulfate
TCLP = toxicity characteristic leaching procedure
VOA = volatile organic analysis
VOC = volatile organic compound
W=Water

Table 3-2. Extraction and Digestion Methods

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Analytical Method	Parameter	Preparatory Methods
SW6010	Trace metals by ICP (water and soil)	SW3005A, SW3010A, SW3015, SW3050B, SW3051
SW6020	Trace metals by ICP-MS (water and soil)	SW3005A, SW3010A, SW3015, SW3050B, SW3051
SW7470/SW7471	Mercury by Cold Vapor Atomic Adsorption (water and soil)	See analytical method
SW6010/SW7000 series TCLP	TCLP Metals	SW1311, SW3010A, SW3015
SW8260	Volatile Organics (water and soil)	SW3585, SW5030B, SW5031, SW5035
SW8260 TCLP	TCLP VOC	SW1311, SW5030B
TO15/TO15 SIM	Volatile Organics (air)	See analytical method
SW8270	Semivolatile Organics (water and soil)	SW3510C, SW3520C, SW3535, SW3540C, SW3541, SW3546, SW3550B
SW8270 TCLP	TCLP Semivolatile Organic Compound	SW1311, SW3520C, SW3510C
Various	General chemistry parameters	See analytical method

ICP = inductively coupled plasma

ICP-MS = inductively coupled plasma/mass spectrometer.

3.4.2 Transport

Sample coolers will be transported to the laboratory (an overnight courier may be used) immediately after sample collection. Intermediate stops should be avoided, except for emergencies, in which case the situation should be noted in the field notebooks. The laboratory should be notified that samples are being shipped.

3.4.2.1 Sample Packaging

Sample packaging and shipping procedures are designed to ensure the samples will arrive intact at the laboratory, along with the COC forms. Samples will be batched according to their analytical groups and sample locations in a manner to prevent cross-contamination of other samples. The field SOPs provide the procedures to pack and ship samples.

3.4.2.2 Shipping Airbills

If samples are shipped, airbills will be retained to provide a record for sample shipment to the laboratory. Completed airbills will accompany shipped samples to the laboratory and will be forwarded with data packages. Airbills will be kept as part of the data packages in the project files.

3.5 Sample Custody

Sample custody is necessary to provide relevant and defensible data. Custody is addressed during field sample collection, during data analyses in the laboratory, and through the proper handling of project files. Individuals will have custody of samples when samples are in their physical possession, in their view after being in their possession, or in their physical possession, having been secured to prevent tampering. In addition, when samples are secured in a restricted area, accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.

COC forms will provide the record of responsibility for sample collection, transport, and submittal to the laboratory. Field personnel designated as responsible for sample custody will fill out COC forms at each sampling location, at a group of sampling locations, or at the end of each day of sampling. When possible, sample tags and COC forms will be produced using the project database management system. If the designated sampling person relinquishes samples to other sampling or field personnel, COC forms will be signed and dated by the appropriate personnel to document the sample transfer. Original COC forms will accompany samples to the laboratory, and copies will be forwarded to the project files. At a minimum, the COC form must include the following information:

- Site name
- PM name and telephone number
- Unique sample ID
- Date and time of sample collection
- Source of sample (including name, location, sample type, and matrix)
- Number of containers
- Designation of MS/MSD
- Preservative(s) used
- Analyses required
- Name of sampler
- Custody transfer signatures and dates and times of sample transfer from the field to transporters and to the laboratories
- Bill of lading or transporter tracking number (if applicable)
- Turnaround time
- Laboratory name, address, and contact information
- Special instructions

Erroneous entries on COC records will be corrected by drawing a single line through the error and entering the corrected information. The person performing the correction will date and initial each change made on the COC form.

3.5.1 Field Custody

COC forms will be required for all samples. The sampling crew in the field will initiate COC forms. COC forms will contain the following information:

- Sample's unique ID number
- Sample date and time
- Sample description
- Sample type
- Preservation method (if any)
- Required analyses

Original COC forms, signed by the sampling crew, will accompany the samples to the laboratory. A copy of relinquished COC forms will be retained with the field documentation. COC forms will remain with the samples at all times. Samples and signed COC forms will remain in the possession of the sampling crew until samples are delivered to the express carrier (such as FedEx) or courier, hand-delivered to the laboratory, or placed in secure storage.

3.5.2 Laboratory Sample Custody

Laboratory custody procedures will be established to ensure the integrity of sample and laboratory-produced data handling. Laboratory custody procedures are defined in the individual laboratory SOPs.

3.5.2.1 Laboratory Sample Receipt

Upon receiving the sample, the laboratory sample custodian will verify package seals, open the packages, check temperature blanks (and record temperatures), verify sample integrity, and inspect contents against COC forms. The inspection procedures and corrective actions shall be in compliance with the laboratory's SOPs. The laboratory will document the occurrence of anomalies in the samples and their resolution in the laboratory records. The project chemist, or their designee, will be contacted to resolve discrepancies between sample containers and COC forms.

Along with sample receipt documentation, the sample custodian will document the following information on the sample receipt forms:

- Date samples received
- Temperature
- Field sample ID
- Laboratory sample ID
- Analytical tests requested for the sample batch
- Sample matrix
- Number of samples in the batch
- Container description and location in the laboratory
- Verification of sample preservation
- Verification of final canister pressure

Sample receipt documentation must be submitted to the project chemist within 24 hours of sample receipt.

Sample holding time tracking begins with the collection of samples and continues until the analysis is complete. Samples not analyzed in accordance with the requirements in this QAPP may be resampled and analyzed at no additional cost per the master service agreement. Ideally, sample custody will be maintained using an internal custody system that requires samples to be kept in a secured and restricted

area when not in use, and to be checked out and checked back in by the analysts who use the samples. The laboratory must maintain internal custody records as part of the documentation file for each sample. Specific instructions concerning the analysis specified for each sample will be communicated to the analysts. Analytical batches will be created, and laboratory QC samples will be introduced into each batch.

3.5.2.2 Laboratory Sample Storage

After the laboratory labels the samples, they will be stored in compliance with the laboratory SOP for sample storage. The sample custodian will note the sample disposal date in the sample ledger.
The laboratory will dispose of samples according to applicable regulations. The laboratory will be required to retain the samples/extracts per the project contract, pending the need for re-analysis.

3.5.2.3 Laboratory Project File

Documentation will be placed in a single, secured project file that will be maintained by the laboratory PM. This file will consist of the following components, all filed chronologically:

- Agreements
- Correspondence
- Memoranda
- Notes and data

Reports (including QA reports) will be filed with correspondence. Analytical laboratory documentation and field data will be filed with notes and data. Filed materials may only be removed by authorized personnel on a temporary basis. The name of the person removing the file will be recorded. The laboratory will be required to retain the sample per the master services agreement with Dow.

3.6 Analytical Method Requirements

Once samples have been properly collected and documented, they will be submitted to the analytical laboratory. Samples will be analyzed in accordance with this QAPP and the specified method. Target analyte lists and RL objectives are specified in Appendix A and will be conveyed via a SOW before sampling begins. Requested RLs will be based on the current NYSDEC Ambient Water Quality Standards, NYSDEC Guidance Values for Class C Surface Water Technical and Operational Guidance Series (1.1.1), NYSDEC Soil Cleanup Objectives for Unrestricted Use, and New York State Department of Health (NYSDOH) Subslab Vapor Concentration Criteria, as applicable. The laboratory's standard RLs will be used for IDW samples. Appendix A provides the required QC checks, minimum frequencies, acceptance criteria, corrective actions, and validation flagging criteria for methods requiring validation.

Samples will be analyzed using EPA-approved methods or other recognized standard methods (EPA 1998a, 1998b). The principal sources for analytical methods are as follows:

- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA SW-846, Third Edition, and its updates [1998a])
- Methods for Chemical Analysis of Water and Wastes (EPA 1983)
- Standard Methods for the Examination of Water and Wastewater, 20th Edition (EPA 1998b)
- Air Method, Toxic Organics-15 (TO-15): Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air, Second Addition (EPA 1999).

Deviations from specified methods will be communicated to the laboratory's PM before test procedures begin. Deviations also must be addressed in the laboratory case narrative.

All samples must be analyzed undiluted or at the lowest possible dilution. The laboratory will contact the project chemist when dilutions are required because of matrix interference. When a target analytes' concentration exceeds the calibration range, a dilution analysis will be performed to accurately determine the concentration. The laboratory will report the undiluted/lowest dilution performed and diluted analyses that are required. It is not acceptable for the laboratory to report all the data from the highest dilution unless analyzing a lower dilution will damage the instrument.

3.7 Analytical Standard Operating Procedures

The laboratory uses analytical SOPs to ensure the samples it receives are analyzed accurately and precisely. The laboratory will follow its analytical SOP or the EPA method guidance when this QAPP does not specify QC criteria. If not otherwise stated within this QAPP, the QC criteria used during the analyses are provided by the analytical SOPs.

3.8 Quality Control Requirements

The following sections outline the purpose and frequency of field and laboratory QC samples.

3.8.1 Quality Control Analyses/Parameters

QC samples will be collected to determine the accuracy and precision of the analytical results.
All sampling activities will comply with the health, safety, and environment plan, and all sample handling procedures will comply with this QAPP.

3.8.2 Field Quality Control Samples

Field QC samples will be collected to determine the accuracy and precision of the analytical results collected in the field. Field-originated blanks provide a way to monitor for potential contamination field samples may be subjected to. The following sections describe the QC sample types and frequencies. Field QC will not be collected for the monitored natural attenuation (MNA), microbial, or waste parameters.

3.8.2.1 Equipment Blanks

Equipment blanks are collected to monitor the cleanliness of the sampling equipment and the effectiveness of decontamination procedures. Contamination from the sampling equipment can bias the analytical results high. When possible, dedicated or disposable, single-use, sampling equipment and supplies will be used for sample collection. Equipment blanks will be prepared by filling sample containers with analyte-free water that has been passed through a decontaminated sampling device. Equipment blanks will be sampled at a frequency of 1 for every 20 samples collected, using nondedicated reusable equipment and should be analyzed for the same parameters as the samples; however, certain parameters may not require equipment blanks. The results from the equipment blanks will be assessed for bias resulting from contamination. If bias is present, the usability of the associated analytical results will be further assessed and qualified, as appropriate. Table 3-3 summarizes how equipment blanks will be collected, based on the project task, if nondedicated equipment is used.

Table 3-3. Equipment Blank Sampling

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Project Task	Frequency
Routine Groundwater (GW) monitoring	One per 20 samples
ISTT Thermal Process Water	None
Investigative sampling (GW, Soil)	One per 20 samples
Investigation-derived waste	None
Air/Soil Gas/Vapor sampling	Not applicable

ISTT = in situ thermal treatment

3.8.2.2 Matrix Spike and Matrix Spike Duplicates

MS/MSDs may be used to assess the effects of sample matrix interference on the precision and accuracy of analyte recovery. MS/MSD pairs will be analyzed at a frequency of 1 pair for every 20 samples. The duplicate aliquots for MS/MSD analyses should be collected simultaneously or in immediate succession with the parent sample. They will be treated in the same manner as the parent sample during storage and shipment. The sampling locations for the MS/MSD will be documented in the field logbook. Table 3-4 lists the MS/MSD pairs that will be analyzed based upon the project task and frequencies.

Table 3-4. MS/MSD Pair Sampling

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Project Task	Frequency
Routine Groundwater monitoring	One per 20 samples
ISTT Thermal Process Water	None
Investigative sampling (GW, Soil)	One per 20 samples
Investigation-derived waste	None
Air/Soil Gas/Vapor sampling	Not applicable

3.8.2.3 Field Duplicates

Field duplicates are collected in the field from a single aliquot of sample to assess the precision and accuracy of the sampling procedures of the field team. Technically, a VOC-in-soil sample is considered a co-located sample, not a duplicate, because of the differences in homogenization; however, the term duplicate is applied here to simplify the discussion. Table 3-5 lists how field duplicates will be collected and analyzed based on the project task and frequencies.

Table 3-5. Field Duplicates

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Project Task	Frequency
Routine Groundwater monitoring	One per 10 samples
ISTT Thermal Process Water	One per 10 samples
Investigative sampling (GW, Soil)	One per 10 samples

Project Task	Frequency
Investigation-derived waste	None
Air/Soil Gas/Vapor sampling	One per 10 samples

3.8.2.4 Trip Blanks

Trip blanks should be collected to assess for possible VOC contamination that could occur during sample shipment. Trip blanks are used to assess the potential introduction of constituents from sample containers or during the transportation and storage procedures. The laboratory will provide the trip blanks. The trip blanks will consist of laboratory-grade deionized water, preserved with hydrochloric acid. One set of trip blanks will accompany each sample cooler containing one or more VOC samples. The results from the trip blanks will be assessed for bias from contamination. If bias is present, the usability of the associated analytical results will be further assessed and qualified, as appropriate. Table 3-6 summarizes how trip blanks will be submitted based on the project task and frequencies.

Table 3-6. Trip Blanks

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Project Task	Frequency
Routine Groundwater monitoring	One per cooler with VOC samples
ISTT Thermal Process Water	One per cooler with VOC samples
Investigative sampling (GW, Soil)	One per cooler with VOC samples
Investigation-derived waste	None
Air/Soil Gas/Vapor sampling	Not applicable

3.8.2.5 Ambient Blank Samples

In the rare event that site conditions may cause contamination of samples during collection, the FTL, in consultation with the project chemist and PM, may decide to collect an ambient blank. Ambient water blanks are samples of ASTM International (ASTM) Type II or deionized water, used to mimic water sample collection procedures that involve the sample exposure to ambient air, such as groundwater or surface water collection. The ambient water blanks are designed to contain airborne contaminants that may become entrained in the sample while the sample is transferred to the container. The blanks are analyzed for the analyses deemed to be potentially impacted by site conditions (such as VOCs). If field conditions are such that ambient water blanks will be collected, they should be collected at a rate of 1 for every 20 field water samples or 1 per event if fewer than 20 samples are collected.

Ambient/outdoor air samples are collected as background concentrations for indoor air sampling. They are collected in a separate certified canister and should be collected at a frequency of 1 per day of sampling per sampling area.

3.8.3 Laboratory Quality Control Samples

The contracted analytical laboratory has a QC program to assess the reliability and validity of the analyses being performed. Laboratory QC checks indicate the state of control that prevailed at the time of sample analysis. QC checks that involve field samples, such as MSs, surrogate spikes, and field duplicates, also indicate the presence of matrix effects.

All QC will be in accordance with method specifications including, but not limited to the following:

- Method blanks
- Hold time
- Initial calibrations
- Continuing calibrations
- Second-source check samples
- Instrument tuning
- LCS
- MS/MSD
- Surrogate spikes
- Post-digestion spikes and serial dilutions
- Internal standards
- Retention time window studies

A laboratory QC batch is defined as a method blank, LCS (LCSD if a MS/MSD is not analyzed), MS/MSD, or a sample duplicate, depending on the method and samples of similar matrix that are extracted or analyzed together. The number of environmental samples allowed in the laboratory QC batch is defined by the remaining time in the method-prescribed, tune period, divided by the analytical run time. Each preparation or analytical batch will be identified in such a way as to be able to associate environmental samples with the appropriate laboratory QC samples.

3.8.3.1 Method Blank

Blanks are used to monitor each preparation or analytical batch for interference and/or contamination from glassware, reagents, and other potential sources within the laboratory. A method blank is an analyte-free matrix (laboratory reagent water for aqueous samples or Ottawa sand, sodium sulfate, or glass beads [metals] for soil samples). All reagents are added in the same amount or proportions as they are added to the samples. The method blank is processed through the entire sample preparation and analytical procedures, along with the samples in the batch. There will be at least one method blank per preparation or analytical batch. If a target analyte is found at a concentration that exceeds the RL, corrective action must be performed to identify and eliminate the contamination source. All associated samples must be re-prepared and re-analyzed after the contamination source has been eliminated. No analytical data may be corrected for the concentration found in the blank.

3.8.3.2 Laboratory Control Sample

The LCS will consist of an analyte-free matrix, such as laboratory reagent water for aqueous samples or Ottawa sand, sodium sulfate, or glass beads (metals) for soil samples spiked with known amounts of analytes that come from a source different than that used for calibration standards. All target analytes specified in the QAPP will be spiked into the LCS. The spike levels will be less than or equal to the midpoint of the calibration range. If LCS results are outside the specified control limits, corrective action must be taken, including sample repreparation and re-analysis, if appropriate. If more than one LCS is analyzed in a preparation or analytical batch, the results of all LCSs must be reported. LCS recovery outside QC limits affects the accuracy for the entire batch and requires corrective action.

An LCS/LCSD pair must be prepared and analyzed If an MS/MSD or MS/Duplicate pair is not prepared and analyzed with an analytical batch, with the exception of Method TO15/TO15 SIM, as MS/MSDs are not applicable to the method.

3.8.3.3 Matrix Spike/Matrix Spike Duplicate

An MS is a sample matrix, fortified with known quantities of specific compounds. It is subjected to the same preparation and analytical procedures as the native sample. For this project, all target analytes specified in the QAPP will be spiked into the sample. MS recoveries are used to evaluate the effect of the sample matrix on the recovery of the analytes of interest. An MSD is a second fortified sample matrix. The RPD between the results of the duplicate MS measures the precision of sample results. Only project-specific samples designated on the COC form will be spiked. The spike levels will be less than or equal to the midpoint of the calibration range. MS/MSD pairs will be analyzed at a frequency of 1 pair for every 20 samples, as applicable to the method. If MS/MSD pairs are not identified on the COC, the laboratory may select another sample to be analyzed as the MS/MSD, or an LCS/LCSD pair must be prepared and analyzed with each analytical batch.

3.8.3.4 Surrogates

Surrogates are organic analytes that behave similarly to the analytes of interest but are not expected to occur naturally in the samples. They are spiked into the standards, and into the samples and QC samples before sample preparation. Recoveries of surrogates are used as an indicator of accuracy, method performance, and extraction efficiency. If surrogate recoveries are outside the specified control limits, corrective action must be taken, including sample re-preparation and/or re-analysis, if appropriate.

3.8.3.5 Internal Standards

Some methods require the use of internal standards to compensate for losses during injection or purging, or losses because of viscosity. Internal standards are compounds that have similar properties as the analytes of interest, but are not expected to occur naturally in the samples. A measured amount of the internal standard is added to the standards, and to the samples and QC samples following preparation. When the internal standard results are outside the control limits, corrective action must be taken, including sample re-analysis, if appropriate.

3.8.3.6 Laboratory Sample Duplicate

A sample duplicate selected by the laboratory is called a laboratory sample duplicate. It is subjected to the same preparation and analytical procedures as the native sample. The RPD between the results of the native sample and laboratory sample duplicate measures the precision of sample results. The data collected may also yield information regarding whether the sample matrix is homogenous or heterogeneous.

3.8.3.7 Interference Check Standards

The interference check samples are used in ICP analyses to verify background and interelement correction factors. They consist of two solutions: A and AB. Solution A contains the interfering analytes, and Solution AB contains both the analytes of interest and the interfering analytes. Both solutions are analyzed at the beginning and at the end of each analytical sequence. When the interference check samples results are outside the control limits, corrective action must be taken, including sample re-analysis, if appropriate.

3.8.3.8 Retention Time Windows

Retention time windows for gas and liquid chromatographic analyses must be established by replicate injections of the calibration standard over multiple days, as described in SW846 8000D, the analytical method, or the appropriate laboratory SOP. The absolute retention time of the calibration verification

standard at the start of each analytical sequence will be used as the centerline of the window. For an analyte to be reported as positive, its elution time must be within the retention time window.

3.8.3.9 Holding Time

The holding time requirements specified in Table 3-1 of this QAPP must be met. For methods requiring both sample preparation and analysis, the preparation holding time will be calculated from the time of sampling to the completion of preparation. The analysis holding time will be calculated from the time of completion of preparation to the time of completion of the analysis, including required dilutions, confirmation analysis, and reanalysis. For methods requiring analysis only, the holding time is calculated from the time of sampling to completion of the analysis, including required dilutions, confirmation analysis, and re-analysis. For analyses with holding times of 72 hours or less, holding times will be calculated in hours. All other holding times will be calculated in days.

3.8.3.10 Sample Dilutions

The dilution of a sample results in elevated RLs, and ultimately affects the usability of the data related to potential actions at the sampling site. It is important to minimize dilutions and maintain the lowest possible RLs. The level of the lesser dilution should be such that it will provide the lowest possible RLs without having a lasting deleterious effect on the analytical instrumentation.

When a sample exhibits characteristics of matrix interference that are identified through analytical measurement or visual observation, appropriate cleanup procedure(s) must be proven ineffective or inappropriate, before proceeding with dilution and analysis.

The laboratory will determine the most appropriate dilution for each analyte and will only report the concentration associated with that dilution. All results associated with dilutions will be clearly flagged as a dilution, and the dilution factor will be reported along with the determined concentration.

3.8.3.11 Manual Integration

The laboratory is required to provide all analysts performing methods that rely on interpretation of chromatographic data with training on appropriate software or manual integration practices. The laboratory will also make every effort to minimize the use of manual integration of data. If it is necessary to use manual integration to correct a software auto-integration error, the manual integration will be clearly identified in the instrument data. Before and after enlargements of the region of the chromatogram where the manual integration was performed will be provided on an appropriate scale that allows an independent reviewer to evaluate the need and quality of the manual integration. The analyst will also document the reason for the manual integration on the chromatogram, along with the date and their initials. The laboratory manager or their designee will approve the manual integration by dating and initialing the chromatogram.

3.9 Instrument/Equipment Testing, Inspection, Maintenance and Calibration Requirements

3.9.1 Laboratory Equipment/Instruments

Only qualified personnel will service instruments and equipment. The instrument calibration procedures are described in the analytical laboratory SOPs. The laboratory will record repairs, adjustments, and calibrations will be documented in the appropriate logbook or data sheet.

Preventive maintenance of laboratory equipment will follow guidelines established by each laboratory's SOPs for instrument inspection and maintenance. The laboratory will maintain a sufficient supply of spare parts for its instruments to minimize downtime. When possible, backup instrumentation will be available.

When practical, analytical equipment should be maintained under a service contract. Such contracts allow for preventive system maintenance and repairs on an as-needed basis. The laboratory should have sufficient trained staff to allow for the day-to-day maintenance of equipment. All laboratory instruments will be maintained according to the manufacturer's specifications and the requirements of the laboratory QAM. All maintenance activities must be documented in the logbooks to provide a history of maintenance records.

The instrument calibration procedures are described in the internal laboratory SOPs. The laboratory will file and maintain records of calibrations. These records may be subject to a QA audit. For all instruments, the laboratory will maintain trained staff to repair instruments using in-house spare parts, or will maintain service contracts with vendors.

All standards used to calibrate equipment will be traceable, directly or indirectly, to the National Institute of Standards and Technology. All standards received will be logged into standard receipt logs maintained by the individual analytical groups. Each group maintains a standards log that tracks the preparation of standards used for calibration and QC purposes.

3.9.1.1 Equipment Monitoring

On a daily basis, the operation of balances, ovens, refrigerators, and water purification systems will be checked and documented. Discrepancies will be immediately reported to the appropriate laboratory personnel for resolution. Specific laboratory preventive maintenance procedures are found in the laboratory's internal QAM.

3.9.2 Field Instruments

Field instruments are described in detailed SOPs associated with the project-specific sampling plans. The field instruments will be rented from a third party, and will be maintained and inspected by that company. During sampling activities, equipment will be calibrated onsite at least daily, or more frequently, depending on the manufacturer's recommendations or field performance questions. Physical copies of the manufacturer's manuals are included with each piece of equipment.

Calibration solutions included with the rented equipment will be verified against the manufacturer's manuals, and if deemed appropriate, will be used to calibrate instruments using factory-approved methods. The calibration methods, times, and responses will be recorded in a field logbook.
The equipment make, model, and serial number, as well as calibration solutions used will be recorded in the field logbooks at the time of calibration. The instruments include those that measure field conditions (such as pH, conductance, temperature) and health and safety conditions (photoionization detector, combustible gas indicator). Some field instruments do not have an applicable calibration procedure (such as water level indicators). These items will be evaluated and removed from service if performance issues arise.

3.10 Inspection/Acceptance Requirements for Supplies and Consumables

Subcontractor services must meet the project scope, specified levels of quality, and submittal schedule. Project contractors or vendors should have contractual arrangements with their suppliers of materials.

All purchased or rented supplies and consumables will be inspected to assure the quality and function will adhere to the standards necessary to meet all project objectives. Field equipment will be checked and calibrated (if necessary) according to documentation provided. Performance assessment (calibration, trial checks, etc.) will be documented in field logbooks and will become part of the project record. Bottles will be checked to assure the quality is sufficient to meet the analytical needs as outlined in the certificate of analysis provided with each shipment. All documentation of certified cleanliness will become part of the project files. All chemicals (ASTM water for blanks, chemical preservatives, etc.) will be inspected to confirm the required specifications to achieve project objectives are met. Inspection and acceptance requirements are the responsibility of the FTL or their designated agent.

3.11 Data Acquisition Requirements (Non-Direct Measurements)

This section identifies the types of data needed for project implementation and decision-making that are not obtained using direct measurements.

The project objectives are first identified, to assess what types of information are needed to implement a project plan to meet these proposed objectives. Typically, the data needed to achieve the project objectives include site maps, sampling location selection and sample identifiers, laboratory method selection and detection limit verification, analytical parameter lists and critical values, field measurement lists, and a project schedule.

3.12 Documentation of Records

3.12.1 Data Reporting

For this QAPP, two levels of data reporting have been defined:

- Field data and health and safety reporting—This level of minimal, or results-only, reporting is used to record field data and monitor health and safety. This is because such data do not generate or require extensive supporting documentation.
- Analytical reporting—Contract Laboratory Program (CLP)-equivalent reporting or a summary reporting format containing similar information is required for all laboratory analyses.

Portable document format (PDF) deliverables, in Level 4 (NYSDEC ASP Category B) format, containing the necessary information to perform data evaluation/data validation, are required for this project with the exception of the Microbial and IDW sampling which requires a Level II summary format; however, there may be instances where a different format is required. Changes to the report format will be documented in the project-specific workplan and laboratory SOW before sampling. The laboratory data report will be organized in a format that facilitates identification and retrieval of data. Table 3-7 summarizes the potential data formats.

3.12.1.1 Field Data Reporting

Field logbooks and tablets are used to record field sampling activities. Field logbook entries will be described with as much detail as possible so reviewers can reconstruct a particular situation without relying on field personnel memory. Modifications to field sampling protocols must be documented in the field logbook. Field data collection forms, such as purge logs, are recorded on paper forms or electronically on tablets, or both. The FTL is responsible for ensuring modifications to sampling protocols are documented.

The field logbooks to be used will be bound field survey books or notebooks. Logbooks will be assigned to the field crew but stored in a secure location when not in use. The title page of each field logbook will contain the following:

- Name of the person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- Project end date

At the beginning of each entry, the date, start time, weather, names of all sampling team members present, and signature of the person making the entry will be documented. Specific information and observations will be recorded in the field notebook or electronically on tablets during all field investigation activities. The following information will be documented:

- Names of field team members present and the level of personal protective equipment
- Names of site visitors, field sampling or investigation team personnel, and nature of their visit
- Equipment model and calibration information
- Sample locations, identification, analyses to be performed, method of collection, odor, visual descriptions, date and time of collection (including start and stop times for vapor samples)
- Sample physical data, such as purge rate, total volume removed, water levels, temperature, pH, dissolved oxygen, turbidity, specific conductance, and oxidation-reduction potential
- Management of IDW (soil cuttings, purge water, personal protective equipment)
- Miscellaneous observations regarding other nearby site activities and equipment problems/troubleshooting measures

Within field logbooks, all entries will be made in ink, and no erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and initialed. Blank or unused portions of a page will be crossed out with a single diagonal line and initialed by the field personnel. Blank pages will be noted as being intentionally blank in the same manner. If data are being collected using electronic forms, the required fields must be field out and be synchronized with the database.

Sampling will comply with the sampling procedures in the SOPs associated with the project-specific work planning documents. Sample collection equipment will be identified, along with sampling time, sample description, parameters being analyzed, and number of containers used. Unique sample ID numbers will be assigned to each sample and field duplicate sample, and will be noted in the field logbook.

The FTL or project chemist will review field data calculations, transfers, and interpretations for accuracy. The appropriate task manager will review field documentation, data reduction, and accuracy of manual/electronic data entries into the data log. The data logs and documents will be checked for the following criteria:

- General completeness
- Readability
- Use of appropriate procedures
- Whether modifications to sampling procedures are clearly stated
- Appropriate instrument calibration and maintenance records
- Reasonability of data collected
- Correctness of sample locations
- Correctness of reporting units, calculations, and interpretations

Field personnel will provide comprehensive documentation of all aspects of field sampling, field analyses, and sample COCs. This documentation constitutes a record that allows for the reconstruction of all field events to aid in the data review and interpretation process. All documents, records, and information relating to the performance of the fieldwork will be retained in the project file.

3.12.1.2 Laboratory Data Reporting

Data reduction will be done manually or using appropriate application software. Quantitation procedures specified for each method must be followed. Calculations for analyses are based on regression analyses of calibration curves. Regression analysis is used to fit a curve through calibration standard data. Sample concentrations are calculated using the resulting regression equations. If data are reduced manually, the documentation must include the formulas used. Application software used for data reduction must have been previously verified by the laboratory for accuracy. Documentation of the software's verification must be maintained on file in the laboratory. All documentation of data reduction must allow the recreation of the calculations.

When possible, analytical data will be transferred directly from the instrument to a computerized data system. Raw data will be stored electronically, and a hard copy file will be maintained. The laboratory data entered will be sufficient to document information used to arrive at reported values.

All data will undergo at least two levels of review at the laboratory before they are released. The analyst performing the tests initially will review 100 percent of the data. After the analyst's review has been completed, 100 percent of the data will be reviewed independently by a senior analyst or by the section supervisor for accuracy, compliance with calibration, and QC requirements, holding time compliance, and completeness. Analyte identification and quantitation must be verified. Calibration and QC results will be compared with the applicable control limits. RLs should be reviewed to make sure they meet the project objectives. The results of multiple dilutions should be reviewed for consistency. Discrepancies must be resolved and corrected. Laboratory qualifiers will be applied when there are nonconformances that could potentially affect data usability. These qualifiers must be properly defined as part of the deliverables. All issues relevant to the quality of the data must be addressed in a case narrative. A copy of the data package will be filed in the project file.

Electronic data storage will be used when possible. All electronic data will be maintained in a manner that prevents inadvertent loss, corruption, and inappropriate alteration. Electronic data will be accessible and retrievable for a period of 5 years after project completion by the laboratory.

Raw data will be examined to assess compliance with QC guidelines. Surrogate, MS, and QC check sample recoveries will be checked. In addition, samples and laboratory blanks will be checked for possible contamination or interferences. Chromatograms and concentrations will be checked to ensure that sample results are within the calibration range; if necessary, dilutions will be performed as defined by the initial calibration range.

Deviations from guidelines will call for corrective action. Deviations determined to be caused by factors outside the laboratory's control, such as matrix interference, will be noted with an explanation in the report narrative. Calculations will be checked and the report reviewed for errors and oversights. The PDF and electronic laboratory reports for samples and analyses will contain the information necessary to perform data evaluation.

Table 3-7. Data Package Deliverables

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

All Analytical Fractions					
Case Narrative – A detailed case narrative per analytical fraction is required and will include explanation of noncompliance and/or exceptions and corrective action. Exceptions will be noted for receipt, holding times, methods, preparation, calibration, blanks, spikes, surrogates (if applicable), and sample exceptions.					•
Sample ID Cross-reference Sheet (Laboratory IDs and Client IDs)					•
Completed COC and sample receipt information					•
Sample preparation (extraction/digestion) logs					•
Copies of nonconformance memos and corrective actions					•
Form[a]	**GC/MS Organic Fractions**	**Level I**	**Level II**	**Level III**	**Level IV**
1	Sample results	•	•	•	• + raw
2	Surrogate Recovery Summary (w/ applicable control limits)	•	•	•	•
3	MS/MSD Accuracy & Precision Summary[b]		•	•	• + raw
3	LCS Accuracy Summary		•	•	• + raw
4	Method Blank Summary		•	•	• + raw
5	Instrument Tuning Summary (including tuning summary for applicable initial calibrations)			•	•
6	Initial Calibration Summary (including concentration levels of standards)			•	• + raw
7	Continuing Calibration Summary			•	• + raw
8	Internal Standard Summary (including applicable initial calibrations)			•	•
Form[a]	**GC/HPLC Organic Fractions**	**Level I**	**Level II**	**Level III**	**Level IV**
1	Sample results	•	•	•[c]	• + raw
2	Surrogate Recovery Summary (w/ applicable control limits)	•	•	•	•
3	MS/MSD Accuracy & Precision Summary[b]		•	•	• + raw
3	LCS Accuracy Summary		•	•	• + raw

All Analytical Fractions					
4	Method Blank Summary		•	•	• + raw
6	Initial Calibration Summary (including concentration levels of standards) [c]			•	• + raw
7	Continuing Calibration Summary[a]			•	• + raw
7	Degradation Summary (Organochlorine Pesticides only) [c]			•	• + raw
8	Analytical Sequence (including internal standard area performance where applicable) [c]			•	•
10	Compound Identification Summary (where confirmation required) [c]			•	•
Form[a]	**Metals Inorganic Fractions**	**Level I**	**Level II**	**Level III**	**Level IV**
1	Sample Results	•	•	•	• + raw
2A	Initial and Continuing Calibration Summary			•	• + raw
3	Initial and Continuing Calibration Blanks and Method Blanks Summary		•	•	• + raw
4	Interference Check Standard Summary			•	• + raw
5A	Pre-digestion MS Recoveries Summary		•	•	• + raw
5B	Post-digestion Spike Recoveries Summary			•	• + raw
6	Native Duplicate or MS/MSD Precision Summary[b]		•	•	• + raw
7	LCS Recovery Summary		•	•	• + raw
8	Method of Standard Addition (if necessary)			•	• + raw
9	Serial Dilution			•	• + raw
10	Instrument or MDL Summary			•	•
11	ICP Interelement Correction Factors			•	•
12	Linear Range Summary			•	•
13	Preparation Log Summary			•	• + raw
14	Analytical Run Sequence and GFAA Post-spike Recovery Summary			•	• + raw

All Analytical Fractions					
Form[a]	**General Chemistry Fractions: (Includes potentiometric, gravimetric, colorimetric, and titrimetric analytical techniques. Examples, TPH (418.1), TOC, etc.)**	**Level I**	**Level II**	**Level III**	**Level IV**
1	Sample Results	•	•	•	• + raw
2A	Initial and Continuing Calibration Summary			•	• + raw
3	Initial and Continuing Calibration Blanks and Method Blanks Summary		•	•	• + raw
5A	Pre-digestion MS Recoveries Summary		•	•	• + raw
6	Native Duplicate or MS/MSD Precision Summary[b]		•	•	• + raw
7	LCS Recovery Summary		•	•	• + raw
10	Instrument or MDL Summary			•	•

[a] CLP Form or summary form with equivalent information

[b] With RPD calculated according to method specifications (CLP using % recovery, SW-846 using concentration)

[c] including deliverables for primary and confirmation analysis (where applicable)

3.12.2 Electronic Analytical Record Format

Concurrently with the submittal of the PDF deliverables, the laboratory will deliver electronic data in the Dow EQuIS or Jacobs LabSpec7 format (or both), as defined in Appendix B. There must not be discrepancies between the PDF reports and the electronic reports. The required format will be specified in the project-specific SOW.

3.12.3 Project Record Maintenance and Storage

This section describes how project records will be stored and maintained. Each project team member is responsible for filing all project information or providing it to the administrative assistant familiar with the project filing system. Individual team members may maintain separate files or notebooks for individual tasks, but must provide such files to a storage location when each task is complete.

Project files may include the following types of documentation, among others:

- Correspondence
- Non-laboratory project invoices and approvals by vendor
- Original unbound reports
- Non-laboratory requests for proposal, bids, contracts, and SOWs
- Field data
- Data evaluation and calculations
- Site reports from others
- Photographs
- Insurance documentation
- Laboratory analytical data and associated documents and memoranda
- Regulatory submittals, licensing, and permitting applications
- Site and reference material
- Health, safety, and environment plans
- Figures and drawings
- Project instructions
- Work plans

3.13 Data Management

Data management entails storing, handling, accessing, and securing data collected during the project. Data will be consolidated and compiled into a project database that can be used to support project data reporting and exports. The following sections describe the project's data management process.

3.13.1 Archiving

PDF and other electronic versions of documentation will be archived in project files and on electronic archive tapes either for the duration of the project, 10 years, or as specified in contractual agreements.

3.13.2 Data Flow and Transfer

The data flow from the laboratory and field to the project staff and data users will be sufficiently documented to ensure data are properly tracked, reviewed, and validated for use.

3.13.3 Record Keeping

In addition to the data management procedures outlined in Section 3.13 for analytical data, the laboratory will ensure it maintains sufficient electronic and hard copy records to recreate each analytical event. The minimum records the laboratory will keep will contain the following components:

- Raw data, including instrument printouts, bench work sheets, or chromatograms with compound ID and quantitation reports
- Laboratory-specific SOPs for each analytical method and QA/QC function in place project samples were analyzed

3.13.4 Project-Specific Database

The project-specific database uses an EQuIS program suite, which is based on Structured Query Language to build forms and report formats. The database is based on a relational model, where independent tables containing fields of data can be linked through selected fields that are common to two or more tables. This database design allows the inclusion of the historical data and allows users to effectively conduct trend analysis and generate a variety of data reports to aid in data interpretation and report generation. Earthsoft's EQuIS Environmental Data Management System database technology will be used for the storage, maintenance, analysis, and reporting of location, field sample, field chemistry, analytical, and hydrogeological data.

The database must be protected from unauthorized access, tampering, accidental deletions or additions, and data or program losses that can result from power outages or hardware failure.

- Users will access the database through Dow's EQuIS server to minimize possible database corruption by data users.

3.13.5 Project File

The final project file will be the central repository for all documents that constitute evidence relevant to sampling and analysis activities. Jacobs is the custodian of the project file and maintains the contents of the evidence files for the project in a secured, limited access area, including all relevant records, reports, logs, field notebooks, pictures, contractor reports, and data reviews.

Jacobs will keep records until project completion and closeout. If necessary, records may be transferred to an offsite records storage facility. The records storage facility must provide secure, access-controlled storage of records. The laboratory will keep analytical laboratory data per their master service agreement with Dow, following submittal to Jacobs.

4. Assessment and Oversight

4.1 Assessments and Response Actions

Field and laboratory assessments are performed to assess technical and procedural compliance with this QAPP. Performance and system audits are key to ensuring this compliance by:

- Confirming appropriate documents are properly completed and are kept current and orderly.
- Ensuring measurement systems are accurate.
- Identifying nonconformances or deficiencies and initiating necessary corrective actions.
- Verifying the field and laboratory QA procedures in this QAPP are properly followed and completed.

The project chemist and laboratory QA manager are responsible for ensuring conformance with the QAPP. The FTL is responsible for ensuring conformance with field QA/QC requirements. The audited activities will be evaluated against specified requirements, which may include an evaluation of the method, procedures, and instructions. Documents and records will be examined, as necessary, to evaluate whether the QA program is effective and properly implemented. Reports and recommendations must be prepared on all audits and submitted to the laboratory QA manager for retention in the project files.

4.1.1 Field Audits

QA audits may be scheduled to verify activities are being performed efficiently and in conformance with approved plans, standards, federal and state regulatory requirements, sound scientific practices, and contractual requirements. Planned and scheduled audits may be performed to verify compliance with aspects of the QA program and to evaluate the effectiveness of the QA program. Audits include an objective examination of work areas, activities and processes; a review of documents and records; interviews with project personnel; and a review of plans and standards.

The sampling program will undergo internal reviews after each sampling event by the FTL or designee. They will pay particular attention to the sampling program with respect to representativeness, comparability, and completeness of the specific measurement parameters involved.

The FTL or their designee will review field documentation (COC forms, field daily sheets, logbooks) as it is generated (daily, weekly) for accuracy, completeness, and compliance with QAPP requirements. The FTL or designee will check for the following criteria:

- Sampling protocols are being followed.
- Samples are placed in proper containers.
- Samples are stored and transported properly.
- Field documentation is complete and accurate.

4.1.2 Field Corrective Action

Project team members may initiate a field corrective action process. The corrective action process consists of identifying a problem, acting to eliminate the problem, monitoring the effectiveness of the corrective action, verifying the problem has been eliminated, and documenting the corrective action.

Corrective actions include correcting COC forms; problems associated with sample collection, packaging, shipping, field record keeping; or additional training in sampling and analysis. Additional approaches may include resampling or evaluating and amending sampling procedures. The QM or their designee will

summarize the problem, establish possible causes, and designate the person responsible for a corrective action. The QM will verify the initial action has been taken and evaluate whether it appears to be effective. The QM will also follow up to confirm the problem has been resolved.

Technical staff and project personnel will be responsible for reporting suspected technical or QA nonconformances or suspected deficiencies to the QM or their designee. The QM or their designee will be responsible for assessing suspected problems in consultation with the PM or their designee and the PC, as to whether the situation affects data quality.

The QM or their designee will be responsible for ensuring that corrective action for nonconformances are initiated by taking the following actions:

- Evaluating all reported nonconformances
- Controlling additional work on nonconforming items
- Selecting disposition or action to be taken
- Maintaining a log of nonconformances
- Reviewing nonconformance reports and corrective actions taken
- Ensuring nonconformance reports are included in the final documentation in the project files

4.1.3 Laboratory Audits

The laboratory QA manager may conduct internal system audits. An internal audit is a qualitative evaluation of all components of the laboratory QC measurement system. The audit serves to determine whether all measurement systems are being used appropriately. The system audits are conducted to evaluate the following components:

- Sample handling procedures
- Calibration procedures
- Analytical procedures
- QC results
- Safety procedures
- Record keeping procedures
- Timeliness of analysis and reporting

Laboratories may also be subject to external audits as deemed necessary. Laboratory audits may be performed by the client or project chemist before analyses begin for this project and at any time during the project. The focus of these audits is to assess general laboratory practices and conformance with the QAPP.

The laboratory QA manager will review internal laboratory performance and will evaluate laboratory precision and accuracy by comparing the results of duplicate samples, QC samples, spikes, and blanks. When a beyond-control-limit situation is encountered, the laboratory manager or other client services will check the analytical results prior to distribution.

4.1.4 Laboratory Corrective Actions

Corrective actions may be required for three classes of problems: sampling problems, analytical/equipment problems, and noncompliance problems. Sampling problems may occur during sampling, sample handling, or sample shipment. Analytical/equipment problems may occur during sample preparation, laboratory instrumental analysis, or data review.

For noncompliance problems, a corrective action program will be developed if it is not already in place, and will be implemented at the time the problem is identified. The person who identifies the problem will

be responsible for notifying the proper project member. If the problem is analytical in nature, information about these problems will be communicated to the laboratory PM and the QA manager, who will direct information to the appropriate project members. The implementation of corrective action will be confirmed through similar channels.

The implementation of all corrective actions will be documented. No staff member will initiate corrective action without prior communication regarding the action needing correction and proposed corrective action through the proper channels. If corrective actions are insufficient, the PM or the QA manager may issue a stop work order.

Corrective actions are required when an out-of-control event or potential out-of-control event is noted. The investigative action depends somewhat on the analysis and the event. Laboratory personnel are alerted that corrective actions may be necessary if the following issues occur:

- QC data are outside the warning or acceptable windows for precision and accuracy.
- Blanks contain target analytes exceed acceptable levels.
- Undesirable trends are detected in spike recoveries or RPD between duplicates.
- Unusual changes occur in detection limits.
- Inquiries are received concerning data quality.
- The laboratory QA manager detects deficiencies during internal or external audits or based on the results of performance evaluation samples.

Corrective action procedures are often handled at the bench level by the analyst, who reviews preparation or extraction procedures for possible errors and checks instrument calibrations, spike and calibration mixes, and instrument sensitivity. If problems persist or cannot be identified, matters are referred to the laboratory supervisor, laboratory PM, or laboratory QA manager for further investigation. Once resolved, full documentation of the corrective action procedures is filed with the laboratory QA manager after approval by Jacobs. Corrective action may include the following tasks:

- Resampling and analyzing the data
- Evaluating and amending sampling procedures
- Evaluating and amending analytical procedures
- Accepting data and acknowledging the level of uncertainty
- Reanalyzing the samples, if sample or extract volume is adequate and holding time criteria permits

If resampling is deemed necessary because of laboratory problems, the PM must identify the appropriate approach, including cost recovery from the laboratory, for the additional sampling effort.

4.2 Reports to Management

If audits are conducted, the reports will be submitted to the PM or project chemist, to address QA issues or proposed corrective actions to maintain QA standards. The audit reports and applicable corrective action reports will be retained in the project file.

5. Data Validation and Usability

5.1 Data Review, Validation, and Verification Requirements

Data review and validation are processes whereby data generated in support of this project are reviewed against the QA/QC requirements. The data are evaluated for precision and accuracy against the analytical protocol requirements. Nonconformances or deficiencies that could affect the usability of data are identified as noted. The effect on the result is then considered when assessing whether the result is sufficient to achieve DQOs. Deficiencies discovered as a result of data verification, review, and/or validation, as well as corrective actions implemented in response, may be documented and submitted in the form of a written report per the project-specific work plans.

5.2 Verification and Validation Methods

5.2.1 Data Verification

Before the laboratory releases the analytical results, both the sample and QC data will be reviewed carefully to verify the sample identity, instrument calibration, detection limits, dilution factors, numerical computations, transcription accuracy, and chemical interpretations. The QC data will also be reduced, and spike recoveries will be included in control charts, and the resulting data will be reviewed to ascertain whether they are within the laboratory-defined limits for accuracy and precision. Nonconforming data will be discussed in the data package cover letter and case narrative. The laboratory will retain all analytical and QC documentation associated with each data package per the MSA with Dow.

As discussed previously, the data are also verified to assess whether the EDDs and the PDF data deliverables are consistent with one another to ensure an accurate database.

5.2.2 Data Validation

Depending on the project-specific objectives, the analytical results of the data collection effort will be validated by Jacobs. Personnel involved in data validation will be independent of any data generation effort. The project chemist will be responsible for overseeing the data validation effort. Data will be validated when the data packages are received from the laboratory. Project-specific planning documents will specify which samples require data validation and the extent of that validation. The validation will be performed on an analytical batch basis using the summary results of calibration and laboratory QC, as well as those of the associated field samples.

In general, four levels of validation correspond to the reports described in Table 3-7. Data requiring validation, as identified in the project-specific workplans, will undergo a Level 3-type validation unless otherwise noted in the project-specific planning documents. Data associated with IDW, microbial, and process sampling (water/vapor) will not be validated, unless otherwise noted.

- **Level 1 –** Verification that samples were analyzed for the methods requested and review of the data for outliers and anomalies.
- **Level 2–** Verification that samples were analyzed for the methods requested; review of the laboratory case narrative for events in the laboratory that affect the accuracy or precision of the data; review of QC indicator data, including method blank, LCS/LCSD, MS/MSD and surrogate recoveries. Finally, a quantitative review of the data will be performed by checking for items such as verifying total concentrations are greater than dissolved concentrations.

- **Level 3 –** Validation of the analytical data, without a review of raw data or analyte verification. Data validation procedures will include the following:
  - Review of the data package for completeness
  - Review of COC records for discrepancies that might degrade data quality
  - Review of the data for compliance with holding time and QC frequency requirements
  - Evaluation of all calibration and QC summary results against the project requirements
  - Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations
  - Initiation of corrective actions, as necessary, based on the data review findings
- **Level 4 –** Validation of the analytical data, as described above for Level 3, including a review of the analytical raw data.

Data validation will be patterned after the *Contract Laboratory National Functional Guidelines for Organic Superfund Methods Data Review* (EPA 2020a), *Contract Laboratory National Functional Guidelines for Inorganic Superfund Methods Data Review* (EPA 2020b), or most current version, substituting method criteria, as applicable, and using the criteria in this QAPP. The QC requirements specified here will take precedence over the functional guidelines. When no specific guidance exists, method requirements will be used.

Laboratory qualifying flags are included on the data summary forms (Form I) that are submitted to the project by the laboratory. During the data review and validation process, the laboratory qualifying flags are reviewed, along with the project-specific validation flags, to determine the final project qualifier applied to the data. Data qualifier flags, if required, are defined as follows and will be applied to the sample results. If multiple validation flags are required for a result, the most severe flag will be applied to the result.

- **U** The analyte was analyzed for, but was not detected exceed the reported sample quantitation limit, or was qualified as not detected due to blank contamination.
- **UJ** The analyte was not detected exceeding the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- **J** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- **R** The sample result was rejected due to serious deficiencies in the ability to analyze the sample and meet the QC criteria. The presence or absence of the analyte could not be verified (note, the analyte or compound may or may not be present).

A data quality evaluation (DQE) report will be generated, documenting the validation and submitted to the PM per project-specific requirements.

5.3 Reconciliation of Validated Data with Data Quality Objectives

The final data validation activity is to assess the usability of the data, based on an evaluation of the validation findings in context of the overall project decisions or objectives. The assessment is used to determine whether the data meet the planned DQOs for the specific project. Both the sampling and analytical activities must be considered, with the goal of assessing whether the final, qualified results support the decisions to be made with the data.

The final results, as adjusted for the findings of data validation and data evaluation, will be checked against the DQOs, and an assessment will be made as to whether the data are of sufficient quality to support them. The decision as to data sufficiency may be affected by the overall precision, accuracy, and completeness of the data as demonstrated by the data validation process. If the data are sufficient to achieve project objectives, the PM will release the data and work may proceed. If not, corrective action will be required.

The data usability of the analytical results will be documented in the DQE report, which will be submitted as described in the project-specific plans. In addition, the overall data usability for project decisions, including limitations, will be documented and submitted, as described in the project-specific plans.

6. References

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Appendix A.
Analytical Method Requirements

Table A-1. Volatile Organic Compounds in Groundwater by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC Water Quality[a] (µg/L)	NYSDEC Surface Water Quality[b] (µg/L)	Method Detection Limit[c] (µg/L)	Reporting Limit[c] (µg/L)
1,1,1,2-Tetrachloroethane	630-20-6	5	--	0.7	2.5
1,1,1-Trichloroethane	71-55-6	5	--	0.7	2.5
1,1,2,2-Tetrachloroethane	79-34-5	5	--	0.17	0.5
1,1,2-Trichloroethane	79-00-5	1	--	0.5	1.5
1,1-Dichloroethane	75-34-3	5	--	0.7	2.5
1,1-Dichloroethene	75-35-4	5	--	0.17	0.5
1,1-Dichloropropene	563-58-6	5	--	0.7	2.5
1,2,3-Trichlorobenzene	87-61-6	5	5[d]	0.7	2.5
1,2,3-Trichloropropane	**96-18-4**	**0.04**	--	**0.7**	**2.5**
1,2,4-Trichlorobenzene	120-82-1	5	5[d]	0.7	2.5
1,2,4-Trimethylbenzene	95-63-6	5	33	0.7	2.5
1,2-Dibromo-3-chloropropane	**96-12-8**	**0.04**	--	**0.65**	**2.5**
1,2-Dibromoethane	**106-93-4**	**0.0006**	--	**0.65**	**2**
1,2-Dichlorobenzene	95-50-1	3	5[e]	0.7	2.5
1,2-Dichloroethane	107-06-2	0.6	--	0.13	0.5
1,2-Dichloropropane	78-87-5	1	--	0.14	1
1,3,5-Trimethylbenzene	108-67-8	5	--	0.7	2.5
1,3-Dichlorobenzene	541-73-1	3	5[e]	0.7	2.5
1,3-Dichloropropane	142-28-9	5	--	0.7	2.5
1,4-Dichlorobenzene	106-46-7	3	5[e]	0.7	2.5
1,4-dioxane	**123-91-1**	**0.35**	**18,000**	**61**	**250**
2,2-Dichloropropane	594-20-7	5	--	0.7	2.5
2-Butanone	78-93-3	50	--	1.9	5
2-Chlorotoluene	95-49-8	5	--	0.7	2.5
2-Hexanone	591-78-6	50	--	1	5
4-Chlorotoluene	106-43-4	5	--	0.7	2.5
4-Methyl-2-pentanone	108-10-1	--	--	1	5

Table A-1. Volatile Organic Compounds in Groundwater by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC Water Quality[a] (µg/L)	NYSDEC Surface Water Quality[b] (µg/L)	Method Detection Limit[c] (µg/L)	Reporting Limit[c] (µg/L)
Acetone	67-64-1	50	--	1.5	5
Benzene	71-43-2	1	10	0.16	0.5
Bromobenzene	108-86-1	5	--	0.7	2.5
Bromochloromethane	74-97-5	5	--	0.7	2.5
Bromodichloromethane	75-27-4	50	--	0.19	0.5
Bromoform	75-25-2	50	--	0.65	2
Bromomethane	74-83-9	5	--	0.7	2.5
Carbon disulfide	75-15-0	60	--	1	5
Carbon tetrachloride	56-23-5	5	--	0.13	0.5
Chlorobenzene	108-90-7	5	5	0.7	2.5
Chloroethane	75-00-3	5	--	0.7	2.5
Chloroform	67-66-3	7	--	0.7	2.5
Chloromethane	74-87-3	5	--	0.7	2.5
cis-1,2-Dichloroethene	156-59-2	5	--	0.7	2.5
cis-1,3-Dichloropropene	*10061-01-5*	*0.4*	--	*0.14*	*0.5*
Dibromomethane	74-95-3	5	--	1	5
Dibromochloromethane	124-48-1	50	--	0.15	0.5
Dichlorodifluoromethane (Freon-12)	75-71-8	5	--	1	5
Ethylbenzene	100-41-4	5	17	0.7	2.5
Hexachlorobutadiene	**87-68-3**	**0.5**	**0.01**	**0.7**	**2.5**
Isopropylbenzene	98-82-8	5	2.6	0.7	2.5
m- and p-Xylene	179601-23-1	5	65[f]	0.7	2.5
Methyl-tert-butyl ether (MTBE)	1634-04-4	10	--	0.17	2.5
Methylene chloride	75-09-2	5	200	0.7	2.5
n-Butylbenzene	104-51-8	5	--	0.7	2.5
n-Propylbenzene	103-65-1	5	--	0.7	2.5

Table A-1. Volatile Organic Compounds in Groundwater by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC Water Quality[a] (µg/L)	NYSDEC Surface Water Quality[b] (µg/L)	Method Detection Limit[c] (µg/L)	Reporting Limit[c] (µg/L)
Naphthalene	91-20-3	10	13	0.7	2.5
o-Xylene	95-47-6	5	65[f]	0.7	2.5
p-Isopropyltoluene	99-87-6	5	--	0.7	2.5
sec-Butylbenzene	135-98-8	5	--	0.7	2.5
Styrene	100-42-5	5	--	0.7	2.5
tert-Butylbenzene	98-06-6	5	--	0.7	2.5
Tetrachloroethene	127-18-4	5	1	0.18	0.5
Toluene	108-88-3	5	100	0.7	2.5
trans-1,2-Dichloroethene	156-60-5	5	--	0.7	2.5
trans-1,3-Dichloropropene	*10061-02-6*	*0.4*	--	*0.16*	*0.5*
Trichloroethene	79-01-6	5	40	0.18	0.5
Trichlorofluoromethane(Freon-11)	75-69-4	5	--	0.7	2.5
Vinyl acetate	108-05-4	--	--	1	5
Vinyl chloride	75-01-4	2	--	0.07	1

[a] New York State Department of Environmental Conservation (NYSDEC) Ambient Water Quality Standards for GA groundwater. June 1998, April 2000 Addendum and February 2023 Addendum.

[b] New York State Department of Environmental Conservation (NYSDEC) Guidance Values for Class C Surface Water. June 1998, April 2000 Addendum and February 2023 Addendum

[C] PACE Alpha Analytical Laboratory Method Detection Limits and Reporting Limits

[d] Applies to sum of 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and 1,3,5-trichlorobenzene isomers

[e] Applies to sum of 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene isomers

[f] Applies to sum of 1,2-xylene, 1,3-xylene, and 1,4-xylene isomers

Analytes where both the MDL and RL exceed the NYSDEC Ambient Water Quality Standards or Surface Water criteria are **bolded**.

Analytes where the RL exceed the NYSDEC Ambient Water Quality Standards or Surface Water criteria are *italicized.*

µg/L = microgram(s) per liter

-- = not applicable

Table A-2. Volatile Organic Compounds in Soils by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC SCO[a] Screening Criteria (µg/kg)	Method Detection Limit[b] (µg/kg)	Reporting Limit[b] (µg/kg)
1,1,1,2-Tetrachloroethane	630-20-6	--	0.132	0.5
1,1,1-Trichloroethane	71-55-6	680	0.167	0.5
1,1,2,2-Tetrachloroethane	79-34-5	600	0.166	0.5
1,1,2-Trichloroethane	79-00-5	--	0.267	1
1,1-Dichloroethane	75-34-3	270	0.145	1
1,1-Dichloroethene	75-35-4	330	0.238	1
1,1-Dichloropropene	563-58-6	--	0.159	0.5
1,2,3-Trichlorobenzene	87-61-6	--	0.322	2
1,2,3-Trichloropropane	96-18-4	340	0.127	2
1,2,4-Trichlorobenzene	120-82-1	3,400	0.272	2
1,2,4-Trimethylbenzene	95-63-6	3,600	0.334	2
1,2-Dibromo-3-chloropropane	96-12-8	--	0.998	3
1,2-Dibromoethane	106-93-4	--	0.279	1
1,2-Dichlorobenzene	95-50-1	1,100	0.144	2
1,2-Dichloroethane	107-06-2	20	0.257	1
1,2-Dichloropropane	78-87-5	--	0.125	1
1,3,5-Trimethylbenzene	108-67-8	8,400	0.193	2
1,3-Dichlorobenzene	541-73-1	2,400	0.148	2
1,3-Dichloropropane	142-28-9	300	0.167	2
1,4-Dichlorobenzene	106-46-7	1,800	0.171	2
1,4-Dioxane	123-91-1	100	35.1	80
2,2-Dichloropropane	594-20-7	--	0.202	2
2-Butanone	78-93-3	120	2.22	10
2-Chlorotoluene	95-49-8	--	0.191	2
2-Hexanone	591-78-6	--	1.18	10
4-Chlorotoluene	106-43-4	--	0.108	2
4-Methyl-2-pentanone	108-10-1	1,000	1.28	10
Acetone	67-64-1	50	4.811	10
Benzene	71-43-2	60	0.166	0.5

Table A-2. Volatile Organic Compounds in Soils by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC SCO[a] Screening Criteria (µg/kg)	Method Detection Limit[b] (µg/kg)	Reporting Limit[b] (µg/kg)
Bromobenzene	108-86-1	--	0.145	2
Bromochloromethane	74-97-5	--	0.205	2
Bromodichloromethane	75-27-4	--	0.109	0.5
Bromoform	75-25-2	--	0.246	4
Bromomethane	74-83-9	--	0.581	2
Carbon disulfide	75-15-0	2,700	4.55	10
Carbon tetrachloride	56-23-5	760	0.23	1
Chlorobenzene	108-90-7	1,100	0.127	0.5
Chloroethane	75-00-3	1,900	0.452	2
Chloroform	67-66-3	370	0.14	1.5
Chloromethane	74-87-3	--	0.932	4
cis-1,2-Dichloroethene	156-59-2	250	0.175	1
cis-1,3-Dichloropropene	10061-01-5	--	0.158	0.5
Chlorodibromomethane	124-48-1	--	0.14	1
Dibromomethane	74-95-3	--	0.238	2
Dichlorodifluoromethane	75-71-8	--	0.915	10
Ethylbenzene	100-41-4	1,000	0.141	1
Hexachlorobutadiene	87-68-3	--	0.169	4
Isopropylbenzene	98-82-8	2,300	0.109	1
m-,p-Xylene	179601-23-1	260	0.56	2
Methylene chloride	75-09-2	50	2.29	5
Methyl t-Butyl Ether (MTBE)	1634-04-4	930	0.201	2
n-Butylbenzene	104-51-8	12,000	0.167	1
n-Propylbenzene	103-65-1	3,900	0.171	1
Naphthalene	91-20-3	12,000	0.65	4
o-Xylene	95-47-6	260	0.291	1
p-Isopropyltoluene	99-87-6	10,000	0.109	1
sec-Butylbenzene	135-98-8	11,000	0.146	1
Styrene	100-42-5	--	0.196	1

Table A-2. Volatile Organic Compounds in Soils by Method SW8260

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDEC SCO[a] Screening Criteria (µg/kg)	Method Detection Limit[b] (µg/kg)	Reporting Limit[b] (µg/kg)
tert-Butylbenzene	98-06-6	5,900	0.118	2
Tetrachloroethene	127-18-4	1,300	0.196	0.5
Toluene	108-88-3	700	0.543	1
trans-1,2-Dichloroethene	156-60-5	190	0.137	1.5
trans-1,3-Dichloropropene	10061-02-6	--	0.273	1
Trichloroethene	79-01-6	470	0.137	0.5
Trichlorofluoromethane	75-69-4	--	0.695	4
Vinyl acetate	108-05-4	--	2.15	10
Vinyl chloride	75-01-4	20	0.335	1

[a] NYSDEC Soil Cleanup Objectives for Unrestricted Use (NYSDEC 2006, 2010), Restricted Use Protection of Groundwater (NYSDEC 2010) and Supplemental Soil Cleanup Objectives Protection of Groundwater (NYSDEC, 2010a).

[b] PACE Alpha Analytical Method Detection Limits and Reporting Limits

µg/kg = microgram(s) per kilogram

-- = not applicable

Table A 3 Polychlorinated Biphenyls by SW8082

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	Method Detection Limit[a] (µg/L)	Reporting Limit[a] (µg/L)
Aroclor 1016	12674-11-2	0.0128	0.071
Aroclor 1221	11104-28-2	0.0153	0.071
Aroclor 1232	11141-16-5	0.0153	0.071
Aroclor 1242	53469-21-9	0.0153	0.071
Aroclor 1248	12672-29-6	0.0153	0.071
Aroclor 1254	11097-69-1	0.0153	0.071
Aroclor 1260	11096-82-5	0.0153	0.071
Aroclor 1262	37324-23-5	0.0153	0.071
Aroclor 1268	11100-14-4	0.0153	0.071
PCBs, Total	1336-36-3	0.0153	0.071

[a] PACE Alpha Analytical Method Detection Limits and Reporting Limits

µg/L = microgram(s) per liter

PCB = polychlorinated biphenyl

Table A- 4 General Chemistry Parameters by Various Methods

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Method	Parameter	CAS Number	Units	NYSDEC Water Quality[a]	NYSDEC Surface Water Quality[b] (µg/L)	Method Detection Limit[c]	Reporting Limit[c]
SW6020	Calcium	7440-70-2	mg/L	--	--	0.0394	0.1
SW6020	Iron	7439-89-6	mg/L	0.3	0.3	0.0191	0.05
SW6020	Magnesium	7439-95-4	mg/L	35	--	0.0242	0.07
SW6020	Manganese	7439-96-5	mg/L	0.3	0.3	0.00044	0.001
SW6020	Potassium	7440-09-7	mg/L	--	--	0.0309	0.1
SW6020	Sodium	7440-23-5	mg/L	--	--	0.0293	0.5
RSK-175	Methane	74-82-8	µg/L	--	--	5	10
RSK-175	Ethane	74-84-0	µg/L	--	--	3	13
RSK-175	Ethene	74-85-1	µg/L	--	--	3	13

Table A- 4 General Chemistry Parameters by Various Methods

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Method	Parameter	CAS Number	Units	NYSDEC Water Quality[a]	NYSDEC Surface Water Quality[b] (µg/L)	Method Detection Limit[c]	Reporting Limit[c]
RSK-175	Acetylene	Acetylene	µg/L	--	--	6	21
SM 2320B	Total Alkalinity	471-34-1	mg CaCO3/L	--	--	--	0.1
SM 2540C	Total Dissolved Solids	TDS	mg/L	--	--	3.07	10
SM5310	Total Organic Carbon	7440-44-0	mg/L	--	--	0.097	0.5
EPA 300.0	Chloride	16887-00-6	mg/L	250	--	0.0839	0.5
EPA 300.0	Sulfate	14808-79-8	mg/L	250	--	0.454	1
EPA 300.0	Nitrate	14797-55-8	mg/L	10	--	0.0128	0.05
QuantArray-Chlor (DNA)	Quant Array Chlorinated	--	Cells/mL	--	--	--	0.25
QuantArray-BGC (DNA)	Quant Array Bio-Geochemical	--	Cells/mL	--	--	--	0.25

[a] New York State Department of Environmental Conservation (NYSDEC) Ambient Water Quality Standards for GA groundwater. June 1998, April 2000 Addendum and February 2023 Addendum.

[b]New York State Department of Environmental Conservation (NYSDEC Guidance Values for Class C Surface Water. June 1998, April 2000 Addendum and February 2023 Addendum.

[c] PACE Alpha Analytical Laboratory Method Detection Limits and Reporting Limits with the exception of RSK-175 and QuantArray-Chlor, which are subcontracted to PACE National and Microbial Insights.

µg/L = microgram(s) per liter

-- = not applicable

$CaCO_3$/L = calcium carbonate per liter

cells/mL = cells per milliliter

DNA = deoxynucleic acid

mg/L = milligram(s) per liter

Table A-5. Volatile Organic Compounds in Indoor/Outdoor Air by Method TO-15 SIM

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDOH Indoor/Ambient Screening Criteria-[a] ($\mu g/m^3$)	NYSDOH Indoor/Ambient Screening Criteria-[b] ($\mu g/m^3$)	NYSDOH Indoor/Ambient Screening Criteria-[c] ($\mu g/m^3$)	Method Detection Limit[d] ($\mu g/m^3$)	Reporting Limit[d] ($\mu g/m^3$)
1,1-Dichloroethene	75-35-4	0.2	--	--	0.033	0.079
cis-1,2-Dichloroethene	156-59-2	0.2	--	--	0.038	0.079
Tetrachloroethene	127-18-4	--	3	--	0.053	0.136
trans-1,2-Dichloroethene	156-60-5	--	--	--	0.03	0.079
Trichloroethene	79-01-6	0.2	--	--	0.033	0.107
Vinyl chloride	75-01-4	--	--	0.2	0.018	0.051

[a] New York State Department of Health (NYSDOH) Matrix A Indoor Air Concentrations (October 2006, updated May 2017).

[b] New York State Department of Health (NYSDOH) Matrix B Indoor Air Concentrations (October 2006, updated May 2017).

[C] New York State Department of Health (NYSDOH) Matrix C Indoor Air Concentrations (October 2006, updated May 2017).

[d] PACE Alpha Analytical Laboratory Method Detection Limits and Reporting Limits

$\mu g/m^3$ = microgram(s) per cubic meter

-- = not applicable

Table A-6. Volatile Organic Compounds in Subslab Soil Vapor by Method TO-15

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	NYSDOH Subslab Vapor Screening Criteria-A[a] (µg/m^3)	NYSDOH Subslab Vapor Screening Criteria-B[b] (µg/m^3)	NYSDOH Subslab Vapor Screening Criteria-C[c] (µg/m^3)	Method Detection Limit[d] (µg/m^3)	Reporting Limit[d] (µg/m^3)
1,1-Dichloroethene	75-35-4	6	--	--	0.255	0.793
cis-1,2-Dichloroethene	156-59-2	6	--	--	0.464	0.793
Tetrachloroethene	127-18-4	--	100	--	0.444	1.36
trans-1,2-Dichloroethene	156-60-5	--	--	--	0.255	0.793
Trichloroethene	79-01-6	6	--	--	0.271	1.07
Vinyl chloride	75-01-4	--	--	6	0.16	0.511

[a] New York State Department of Health (NYSDOH) Matrix A Subslab Vapor Concentrations (October 2006, updated May 2017).

[b] New York State Department of Health (NYSDOH) Matrix B Subslab Vapor Concentrations (October 2006, updated May 2017).

[C] New York State Department of Health (NYSDOH) Matrix C Subslab Vapor Concentrations (October 2006, updated May 2017).

[d] PACE Alpha Analytical Laboratory Method Detection Limits and Reporting Limits

µg/m^3 = microgram(s) per cubic meter

-- = not applicable

Table A-7. Volatile Organic Compounds in Process Vapor by Method TO-15—*ISTT Thermal*

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	Method Detection Limit[a] ($\mu g/m^3$)	Reporting Limit[a] ($\mu g/m^3$)
1,1,1-Trichloroethane	71-55-6	0.273	1.09
1,1,2,2-Tetrachloroethane	79-34-5	0.422	1.37
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	0.503	1.53
1,1,2-Trichloroethane	79-00-5	0.366	1.09
1,1-Dichloroethane	75-34-3	0.254	0.809
1,1-Dichloroethene	75-35-4	0.255	0.793
1,2,4-Trichlorobenzene	120-82-1	0.5	1.48
1,2,4-Trimethylbenzene	95-63-6	0.181	0.983
1,2-Dibromoethane	106-93-4	0.431	1.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	0.413	1.4
1,2-Dichlorobenzene	95-50-1	0.378	1.2
1,2-Dichloroethane	107-06-2	0.244	0.809
1,2-Dichloropropane	78-87-5	0.282	0.924
1,3,5-Trimethylbenzene	108-67-8	0.332	0.983
1,3-Butadiene	106-99-0	0.148	0.442
1,3-Dichlorobenzene	541-73-1	0.377	1.2
1,4-Dichlorobenzene	106-46-7	0.382	1.2
1,4-Dioxane	123-91-1	0.29	0.721
2,2,4-Trimethylpentane	540-84-1	0.169	0.934
2-Butanone	78-93-3	0.142	1.47
2-Hexanone	591-78-6	0.266	0.82
3-Chloropropene	107-05-1	0.183	0.626
4-Ethyltoluene	622-96-8	0.182	0.983
4-Methyl-2-pentanone	108-10-1	0.173	2.05
Acetone	67-64-1	1.64	2.38
Benzene	71-43-2	0.156	0.639
Benzyl chloride	100-44-7	0.25	1.04
Bromodichloromethane	75-27-4	0.338	1.34
Bromoform	75-25-2	0.663	2.07

Table A-7. Volatile Organic Compounds in Process Vapor by Method TO-15—*ISTT Thermal*

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	Method Detection Limit[a] ($\mu g/m^3$)	Reporting Limit[a] ($\mu g/m^3$)
Bromomethane	74-83-9	0.3	0.777
Carbon disulfide	75-15-0	0.174	0.623
Carbon tetrachloride	56-23-5	0.314	1.26
Chlorobenzene	108-90-7	0.287	0.921
Chloroethane	75-00-3	0.212	0.528
Chloroform	67-66-3	0.309	0.977
Chloromethane	74-87-3	0.142	0.413
cis-1,2-Dichloroethene	156-59-2	0.464	0.793
cis-1,3-Dichloropropene	10061-01-5	0.186	0.908
Cyclohexane	110-82-7	0.127	0.688
Dibromochloromethane	124-48-1	0.523	1.7
Dibromomethane	74-95-3	0.4	1.42
Dichlorodifluoromethane	75-71-8	0.288	0.989
Ethyl Acetate	141-78-6	0.44	1.8
Ethyl Alcohol	64-17-5	1.38	9.42
Ethylbenzene	100-41-4	0.188	0.869
Heptane	142-82-5	0.193	0.82
Hexachlorobutadiene	87-68-3	0.564	2.13
iso-Propyl Alcohol	67-63-0	1.17	1.23
Methyl tert butyl ether	1634-04-4	0.189	0.721
Methylene chloride	75-09-2	0.466	1.74
Naphthalene	91-20-3	0.464	1.05
n-Hexane	110-54-3	0.128	0.705
o-Xylene	95-47-6	0.197	0.869
p/m-Xylene	179601-23-1	0.395	1.74
Propylene	115-07-1	0.103	0.861
Styrene	100-42-5	0.185	0.852
Tetrachloroethene	127-18-4	0.444	1.36
Tetrahydrofuran	109-99-9	0.168	1.47

Table A-7. Volatile Organic Compounds in Process Vapor by Method TO-15—*ISTT Thermal*

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Parameter	CAS Number	Method Detection Limit[a] ($\mu g/m^3$)	Reporting Limit[a] ($\mu g/m^3$)
Toluene	108-88-3	0.196	0.754
trans-1,2-Dichloroethene	156-60-5	0.255	0.793
trans-1,3-Dichloropropene	10061-02-6	0.198	0.908
Trichloroethene	79-01-6	0.271	1.07
Trichlorofluoromethane	75-69-4	0.386	1.12
Vinyl acetate	108-05-4	0.169	3.52
Vinyl bromide	593-60-2	0.313	0.874
Vinyl chloride	75-01-4	0.16	0.511
Xylene (Total)	1330-20-7	0.197	0.869

[a]PACE Alpha Analytical Laboratory Method Detection Limits and Reporting Limits

$\mu g/m^3$ = microgram(s) per cubic meter

Table A-8. Calibration and QC Requirements for Metals by SW6020[a]

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Tuning	Prior to ICAL	Mass calibration ≤ 0.1 amu from the true value. Resolution < 0.9 amu full width at 10% peak height.	Retune the instrument and verify.
Initial calibration (a blank and at least three standards or a blank and a high standard)	Before sample analysis, every 24 hours, when modifications are made to the system, or when continuing calibration verification fails	If more than one standard is used, correlation coefficient (r) must be > 0.995 or coefficient of Determination (r^2) $\geq$ 0.990	NA
Initial Calibration/Second-source calibration verification	Immediately following each initial calibration	All analytes within ±10% of expected value	Correct problem and repeat initial calibration.
Low-level/Midlevel Calibration Verification Standard	Immediately following multipoint ICAL or single-point ICAL	Analytes within ± 20% of expected value for LL and ± 10% for midlevel	Correct the problem and repeat the ICAL.
Calibration blanks	After every ICV or continuing calibration verification analysis	No analytes detected at or exceed the RL	Correct the problem, then re-analyze previous 10 samples.
CCV	After every 10 samples and at the end of the analysis sequence	All analytes within ±10% of expected value	Recalibrate and re-analyze all samples since the last acceptable continuing calibration verification.
Internal Standard (IS)	Every field sample, standard and QC sample.	IS intensity in the samples within 30-120% of intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Re-analyze sample at 5- fold dilutions until criteria is met.

Table A-8. Calibration and QC Requirements for Metals by SW6020[a]

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
			For failed QC samples, correct problem, and rerun all associated failed field samples.
Method Blank	At least one per preparatory/ analytical batch	No analytes detected at or exceed the RL	Correct the problem and re-prep and re-analyze all associated samples.
Interference check standard (ICS)	At the start and end of each analytical sequence or twice during an 8-hour period, whichever is more frequent	All analytes within ±20% of expected value	Correct the problem, recalibrate, re-analyze ICS and all affected samples.
Matrix spike/matrix spike duplicate (MS/MSD)	One set per 20 project-specific liquid samples. MSD is optional if a laboratory sample duplicate is performed. MS/MSD not required for solid samples.	All analytes within laboratory QC limits.	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the RL in either sample and RPD >20% One sample result < RL and a difference of ±RL	None
Laboratory Control Sample (LCS)	At least one per analytical batch	All analytes within laboratory QC limits.	Correct the problem, and re-prep and re-analyze the LCS and all samples in the analytical batch.
Dilution test (serial dilution) (applies only if undiluted sample result is ≥ 25 times the MDL	One per 20 samples (or less) of each matrix in a batch or when MS fails (	Result from 1:5 dilution must be within ±20% of the undiluted sample result	None
Linear Range Calibration check standard	Per method	All analytes within ±10% of expected value	Correct problem then re-analyze or re-set linear range.

Table A-8. Calibration and QC Requirements for Metals by SW6020[a]

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Post-digestion spike addition (applies only if undiluted sample result is ≤25 times the MDL)	One per 20 samples (or less) of each matrix in a batch or when MS fails	Recovery within 75-125% of expected value for analytes that did not pass MS criteria	None

[a] Method version will be coordinated with laboratory. If the specific version of a method requires additional evaluation these additional requirements must also be met.

≥ = equal to or greater than
> = greater than
< = less than
≤ = less than or equal to
LCS = laboratory control sample
CCV = continuing calibration verification
NA = not applicable
QC = quality control
RL = reporting limit

Table A-9. Calibration and QC Requirements for Volatile Organic Compounds by SW8260[a]

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
BFB Tuning	Prior to initial calibration and calibration verification (every 12 hours)	Refer to criteria listed in the method	Retune instrument and verify.
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	Option 1: Avg. RF %RSD ≤ 20% all compounds; minimum RFs per method Option 2: Least squares regression $r^2 \geq 0.99$	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Once for each multipoint initial calibration	All analytes within ±30% of expected value	Correct the problem and repeat initial calibration.
Low-level calibration verification	After calibration if linear regression curve used	All analytes within ±30% of expected value	Correct the problem and repeat initial calibration
Continuing calibration verification	At the start of each analytical sequence and every 12 hours thereafter	Minimum RFs per method; %D ≤ 20% all compounds.	Correct the problem, then recalibrate and re-analyze all samples since the last acceptable continuing calibration verification.
Retention time window calculated for each analyte	Each analyte	Relative retention time of each analyte within + 0.06 relative retention time units of the continuing calibration verification	Not applicable (used for identification of analyte).
Internal Standards	Each sample and QC sample, method blank, MS/MSD and LCS	Retention time within ±30 seconds from retention time of the daily continuing calibration verification standard. EICP area within –50% to +100% of the daily continuing calibration verification standard	Inspect mass spectrometer and gas chromatography for malfunctions; re-analyze all affected samples.

Table A-9. Calibration and QC Requirements for Volatile Organic Compounds by SW8260[a]

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Method Blank	At least one per analytical batch	No analytes detected at or exceed the RL	Correct the problem, then re-prep and re-analyze all associated samples.
Surrogate spike	Every standard, sample, method blank, MS/MSD and LCS	All analytes within laboratory QC limits.	Correct the problem and re-analyze (re-prep if necessary).
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed.	All analytes within laboratory QC limits	None
LCS	At least one per analytical batch	All analytes within laboratory QC limits.	Correct the problem, then re-prep and re-analyze the LCS and all samples in the analytical batch.

[a] Method version will be coordinated with laboratory. If the specific version of a method requires additional evaluation these additional requirements must also be met.

The RRF for certain compounds (1,4-dioxane, ketones, etc.) may not meet the specified method criteria due to nature of the compounds. Laboratory SOPs may need to be reviewed for exceptions to the method criteria.

Table A-10. Calibration and Quality Control Requirements for Dissolved Gases by Method RSK-175

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	If the %RSD is ≤ 20%, the average RRF may be used for quantitation; otherwise use calibration curve with coefficient of correlation or determination ≥ 0.99.	Correct the problem and repeat the initial calibration.
Second-Source/Continuing calibration verification	At the start of each analytical sequence and after every 10 samples, and at the end of the sequence	Analytes within ±20% (30% for CO_2) of expected value	Re-analyze. Correct the problem, then recalibrate and re-analyze all samples since the last acceptable CCV, if possible (enough sample vials submitted), or flag all data associated.
LCS	At least one per analytical batch	All analytes within laboratory QC limits.	Correct the problem, and re-prep and re-analyze the LCS and all samples in the analytical batch.
Method Blank	At least one per analytical batch	No analytes detected at or exceed the RL.	Correct the problem and re-prep and re-analyze all associated samples.
Laboratory sample duplicate	Once per analytical batch.	All analytes within laboratory QC limits.	None.

Table A-11. Calibration and Quality Control Requirements for General Chemistry Parameters

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (a blank and at least five standards/blank and three standards for EPA300)—if applicable	Before initial sample analysis, whenever modifications are made to the analytical system, or when continuing calibration verification fails.	Correlation coefficient of linear regression is ≥ 0.995.	Correct the problem and repeat the initial calibration.

Table A-11. Calibration and Quality Control Requirements for General Chemistry Parameters

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Second-source calibration verification	Immediately following each initial calibration.	Analytes within ±10% of expected value	Correct the problem and repeat initial calibration.
Calibration blank	After every second-source or continuing calibration verification analysis.	No analytes detected at or exceed the RL.	Correct the problem, then re-analyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence.	Within ±10% of expected value	Recalibrate and re-analyze all samples since the last acceptable continuing calibration verification.
Method blank	At least one per analytical batch.	No analytes detected at or exceed the RL.	Correct the problem and re-prep and re-analyze all associated samples.
MS/MSD	One set per 20 project-specific liquid samples. MSD is optional if a laboratory sample duplicate is performed. MS/MSD not required for solid samples.	All analytes within laboratory QC limits.	None.
Laboratory sample duplicate	Once per analytical batch if MSD not performed.	All analytes within laboratory QC limits.	None.
LCS	At least one per analytical batch.	All analytes within laboratory QC limits.	Correct the problem, and re-prep and re-analyze the LCS and all samples in the analytical batch.

Table A-12. Calibration and Quality Control Requirements for Volatile Organic Compounds by Method TO-15/TO-15 SIM

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Quality Control Check	Frequency	Criteria	Corrective Action
Tuning Check	Before initial calibration and calibration verification	Refer to criteria listed in the method.	Retune instrument and verify.
ICAL (minimum five standards)	Initial calibration before sample analysis	RSD for each analyte ≤ 30% with at most 2 exceptions up to 40%	Correct problem then repeat initial calibration.
Second-source Calibration Verification	Once per ICAL	All analytes within ± 30% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat initial calibration.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 30% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.
Internal Standards	Each sample	Retention time ± 0.33 minutes from retention time of the IS in the most recent valid calibration (ICAL midpoint standard or CCV). EICP area within ± 40% of area of the IS in most recent valid calibration	Inspect mass spectrometer and Gas Chromatography for malfunctions. Re-analysis of samples analyzed while the system was malfunctioning is mandatory.
Surrogates	Each sample	All analytes within laboratory QC limits.	Assess data. Correct problem. If necessary, re-prepare and analyze the sample
Method Blank	One per analytical batch	No analytes detected ≥ RL	Assess data. Correct problem. If necessary, re-prepare and analyze method blank and all samples processed with the contaminated blank.

Table A-12. Calibration and Quality Control Requirements for Volatile Organic Compounds by Method TO-15/TO-15 SIM

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

Quality Control Check	Frequency	Criteria	Corrective Action
LCS for All Analytes	At least one per analytical batch	All analytes within laboratory QC limits.	Correct the problem and re-analyze (re-prep if necessary).
Canister Pressure	Each canister before shipment to field	Must be set at -30" of mercury	Correct problem.
Canister Certification (must be certified by same analytical method as sample analysis)	Prior to sampling	Batch Certification (soil vapor)—Canisters must be certified to the RL Individual Certification (Indoor Air)-Individual canisters certified to the Reporting Limit	NA

" = inch(es)

Table A-13. Data Qualifying Conventions

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Requirement	Criteria	Flag	Flag Applied To
Holding Time	Time exceeded for extraction or analysis Holding time exceeded by a factor of two	J for positive results; UJ for nondetects J for positive results; R for nondetects	All analytes in the sample.
Sample Preservation	Sample not preserved (if sample preservation was not done in the field but was performed at the laboratory upon sample receipt, no flagging is required)	J for positive results; UJ for nondetects	All analytes in the sample.
Sample Integrity	Temperature out of control VOCs received with headspace >6mm	J for positive results; UJ for nondetects (if temperature excessive, NDs may be flagged R) J for positive results; UJ for nondetects	All analytes in the sample.
Instrument Tuning	Refer to method criteria	Apply R to all results	All samples associated with the tune.
Initial Calibration[a]	All analytes must be within method specified RSD criteria RRF < method criteria	J for positive results; UJ for nondetects R for all nondetects greater than twice the control criteria J for positive results; UJ for nondetects; R based on professional judgment	All associated samples in analysis batch
Second-Source Check and CCV[a]	All analytes must be within method specified %D criteria RRF < method criteria	High Bias: J for positive results, no flag for nondetects Low Bias: J for positive results, UJ for nondetects; R for all nondetects greater than twice the control criteria J for positive results; UJ for nondetects; R based on professional judgment	All associated samples in analysis batch.
Low-level Calibration Checks	All analytes must be within method specified criteria	High Bias: J positive results, no flag for nondetects	All associated samples in analysis batch.

Table A-13. Data Qualifying Conventions

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Requirement	Criteria	Flag	Flag Applied To
		Low Bias: J positive results, UJ nondetects; R for all nondetects greater than twice the control criteria	
Interference Check Samples	All analytes must be within method specified criteria	High Bias: J positive results, no flag for nondetects Low Bias: J positive results, UJ nondetects; R for nondetects with %R<50%	All associated samples in analysis batch
Internal Standards	Area > upper control limit Area < lower control limit Area < 10%	J for positive results J for positive results; UJ for nondetects J for positive results; R for nondetects	Sample
Surrogates	% R > upper control limit %R < lower control limit %R <10%	J for positive results, no flag for nondetects J for positive results; UJ for nondetects J for positive results; R for nondetects	Sample
LCS	% R > upper control limit %R < lower control limit and >10% %R <10% RPD> control limit	J for positive results, no flag for nondetects J for positive results; UJ for nondetects J for positive results; R for nondetects J for positive results, no flag for nondetects	The specific analyte(s) in all samples in the associated batch.

Table A-13. Data Qualifying Conventions

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Requirement	Criteria		Flag	Flag Applied To
Blanks (Method, Field, Equipment, Trip or Calibration)	Blank Result	Sample	Flag U and raise to RL	The specific analyte(s) in the associated sample.
	< RL	<RL		
		≥ RL but < 2x blank result for common contaminants	U at sample concentration	
		≥ RL and ≥ blank result (>2x for common contaminants)	Use professional judgment	
	≥ RL	<RL	Flag U and raise to RL	
		≥ RL but < blank result	U at sample concentration	
		≥ RL and ≥ blank result (2x for common contaminants)	Use professional judgment	
Field Duplicates	Concentration of reported analytes are > 5 times the RL in either sample and RPD > UCL (30% for air/ water samples; 50% for soil samples)) One or both sample results < 5 times the RL and a difference of ±2 times the RL for water/air; (±4 times for soil).		J for positive results, no flag for nondetects	The specific analyte(s) in the associated sample. Note: No flagging is required for results less than the RL.
Laboratory Duplicates	RPD > control limit per method		J for positive results, no flag for nondetects	The specific analyte(s) in the associated sample. Note: No flagging is required for results less than the RL

Table A-13. Data Qualifying Conventions

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Requirement	Criteria	Flag	Flag Applied To
MS/MSD and Post-digestion Spikes	%R > upper control limit	J for positive results, no flag for nondetects	The specific analyte(s) in the parent sample.
	%R < lower control limit	J for positive results; UJ for nondetects	
	%R <10%	J for positive results; R for nondetects	
	MS/MSD RPD > control limit	J for positive results, no flag for nondetects	
	Sample concentration > 4 times the spike concentration	No flag required	
	Excessive dilution[a]	No flag required	
Serial Dilutions	All analytes must be within method criteria	J positive results	The specific analyte(s) in the parent sample.
	Sample concentration < 25x MDL	No flag required	
Initial Canister pressure (Pressure should be between 28-30" Hg before sampling)	≤26"Hg	Apply J to detects and UJ to nondetects	Sample
	≤24"Hg	Apply J to detects and R to nondetects	
Final Canister pressure (Pressure should be between 2 to 10" Hg after sampling commences) (5" Hg is ideal)	If ≥10"Hg—Sampling time may be extended, if DQO's allow, to appropriate level. If sampling time cannot be extended, sample will be diluted by laboratory.	No flag required	Sample
	No change in pressure	Reject all data if analyzed as sample was not collected	
	≤1"Hg in field (sampling time cannot be verified)	Apply J to detects and UJ to nondetects	

Table A-13. Data Qualifying Conventions

Essex-Hope Superfund Site, Jamestown, New York Quality Assurance Project Plan

QC Requirement	Criteria	Flag	Flag Applied To
	If final canister pressure in field is acceptable, but final pressure upon receipt at laboratory is ≤1", it may indicate the canister leaked during shipment	Use professional judgment	

[a] Based on analyte-specific review. The RRF for certain compounds (1,4-dioxane, ketones, etc.) may not meet the specified method criteria due to nature of the compounds. Laboratory SOPs may need to be reviewed for exceptions to the method criteria.

%R = percent recovery

RRF = relative response factor

Appendix B.
Electronic Data Specifications

B.1 Electronic Data Deliverable Format for EQuIS

Dow EQuIS electronic deliverable (EDD) deliverables will be provided in compliance with the current version of the Dow EQEDD standard. The most recent version of Dow EQEDD may be found at the following link: https://earthsoft.com/products/edp/edp-format-for-dow/.

B.2 Electronic Data Deliverable Format for Jacobs

The EDD file from the laboratory will be a comma-delimited ASCII (CDA) file in the format listed as follows. There will be one file per hard copy report, and the filename of the EDD file will be in the format REPORTID.txt or REPORTID.csv, where REPORTID is the hard copy report identifier of sample delivery group.

The first row of the EDD will contain the 47 field name values, as listed in the EDD Specification Table,

The EDD Specification Table lists the attributes of the columns for each row of the CDA file. The fields should be reported in the order indicated.

The **Data Type** column describes the value in the field as either text (alphanumeric), number (numeric only), date (format: mm/dd/yyyy), or time (24-hour format hh:mm). If the field is conditional or optional and there is no value to be reported, report a null (no) value. For a text field, do not report a zero-length string (i.e., “”).

The **Data Length** column contains the maximum length of a text value for the particular data field.

The **Rqmt** column contains a code indicating whether the value is required (R) for all rows, optional (O) for all rows, or conditional (C) and depends on the type of result reported.

The VVL (Valid Value List) column contains a flag to indicate whether the data field has (Y) or does not have (N) a valid value list provided by Jacobs associated with it.

B.2.1 Modification Notes:

B.2.1.1 Changes as of September 2006 Revision:

1. Change the Requirement for CAS to R (Field No. 21).

B.2.2 Changes as of February 2011 Revision:

1. Add new field to the end of labspec named “Spike_Added” (Field No. 48).
2. Add new field to end of labspec named ‘Surr_Spike_Units’ (Field No. 49).
3. Add new field to end of labspec named “LOD” (Field No. 50).
4. Add new field to end of labspec named “LODAdjusted” (Field No. 51).

Table B-1. EDD Specification Table

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
1	VersionCode	text	15	R	Y	Code identifying the version of the EDD deliverable.
2	LabName	text	10	R	Y	Identification code for the laboratory performing the work. This value is used to distinguish among different facilities.
3	SDG	text	15	R	N	Sample delivery group designation. Always populated for all samples, including QC.
4	FieldID	text	30	R	N	Client sample ID as appears on COC with optional lab-assigned suffixes and/or prefixes to make it unique. If the sample identifier on the COC and the prefix/suffix is greater than 20 characters, abbreviate the value but make it unique. For laboratory QC samples (i.e., method blanks, lab control samples), use a unique lab sample identifier.
5	NativeID	text	30	R	N	Client sample ID, exactly as on the COC. No prefix or suffix allowed on client sample IDs. Used to identify the native sample from which other samples are derived (e.g., QAQCType = "LR", "MS", or "SD"). For laboratory QC samples (i.e., method blanks, lab control samples), use the FieldID value that was assigned. However, for lab blank spike duplicate samples, use the FieldID value that was assigned to the associated lab blank spike sample.
6	QAQCType	text	2	R	Y	This is the code for the sample type. Any field sample that is not used as lab QC and is not otherwise marked on the COC should have the designation of "N" (normal field sample). No suffix allowed (i.e., do not add numbers as suffixes to the QAQCType values as is called for in the ERPIMS guidelines). Note that if all analyses for a given sample are diluted, then the first dilution should be designated as the normal sample. If more dilutions are required, then the next dilution should be designated as the first true dilution with a QAQCType value of "LR" and a LRType value of "DL" (see LRType, below).

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
7	LRType	text	3	C	Y	This is the code for laboratory replicate sample type. Values are: blank (if QAQCType value is not "LR"), "DL" (dilution), "RE" (reanalysis), "D" (inorganic duplicate), "CF" (confirmation). For multiple dilutions or re-analyses of the same sample, append the replicate number after the LRType value (i.e., "RE", "RE2", "RE3", etc.).
8	Matrix	text	5	R	Y	Sample matrix code. Valid values are as follows: "AIR", "WATER", "SOIL", unless otherwise provided by the project data manager and marked on the COC. The use of "liquid", "solid", etc. for lab QC is not allowed.
9	LabSampleID	text	12	R	N	Laboratory sample ID that is assigned by the laboratory. Prefix or suffix is allowed. This is where dilutions or re-extractions are noted. Ex: "D97-11111RE" is acceptable.
10	AnalysisMethod	text	20	R	Y	Analysis method code. This is the identifier of the analytical method that was performed on the sample. Example: SW8260A. Generic names such as "EPA" or "USEPA" should not be used.
11	ExtractionMethod	text	20	R	Y	Preparation method code. A value in this field is required. If the preparation is described in the method, use "METHOD." If there is no separate preparation required, use "NONE." Note that Total and Dissolved metal analyses are differentiated by the value in this column. Note that Total, TCLP, and SPLP analyses are now differentiated by the value in the LeachMethod column (see Field Number 42 in this chart).
12	SampleDate	date		C	N	Date of sample collection. Value is required for all samples sent to the laboratory and samples derived from those samples. Format: mm/dd/yyyy
13	SampleTime	time		C	N	Time of sample collection. Value is required for all samples sent to the laboratory and samples derived from those samples. 24-hour format: hh:mm

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
14	ReceiveDate	date		C	N	Date of sample receipt in the lab. Value is required for all samples sent to the laboratory and samples derived from those samples. Format: mm/dd/yyyy
15	ExtractDate	date		C	N	Date of sample preparation (extraction or digestion). Value is required if the ExtractionMethod field value is other than "NONE." Format: mm/dd/yyyy
16	ExtractTime	time		C	N	Time of sample preparation. Value is required if the ExtractionMethod field value is other than "NONE." 24-hour format: hh:mm
17	AnalysisDate	date		R	N	Date of sample analysis. Value is required for all records. Format: mm/dd/yyyy
18	AnalysisTime	time		R	N	Time of sample analysis. Value is required for all records. 24-hour format: hh:mm
19	PercentSolids	number		R	N	Percent solids within the sample. Should be zero for water samples.
20	LabLotCtlNum	text	10	C	N	Identifier of an autonomous group of environmental samples and associated QC samples prepared together. For example, its value can be a digestion or extraction batch ID. If there is no separate extraction or preparation performed, leave this field blank.
21	CAS	text	20	R	N	CAS number of analyte, if available.
22	ParamID	text	12	R	Y	Parameter identifier code for the parameter listed in the Analyte field.
23	Analyte	text	60	R	N	Name of analyte, chemical name.
24	Result	text	10	R	N	Result of the analysis. Surrogate analytes will be reported in units of percent. All others will be reported in sample concentration units. If undetected, report the adjusted MDL or adjusted RL, depending on the project. (Reported as a text field to preserve significant figures.)
25	ExpectedValue	number		C	N	"100" for surrogates; "0" (zero) for blanks; spike level plus parent result for LCS, and MS/MSD; parent value for lab duplicate; etc.
26	Units	text	10	R	Y	Units of measure used in the analysis. Report "PERCENT" for surrogate analytes and concentration units for all others.

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
27	Dilution	number		R	N	Total dilution reported in the analysis. Default value should be 1 (one). This value should reflect changes to sample preparation amounts as defined by the method (e.g., less sample used for standard VOC analysis).
28	MDL	number		C	N	Minimum detection limit adjusted for preparation and dilution. Note that this value may be the MDL or the instrument detection limit, depending on the method and the project requirements. This value is not adjusted for percent moisture.
29	RL	number		C	N	RL adjusted for preparation and dilution. Value is not adjusted for percent moisture. Equivalent to PQL.
30	LabQualifier	text	6	R	N	Lab qualifier for the results, as reported on the hard copy. Use "=" as first (or only) qualifier value for detected results if there are no other qualifiers for the result.
31	Surrogate	text	1	R	Y	Is the chemical a surrogate? Report "Y" for yes or "N" for no.
32	Comments	text	240	O	N	Comment field
33	ParValUncert	text	16	C	N	Radiological parameter value uncertainty.
34	Recovery	number		C	N	Percent recovery for MS, SD, LCS, LCSD, and surrogate compounds.
35	LowerControlLimit	number		C	N	Lower control limit value for spiked compounds, expressed in units of Percent. A value in this field is required if there is a value in the Recovery field (Field No. 34).
36	UpperControlLimit	number		C	N	Upper control limit value for spiked compounds, expressed in units of Percent. A value in this field is required if there is a value in the Recovery field (Field No. 34).
37	Basis	text	1	R	Y	Weight basis for soil (or solid) sample analysis. Use "D" for dry-weight basis, "W" for wet-weight basis, or "X" if not applicable.
38	ConcQual	text	1	R	Y	Concentration qualifier. Use "=" for detects, "J" for estimated value (value between detection limit and RL), "U" for undetected result, or "E" for exceeded result.

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
39	MDLAdjusted	number		C	N	Minimum detection limit adjusted for preparation, dilution and percent moisture. See the description of the MDL field (Field No. 28) for an explanation of the contents of this field.
40	RLAdjusted	number		C	N	RL adjusted for preparation, dilution, and percent moisture. Equivalent to PQL
41	SampleDescription	text	30	C	N	Full sample identifier value as it appears on the COC. In some cases, this may be the name of the sampling location instead of the sample. Required for all samples that are either collected in the field and specified on the COC, or derived from samples that are collected in the field and specified on the COC.
42	LeachMethod	text	20	R	Y	Analytical method used for leaching the sample. This applies to TCLP, SPLP, or other leaching or pre-extraction leaching procedures. Use "NONE" if the sample was not leached.
43	LeachDate	date		C	N	Date that the leaching method was performed (start date for multi-date leaching procedures). Value is required if the LeachMethod field value is other than "NONE." Format: mm/dd/yyyy.
44	LeachTime	time		C	N	Time that the leaching procedure started. Value is required if the LeachMethod field value is other than "NONE." 24-hour format: hh:mm.
45	LeachLot	text	10	C	N	Identifier of an autonomous group of environmental samples and associated QC samples leached at the same time. Value is required if the LeachMethod field value is other than "NONE." If the sample was not leached, leave this field blank.
46	AnalysisLot	text	10	R	N	Identifier of an autonomous group of environmental samples and associated QC samples analyzed together. A value in this field is mandatory (i.e., it should not be blank).
47	CalRefID	text	10	C	N	Identifier of a group of environmental and QC samples linked by a common set of calibration records. All results with the same CalRefID value will have had the same initial calibration run.

Field Number	Field Name	Data Type	Data Length	Rqmt	VVL	Description and Comments
48	Spike_Added	number	18	C	N	Concentration of an analyte spiked into a sample. Populate for MS, SD, BS,BD, and surrogate compounds (maximum 6 decimal places).
49	Surr_Spike_Units	text	10	R	Y	Concentration unit for the surrogate spike added.
50	LOD	number		C	N	Limit of detection (QSM LOD) adjusted for preparation and dilution. Value is not adjusted for percent moisture.
51	LODAdjusted	number		C	N	Limit of detection (QSM LOD) adjusted for preparation, dilution, and percent moisture.

Each row is uniquely identified by the values in the following fields:

- FieldID
- LabSampleID
- AnalysisMethod
- ExtractionMethod
- LeachMethod
- ParamID

If an analytical sample must be diluted or reanalyzed and reported in addition to the original analytical sample, the diluted or reanalyzed sample should have a FieldID value that is different that that of the original sample. This can be accomplished through the addition of a suffix to the original FieldID that establishes a new and unique FieldID for the associated records.

B.2.3 Example Valid Values

The project data manager will provide the laboratory with a list of valid values that the laboratory will use in constructing the EDD. The following are some example valid values.

Field Name	Valid Value	Meaning
VersionCode	5.00AFCEE3	Format 4.20, AFCEE data values. LabQualifier field contains the laboratory qualifier values defined in the AFCEE QAPP, version 3.0.
VersionCode	5.00EPACLP	Format 4.20, EPA data values. LabQualifier field contains the standard EPA CLP lab qualifiers.
QAQCType	N	Normal, environmental sample
QAQCType	LB	Laboratory method blank
QAQCType	MS	Laboratory matrix spike sample
QAQCType	SD	Laboratory matrix spike duplicate
QAQCType	LR	Laboratory replicate (dilution, reanalysis, duplicate)
QAQCType	BS	Laboratory method blank spike
QAQCType	BD	Laboratory method blank spike duplicate
LRType	DL	First dilution sample
LRType	DL2	Second dilution sample
LRType	DL3	Third dilution sample
LRType	RE	First reanalysis/re-extraction sample
LRType	RE2	Second reanalysis/re-extraction sample
LRType	RE3	Third reanalysis/re-extraction sample
LRType	D	Inorganic duplicate sample
LRType	CF	First confirmation analysis sample
LRType	CF2	Second confirmation analysis sample
LRType	CF3	Third confirmation analysis sample
AnalysisMethod	SW8260A	Volatiles by method 8260A in EPA SW846.
AnalysisMethod	SW8270	Semivolatiles by method 8270 in EPA SW846.
AnalysisMethod	SW6010	ICP metals by method 6010 in EPA SW846.
AnalysisMethod	SW7060	GFAA Arsenic by method 7060 in EPA SW846.
ExtractionMethod	FLDFLT	Field filtration for dissolved metals analysis
ExtractionMethod	C3050	CLP-modified SW3050 acid digestion for metals analysis in soil samples.
ExtractionMethod	SW1311	TCLP extraction
ExtractionMethod	DISWAT	Distilled water extraction for analytes in soil samples.

Field Name	Valid Value	Meaning
ExtractionMethod	SW3510	Separatory funnel extraction
ExtractionMethod	SW3540	Soxhlet extraction
ExtractionMethod	TOTAL	Digestion of unfiltered waters for total metals analysis
ParamID	ACE	Acetone
ParamID	AS	Arsenic
ParamID	BHCGAMMA	gamma-BHC (Lindane)
ParamID	BZ	Benzene
ParamID	CDS	Carbon disulfide
ParamID	PB	Lead
ParamID	PHENOL	Phenol
ParamID	SE	Selenium
ParamID	TCE	Trichloroethene