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SEPTEMBER 2013
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LIST OF ACRONYMS

bgs  Below ground surface

cis-1,2-DCE  \emph{cis}-1,2-dichloroethene
CVO\textsuperscript{C}  Chlorinated volatile organic compound

DER  Division of Environmental Remediation

EA  EA Engineering, P.C. and its affiliate EA Science and Technology
EC  Engineering control
EPA  U.S. Environmental Protection Agency
EWP  Excavation Work Plan

HASP  Health and Safety Plan
HRC  Hydrogen release compound

IC  Institutional control
IRM  Interim remedial measure

LCS  LCS, Inc.

NYS  New York State
NYSDEC  New York State Department of Environmental Conservation
NYSDOH  New York State Department of Health

PCE  Tetrachloroethene
PFE  Pressure field extension

QA  Quality assurance
QAPP  Quality Assurance Project Plan
QC  Quality control

RI  Remedial investigation
ROD  Record of Decision

SCG  Standards, criteria, and guidance
SCO  Soil Cleanup Objective
SMP  Site Management Plan
SSDS  Sub-slab depressurization system

TCE  Trichloroethene

\(\mu\text{g}/m^3\)  Micrograms per cubic meter
\(\mu\text{g}/L\)  Micrograms per liter
<table>
<thead>
<tr>
<th>VC</th>
<th>Vinyl chloride</th>
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<tr>
<td>VI</td>
<td>Vapor intrusion</td>
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<tr>
<td>VOC</td>
<td>Volatile organic compound</td>
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1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This document is required as an element of the remedial program at Clinton West Plaza (hereinafter referred to as the “site”) under the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program, administered by New York State Department of Environmental Conservation (NYSDEC). The site was remediated in accordance with the Record of Decision (ROD) (NYSDEC 2010a)1.

1.1.1 General

EA Engineering, P.C., and its affiliate EA Science and Technology (EA) were tasked by the NYSDEC to manage and perform the remediation of a 2.49 acre property located at 609–625 West Clinton Street in the City of Ithaca, Tompkins County, New York (Figure 1). The Remedial Party, EA, was required to investigate and remediate contaminated media at the site. A figure showing the site location and boundaries of this 2.49-acre site is provided in Figure 2. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement/Notice currently being prepared by the NYSDEC to be subsequently included in Appendix A and B following recording with the Tompkins County Clerk’s office.

After completion of the remedial work described in the Pilot Study Conceptual Design Report (EA 2011)2, residual Volatile Organic Compound (VOC) contamination was left in the subsurface at this site, which is hereafter referred to as ‘remaining contamination.” This Site Management Plan (SMP) was prepared to manage remaining contamination at the site until the Institutional Control (IC) is extinguished in accordance with Environmental Conservation Law Article 71, Title 36. All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in NYS.

This SMP was prepared by EA in accordance with the requirements in NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation (NYSDEC 2010b)3, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the ICs and engineering controls (ECs) that are required by the Environmental Easement/Notice for the site.

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1 NYSDEC. 2010a. ROD. Clinton West Plaza, Site Number 755015, City of Ithaca, New York. May.
3 NYSDEC. 2010b. DER-10 Technical Guidance for Site Investigation and Remediation. May.
1.1.2 Purpose

The site contains contamination left after completion of the remedial action. ECs have been incorporated into the site remedy to control exposure to remaining contamination during the use of the site to ensure protection of public health and the environment. An Environmental Easement/Notice to be recorded with the Tompkins County Clerk will require compliance with this SMP and all ECs and ICs placed on the site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement/Notice for contamination that remains at the site. This plan has been approved by the NYSDEC, and compliance with this plan is required by the Environmental Easement/Notice. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the site after completion of the remedial action, including: (1) implementation and management of all ECs and ICs; (2) media monitoring; (3) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and (4) defining criteria for termination of groundwater treatments.

To address these needs, this SMP includes three plans: (1) an EC/IC Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial treatment.

This plan also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement/Notice to be subsequently placed in Appendix A. Failure to properly implement the SMP is a violation of the Environmental Easement/Notice.

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and, thereby, subject to applicable penalties.
1.1.3 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC’s project manager. In accordance with the Environmental Easement/Notice (Appendix A) for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The 2.49 acre site is commercially developed with an active 36,254 ft² shopping plaza that was constructed in 1970 and is currently owned by Clinton West, Ltd. (Tax Map ID Number: 79-6-8.2). The site is surrounded by residential neighborhoods and a retail property (Figure 2). A laundromat, Clinton West Laundry, was located at 609 West Clinton Street within the Clinton West Plaza, Ithaca, New York, but is no longer operational and the space is vacant. Residential structures are located immediately southwest and east of the property. The site includes large parking areas paved with asphalt. The boundaries of the site are more fully described in Appendix B – Metes and Bounds, to be subsequently included in the SMP following recording with the Tompkins County Clerk’s office.

1.2.2 Site History

The Clinton West Plaza site was initially reported as a potential site with contamination after First Niagara Bank of Rochester, New York retained LCS, Inc. (LCS) of Buffalo, New York to conduct an Environmental Transaction Screening, Environmental Site Assessment Report in December 2005 (LCS 2006)⁴. The Environmental Site Assessment report concluded that a Phase II investigation was warranted to assess the environmental conditions on-site due to the former operational history of a dry cleaner at the site. LCS completed the Phase II subsurface investigation and supplemental subsurface investigations, and determined that soil and groundwater contamination associated with dry cleaning chemicals, notably tetrachloroethylene (PCE), existed at the site. PCE is a solvent commonly used in the dry cleaning process. Based on the findings of the Phase II investigation, the site was listed on the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites in New York State as a Class 2 site (Site No. 755015).

1.2.3 Geologic Conditions

The site is located in the Appalachian Uplands Physiographic Province where local topographic features result from glacial and fluvial processes. The site is located 1.5 mi

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south of Cayuga Lake and is approximately 300 ft northeast of Six Mile Creek which flows northward to Cayuga Inlet and Lake. The site topography and surrounding area is relatively flat.

The upper foot of soil is comprised primarily of topsoil, sand, and gravel, underlain by a layer of brown clay with fine sands, trace silts, and some organics to depths ranging from 2 to 7 ft below ground surface (bgs). Underlying the brown clay unit is a layer of brown sand with trace silts ranging from 1 to 6 ft in thickness (averaging approximately 2.5–3 ft in thickness). Underlying the brown sand unit is a distinct gray clay unit, which was observed to the termination depths of a majority of the soil borings (approximately 16–20 ft bgs). The gray clay unit was typically 10+ ft in thickness. A brown fine to medium sand was observed below the gray clay in the western soil borings. Additionally, a peat layer was encountered at approximately 19 ft bgs in the southernmost soil boring. Two cross-sections, included as Figure 3, illustrate subsurface lithology based on data collected from April 2011.

Groundwater has been encountered on-site at depths ranging from approximately 2 ft bgs to 5 ft bgs. Groundwater depth at the site is considered shallow and could potentially be influenced by temporal changes and seasonal precipitation events. Based on groundwater gauging data, shallow groundwater has been estimated to generally flow south-southwest towards Six Mile Creek. However, localized groundwater flows radially from the Clinton West Plaza. Based on the hydraulic gradient between six monitoring well sets within the area of the groundwater contaminant plume, the average groundwater gradient was calculated at -0.009 ft/ft. This represents a relatively flat groundwater gradient and profile. Groundwater flow direction in the observed subsurface lithology would tend to be along flow pathways of least hydraulic resistance. Flow along these pathways would be significantly higher than within the silt and clay units. The groundwater elevation data and flow patterns observed have been consistent with previous investigations. The direction of groundwater flow, as interpolated from data collected in October 2012, is illustrated on Figure 4.

1.3 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

A remedial investigation (RI) was performed to characterize the nature and extent of contamination at the site. The results of the RI are described in detail in the following reports:

A review of the RI/Feasibility Study Report prepared by Fagan Engineers (2009)\(^5\) for the Clinton West Plaza site is summarized below:

- No on-site soil source for chlorinated volatile organic compounds (CVOCs) was identified or delineated during the RI and the report suggests that CVOC soil

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concentrations detected greater than site standards, criteria, and guidance (SCGs) values were likely related to elevated CVOC groundwater concentrations.

- Groundwater concentrations of CVOCs have been reported greater than site SCGs dating back to 2006 (LCS)$^5$. Two groundwater sampling events (2008 and 2009) conducted during the RI identified a dissolved-phase CVOC plume in an area south of the former dry cleaners building.

- Soil vapor intrusion (VI) sampling identified an exceedance of the New York State Department of Health (NYSDOH) Air Guideline for PCE within the current laundry facility.

- The Feasibility Study recommended the selection of Alternative 5, which included installation of a sub-slab depressurization system (SSDS), a pre-design investigation, source area chemical-oxidation, injection of a hydrogen release compound (HRC)$^\text{®}$, implementation of ICs, and long-term monitoring.

EA completed a supplemental pre-design investigation in April 2011. Samples were collected from media that included subsurface soil, groundwater, and microbial populations and community structures. Further details on the historical and pre-design investigation results are provided in the Pilot Study Conceptual Design Report (EA, 2011)$^2$. Highlights from the pre-design investigation are summarized below.

- A review of soil data presented in the RI report revealed that the two subsurface soil samples collected in areas south of the former dry cleaning facility and at depths ranging between 8 and 16 ft bgs had reported VOC concentrations above soil cleanup objectives (SCOs).

- Subsurface soil samples collected during the pre-design investigation south of the facility and at depths below 8 ft had reported concentrations of VOCs above site SCOs (Figure 5). The subsurface soil areas of concern identified were located within a low-permeability soil unit identified during soil boring advancement (e.g., gray clay) and are likely the result of dense non-aqueous phase liquid mass diffusion processes.

- Groundwater impacts were identified in six wells at concentrations greater than applicable SCG values. These impacts are summarized in Table 1 and depicted on Figure 6. The highest concentrations of total CVOCs were detected at TPMW-3 (2,016 μg/L), TPMW-4 (728.8 μg/L), MMW-01 (192.1 μg/L), and MW-16 (40 μg/L). Based upon groundwater data collected in May 2010, the estimated groundwater contaminant plume covered approximately 0.13 acre and extended to an approximate depth of 20 ft.
Analysis of the in-situ microbiological populations during the pre-design investigation indicated that community structure was dominated by methanogens, but also identified existing populations of known dechlorinating bacteria (i.e., Dehalococcoides, Dehalobacter, and Desulfurmonas).

Analysis of natural attenuation parameters indicated that anaerobic conditions are present within the dissolved-phase groundwater plume and reductive dechlorination appeared to be occurring. The pre-design investigation data suggested that methanogenesis was occurring (e.g., elevated methane and ethane/ethene concentrations, negative oxidation-reduction potential, neutral pH, decreased nitrate and sulfate concentrations, etc.) at the site and that available hydrogen may have been a limiting factor in the development of favorable dechlorinating bacteria populations.

Soil VI evaluations were completed at five residential structures located on Center Street and North Titus Avenue. One indoor air and one sub-slab vapor sample was collected from the basement of each structure, with the exception of the laundry facility where only an indoor air sample was collected.

As an interim remedial action required by the ROD (NYSDEC 2010a), a SSDS was installed at the laundry facility on February 7, 2011. The approved system, including a system fan, interior and exterior piping, and exterior system discharge was installed by a NYSDEC standby contractor under the supervision of EA. The installation of this system is detailed in Section 1.4.

Sub-slab vapor concentrations of PCE ranged from 0.38 J micrograms per cubic meter (μg/m³) to 15 μg/m³ and indoor air concentrations ranged from non-detect to 12 μg/m³ within the residential structures. The NYSDOH air guideline value for PCE is 100 μg/m³.

Sub-slab vapor concentrations of trichloroethene (TCE) within the residential structures ranged from non-detect to 26 μg/m³ and no detections of TCE were reported greater than the laboratory method detection limit in indoor air samples. The NYSDOH air guideline value for TCE is 5 μg/m³.

Based on the VI results, NYSDOH issued individual letters to the respective homeowners, which described the purpose of the sampling and analytical results and presented the States’ recommendations for future action, if warranted. Due to the confidentiality of these letters and privacy of the homeowners, no additional VI information is included within this report. The locations of these vapor intrusion evaluations are depicted on Figure 7.
1.4 SUMMARY OF REMEDIAL ACTIONS

The site was remediating in accordance with the NYSDEC-approved Pilot Study Conceptual Design Report (EA 2011) and the Pre-Design Investigation and Pilot Study Program Letter Work Plan (EA 2010a).

The following is a summary of the remedial actions performed at the site:

1. Installation of a SSDS, as an interim remedial measure (IRM), as outlined in the ROD (NYSDEC 2010a), in the Clinton West Laundry tenant space located at 609 West Clinton Street.

2. Injection of 3,600 lbs of HRC® substrate at 36 injection points at a loading rate of 5 lbs/ft using direct-push technology to a depth of 25 ft bgs (Figure 8).

3. Preparation for execution and recording of an Environmental Easement/Notice to restrict land use and prevent future exposure to any contamination remaining at the site.

4. Other major remedial elements including all ICs listed here: see later section for list of common ICs.

5. Development and implementation of a SMP for long-term management of remaining contamination as required by the Environmental Easement/Notice, which includes plans for: (1) ICs and ECs, (2) monitoring, (3) operation and maintenance, and (4) reporting;

Remedial activities were completed at the site in February and November 2011. Baseline and post-injection groundwater monitoring was performed from October 2011 through November 2012. No contaminated materials were removed from the site.

1.4.1 Interim Remedial Measure and Site-Related Treatment System

Results of the RI indicated that due to the presence of CVOCs in groundwater and soil vapor, potential existed for human health exposure via the VI pathway. Site contaminants addressed through the remedy selection process were PCE, TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC). As outlined in the ROD (NYSDEC 2010a), the selected remedial alternative required the installation of a SSDS to mitigate the potential for VI at the Clinton West Laundry facility. The design and installation of this element of the ROD were conducted as an IRM to mitigate the potential for human health exposure to site related contaminants.

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NYSDEC initiated the IRM using an existing standby Remedial Contractor, Groundwater & Environmental Services, Inc. (GES), to perform the SSDS installation activities. A pre-design pressure field extension (PFE) test was completed on December 9, 2010. Based on the PFE test, EA issued a memo to NYSDEC indicating that SSDS would be a suitable technique to mitigate the potential for VI at the Clinton West Laundry facility. Following NYSDEC approval, GES, under the supervision of EA, installed the system fan, interior and exterior piping, and exterior system discharge on February 7, 2011.

During design and installation activities, EA provided technical assistance on design requirements and system sizing, as well as on-site oversight support and system installation documentation. The Mitigation System Installation Record is included as Appendix C. No additional long-term treatment systems were installed as part of the site remedy.

1.4.2 Enhanced Anaerobic Bioremediation

Based on the approved Pilot Study Conceptual Design Report (EA 2011) and Pre-Design Investigation and Pilot Study Program Letter Work Plan (EA 2010a), EA completed the subsurface injection of an organic substrate to stimulate direct anaerobic reductive dechlorination of CVOCs present in groundwater at the site.

In order to enhance *in-situ* anaerobic reductive dechlorination of CVOCs in groundwater, a sufficient mass of organic substrate was required to meet electron acceptor demands of both native (inorganic) and CVOCs within the targeted treatment zone. HRC® is an ester of glycerol, a three-carbon polyalcohol, and lactic acid. Once injected into the subsurface, HRC® slowly releases lactic acid, which undergoes fermentation, generating molecular hydrogen and a series of carboxylic acids that act as electron donors for utilization by bacteria that carryout reductive dechlorination.

Groundwater samples were collected from a network of 11 monitoring wells during six monitoring events (three monthly followed by three quarterly events from November 2011 through October/November 2012). Data were compared to results from a baseline monitoring event, as well as previous investigations completed in October 2011 prior to the substrate injection.

During the baseline groundwater sampling event conducted in October 2011, it was noted that monitoring well MW-17 was compromised due to a broken flush-mount cover. The J-plug and polyvinyl chloride riser were also broken, which exposed the monitoring well to surface run-off. This monitoring well was historically used to evaluate upgradient groundwater conditions and was installed as part of a historical investigation. Additionally, no site contaminants were ever detected during previous sampling events. Due to its location, non-detections, and the availability of alternate upgradient monitoring wells located at the site, the monitoring well was decommissioned on February 22, 2012 in accordance with NYSDEC Commissioners Policy 43 (CP-43). Upon completion of
the decommissioning activities EA issued NYSDEC a letter report (EA 2012)\textsuperscript{7} detailing the procedures and included a photo log of the work.

The field sampling procedures and protocols, number of environmental samples collected, as well as the quality assurance (QA)/quality control (QC) procedures, were provided in the Pilot Study Conceptual Design Report (EA 2011)\textsuperscript{2}. In addition, field investigation activities were conducted consistent with EA’s Generic Health and Safety Plan (HASP) developed for work assignments conducted under standby Contract D007624 (EA 2006)\textsuperscript{8}. A site-specific HASP Addendum was developed and is provided as Appendix F.

Further details on the enhanced anaerobic bioremediation process and implementation at this site are provided in the Enhanced Anaerobic Bioremediation Pilot Study Summary Report (EA, 2013)\textsuperscript{9}.

1.4.3 Remaining Contamination

During the performance monitoring period, concentrations of CVOCs were consistently reported in treatment zone monitoring locations TPMW-3, TPMW-4, and MMW-01; and at monitoring locations MMW-04 and MW-14 located south and southwest of the targeted treatment zone. However, results from post-injection groundwater sampling indicate that concentrations of PCE and TCE have been significantly reduced within the targeted treatment zone. Concentrations of PCE and TCE at TPMW-3 were reduced by 98 and 92 percent, respectively. Concentrations of PCE and TCE were both reduced by 100 percent (non-detect) at TPMW-4. PCE and TCE were not detected at other monitoring locations within the treatment zone, which suggests that the substrate injection process did not displace impacted groundwater to areas inside or outside of the target treatment zone.

However, groundwater analytical results from the October/November 2012 sampling event indicate that site contaminants of concern remain at concentrations greater than their relevant SCGs at TPMW-3, TPMW-4, and MMW-01. Concentrations of PCE (12 μg/L), TCE (31 μg/L), cis-1,2-DCE (370 μg/L), trans-1,2-dichloroethene (7.9 μg/L), and VC (190 μg/L) remain at TPMW-3 greater than their respective SCGs. Concentrations of VC (2.4 μg/L) remain at TPMW-4 at a concentration greater than its SCG. Concentrations of cis-1,2-DCE (51 μg/L) and VC (190 μg/L) remain at MMW-01 at concentrations greater than their respective SCGs.

Daughter compounds (cis-1,2-DCE and VC) commonly produced during the anaerobic reductive dechlorination process were consistently detected at TPMW-3, TPMW-4, and

\textsuperscript{7} EA. 2012. Letter Report. 29 February.
MMW-01 during post-injection monitoring. Groundwater data show that these compounds increased in concentration following the injection event and steadily decreased sequentially at each monitoring location.

During the April 2012 performance monitoring event, additional monitoring wells were included to evaluate the potential for substrate influences in areas west of the pilot study treatment zone and within area where historical CVOCs had been detected. Monitoring well MW-16 is located due west of the site and near a sewer line corridor. MW-16 was not originally included in the process and performance monitoring program as this monitoring well is located to the west of the targeted treatment zone outside of the expected area of influence. The reported concentration of PCE (11 micrograms per liter [μg/L]) at MW-16 is similar to that reported during the May 2011 pre-design investigation (18 μg/L). Additionally, no metabolic acids were reported in the additional monitoring points (MW-16, TPMW-1, and TPMW-5), indicating that substrate had not influenced groundwater quality conditions in this portion of the site.

Although, site-related contaminants of concern were identified within subsurface soil during previous investigations, soil samples were collected from depth intervals within the saturated zone and, therefore, are likely not representative of the subsurface soil, but include the contaminant fraction from groundwater. Under the remedial action performed at the Clinton West site, potential impacts to soil were addressed as part of the groundwater remedial design. Based on the previous soil sampling data and reductions in CVOC concentrations observed in groundwater, residual contamination in subsurface soil is expected to be minimal and treated concurrently with groundwater. Future groundwater monitoring will identify the potential and significance of residual soil contamination. If groundwater monitoring results indicate a potential for a continuing soil source additional injection events may be warranted under this SMP.

Table 2 and Figure 9 summarize the results of all groundwater samples collected at the site after completion of the remedial action that exceed the unrestricted use concentrations for VOCs. Since contaminated groundwater remains beneath the site after completion of the remedial action, ECs and ICs are required to protect human health and the environment. These ECs and ICs are described in the following sections. Long-term management of these ECs and ICs, and residual contamination will be performed under this SMP.
2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

Since remaining contaminated groundwater/soil vapor exists beneath the site, ECs and ICs are required to protect human health and the environment. This EC/IC Plan describes the procedures for the implementation and management of all EC/ICs at the site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

This plan provides:

- A description of all EC/ICs on the site.
- The basic implementation and intended role of each EC/IC.
- A description of the key components of the ICs set forth in the Environmental Easement.
- A description of the features to be evaluated during each required inspection and periodic review.
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Excavation Work Plan (EWP) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site.
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the site remedy, as determined by the NYSDEC.

2.2 ENGINEERING CONTROLS

2.2.1 Engineering Control Systems

2.2.1.1 Cover System

Subsurface soil was not disturbed at the site during the implementation of the remedial action per the ROD. Exposure to remaining contamination in soil at the site is prevented by the existing soil cover that remains at the site. Additionally, asphalt pavement, concrete-covered sidewalks, and concrete building slabs prevent incidental contact or
ingestion of subsurface soil at the majority of the site. The EWP that appears in Appendix D outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

2.2.1.2 Sub-slab Depressurization System

Exposure to indoor air impacted with VOCs within the site building is prevented by a SSDS, which was installed in the site building by the NYSDEC in February 2011 as an IRM. The system serves to reduce the pressure beneath the building slab by venting potentially impacted soil vapor to outside of the building.

The SSDS is located in the southwest corner of the tenant laundry facility at 609 West Clinton Street. A pre-design PFE test was completed on December 9, 2010. Based on the PFE, EA issued a memo to NYSDEC indicating that SSDS would be a suitable technique to mitigate the potential for VI at the Clinton West Laundry facility. Following NYSDEC approval, Groundwater and Environmental Services, Inc., under the supervision of EA, installed the system fan, interior and exterior piping, and exterior system discharge on February 7, 2011. The SSDS Information Package, which includes operation and maintenance instructions, is provided as Appendix E.

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10 (NYSDEC 2010b)3.

2.2.2.1 Sub-slab Depressurization System

The active SSDS will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SSDS is no longer required, a proposal to discontinue the SSDS will be submitted by the property owner to the NYSDEC and NYSDOH.

2.2.2.2 Monitored Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC, until residual groundwater concentrations are found to be consistently below NYSDEC standards or have become asymptotic at an acceptable level over an extended period. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.
2.3 INSTITUTIONAL CONTROLS

A series of ICs is required by the ROD (NYSDEC 2010a)\(^1\) to: (1) implement, maintain and monitor EC systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to commercial and restricted residential (portions of the property zoned for each use by the City of Ithaca) uses only. Adherence to these ICs on the site is required by an Environmental Easement/Notice (Appendix A) and will be implemented under this SMP.

These ICs are:

- Compliance with an Environmental Easement/Notice and this SMP.
- All ECs must be operated and maintained as specified in this SMP.
- All ECs on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Groundwater and indoor air monitoring must be performed as defined in this SMP.
- Data and information pertinent to site management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

ICs identified in an Environmental Easement/Notice (Appendix A) may not be discontinued without an amendment to or extinguishment of the Environmental Easement/Notice.

The site has a series of ICs in the form of site restrictions. Adherence to these ICs will be required by an Environmental Easement/Notice (Appendix A). Site restrictions that apply to the Controlled Property are:

- The property may only be used for restricted residential or commercial use (as zoned for such use by the City of Ithaca) provided that the long-term ECs and ICs included in this SMP are employed.
- The property may not be used for a higher level of use, such as unrestricted residential use without additional remediation and amendment of an Environmental Easement/Notice, as approved by the NYSDEC.
- All future activities on the property that will potentially disturb remaining contaminated material must be conducted in accordance with this SMP.
The use of the groundwater for a source of potable or process water is restricted without treatment rendering it safe for intended use.

The potential for VI must be evaluated for any buildings developed in the area noted on Figure 2, and any potential impacts that are identified must be monitored or mitigated.

The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

### 2.3.1 Excavation Work Plan

The site has been remediated for restricted residential and commercial use. Any future intrusive work that will penetrate the soil cover or cap, or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system will be performed in compliance with the EWP that is attached as Appendix D to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a HASP and Community Air Monitoring Plan (CAMP) prepared for the site or in accordance with the NYSDOH Generic CAMP. A HASP Addendum is attached as Appendix F to this SMP that is in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section D-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP, and CAMP, and will be included in the periodic inspection and certification reports submitted under the Periodic Review Report (Section 5).

The site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The site owner will ensure that site development activities will not interfere with, or otherwise impair or compromise, the ECs described in this SMP.
2.3.2  Soil Vapor Intrusion Evaluation

Prior to the construction of any enclosed structures located within the area identified on Figure 7, a soil VI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the proposed structure. Alternatively, a soil VI mitigation system may be installed as an element of the building foundation without first conducting an investigation. This mitigation system will include a vapor barrier and passive SSDS that is capable of being converted to an active system. The SSDS system is only recommended as a conservative alternative to performing a soil VI evaluation and designing a mitigation system.

Prior to conducting a soil VI investigation or installing a mitigation system, a Work Plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This Work Plan will be developed in accordance with the most recent NYSDOH Guidance for Evaluating VI in the State of New York (NYSDOH 2006)10. Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the soil VI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary (unvalidated) soil VI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as mitigation. Validated soil VI data will be transmitted to the property owner within 30 days of validation. If any indoor air test results exceed NYSDOH guidelines, relevant NYSDOH fact sheets will be provided to all tenants and occupants of the property within 15 days of receipt of validated data.

Soil VI sampling results, evaluations, and follow-up actions will also be summarized in the next Periodic Review Report.

2.4  INSPECTIONS AND NOTIFICATIONS

2.4.1  Inspections

Inspections of all remedial components installed at the site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed
- If these controls continue to be protective of human health and the environment
- Compliance with requirements of this SMP and the Environmental Easement/Notice

Achievement of remedial performance criteria
Sampling and analysis of appropriate media during monitoring events
If site records are complete and up to date
Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the EC/ICs implemented at the site by a qualified environmental professional as determined by NYSDEC.

2.4.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use in accordance with the ROD (NYSDEC 2010a)\(^1\).
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the EWP (Appendix D).
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other ECs and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48 hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective
purchaser has been provided with a copy of all approved work plans and reports, including this SMP.

- Within 15 days after the transfer of all or part of the site, the new owner’s name, contact representative, and contact information will be confirmed in writing.

2.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance the Owner or Owner’s representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the NYSDEC Project Manager. These emergency contact lists must be maintained in an easily accessible location at the site.

**Emergency Contact Numbers**

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical, Fire, and Police:</td>
<td>911</td>
</tr>
<tr>
<td>One Call Center:</td>
<td>(800) 272-4480</td>
</tr>
<tr>
<td></td>
<td>(3 day notice required for utility markout)</td>
</tr>
<tr>
<td>Poison Control Center:</td>
<td>(800) 222-1222</td>
</tr>
<tr>
<td>Pollution Toxic Chemical Oil Spills:</td>
<td>(800) 424-8802</td>
</tr>
<tr>
<td>NYSDEC Spills Hotline</td>
<td>(800) 457-7362</td>
</tr>
</tbody>
</table>

**Contact Numbers**

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYSDEC Division of Environmental Remediation</td>
<td>518-402-9814</td>
</tr>
</tbody>
</table>

Note: Contact numbers subject to change and should be updated as necessary
2.5.2 Map and Directions to Nearest Health Facility

Site Location: Clinton West Plaza  
Nearest Hospital Name: Cayuga Medical Center  
Hospital Location: 101 Dates Drive, Ithaca, NY  
Hospital Telephone: 607-274-4011

Directions to the Hospital:
1. Head west on W Clinton St toward S Meadow St.
2. Take the 1st right onto S Meadow St.
3. Turn left onto W Buffalo St.
4. Continue onto NY-96 N/Cliff St.
5. Continue to follow NY-96 N.
6. Turn right toward Harris B Dates Dr.
7. Turn left onto Harris B Dates Dr.
8. Turn right toward Dates Dr.
9. Turn right onto Dates Dr.
   Destination will be on the right

Total Distance: 3.7 miles  
Total Estimated Time: 12 minutes
Map* Showing Route from the site to the Hospital:

*Map and image is from maps.google.com
2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (Section 2.5.1). The list will also be posted prominently at the site and made readily available to all personnel at all times.

2.5.3.1 Spill Procedures

In the event that a hazardous substance is released on the site, all site personnel shall be notified immediately. If the substance poses an immediate threat to human health and the environment, evacuation and notification of the appropriate authorities including the NYSDEC Spill Response team (listed in previous table) may be necessary. If the release is minimal and does not pose a health risk, the leak shall be contained and the spilled material shall be cleaned up with appropriately sized absorbent pads. Materials used to contain the substance shall be disposed of properly.

2.5.3.2 Evacuation Plan

If site evacuation is necessary, site personnel shall exit the site on Center Street. All site personnel shall be notified of the evacuation.
3.0 SITE MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the site, the soil cover system, and all affected site media identified below. Monitoring of other ECs is described in Section 4, Operation and Maintenance Plan. This Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils).
- Assessing compliance with applicable NYSDEC SCGs, particularly ambient groundwater standards and Part 375 SCOs for soil.
- Assessing achievement of the remedial performance criteria.
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency
- Information on all designed monitoring systems (e.g., well logs)
- Analytical sampling program requirements
- Reporting requirements
- QA/QC requirements
- Inspection and maintenance requirements for monitoring wells
- Monitoring well decommissioning procedures
- Annual inspection and periodic certification.

Semiannual monitoring of the performance of the remedy and overall reduction in contamination on-site and off-site will be conducted for the first 2 years. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels in air, soil, and/or groundwater in the affected areas, will be evaluated to determine if the remedy
continues to be effective in achieving remedial goals. Monitoring programs are summarized in the table below and outlined in detail in Sections 3.2 and 3.3 below.

**Monitoring/Inspection Schedule**

<table>
<thead>
<tr>
<th>Monitoring Program</th>
<th>Frequency*</th>
<th>Matrix</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>Semiannual (for the first 2 years)</td>
<td>Water</td>
<td>VOCs</td>
</tr>
<tr>
<td>SSDS/Indoor Air</td>
<td>As recommended by State agencies (during the heating season)</td>
<td>Air</td>
<td>VOCs</td>
</tr>
</tbody>
</table>

The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH.

### 3.2 SOIL COVER SYSTEM MONITORING

The soil cover and asphalt parking areas will be inspected on annual basis to identify any disturbances or otherwise impaired.

### 3.3 MEDIA MONITORING PROGRAM

Groundwater and indoor air will be monitored as part of the management of this site.

#### 3.3.1 Groundwater Monitoring

The network of monitoring wells has been installed to monitor both up-gradient and down-gradient groundwater conditions at the site. The network of on-site and off-site wells was designed and installed during the RI (Fagan Engineers 2009)\(^6\) and pre-design investigation (EA 2010a)\(^8\). A total of 21 monitoring wells and 3 temporary monitoring points are located at the site. Of these, 11 were selected for groundwater monitoring during the remedial action based upon the spatial relationship to the targeted treatment zone. Additionally, the monitoring wells were selected based on previous CVOC detections, location to the estimated contaminant plume and the targeted treatment zone, and location upgradient or downgradient of the contaminant plume based on groundwater gradients and flow direction. The groundwater monitoring wells on site are installed to a maximum of 25 ft bgs and constructed with 10 ft of screen. The layout of the groundwater monitoring well network is illustrated in Figure 10.

These 11 monitoring wells were sampled in October 2011 to establish baseline groundwater quality conditions and six times during the-post-injection monitoring phase of the remedial action. The last sampling event was completed by EA in October/November 2012. Samples were analyzed form VOCs (Method SW8260B). Results of the baseline sampling and six post-injection monitoring events are shown on Figure 9. Additionally, six existing groundwater monitoring wells provide no additional data and are not required to monitor the effectiveness of the remedy and should be
decommissioned per CP-43 with the approval of the NYSDEC (see Section 3.3.1.2 and Figure 10).

Groundwater monitoring is to be performed semiannually for the first 2 years and as directed by NYSDEC thereafter. Groundwater is to be analyzed VOCs (Method SW8260B). The following monitoring wells are to be sampled as part of the groundwater monitoring program for the site:

<table>
<thead>
<tr>
<th>Monitoring Wells at the Clinton West Plaza</th>
<th>Stick-up or Flushmount</th>
<th>Well Depth (ft bgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upgradient On-site Monitoring Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMW-03</td>
<td>Flushmount</td>
<td>19.39</td>
</tr>
<tr>
<td>TPMW-6</td>
<td>Flushmount</td>
<td>15.61</td>
</tr>
<tr>
<td><strong>Downgradient On-site Monitoring Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPMW-3</td>
<td>Flushmount</td>
<td>12.95</td>
</tr>
<tr>
<td>TPMW-4</td>
<td>Flushmount</td>
<td>14.52</td>
</tr>
<tr>
<td>MMW-01</td>
<td>Flushmount</td>
<td>19.35</td>
</tr>
<tr>
<td>MMW-02</td>
<td>Flushmount</td>
<td>19.56</td>
</tr>
<tr>
<td>MMW-04</td>
<td>Flushmount</td>
<td>29.45</td>
</tr>
<tr>
<td>MW-14</td>
<td>Flushmount</td>
<td>14.46</td>
</tr>
<tr>
<td>TPM-01</td>
<td>Flushmount</td>
<td>24.39</td>
</tr>
<tr>
<td>TPM-02</td>
<td>Stick-up</td>
<td>28.41</td>
</tr>
<tr>
<td>TPM-03</td>
<td>Flushmount</td>
<td>21.85</td>
</tr>
</tbody>
</table>

Monitoring well construction logs are included in Appendix G. Caps and plugs for monitoring wells are labeled with well IDs in indelible ink and should be relabeled during each sampling event. Flushmount wells are secured by a bolts and steel covers. Due to the lack of space inside the flushmount curb boxes, monitoring wells are not currently locked. TPM-02 is a temporary monitoring point and is not secured.

The sampling frequency may be modified with the approval of the NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

The groundwater monitoring well network is shown in Figure 10. Figure 9 and Table 2 provides a summary of the post-remedial action groundwater quality for VOCs.

Deliverables for the groundwater monitoring program are specified below.

### 3.3.1.1 Sampling Protocol

All monitoring well sampling activities will be recorded in a field book and a groundwater sampling log presented in Appendix H. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log will serve as the inspection form for the groundwater monitoring well network.
Prior to sampling, all monitoring wells shall be inspected and gauged to obtain the static water levels for the site. Monitoring well purging will be performed and groundwater samples will be collected from the monitoring wells using a submersible pump and dedicated section of polyethylene tubing. A water quality meter (Horiba U-52 or similar) with flow-through cell (flushed with distilled water before use at each well) will be used during well purging for field measurement of pH, specific conductance, temperature, oxidation-reduction potential, turbidity, and dissolved oxygen. Each well shall be purged three well volumes or until field parameters stabilize, whichever occurs first. Purge water is to be discharged to the ground surface near the well. In the event that a strong odor or sheen is evident, water is to be drummed, characterized, handled, and disposed of at a licensed treatment, storage, and disposal facility.

The following procedures will be used for monitoring well groundwater sampling:

- Wear appropriate personal protective equipment as specified in the site-specific HASP Addendum (Appendix F). In addition, samplers will use new nitrile sampling gloves for the collection of each sample.

- Unlock and remove the well cap where necessary.

- Measure the static water level in the well with an electronic water level indicator.

- The water level indicator will be washed with Alconox detergent and water, then rinsed with deionized water between individual monitoring wells to prevent cross-contamination.

- Calculate the volume of water in the well.

- Place polyethylene sheeting around the well casing to prevent contamination of sampling equipment in the event sampling equipment is dropped.

- Purge water from the well until water quality parameters are stabilized or 3-5 well volumes of water (unless otherwise approved), using USEPA Low-Flow methodology as described below.

- Pump with a peristaltic pump equipped with new polyethylene tubing dedicated to each well. Set pump/tubing intake at the approximate mid-point of the monitoring wells screened interval and start pump.

- Allow field parameters of pH, reduction-oxidation potential (Eh), dissolved oxygen, specific conductivity, turbidity, and temperature to stabilize before sampling. Purging will be considered complete if the following conditions are met:
  - Consecutive pH readings are ±0.1 pH units of each other
Consecutive dissolved oxygen readings are ±10 percent of each other
Consecutive Redox readings are ±0.10 units of each other
Consecutive measured specific conductance is ±3 percent of each other
Turbidity < 50 Nephelometric turbidity units

If these parameters are not met after purging a volume equal to 3-5 times the volume of standing water in the well, the Remedial Project Manager will be contacted to determine the appropriate action(s).

- If the well is purged dry before the required volumes are removed, the well may be sampled when it recovers (recovery period up to 24 hours).

- Place analytical samples in cooler and chill to 4°C. Samples will be shipped to the analytical laboratories within 24 hours.

- Pump will be decontaminated and the polyethylene suction/discharge line will be properly discarded.

- Re-lock well cap.

- Fill out field sampling form, labels, custody seals, and chain-of-custody forms.

Groundwater samples will be placed in appropriate sample containers, sealed, and submitted to the laboratory for analysis.

### 3.3.1.2 Monitoring Well Repairs, Replacement, and Decommissioning

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells rendered unserviceable (e.g., damaged screen or excessive silting) or approved for removal will be properly decommissioned and replaced if necessary (as per the Monitoring Plan).

Well decommissioning procedures are as follows:

- Measure total depth of the well to ensure the well depth is consistent with the recorded construction depth.

- Remove the steel manhole or steel stickup protective casing with an effort being made to ensure that the riser does not splinter and/or become structurally unstable for pulling.

- The bottom of the casing shall be punctured and the casing freed from the hole using suitable equipment (i.e., drill rig cable system). Well materials shall be disposed of at a licensed disposal facility.
The well shall be tremie-grouted with a cement bentonite grout while removing the casing. The grout shall be completed to a depth of approximately 5 ft below grade.

A bentonite seal shall be placed on top of the grout.

The remaining riser shall be sealed with a Portland cement plug to the ground surface.

The following table identifies the six monitoring wells no longer needed to assess remedial action performance or monitoring under the SMP. These monitoring wells will be scheduled for decommissioning upon finalization of the SMP and approval by NYSDEC.

<table>
<thead>
<tr>
<th>Monitoring Wells Proposed to be Decommissioned at Clinton West Plaza</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upgradient On-site Monitoring Wells</strong></td>
</tr>
<tr>
<td>MW-07</td>
</tr>
<tr>
<td>MW-08</td>
</tr>
<tr>
<td>MW-09</td>
</tr>
<tr>
<td>MW-10</td>
</tr>
<tr>
<td>MW-11</td>
</tr>
<tr>
<td>MW-12</td>
</tr>
</tbody>
</table>

In the event the casing or well screen is severed during casing pulling, or if a borehole collapse occurs, the remaining materials will be removed by over-drilling using the conventional augering method described below:

- Overdrilling shall be conducted by either using a hollow-stem auger with outward facing carbide cutting teeth with a diameter 2 in. larger than the casing and/or using a hollow-stem auger fitting with a plug used to grind the well materials which will be brought to the surface by the auger. Spoils shall be drummed and disposed of at a licensed disposal facility.

- Overdrilling shall be advanced 0.5 ft beyond the original bore depth.

- Once the desired drilling depth has been completed (using open ended hollow-stem auger method) the casing and screen shall be retrieved from the center of the augers.

- As the augers are being retracted, cement-bentonite grout shall be pumped down the center of the augers.
- Bore hole shall be grouted and sealed with bentonite and Portland cement as described above.

Replacement wells shall be constructed using methods consistent with those used during the RI (Fagan Engineers 2009) and pre-design investigation. Existing monitoring well construction logs are provided in Appendix G.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC’s Commissioner Policy – 43 Groundwater Monitoring Well Decommissioning Policy (NYSDEC 2009)11. Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

### 3.3.2 Indoor Air Monitoring

Indoor air sampling is to take place annually as required by the NYSDEC and NYSDOH, as discussed in Section 1.3 of this plan, on-site on an annual basis to monitor effectiveness of SSDSs and potential soil VI. Samples are to be analyzed by an Environmental Laboratory Analytical Program-certified laboratory for VOCs using U.S. Environmental Protection Agency (EPA) Method TO-15. In accordance with the NYSDOH guidance for evaluating soil VI (2006a)9, the analysis for the indoor air samples is to achieve detection limits of 0.25 μg/m³ for each compound.

Prior to collection of indoor air, an inspection of general site conditions is to be performed. The inspection is to include the following activities:

- Completion of the NYSDOH Indoor Air Quality Questionnaire and Building Inventory included in Indoor Air Sampling and Analysis Guidance (NYSDOH 2006b)12. A sample of the questionnaire is provided in Appendix H. As directed by NYSDEC, a limited product inventory will be prepared. Sections 1 through 12 of the questionnaire will be completed with the exception of Section 4. In addition, a floor plan sketch of the first floor will not be required.

---

12 NYSDOH. 2006b. Indoor Air Sampling and Analysis Guidance.
• Documentation of weather conditions outside and temperature inside.

• Ambient air (indoor and outdoor) screening using field equipment (i.e., parts per billion photoionization detector).

• Selection of air sampling locations.

An active approach, utilizing laboratory batch-certified Summa canisters, regulated for a 24-hour sample collection, will be used to monitor the indoor air conditions. The following procedures will be used for all indoor air sampling:

• Visually assess the building to be sampled. Select an area for sampling that is approximately 3–4 ft above the floor surface, out of the line of traffic, and away from any vents or windows.

• Place a canister in the selected sample location. The canister must be certified clean in accordance with EPA Method TO-15 and under a vacuum pressure of no more than -30 in. of mercury in Hg. Flow controllers must be set for a 24-hour collection period.

• Record the serial number of the canister and associated regulator on the chain-of-custody form and field notebook/sample form. Assign a sample identification on the canister identification tag and record this on chain-of-custody and field notebook/sample form. For the property owner’s privacy, do not use a sample identifier containing the name of the property owner or the address of the property.

• Record the gauge pressure; the vacuum gauge pressure must read -25 in Hg or less, or the canister cannot be used.

• Record the start time on the chain-of-custody form and on the air sampling form (Appendix H), and take a digital photograph of canister setup and the surrounding area.

To terminate the sample collection:

• Close the canister valve; record the stop time on the chain-of-custody form and in the field notebook/sample form.

• Record the final gauge pressure and disconnect the pressure gauge/flow controller from the canister.

• Install the plug on the canister inlet fitting and place the sample container in the original box.
Complete the sample collection log with the appropriate information, and log each sample on the chain-of-custody form.

3.4 SITE-WIDE INSPECTION

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed (Appendix H). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage.
- An evaluation of the condition and continued effectiveness of ECs.
- General site conditions at the time of the inspection.
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection.
- Compliance with permits and schedules included in the Operation and Maintenance Plan.
- Confirm that site records are up to date.

SSDS inspections will take place as part of the annual site-wide inspection and are discussed in Section 4.0 of this plan.

3.5 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) Addendum prepared for the site (Appendix I). Main components of the QAPP Addendum include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
  - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
  - Sample holding times will be in accordance with the NYSDEC Analytical Services Protocol requirements.
Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.

- Sample Tracking and Custody

- Calibration Procedures:
  - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
  - The laboratory will follow all calibration procedures and schedules as specified in EPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.

- Analytical Procedures

- Preparation of a Data Usability Summary Report, which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

- Internal QC and Checks

- QA Performance and System Audits

- Preventative Maintenance Procedures and Schedules

- Corrective Action Measures.

### 3.6 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. A letter report will also be prepared subsequent to each sampling event. The report will include, at a minimum:

- Date of event

- Personnel conducting sampling
• Description of the activities performed

• Type of samples collected (e.g., sub-slub vapor, indoor air, outdoor air, etc);

• Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.)

• Sampling results in comparison to appropriate standards/criteria

• A figure illustrating sample type and sampling locations

• Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format)

• Any observations, conclusions, or recommendations

• A determination as to whether groundwater conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC.

A summary of the monitoring program deliverables are summarized below.

**Schedule of Monitoring/Inspection Reports**

<table>
<thead>
<tr>
<th>Task</th>
<th>Reporting Frequency¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter inspection and Monitoring Report</td>
<td>Semiannually for the first 2 years</td>
</tr>
<tr>
<td>Periodic Review Report</td>
<td>January 2014 (First), annually thereafter</td>
</tr>
</tbody>
</table>

¹. The frequency of events will be conducted as specified until otherwise approved by NYSDEC.
4.0 OPERATION AND MAINTENANCE PLAN

4.1 INTRODUCTION

This Operation and Maintenance Plan describes the measures necessary to operate, monitor, and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the site to operate and maintain the SSDSs
- Includes an operation and maintenance contingency plan
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSDSs are operated and maintained.

Information on non-mechanical ECs (i.e., soil cover system) is provided in Section 2 – EC/IC Plan. A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP.

4.2 ENGINEERING CONTROL SYSTEM OPERATION AND MAINTENANCE

There is one SSDS on-site and it is located in the southwest corner of the tenant laundry facility in the building at 609 West Clinton Avenue. The system serves to reduce sub-slab pressure and vent built-up soil gas outside of the building. The system consists of slotted screen installed beneath the slabs, connected to polyvinyl chloride pipe, an in-line ventilation fan, and an exterior exhaust point. The exhaust pipe is located within the building and vents above the roof of the building. The vent fan is outside of the building. The exhaust point is covered with rain caps. The system location is shown on Figure 11. The system has run continuously since February 2011.

4.2.1 Scope

The SSDS is continuously operational, and requires minimal maintenance and oversight; however, an annual inspection is required to verify continuous and effective operation. The following sections detail system startup, inspections, and maintenance.

4.2.2.1 System Startup and Testing

Prior to system startup, the building slab, including the system slab and wall penetration and any gaps between the slab and the walls, is to be sealed with a polyurethane sealant. After the fan is turned on, the operating pressure is to be marked on the pressure gauge.
located on the vertical pipe. The pressure is to be checked weekly during continuous operation, until the pressure is observed to be the same during two consecutive weeks.

Following system startup, a field test is to be conducted to check negative pressure beneath the slab. Starting approximately 5 ft from the system, a ¼-in. diameter hole is to be drilled completely through the concrete slab. The vacuum is to be measured using a handheld electric manometer at the test location. This is to be repeated an additional 5 ft from each previous test hole, until the furthest possible point on the slab has been tested. Each previously tested hole is to be filled with fast-setting concrete prior to the succeeding test. The system is working properly if all points tested show a pressure drop of 0.5 Pa or higher.

The system testing described above will be conducted if, in the course of the SSDS lifetime, significant changes are made to the system, and the system must be restarted.

4.2.2.2 System Operation: Equipment Maintenance

In the event that the annual inspection discussed in Section 4.3 reveals system failure or potential for system failure, the building owner and NYSDEC SSDS contact should be notified immediately. Faulty parts of the system should be replaced if possible, or cracks should be sealed using a polyurethane sealant. Depending on the complexity of the problem, an experienced professional should be consulted to return the system to service.

4.3 ENGINEERING CONTROL SYSTEM PERFORMANCE MONITORING

A SSDS has been installed to mitigate possible soil VI into the occupied tenant laundry facility at the on-site building. While the system involves very little in the way of operation and maintenance, monitoring is necessary to verify system functionality and effectiveness. An annual inspection described in Section 4.3.1 will serve to verify that the system components are in working condition and are not compromised in any way. Annual air sampling as discussed in Section 4.3.2 will serve to verify that the system is effectively mitigating vapor intrusion.

4.3.1 General Equipment Monitoring

An annual inspection will be performed on both systems in conjunction with the annual site-wide inspection discussed in Section 3.4 of this plan. The inspection is to include the following:

- Inspect all visible system components, including the system piping, fans,
manometer, etc. Note any cracks in piping or other operational issues

- Inspect slab for cracks, noting location and size of gaps, or where seals have begun to fail

- Make sure that contact information on the SSDS is up to date

- Note changes in building use and changes in heating, ventilation and air conditioning.

Inspection frequency is subject to change with the approval of the NYSDEC and NYSDOH. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Monitoring deliverables for the SSDS are specified later in this plan.

A complete list of components to be checked is provided in the Inspection Checklist, which is part of the site-wide inspection form presented in Appendix H. If any equipment readings are not within their typical range, if any equipment is observed to be malfunctioning, or the system is not performing within specifications, maintenance and repair as per the Operation and Maintenance Plan are required immediately, and the SSDS is to be restarted.

4.3.2 Sampling Event Protocol

Indoor air monitoring is to take place on an annual basis, during the heating season, as required by the NYSDEC and NYSDOH. This is discussed in Section 3.3.2 of this plan. In the event that indoor air monitoring indicates VOC contamination in the air, or per NYSDEC’s request, a full sub-slab soil VI evaluation is to be completed. This would include the collection of an indoor air sample, a sub-slab air sample, and an outdoor air sample. The indoor sample is to be collected as discussed in Section 3.3.2. The following procedures will be used for collection of sub-slab soil vapor samples:

- Visually assess the condition of the floor. Select an area for sampling that is out of the line of traffic and away from major cracks and other floor penetrations (sumps, pipes, etc.). Refer to historical sample forms (Appendix J) for ideal sample locations.

- Drill a ¾-in. diameter hole completely through the concrete floor slab using an electric hammer drill.

- Sweep concrete dust away from the drill hole and wipe the floor with a dampened towel. Concrete dust can be cleaned up with a vacuum equipped with a high efficiency particulate air filter only after the sample tubing is properly sealed and
sample collection has begun.

- Insert the Teflon-lined polyethylene tubing (¼-in. inside diameter × ⅜-in. outside diameter, approximately 3-ft long) into the hole drilled in the floor, extending no further than 2 in. below the bottom of the floor slab.

- Pour the melted beeswax around the tubing at the floor penetration, packing it in tightly around the tubing.

- Attach a syringe to the sample tube and purge approximately 100 mL of air/vapor. The syringe will be capped and the air released outside the building as to not interfere with the indoor air sample collection.

- Place a canister on the floor adjacent to the sample tube. The canister will be a 6-L canister (provided by an independent laboratory) with a vacuum gauge and flow controller. The canister must be certified clean in accordance with EPA Method TO-15 and under a vacuum pressure of no more than -30 in. of mercury in HG. Flow controllers must be set for a 24-hour collection period.

- Record the serial number of the canister and associated regulator on the chain-of-custody form and field notebook/sample form. Assign sample identification on the canister identification tag and record this on the chain-of-custody form and field notebook/sample form. For the property owner’s privacy, do not use a sample identifier containing the name of the property owner or the address of the property.

- Record the gauge pressure; the vacuum gauge pressure must read -25 in Hg or less, or the canister cannot be used.

- Record the start time on the chain-of-custody form and on the field record of air sampling (Appendix H), and take a digital photograph of canister setup and the surrounding area.

To complete the sample collection:

- Close the canister valve and record the stop time on the chain-of-custody form and in the field notebook/sample form.

- Record the final gauge pressure and disconnect the sample tubing and the pressure gauge/flow controller from the canister, if applicable.

- Install the plug on the canister inlet fitting and place the sample container in the original box.
- Complete the sample collection log with the appropriate information, and log each sample on the chain-of-custody form.

- Remove the temporary subsurface probe and properly seal the hole in the slab with hydraulic cement.

Field QC samples will include duplicates and trip blanks. Field duplicates will be collected at the rate of 1 duplicate per 20 original samples (20 percent). Field duplicates will be collected by installing an in-line stainless steel “tee,” which will essentially split the flow coming from the sample tubing penetrating the floor to two canisters set up adjacent to each other and each collecting vapors at identical flow rates.

Concurrently with the indoor air and sub-slab soil vapor monitoring program, one outdoor ambient air sample will be collected each day that indoor air monitoring occurs. The ambient air samples will be collected during the same 24-hour period as the indoor air samples, which represent outdoor air conditions for the sampling area. The ambient air samples will be collected in a laboratory batch-certified Summa canister regulated for a 24-hour sample collection. A section of Teflon or polyethylene tubing that is identified as laboratory- or food-grade will be extended from the Summa canister to collect the ambient air sample from the breathing zone at approximately 3–5 ft above ground surface. Consistent with the indoor and sub-slab vapor sampling, the collecting rate of the outdoor air sample will be less than 0.2 L per minute.

Air samples will be analyzed by an Environmental Laboratory Analytical Program-certified laboratory for VOCs using EPA Method TO-15. In accordance with the NYSDOH Indoor Air Sampling and Analysis Guidance, the analysis for indoor and outdoor air samples will achieve a minimum reporting limit of 0.25 µg/m³. The analysis for sub-slab soil vapor samples will achieve minimum reporting limit of 5 µg/m³ for structures with full-slab foundations and a minimum 1 µg/m³ for structures with less than a full-slab foundation. For specific parameters identified by NYSDOH, where the selected parameters may have a higher detection limit (e.g., acetone), the higher detection limits will be designated by NYSDOH. The analytical turnaround time will be 14 days from receipt of sample containers. Analytical results will be provided as an electronic data deliverable.

4.4 MAINTENANCE AND PERFORMANCE MONITORING REPORTING REQUIREMENTS

Maintenance reports and any other information generated during regular operations at the site will be kept on file on-site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Periodic Review Report, as specified in the Section 5 of this SMP.
4.4.1 Routine Maintenance Reports

During each maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities
- Presence of leaks
- Date of leak repair
- Other repairs or adjustments made to the system
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet)
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).
5. INSPECTIONS, REPORTING, AND CERTIFICATIONS

5.1 SITE INSPECTIONS

5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedule provided in Section 3 Monitoring Plan of this SMP. At a minimum, a site-wide inspection will be conducted twice a year. Inspections of remedial components (SSDS in this case) will also be conducted when a breakdown of any treatment system component has occurred or whenever a severe condition exists.

5.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

A general site-wide inspection form will be completed during the site-wide inspection (Appendix H). This form is subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format in the Periodic Review Report.

5.1.3 Evaluation of Records and Reporting

The results of the inspection and site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective
- The Monitoring Plan is being implemented
- Operation and maintenance activities are being conducted properly
- The site remedy continues to be protective of public health and the environment and is performing as designed in the Remedial Action Work Plan (Conceptual Pilot Study Design Report) and Final Engineering Report.

5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS

After the last inspection of the reporting period, a qualified environmental professional will prepare the following certification or similar as provided by the NYSDEC:

For each IC/EC identified for the site, I certify that all of the following statements are true:
The inspection of the site to confirm the effectiveness of the ICs/ECs required by the remedial program was performed under my direction.

The IC/EC employed at this site is unchanged from the date the control was put in place, or last approved by the Department.

Nothing has occurred that would impair the ability of the control to protect the public health and environment.

Nothing has occurred that would constitute a violation or failure to comply with any SMP for this control.

Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control.

If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document.

Use of the site is compliant with the Environmental Easement/Notice (Appendix A).

The EC systems are performing as designed and are effective.

To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program.

The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner’s Designated Site Representative].

The signed certification will be included in the Periodic Review Report described below.

For each IC identified for the site, I certify that all of the following statements are true:

- The IC employed at this site is unchanged from the date the control was put in place, or last approved by the Department.
Nothing has occurred that would impair the ability of the control to protect the public health and environment.

Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control.

Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control.

If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document.

Use of the site is compliant with the Environmental Easement/Notice (Appendix A).

The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner’s Designated Site Representative].

5.3 PERIODIC REVIEW REPORT

A Periodic Review Report will be submitted to the NYSDEC every calendar year, beginning after approval of the Final Engineering Report. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in the metes and bounds. The report will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each annual certification period. Media sampling results will also incorporated into the Periodic Review Report. The report will include:

Identification, assessment, and certification of all ECs/ICs required by the remedy for the site.

Results of the required annual site inspections and severe condition inspections, if applicable.

All applicable inspection forms and other records generated for the site during the reporting period in electronic format.
A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions.

Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format.

A site evaluation, which includes the following:
- The compliance of the remedy with the requirements of the site-specific ROD (NYSDEC 2010a)\(^1\)
- The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications
- Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored
- Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan
- The overall performance and effectiveness of the remedy.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office and Regional Office in which the site is located, and in electronic format to NYSDEC Central and Regional Offices, and the NYSDOH Bureau of Environmental Exposure Investigation.

5.4 CORRECTIVE MEASURES PLAN

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an IC/EC, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the corrective measures plan until it is approved by the NYSDEC.
FIGURE 1
Site Location Map

Legend
- Highway
- Major Road
- Local Road
- Park
- Rivers & Streams
- Surface Water Body

Source: ESRI Street Maps USA
FIGURE 2
Site and Surrounding Area

Legend
Select Structures
- Dry Cleaners
- Residence
- Utility Building

Zoning
- Commercial
- Residential

1 inch = 70 feet
Source: Orthoimagery: NYSGIS Clearinghouse, Natural Color - 2007; Property Parcels: Tompkins County 2010
FIGURE 4
Interpreted Groundwater Contours 31 October 2012

Legend

- Groundwater Monitoring Well
- Interpreted Groundwater Flow Direction
- Interpreted Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour

Source: Orthoimagery: NYSGIS Clearinghouse, Natural Color - 2007

Scale: 1 inch = 40 feet

CLINTON WEST PLAZA (755015)
SITE MANAGEMENT PLAN
ITHACA, NEW YORK

PROJECT MGR: RSC
DESIGNED BY: ALK
CREATED BY: CJS
CHECKED BY: RSC
SCALE: AS SHOWN
DATE: SEPTEMBER 2013
PROJECT NO: 14907.04
FILE NO: GIS/PROJECTS/1490704_FIG4.MXD
### Chlorinated Volatile Organic Compounds Exceedences in Subsurface Soil Samples - March 2006 and April 2011

**Clinton West Plaza (755015)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Sample Year</th>
<th>Sample Depth</th>
<th>VOCs</th>
<th>mg/kg</th>
<th>cis-1,2-Dichloroethene mg/kg</th>
<th>Tetrachloroethene mg/kg</th>
<th>Trichloroethene mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH-1 (March 2006)</td>
<td>(8-10 ft)</td>
<td></td>
<td>VOCs</td>
<td></td>
<td>cis-1,2-Dichloroethene</td>
<td>Tetrachloroethene</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cis-1,2-Dichloroethene</td>
<td>.52 E</td>
<td>.4 E</td>
<td>.9 D</td>
<td>2.1 D</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Vinyl Chloride</td>
<td>.064 E</td>
<td>.064 E</td>
<td>.15 D</td>
<td>.3 D</td>
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<tr>
<td>SB-06 (April 2011)</td>
<td>(8-9 ft)</td>
<td></td>
<td>VOCs</td>
<td></td>
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<td>Tetrachloroethene</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>2.2 JD</td>
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<td>58 D</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Vinyl Chloride</td>
<td>4.4 D</td>
<td>2.2 JD</td>
<td>90 D</td>
<td>58 D</td>
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<td>Trichloroethene</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>5.8 JD</td>
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<td>65 D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vinyl Chloride</td>
<td>9.8 D</td>
<td>5.8 JD</td>
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<td>65 D</td>
</tr>
<tr>
<td>BH-6 (March 2006)</td>
<td>(14-16 ft)</td>
<td></td>
<td>VOCs</td>
<td></td>
<td>cis-1,2-Dichloroethene</td>
<td>Tetrachloroethene</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td></td>
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<td>1.6 E</td>
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<td></td>
<td></td>
<td>Vinyl Chloride</td>
<td>1.6 E</td>
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<td>3.1 JD</td>
<td>1.5 JD</td>
</tr>
</tbody>
</table>

Values in **RED** indicate concentration in excess of NYCRR Part 375 Soil Cleanup Objective for Unrestricted Use.

**Legend**
- **Subsurface Soil Boring (2011)**
- **Subsurface Soil Boring (2006)**
- **Groundwater Monitoring Well**
- **Commercial**
- **Residential**

**Source:** ESRI Street Maps USA

**Figure 5**

Chlorinated Volatile Organic Compounds Exceedences in Subsurface Soil Samples - March 2006 and April 2011

**CLINTON WEST PLAZA (755015)**

**SITE MANAGEMENT PLAN**

**ITHACA, NEW YORK**

**Project No:**

**GIS/PROJECTS/14907.02_FIG5.MXD**

**Designed By:**

**CJS**

**Checked By:**

**RSC**

**Date:**

**September 2013**

**Scale:**

**AS SHOWN**

**Project No:**

**14907.04**

**File No:**

**GIS/PROJECTS/14907.02_FIG5.MXD**
CLINTON WEST PLAZA (755015)
SITE MANAGEMENT PLAN
ITHACA, NEW YORK

FIGURE 7
Soil Vapor Intrusion Evaluation Locations (2011)

Legend
- Dry Cleaners
- Residence
- Indoor Air Sample Location
- Utility Building
- Tax Parcel Boundary

Scale: 1 inch = 60 feet

Source: Orthoimagery: NYSGIS Clearinghouse, Natural Color - 2007; Property Parcels: Tompkins County 2010
FIGURE 10
Groundwater Monitoring Well Network

CLINTON WEST PLAZA (755015)
SITE MANAGEMENT PLAN
ITHACA, NEW YORK

Legend

Groundwater Monitoring Well
Temporary Monitoring Point
Property Boundary

1 inch = 60 feet
Source: Orthoimagery: NYSGIS Clearinghouse, Natural Color - 2007
<table>
<thead>
<tr>
<th>MW ID</th>
<th>TPMW-3</th>
<th>TPMW-4</th>
<th>TPMW-6</th>
<th>TPM-01</th>
<th>TPM-02</th>
<th>TPM-03</th>
<th>MMW-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screened Interval</td>
<td>6 - 16 ft bgs</td>
<td>6 - 16 ft bgs</td>
<td>6 - 16 ft bgs</td>
<td>18 - 28 ft bgs</td>
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<td>14.5 - 24.5 ft bgs</td>
<td>10 - 20 ft bgs</td>
</tr>
<tr>
<td>Sample Type</td>
<td>Groundwater</td>
<td>Groundwater</td>
<td>Groundwater</td>
<td>Groundwater</td>
<td>Groundwater</td>
<td>Groundwater</td>
<td>Groundwater</td>
</tr>
<tr>
<td>Acetone (μg/L)</td>
<td>(&lt;2.2) R</td>
<td>(&lt;2.2) R</td>
<td>7.8 R</td>
<td>7.0 R</td>
<td>(&lt;2.2) U</td>
<td>6.1 R</td>
<td>5.8 R</td>
</tr>
<tr>
<td>2- Butanone (μg/L)</td>
<td>(&lt;2.1) R</td>
<td>(&lt;2.1) R</td>
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</tr>
<tr>
<td>Carbon disulfide (μg/L)</td>
<td>3.2 U</td>
<td>2.1 U</td>
<td>(&lt;0.34) U</td>
<td>(&lt;0.34) U</td>
<td>1.7 R</td>
<td>(&lt;0.34) U</td>
<td>(&lt;0.34) U</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene (μg/L)</td>
<td>990 D</td>
<td>430 D</td>
<td>(&lt;0.48) U</td>
<td>(&lt;0.48) U</td>
<td>0.8 J</td>
<td>(&lt;0.48) U</td>
<td>(&lt;0.48) U</td>
</tr>
<tr>
<td>trans-1,2-Dichloroethene (μg/L)</td>
<td>12 D</td>
<td>4.7 D</td>
<td>(&lt;0.65) U</td>
<td>(&lt;0.65) U</td>
<td>1.6 D</td>
<td>(&lt;0.65) U</td>
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</tr>
<tr>
<td>Tetrachloroethene (μg/L)</td>
<td>690 D</td>
<td>26 D</td>
<td>(&lt;0.65) U</td>
<td>(&lt;0.65) U</td>
<td>0.71 J</td>
<td>(&lt;0.65) U</td>
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<tr>
<td>Trichloroethene (μg/L)</td>
<td>410 D</td>
<td>51 D</td>
<td>(&lt;0.36) U</td>
<td>(&lt;0.36) U</td>
<td>2.7 D</td>
<td>(&lt;0.36) U</td>
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</tr>
<tr>
<td>Vinyl chloride (μg/L)</td>
<td>92 J</td>
<td>130 D</td>
<td>(&lt;0.50) U</td>
<td>0.55 J</td>
<td>0.57 J</td>
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</tr>
</tbody>
</table>

**Parameters List**

<table>
<thead>
<tr>
<th>EPA Method 8260B</th>
<th>Parameters List</th>
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**NYSDEC AWQS (μg/L)**

- Bold and shaded values indicate that the analyte was detected greater than the NYSDEC Ambient Water Quality Standards.
- Underline signifies that the analyte was not detected above the sample reporting limit; and the reporting limit is approximate.
- Italic signifies that the analyte was not detected above the sample reporting limit and the reporting limit is approximate.
- Bold signifies that the analyte was detected greater than the NYSDEC Ambient Water Quality Standards.
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# TABLE 2 SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER SAMPLES - OCTOBER/NOVEMBER 2012

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<tr>
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<td>L2322-09</td>
<td>L2322-10</td>
<td>L2322-11</td>
<td>L2322-12</td>
<td>L2322-05</td>
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<tr>
<td>MW ID</td>
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<td>21 J</td>
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<td>L2322-12</td>
<td>L2322-05</td>
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<td></td>
</tr>
<tr>
<td>MW ID</td>
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<td>31 D</td>
<td>370 J</td>
<td>3.1 U</td>
<td>5.0 J</td>
<td>(&lt;2.2) R</td>
<td>(&lt;2.2) R</td>
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<tr>
<td>MW ID</td>
<td>7.9 D</td>
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<td>31 D</td>
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<td>L2322-05</td>
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<tr>
<td>MW ID</td>
<td>3.9 J</td>
<td>0.44 J</td>
<td>0.04 J</td>
<td>2 (s)</td>
<td>190 J</td>
<td>2.4 J</td>
<td>U (0.50) U</td>
<td>U (0.50) U</td>
<td>190 J</td>
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<tr>
<td>Lab ID</td>
<td>L2322-08/DL</td>
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<td>L2322-05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Parameters List**
- 2-Butanone (μg/L)
- 1,2-Dichloroethene (μg/L)
- cis-1,2-Dichloroethene (μg/L)
- trans-1,2-Dichloroethene (μg/L)
- Methylene Chloride (μg/L)
- Tetrachloroethene (μg/L)
- Trichloroethene (μg/L)
- 1,2,3-Trichloropropane (μg/L)
- Vinyl chloride (μg/L)

**MW ID**
- TPMW-3
- TPMW-4
- TPMW-6
- TPM-01
- TPM-02
- TPM-03
- MMW-01

**Sample Date**
- 11/1/12
- 10/31/2012
- 10/31/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012

**Screened Interval**
- 6 - 16 ft bgs
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- L2322-11
- L2322-12
- L2322-05

**NYSDEC AWQS (μg/L)**
- 50 (g)
- (<0.50) U
- (<0.50) U
- 10/31/2012
- 11/1/2012
- 10/31/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012
- 11/1/2012

**NOTE:**
- EPA = U.S. Environmental Protection Agency
- ID = Identification
- bgs = Below ground surface
- NYSDEC = New York State Department of Environmental Conservation
- AWQS = Ambient Water Quality Standard
- μg/L = Micrograms per liter
- J = Analyte detected below the practical quantification limit (PQL)
- R = Sample result is rejected due to serious deficiencies. The presence or absence of the analyte cannot be verified
- U = No guidance value or standard.
- QA/QC = Quality assurance/quality control

**Bold and shaded values indicate that the analyte was detected greater than the NYSDEC Ambient Water Quality Standards.**