1500 Astor Avenue
Remedial Action Work Plan

2300-2314 Eastchester Avenue, Bronx, New York
Block 4393, Lot 1
BCP Site #C203105

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 2
47-40 21st Street
Long Island City, NY 11101

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CERTIFICATIONS

I, Matthew M. Carroll, certify that I am currently a registered professional engineer licensed by the State of New York and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

091629	08/14/2019	
NYS Professional Engineer #	Date	Matthew M. Carroll, P.E. Signature

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AGV	NYSDOH Air Guidance Value
AOC	area of concern
AS	air sparging
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
ECL	Environmental Conservation Law
BTEX	benzene, toluene, ethylbenzene and xylenes
CAMP	Community Air Monitoring Program
C&D	construction and demolition
CDS	construction dewatering system
Class GA Standards	NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CPP	Citizen Participation Plan
COC	Certificate of Completion
DCE	dichloroethylene
DER-10	NYSDEC Division of Environmental Remediation (DER), DER-10 / Technical Guidance for Site Investigation and Remediation
DRO	diesel range organics
DOC	dissolved organic carbon
DUSR	Data Usability Summary Report
EC	engineering control
ESA	Environmental Site Assessment
EZ	exclusion zone
FB	field blanks
FER	Final Engineering Report
ft-bs	feet below building slab
ft-bg	feet below sidewalk grade
ft-msl	feet above mean sea level
GPM	Gallons per minute
HASP	Health and Safety Plan
HSA	Hollow Stem Auger
HSO	Health and Safety Officer
IC	institutional control
ISCO	*in-situ* chemical oxidation
IRM	Interim Remedial Measure
MW	monitoring well
NAVD	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum of 1929
NIOSH	National Institute for Occupational Safety and Health
NYCDEP	New York City Department of Environmental Protection
NYCDEP Limits	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers
NYCDOB	New York City Department of Buildings

NYCDOT	New York City Department of Transportation
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOH-ELAP	NYSDOH Environmental Laboratory Approval Program
O&M Plan	Operations and Maintenance Plan
OSHA	Occupational Safety and Health Association
PCB	polychlorinated biphenyl
PCE	perchloroethylene, aka tetrachloroethylene
PID	photoionization detector
PGWSCOs	6 NYCRR 375-6.8(b) and CP-51 Protection of Groundwater Soil Cleanup Objectives
PP Metals	Priority Pollutant Metals
PPE	personal protective equipment
QA/QC	quality assurance / quality control
QAPP	Quality Assurance Project Plan
RAWP	Remedial Action Plan
RCNY	Rules of the City of New York
RAO	Remedial Action Objective
RE	Remedial Engineer
RI	remedial investigation
RSCOs	Recommended Soil Cleanup Objectives
RUSCOs	6 NYCRR 375-6.8(b) and CP-51 Track 2 – Commercial Use Soil Cleanup Objectives
SB	soil boring
SCGs	Standards, Criteria and Guidance
SV	soil vapor
SMP	Site Management Plan
SMMP	Soil/Material Management Plan
SSDS	sub-slab depressurization system
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TAGM 4046	NYSDEC Technical and Administrative Guidance Memorandum #4046
TB	trip blanks
TCE	trichloroethylene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCLP Limits	USEPA Maximum Concentrations of Contaminants for the Toxicity Characteristic
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank

UUSCOs	6 NYCRR 375-6.8(a) Track 1 Unrestricted Use Soil Cleanup Objectives
VOC	volatile organic compound

EXECUTIVE SUMMARY

SITE DESCRIPTION/PHYSICAL SETTING/SITE HISTORY

On February 21, 2018, Eastchester-Astor, LLC (the "Volunteer") entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) to investigate and remediate the property located at 1500 Astor Avenue Site in the Bronx, New York (the "Site"). The New York State Brownfield Cleanup Agreement Index Number is C203105-01-18 and the Site Number is C203105.

The Site is located at 1500 Astor Avenue and 2300-2314 Eastchester Road in the Pelham Gardens neighborhood of the Bronx, New York. The Site is an L-shaped 0.66-acre parcel located in the Bronx Community Board 11 and is identified as Block 4393, Lot 1 on New York City Tax Maps. The Site is located on the northeast corner of Astor Avenue and Eastchester Avenue. A location map for the Site is provided as Figure 1. A map of the current Site layout is included as Figure 2.

The Astor Avenue building is two stories and is currently occupied by medical offices. The Eastchester Road building is one story and is currently divided into five commercial units. The Eastchester Road building has a full basement, which is used for storage only.

The Volunteer is not proposing to change the use of the Site. Based on a review of historic information, a portion of the Site (2312 Eastchester Road) was used as a dry cleaner for approximately 32 years. The former occupant of the Site, MC Cleaners, was identified as a Large Quantity Generator of Hazardous Wastes by the US Environmental Protection Agency (EPA), with no violations. Other prior uses of the Site include residential dwellings, a funeral home, a bowling alley, a nursery, dry cleaners and retail/office tenants.

SUMMARY OF THE REMEDIAL INVESTIGATION

A Remedial Investigation Report (RIR), also dated July 2018, was prepared by Tenen Environmental LLC (Tenen).

The investigation consisted of installation of several soil borings and collection of soil samples, installation and sampling of groundwater monitoring wells, and sampling of interior sub-slab soil vapor, exterior soil vapor, indoor and ambient air. Based on the results of the remedial investigation (RI) and previous investigations, the following summary has been prepared:

Site History

- A portion of the Site was operated by a dry cleaning facility for approximately 32 years.
- Previous reports identified tetrachloroethene (PCE) impacts in soil, groundwater and soil vapor.

Geology/Hydrogeology

- The Site is covered by six inches to five feet of surface fill material, underlain by layers of reddish-brown medium to coarse grain sand with some silt and degraded bedrock.
- Groundwater was encountered at approximately 1.34 feet below grade (ft-bg) (building cellar) to 7.8 ft-bg (below sidewalk grade) and flows in a southwest direction.

Soil

- The results of the Remedial Investigation (RI) indicate that there is a PCE source area in soil located behind the on-site building fronting Eastchester Road. PCE was vertically and horizontally delineated in soil as part of this RI and is estimated to be limited to a 160 square foot area having a depth of seven feet.
- Petroleum-related volatile organic compounds (VOCs) were not detected in soil at concentrations exceeding applicable standards.
- One semivolatile organic compound (SVOC) [benzo(a)pyrene] was detected in one shallow (0-1 ft-bg) soil sample (TSB-9) at a concentration slightly exceeding the Restricted Commercial SCO. TSB-9 was located in the landscaped area south of the Astor Place Site building. SVOCs are common constituents of historic fill material.

Groundwater

- Chlorinated solvents were detected above the TOGS 1.1.1 Ambient Class GA Water Quality Standards (Class GA Standards) in groundwater collected from the PCE source area (shallow and deep wells) and areas downgradient of the source area. Chlorinated solvents were either not detected or detected and very low concentrations below Class GA Standards in upgradient and crossgradient wells.

Soil Vapor

- Chlorinated solvents were detected in indoor air samples at concentrations exceeding EPA BASE indoor air mean values. No chlorinated solvents were detected in indoor air at concentrations exceeding the New York State Department of Health (NYSDOH) Soil Vapor Intrusion Guidance Air Guidance Values (AGVs). PCE was detected in all four soil vapor samples and both indoor air samples collected. Comparison of the highest PCE concentration in soil vapor collected from the basement of the onsite building to the PCE concentration in the corresponding indoor air sample with NYSDOH Matrix B indicates that monitoring is necessary.

Petroleum Impacts

- Petroleum-related VOCs were detected in indoor air samples at concentrations exceeding EPA BASE indoor air mean values. Petroleum-related VOCs were also detected in all four soil vapor samples collected.

Qualitative Environmental Assessment

- The following potential exposure routes were identified: direct contact with surface soils, inhalation (and incidental ingestion), ingestion of groundwater, direct contact with groundwater and inhalation of vapors.

- Potential impacts from these exposure routes can be mitigated through the implementation of Health and Safety Plan (HASP) and Community Air Monitoring Program (CAMP) during ground-intrusive activities, current Site caps (building foundations, asphalt parking lot and landscaping soil cap) and through Site remediation performed under an approved remedial action work plan.

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The results of the remedial investigations provided sufficient data to complete a Qualitative Human Health Exposure Assessment, which identified several potential exposure pathways that include:

- direct contact with subsurface soils (and incidental ingestion);
- ingestion of groundwater;
- dermal contact with groundwater/inhalation of volatile groundwater constituents; and,
- inhalation of vapors.

The potential exposure pathways associated with the remediation/construction phase of the remedial action are temporary and of limited duration. Worker exposure to impacted soil, soil vapor, groundwater and particulates will be addressed by adherence to health and safety protocols. Potential exposure of neighborhood residents and other off-site populations will be addressed through compliance with the Community Air Monitoring Plan (CAMP). A summary of the CAMP is included in Appendix A of this RAWP. Potential for exposure of building workers to contaminants in indoor air will be minimized by soil source remediation, groundwater remediation and venting trapped soil vapor below the existing slab.

SUMMARY OF THE REMEDIAL ACTIONS

The proposed Track 2 remedy, intended to address all environmental issues associated with the Site, consists of the following:

- Excavation and off-site disposal of all on-site soils which exceed the Commercial Use SCOs for non-PCE constituents and the Protection of Groundwater SCOs for PCE and its breakdown products as defined by 6 NYCRR Part 375-6.8, at all depths throughout the Site;
- Disposal of impacted material from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
- Collection and analysis of post-remedial end-point samples to document remaining concentrations of contaminants. Samples will be evaluated for attainment of use-specific SCOs, which would support a Track 2 remedy;
    - In the event that Track 2 is not achieved, there is a contingent Track 4 remedy where certain elements of the cover system will constitute engineering controls and will be subject to a Site Management Plan;

- Import of materials to be used for backfill and cover in compliance with: (1) the Part 375-6.7(d) and (2) all Federal, State and local rules and regulations for handling and transport of material;
- Completion of in-situ chemical oxidation (ISCO) treatment via encapsulated reactant cylinders placed into select, existing and newly installed groundwater monitoring wells. Encapsulated reactant technology enables the oxidant, solid form potassium permanganate, to provide controlled oxidant release in saturated soils and groundwater;
- Mitigation of trapped soil vapor beneath the cellar slab;
- Modification of the existing sump to treat collected groundwater and prevent vapor migration into the building;
- Post-remedial sampling of soil, soil vapor, indoor air and groundwater; and,
- Preparation of a Final Engineering Report (FER) to document the implemented remedial actions.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

Eastchester-Astor, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on January 18, 2018, to investigate and remediate an approximately 28,918 square feet (SF) (0.66 acre) property located at 1500 Astor Avenue and 2300-2314 Eastchester Road (Block 4393, Lot 1) in the Pelham Gardens neighborhood of the Bronx, New York (the "Site"). Eastchester-Astor, LLC is a Volunteer in the Brownfield Cleanup Program.

The Astor Avenue building is two stories and is currently occupied by medical offices. The Eastchester Road building is one story and is currently divided into five commercial units. The Eastchester Road building has a full basement, which is used for storage only.

The Volunteer is not proposing to change the future use of the Site. To date, no redevelopment is contemplated.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination, as determined from data gathered during the Remedial Investigation (RI) activities performed between March and June 2018, respectively.

The RAWP provides an evaluation of Track 1 and Track 2 remedies and other applicable remedial measure alternatives, their associated costs, and the recommended and preferred remedy to address on-Site contamination. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have yet to determine if the Site poses a significant threat to human health. The RI for this Site did not identify fish and wildlife resources.

1.1 Site Location and Description

The Site is located at 1500 Astor Avenue and 2300-2314 Eastchester Road in the Pelham Gardens neighborhood of the Bronx, New York. The Site is an L-shaped parcel, consisting of 28,918 SF (0.66 acres) on the northeast corner of Astor Avenue and Eastchester Road. The Site is located in Bronx Community Board 11. A location map for the Site is provided as Figure 1. A map of the current Site layout is included as Figure 2.

1.2 Proposed Site Plan

The Remedial Actions being performed under the RAWP are intended to make the Site protective of human health and the environment consistent with the NYSDOH Soil Vapor Intrusion Decision Matrices and the contemplated end use of the Site. At this time, the Volunteer is not proposing to change the future use of the Site and is not contemplating redevelopment of the Site.

1.3 Description of Surrounding Property

The surrounding area is generally residential with some commercial uses north of the site along Eastchester Road. The Jacobi Medical Center is located south of site, across Pelham Parkway. The Site is bounded by residential buildings in each direction, except for a medical office located to the north of the Site, along Eastchester Road.

The Site is located in an R4A zoning district with a C1-2 commercial overlay; a designation that typically denotes two and three story residential buildings with commercial uses that serve local retail needs.

Based on a review of the New York City Office of Environmental Remediation (OER) Searchable Property Environmental E-Database (SPEED), no public schools, hospitals or day care centers are present within 500 feet of the Site. The Jacobi Medical Center is located approximately 950 feet south of the Site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work described in the May 2018 Remedial Investigation Work Plan (RIWP), which was approved by NYSDEC. This section presents the findings of the previous investigations conducted on-Site as well as the findings of the 2018 remedial investigation (RI) performed by Tenen.

Investigations and sampling efforts conducted at the Site are described in the following reports:

- *Phase I Environmental Site Assessment Report, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York,* Property Solutions, February 4, 2016.
- *Limited Phase II Subsurface Investigation, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York,* Property Solutions, July 22, 2016.
- *Limited Phase II Subsurface Investigation Addendum, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York,* Property Solutions, August 8, 2016.
- *Summary of Investigation Activities – March 2017, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York,* Property Solutions, May 5, 2017.
- *Remedial Investigation Report, 1500 Astor Avenue, Bronx, New York. Tenen Environmental. July 2018.*

Site History

- A portion of the Site was operated by a dry cleaning facility for approximately 32 years.

Geology/Hydrogeology

- The Site is covered by six inches to five feet of surface fill material, underlain by layers of reddish-brown medium to coarse grain sand with some silt and degraded bedrock.
- Groundwater was encountered at approximately 1.34 feet below grade (ft-bg) (building cellar) to 7.8 ft-bg (below sidewalk grade) and flows in a southwest direction.

Soil

- The results of the Remedial Investigation (RI) indicate that there is a PCE source area in soil located behind the on-site building fronting Eastchester Road. PCE was vertically and horizontally delineated in soil as part of this RI and is estimated to be limited to a 160 square foot area having a depth of seven feet.
- Petroleum-related volatile organic compounds (VOCs) were not detected in soil at concentrations exceeding applicable standards.
- One semivolatile organic compound (SVOC) [benzo(a)pyrene] was detected in one shallow (0-1 ft-bg) soil sample (TSB-9) at a concentration slightly exceeding the Restricted Commercial SCO. TSB-9 was located in the landscaped area south of the Astor Place Site building. SVOCs are common constituents of historic fill material.

Groundwater

- Chlorinated solvents were detected above the TOGS 1.1.1 Ambient Class GA Water Quality Standards (Class GA Standards) in groundwater collected from the PCE source area (shallow and deep wells) and areas downgradient of the source area. Chlorinated

solvents were either not detected or detected and very low concentrations below Class GA Standards in upgradient and crossgradient wells.

Soil Vapor

- Chlorinated solvents were detected in indoor air samples at concentrations exceeding EPA BASE indoor air mean values. No chlorinated solvents were detected in indoor air at concentrations exceeding NYSDOH Soil Vapor Intrusion Guidance Air Guidance Values (AGVs). PCE was detected in all four soil vapor samples and both indoor air samples collected. Comparison of the highest PCE concentration in soil vapor collected from the basement of the onsite building to the PCE concentration in the corresponding indoor air sample with NYSDOH Matrix B indicates that monitoring is necessary.

Petroleum Impacts

- Petroleum-related VOCs were detected in indoor air samples at concentrations exceeding EPA BASE indoor air mean values. Petroleum-related VOCs were also detected in all four soil vapor samples collected.

Qualitative Environmental Assessment

- The following potential exposure routes were identified: direct contact with surface soils, inhalation (and incidental ingestion), ingestion of groundwater, direct contact with groundwater and inhalation of vapors.
- Potential impacts from these exposure routes can be mitigated through the implementation of Health and Safety Plan (HASP) and Community Air Monitoring Program (CAMP) during ground-intrusive activities, current Site caps (building foundations, asphalt parking lot and landscaping soil cap) and through Site remediation performed under an approved remedial action work plan.

2.1 Significant Threat

The NYSDEC and NYSDOH have yet to determine if the Site poses a significant threat to human health. The RI for this Site did not identify fish and wildlife resources.

3.0 CONTAMINATION CONDITIONS

3.1 Conceptual Model of Site Contamination

The Site is currently used for medical and commercial offices. A portion of the Site, 2312 Eastchester Road, was used as a dry cleaner for at least 32 years. Other prior uses include residential dwellings, a funeral home, a bowling alley, a nursery, dry cleaners and retail/office tenants. The former occupant of the 2312 Eastchester Road unit, MC Cleaners, was identified as a Large Quantity Generator of Hazardous Wastes by EPA, with no violations.

Based on the results of the RI and the findings of prior investigations, the contaminants of concern at the Site are chlorinated volatile organic compounds (CVOCs), specifically PCE. One historic fill-related polyaromatic hydrocarbon (PAH), benzo(a)pyrene, was also detected above the Commercial Use SCO in soil used for landscaping.

PCE was detected at elevated concentrations in soil vapor, soil and groundwater. PCE was detected above the Part 375 Commercial Use and Protection of Groundwater SCOs in the shallow soil at one location in the parking area behind the 2312 Eastchester Avenue units. PCE was detected in groundwater above the Class GA Standard across the Site, with the highest concentrations consistent with the elevated soil concentrations. In the sub-slab soil vapor, PCE was detected in soil vapor at varying concentrations across the Site, with the highest concentration also in the area of the historic dry cleaner. Breakdown products of PCE, were not detected at elevated levels in soil vapor or soil; trichloroethene (TCE) and cis-1,2-dichloroethylene (cis-1,2-DCE) were detected at elevated concentration in groundwater.

A CVOC source area was identified onsite during the RI and is present behind the former dry cleaner. Analytical results from soil samples collected as part of this RI indicate that PCE in soil is limited to this area. The distribution of groundwater impacts supports a relationship between the soil source area and chlorinated solvent concentrations in groundwater downgradient of the source area. Based upon the distribution of PCE impacts, the presence of PCE is likely due to historic dry cleaning operations at the Site.

Table 1 presents the Part 375 Unrestricted Use SCOs. Table 2 presents the Part 375 Restricted Commercial Use and Protection of Groundwater SCOs. Table 3 presents the TOGS 1.1.1 Ambient Class GA Water Quality Standards. Tables 4, 5 and 6 include the results of the RI sampling. Figures 3, 4, and 5 present soil, groundwater, soil vapor and indoor analytical results, respectively, for all historic sampling completed at the Site.

4.0 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

4.1 Qualitative Human Health Exposure Assessment

A qualitative exposure assessment (QHHEA) has been completed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a qualitative EA (NYSDEC DER-10; Technical Guidance for Site Investigation and Remediation; Appendix 3 B). The qualitative exposure assessment evaluates the potential for populations to be exposed to Site contaminants.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms to an exposed population; (3) a receptor population; (4) a route of exposure; and (5) a point of exposure to a receptor population. Potential contaminant receptors include the following populations:

- Site workers (primarily environmental professionals and contractors)
- Construction workers, visitors or trespassers
- Current building occupants, tenants, commercial workers, and patrons
- Future building occupants, tenants, commercial workers, and patrons
- Future on-Site workers and utility workers
- Off-Site residents/building occupants
- Off-Site maintenance workers

The following potential exposure routes are considered incomplete:

Groundwater Ingestion

New York City code prohibits the use of groundwater for potable purposes. This pathway is incomplete.

Inhalation of Vapors by Future Building Employees

Remediation will include excavation of a hot spot of PCE in soil and treatment of PCE in groundwater. Following remediation of the soil and groundwater, the trapped soil vapor will be vented and the existing slab sealed, as necessary.

The following potential exposure routes are considered complete:

Inhalation of Vapors and Particulates by On-Site Environmental and Construction Workers (and incidental ingestion).

During slab penetrations, excavation and soil handling, on-Site personnel and construction workers may be exposed to dust and vapors via inhalation.

Dermal Contact with Soil by On-Site Environmental and Construction Workers

During slab penetrations, excavation and soil handling, on-Site personnel and construction workers may be exposed to contaminants in soil via dermal contact. This exposure would be mitigated by adherence to the Health and Safety Plan (HASP), included in Appendix B, during ground intrusive activities.

Dermal Contact with Groundwater by On-Site Environmental and Construction Workers

Dermal exposure to contaminants in groundwater should be limited to environmental professionals collecting groundwater samples for environmental analysis or treating the groundwater through existing monitoring wells as the groundwater is below the proposed excavation depth and dewatering is not contemplated. This exposure would be mitigated by adherence to the HASP, included in Appendix B, during sampling activities.

Inhalation of Vapors and Particulates by Off-Site Residents/Building Workers

Work during slab penetrations as well as soil excavation and removal may generate dust and vapors that could be inhaled by off-Site residents/building occupants and maintenance personnel.

The above potential exposures are limited to the remediation/construction phase of the proposed remedial action. Adherence to health and safety protocols will address environmental and construction worker exposure to contaminated soil vapors, particulates and groundwater. Potential exposure of off-Site residents and building occupants will be addressed by implementation of the Community Air Monitoring Plan (CAMP) referenced in Section 7.4 of this RAWP and included as Appendix A.

4.2 Remedial Action Objectives

The goals of remediation are to remove the on-Site sources of chlorinated solvent impacts so as to allow for the Site's continued commercial use and reduce the concentrations of contaminants in soil vapor, soil and groundwater to levels below applicable Standards, Criteria and Guidance (SCGs). Based on the results of the remedial investigations conducted at the Site, the following Remedial Action Objectives (RAOs) have been identified:

4.2.1 Soil

The CVOC PCE, was detected at concentrations above the Commercial Use and Protection of Groundwater SCOs at one location in the parking area. Benzo(a)pyrene was detected in one sample slightly above the Commercial Use SCO in a landscaped area.

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure to contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

4.2.2 Groundwater

The CVOC PCE was detected in the groundwater above applicable SCGs. Dissolved metals, consistent with typical earth metals attributable to the conditions of the aquifer, have also been detected above applicable SCGs.

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore the groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

4.2.3 Soil Vapor

Chlorinated solvents, specifically PCE, have been detected in the soil vapor at the Site, although at concentrations that do not require active mitigation.

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into the building at the Site.

5.0 DESCRIPTION OF REMEDIAL ACTION WORK PLAN

5.1 Evaluation of Remedial Alternatives

The alternatives considered to address contamination in soil, soil vapor and groundwater are discussed below.

5.1.1 Soil

Three remedial alternatives were considered to address CVOC- and fill-related impacts in the soil.

Alternative 1 – Track 2 Pre-remedial Shallow Soil Sampling and Excavation of Hot Spots. The majority of the Site is currently improved with concrete building slabs and asphalt paving. A small portion of the Site (~920 square feet) located along Astor Avenue is currently landscaped with a soil cap. One PAH, benzo(a)pyrene, was detected at 1.1 mg/kg, slightly above the 1 mg/kg Commercial Use SCO during the 2018 RI. Additional sampling for PAHs will be completed in the landscaped area to determine the average concentrations of PAHs across the cap and vertically delineate the extent of fill with PAHs above the Commercial Use SCOs. As necessary, the top one foot of soil will be removed and replaced so that the cap is appropriate for commercial use. The attainment of a Track 2 remedy does not require the installation of a cover system.

Pre-remedial shallow soil samples will be collected every 30 linear feet (LF) at depths of approximately 0-2 inches and 2-12 inches below grade within the landscaped area in order to delineate the extent of the benzo(a)pyrene impacts and evaluate the current cover system. The samples will be analyzed for PAHs and will be used to dictate the extent of soil removal in the landscaped area of Site. Figure 6 depicts the pre-delineation sample locations.

Excavation in the parking area would allow for the removal of the bulk of the CVOC contaminant mass at the Site. The excavation of the shallow soil interval would include an interval from zero to at least six feet below grade; specifically in the area around boring TSB-8 (per Tenen's RI) for the attainment of Commercial Use SCOs for non-PCE constituents and the Protection of Groundwater SCO for PCE and TCE, cis-1,2 DCE and vinyl chloride (VC), herein referred to as PCEs "breakdown products". Soil removal and subsequent disposal would occur within the hot spot areas. The excavated area would be backfilled with soil and capped with asphalt. All imported fill will be sampled and analyzed prior to importation to Site to ensure that the material meets applicable Commercial Use SCOs.

End-point samples will be collected to document the condition of soils that will be left in-place and capped. This alternative includes a shallow excavation to a depth of approximately six feet below grade. At this depth, end-point samples will be collected from the bottom and sidewalls of the spot location and will be analyzed for VOCs and SVOCs. If the end-point sample concentrations do not meet the lower of the Commercial Use for non-PCE compounds and Protection of Groundwater SCOs for PCE and its breakdown products, excavation and additional end-point sampling will continue until the appropriate SCOs are met.

The extent of the hot spot excavation is depicted on Figure 7. Post excavation endpoint sample locations are depicted on Figure 8.

A CAMP (Appendix A) and Soil/Materials Management Plan (Appendix C) will be implemented during the invasive Site activities to prevent or minimize potential impacts to human health and the environment. End-point samples will confirm the removal of soil to concentrations below applicable Commercial Use and Protection of Groundwater SCOs (for PCE and its breakdown products).

This alternative is the preferred remedy as it is appropriate for source removal and the continued commercial use of the Site.

Alternative 2 – Track 1 Excavation. Excavation of all soil with concentrations above the Unrestricted Use and Protection of Groundwater SCOs would be completed. Based on previous investigations completed at the Site, this alternative would include additional (compared to Soil Alternative 1) excavations across the Site, particularly in the parking area, at depths up to 7.5 feet below grade. Replacement of the asphalt slab would be implemented in accordance with *Alternative 1.*

Alternative 3 – Track 4 Cover System. Excavation of soil within the landscaped area to 12" below grade and import and placement of material meeting the lower of the Protection of Groundwater and Commercial Use SCOs. End-point samples will be collected every 900 SF (two samples total) in the Track 4 area to document the condition of soils that will be left in-place and capped. This cover system will constitute an engineering control that will require a Site Management Plan and Environmental Easement. Excavation within the parking area would be implemented in accordance with *Alternative 1.*

5.1.2 Soil Vapor

Two remedial alternatives were considered to address the levels of CVOCs present in the soil vapor at the Site.

Alternative 1 – Soil Vapor Venting. The trapped soil vapor beneath the Eastchester Road building will be released from the below the slab by venting above the roof. Several four-inch diameter holes will be drilled through the existing slab, as shown on Figure 9 and Appendix F, and a PVC header system, moisture knock-out drum and blower will be used to exhaust the trapped soil vapor above the Eastchester Road building roofline. A pressure field extension test and blower sizing event will be completed. The venting system will act as a short term engineering control at the Site. The system will run for approximately five days, at which point it will be shut down for indoor air testing. The system will continue to be operated as necessary. Given the soil and groundwater source removal, future potential for soil vapor intrusion is limited. Any cracks or holes in the existing slab will be sealed with caulk.

Quarterly rounds of paired, post-venting sub-slab soil vapor and indoor air sampling events would be collected to confirm the efficacy of this approach. Post-remedial soil vapor and indoor samples will be collected in accordance with the SMP and will be analyzed for CVOCs. Soil vapor and indoor air sample location as are depicted on Figure 10.

Alternative 2 – Soil Vapor Venting, Vapor Barrier and Vapor Sealant. If required following soil vapor venting (Alternative 1), a vapor sealant would be applied to the existing Eastchester Road building to mitigate potential soil vapor intrusion. The vapor sealant would be installed over the existing concrete basement slab and consist of a chemically resistant seal with a minimum thickness of 20-mil. The vapor sealant would be Retro-Coat™, manufactured by Land Science Technologies and it would be installed by a licensed installer. An HDPE vapor barrier would be installed over the unpaved area of the basement. The vapor barrier would be the 20-mil thick Florprufe®, manufactured by GCP Applied Technologies, Inc.

Quarterly indoor air sampling would be implemented under this alternative to monitor the efficacy of this approach to ensure the vapor barrier and vapor sealant continues to be protective of human health and the environment.

Groundwater is located approximately one inch to one foot below the existing slab under the Eastchester Avenue building, which is where the elevated sub-slab soil vapor concentrations were detected. This limits the ability to use an active sub-slab depressurization system (SSDS). The shallow water table is not expected to impact the feasibility of the soil vapor mitigation process or the vapor barrier and vapor sealant process. The soil vapor mitigation system includes a moisture knockout tank and can be turned off if the groundwater is too high.

In this alternative, long-term institutional and engineering controls would include maintenance of the vapor barrier in site management activities.

5.1.3 Groundwater

One remedial alternative for groundwater has been considered and is described below.

Alternative 1 – ISCO and Sump Treatment. Based on the distribution of dissolved PCE in groundwater, the concentrations in the area of the existing sump within the basement of the Eastchester Road building are assumed to be above the 20 ug/L New York City Department of Environmental Protection (NYCDEP) Limitation for Effluent to Sanitary or Combined Sewers, as the sump effluent has not been sampled. The sump operates on-demand based on a float switch and is estimated to pump at approximately 20 gallons per minute (gpm). The intermittent flow and low flow rate does not appear to affect the groundwater flow direction (based on the groundwater flow map) and is not expected to affect the ISCO treatment. Given the perched groundwater condition and the potential for stormwater infiltration to the sump, the concentrations are likely diluted prior to discharge, however in order to be conservative, the sump will retrofitted with a drum of granular activated carbon (GAC),used to treat the effluent prior to discharge to the sewer system and a tightfitting cover and/or rubber gasket to mitigate potential soil vapor intrusion into the building. Subsequent to the GAC treatment, the sump effluent will be sampled and analyzed for CVOCs prior to discharge into the New York City sewer system to confirm it meets the NYCDEP Limitation for Effluent to Sanitary or Combined Sewers. Indoor air sampling has not been completed in the area of sump and, therefore, one indoor air sample will be collected and the results provided to the NYSDEC and NYSDOH. Figure 12 depicts the location of the sump and treatment area.

Implementation of ISCO involves introducing oxidants into the subsurface, via the existing groundwater well network, to break down contaminants into less toxic degradation products. An in-situ chemical oxidation reagent will be introduced into the subsurface to breakdown PCE and related compounds that were detected at elevated concentrations in the groundwater. The chemical oxidant would be introduced into the aquifer via an encapsulated reactant cylinder emplaced into three existing groundwater monitoring wells (MW-1S, MW-5 and MW-11) and two newly installed groundwater monitoring wells (MW-13 and MW-14) located within and downgradient of the PCE source area. The encapsulating matrix, benign paraffin wax, is biodegradable and insoluble in water, but is soluble in chlorinated solvents such as PCE. This results in the oxidant being released very slowly into water from the encapsulating matrix while releasing rapidly into PCE. The release of the oxidant is typically characterized by an initial rapid release (less than ten minutes) followed by a sustained release for the remaining life cycle of the cylinder. As further described in Section 8.1, approximately 5.2 pounds of potassium permanganate will be released in each of the five wells, with a treatment duration of two to five years, depending on the groundwater flow rate. Encapsulated reactant technology enables the oxidant, solid form potassium permanganate, to provide years of controlled oxidant release in saturated soils and groundwater. Figure 11 depicts the locations of the treatment wells.

Post-remedial groundwater sampling will be performed in accordance with an SMP. Post-remedial groundwater samples will be collected from one source-area monitoring well, MW-1S, and four downgradient monitoring wells, MW-5,MW-11, MW-13 and MW-14, as shown on Figure 13, in order to evaluate the efficacy of the ISCO treatment. The first round of post-remedial groundwater sampling will occur six months after the start of the groundwater remedy. The reactant cylinder will be removed from the monitoring wells prior to sampling to allow for stabilization of the aquifer. The length of time required for stabilization is based on soil oxidant demand and the groundwater flow rate. The potassium permanganate results in a pink color to the groundwater; samples will not be collected until there is no pink hue in the purge water. In addition to colorimetric evaluation, treatment wells will be measured for field parameters [pH, oxidation reduction potential (redox), dissolved oxygen (DO), temperature, and specific conductance] prior to ISCO to establish baseline conditions and prior to any post remedial groundwater sampling event. Dissolved oxygen values, in particular, will be assessed for the presence of residual oxidant. The DO content of water is an indicator of its organic pollutant load (i.e., DO decreases with increasing contaminant concentrations). Increases in DO concentrations reflect oxidizing conditions and generally coincide with the oxidant movement[1]. Pre-remedy stabilized DO readings in the well proposed for treatment and long-term monitoring ranged from 0.81 milligrams per liter (mg/L) in well MW-5 to 6.59 mg/L in well MW-11. Groundwater samples will be analyzed for CVOCs. If the results of the first post-remedial groundwater sampling indicate that CVOC concentrations have decreased below applicable standards, eight confirmatory rounds of samples will be collected over eight quarters to confirm that concentrations do not rebound, at which point the groundwater remedy will be considered complete. If they have not decreased below applicable standards, additional treatment and post-treatment samples will be collected.

[1] Technical and Regulatory Guidance for In Siti Chemical Oxidation of Contaminated Soil and Groundwater, Interstate Technology & Regulatory Council (ITRC), Second Edition, January 2005.

Groundwater in the New York City area is not used as a potable (drinking) water source. New York City residents receive their drinking water supply from surface reservoirs located in upstate New York.

This alternative is the preferred remedy as it is appropriate for both anoxic and aerobic conditions within the groundwater, as well as the given lithology of the Site. Given these parameters, a pilot test will not be required prior to implementation.

5.2 Standards, Criteria and Guidance (SCGs)

The Remedial Action SCGs are listed below.

SCG	Scope / Application
NYSDEC Brownfield Cleanup Program Guide (draft 2004)	General program guidance
NYSDEC CP-51 / Soil Cleanup Guidance (2010)	Restricted Use SCOs for soil
NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (2010)	End-point sampling methodology; underground storage tank (UST) closure
NYSDEC DER-31 Green Remediation (2011)	Green remediation components
NYSDEC TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998)	Class GA Standards for groundwater
NYSDOH Guidance for Evaluating Soil Vapor Intrusions in the State of New York (2006)	Soil vapor guidance
NYSDOH Generic Community Air Monitoring Plan	Plan for monitoring dust and volatile organics resulting from construction activities
New York State Codes, Rules and Regulations (NYCRR) Title 6 Part 360 – Solid Waste Management Facilities	Off-site disposal of waste for facilities in NYC
New York State Codes, Rules and Regulations (NYCRR) Title 6 Part 364 – Waste Transporter Permits	Transporter requirements for off-site disposal of waste
6 NYCRR Part 370 – Hazardous Waste Management System	Disposal of hazardous waste, if encountered
6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)	General administrative guidance
6 NYCRR Part 376 – Land Disposal Restrictions	Disposal of hazardous waste, if encountered
6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Regulations	Discharge of wastewater and stormwater
Code of Federal Regulations (CFR) Title 29 Part 1910.120 - Hazardous Waste Operations and Emergency Response Standard	Worker safety

29 CFR Title 29 Part 1926 - Safety and Health Regulations for Construction	Worker safety
40 CFR Parts 144 and 146 – Underground Injection Control Program	Injection of chemicals into the groundwater
Title 15, Rules of the City of New York (RCNY), Chapter 19 - Use of the Public Sewers	Discharge of groundwater to the municipal sewer system
NYCDEP Limitations for Effluent to Sanitary or Combined Sewers	Discharge of groundwater to the municipal sewer system

5.3 Evaluation of Alternatives

The remedial alternatives for soil, groundwater and soil vapor are discussed below. Each alternative was evaluated based on the following remedy selection factors (as defined in DER-10, Section 4.2):

- Protection of human health and the environment
- Conformance with standards, criteria and guidelines
- Short-term effectiveness and performance
- Long-term effectiveness and performance
- Reduction in toxicity, mobility or volume
- Implementability
- Cost effectiveness
- Community acceptance
- Land use

5.3.1 Protection of Human Health and the Environment

Each alternative would be protective of human health and the environment. Soil/fill will be excavated at select hot spot locations to meet Commercial Use SCOs for non-PCE constituents and the Protection of Groundwater SCO for PCE and its breakdown products, consistent with the proposed future commercial use of the Site. Groundwater in this area is not used as a source of drinking water. The source of potential soil vapor impacts would be removed and the existing, trapped soil vapor would be vented.

A Health and Safety Plan (HASP), including monitoring/management for particulates and volatiles will be implemented during remedial activities.

5.3.2 Conformance with Standards, Criteria and Guidelines

Each alternative would conform to the SCGs. The soil alternatives would remove the bulk of CVOC soil impacts.

On-site construction safety will conform to the HASP requirements, which incorporate Occupational Safety and Health Administration (OSHA) requirements.

5.3.3 Short-Term Effectiveness and Performance

Each alternative would be effective over a short-term time horizon. The soil alternatives are consistent with the proposed use. Soil Alternative 2 (Track 1 SCOs) is associated with the most significant short-term impacts, related to the increased duration associated with more extensive and deeper soil removal. These impacts include the potential for particulate and volatile impacts and additional truck traffic. To a slightly lesser extent, Soil Alternative 1 (hot spot excavations) and 3 (capping with hot spot excavation) would have similar potential impacts. These potential impacts are addressed in the various control plans included in this RAWP.

5.3.4 Long-Term Effectiveness and Performance

Each alternative would be effective over a long-term time horizon. The three soil alternatives, the groundwater alternative and Soil Vapor Alternative 1 would be consistent with the proposed use without long-term engineering controls. The potential for residual impacts in soil vapor would remain and would be managed by the installation of a vapor sealant (Soil Vapor Alternative 2), if required following the implementation of Soil Vapor Alternative 1 (sub-slab venting). Groundwater in this area is not used as a source of drinking water.

5.3.5 Reduction in Toxicity, Mobility or Volume

Each alternative would reduce the toxicity, mobility and volume of the contaminants present on-site. In particular, Soil Alternatives 1, 3 (hot spot excavations and capping with hot spot excavation, respectively) and 2 (Track 1 SCOs), the Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (sub-slab venting) and 2 (vapor barrier) would remove the bulk of the impacts present at the Site.

5.3.6 Implementability

Each alternative would be implementable. Soil Alternatives 1 (hot spot excavations), 2 (Track 1 SCOs) and 3 (capping and hot spot excavation), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternatives 1 (soil vapor venting) and 2 (vapor barrier) can be implemented as part of the Site remedial action utilizing standard environmental and construction means and methods.

5.3.7 Cost Effectiveness

The implementation of Soil Alternative 1 (hot spot excavations), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (soil vapor venting) is estimated at approximately $110,000, as shown in Table 7. Additional reporting and long-term monitoring costs, approximately $95,000, would also be incurred. The costs to implement Soil Alternative 2 (Track 1 SCOs) would be much higher due to the additional excavation both by area and depth in the parking lot. The cost to implement Soil Alternative 3 (capping and hot spot excavation) would be slightly higher than Alternative 1 due to the excavation of the entire landscaped area to one foot below grade and the installation of a soil cap. The costs to implement Soil Vapor Alternative 2 (vapor barrier) and would also be higher.

5.3.8 Community Acceptance

Each alternative eliminates potential exposure pathways and will result in a decrease in toxicity, mobility and volume (see Section 5.3.5). These considerations, in conjunction with the future commercial use of the Site and acknowledgement that groundwater is not used as a potable source of water in this area of the Bronx, should result in acceptance by the community.

The short-term impacts (see Section 5.3.3) are greater due to the additional construction impacts, although these will be addressed by the various control plans in this RAWP. The selected remedy will be subject to a 45-day public comment period in accordance with the Citizen Participation Plan. Any substantive public comments received will be addressed before the remedy is approved.

5.3.9 Land Use

Each of the proposed alternatives is compatible with the proposed land use at the Site, which has been documented in the BCP Application and in Section 1.3.

The following findings, based on a review of previous environmental and public documents, support the compatibility of the proposed Site land use with that of the surrounding area:

1. The use proposed for the Site conforms to applicable zoning laws or maps or the reasonably anticipated future use of the Site.
2. The proposed use conforms to historical and/or recent development patterns in the area.
3. The Site does not fall within the boundaries of an existing Brownfield Opportunity Area (BOA).
4. According to the New York City Planning Commission Zoning Map, the Site is located in an R4A zoning district with a C1-2 commercial overlay; a designation that typically denotes two and three story residential buildings with commercial uses that serve local retail needs.
5. The Site is located in an urban setting characterized by residential and commercial uses. There are no areas zoned for agricultural use in the proximity of the Site.
6. According to the NYSDEC database for environmental justice concerns, the Site is not part of a Potential Environmental Justice Area (PEJAs).
7. There are no federal or state land designations.
8. The population growth patterns and projections support the proposed land use.
9. The Site is accessible to existing infrastructure.
10. The Site is not located in close proximity to important federal, state or local natural resources, including waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species.
11. Municipal water supply wells are not present in this area of New York City; therefore, groundwater from the Site cannot affect municipal water supply wells or recharge areas. The Federal Emergency Management Agency (FEMA) flood insurance rate map for the Site (Map Number 3604970102F) indicates that the Site is not located within the 0.2% annual chance floodplain (500-year flood).

5.4 Selection of the Preferred Remedial Actions

The preferred Track 2 remedy, intended to address all environmental issues associated with the Site, consists of the following: Soil Alternative 1 (hot spot excavations), Groundwater Alternative

1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (soil vapor venting). The preferred remedy is further described below:

- Excavation and off-site disposal of all on-site soils which exceed the Commercial Use SCOs for non-PCE constituents and the Protection of Groundwater SCOs for PCE and its breakdown products, as defined by 6 NYCRR Part 375-6.8, at all depths throughout the Site;
- Disposal of impacted material from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
- Collection and analysis of post-remedial end-point samples to document remaining concentrations of contaminants. Samples will be evaluated for attainment of use-specific SCOs, which would support a Track 2 remedy;
- Import of materials to be used for backfill and cover in compliance with: (1) the Part 375-6.7(d) and (2) all Federal, State and local rules and regulations for handling and transport of material;
- Completion of ISCO treatment via an encapsulated reactant cylinder placed into select, existing on-site groundwater monitoring wells. Encapsulated reactant technology enables the oxidant, solid form potassium permanganate, to provide controlled oxidant release in saturated soils and groundwater;
- Following PCE remediation, venting of trapped soil vapor beneath the cellar slab;
- Post-remedial sampling of soil, soil vapor, indoor air and groundwater; and,
- Preparation of a Final Engineering Report (FER) to document the implemented remedial actions.

In the event that Track 2 SCOs are not met in accordance with the preferred remedy, a Contingent Track 4 remedy will be implemented consisting of the following: Soil Alternative 3 (capping and hot spot excavation), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 2 (vapor barrier).

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER. The Site source of chlorinated compounds (i.e., the soil in the parking area behind the former dry cleaner) will be removed. Site soils will meet the Commercial Use SCOs for non-PCE compounds and the Protection of Groundwater SCO for PCE and its breakdown products; end-point sampling will confirm targeted SCOs are met. Soil vapor impacts will be mitigated by removing the source of chlorinated solvents in soil and groundwater and venting the trapped soil vapor.

The following land-use factors were considered in selecting these remedial measures. Land Use Factor	Remedy Evaluation Result
Zoning	Remedy is consistent

The following land-use factors were considered in selecting these remedial measures. Land Use Factor	Remedy Evaluation Result
Applicable comprehensive community master plans or land use plans	Remedy is consistent (not within a Brownfield Opportunity Area)
Surrounding property uses	Remedy is consistent
Citizen participation	Remedy is consistent; CPP requirements implemented regardless of selected remedy
Environmental justice concerns	None identified (Site is not in a PEJA)
Land use designations	Remedy is consistent
Populations growth patterns	Remedy is consistent
Accessibility to existing infrastructure	Remedy is consistent
Proximity to cultural resources	None identified
Proximity to natural resources	None identified
Off-Site groundwater impacts	Remedy removes the source of the chlorinated impacts. Groundwater will be monitored on-Site following implementation of the remedy.
Proximity to floodplains	Site is outside the 500 year flood zone.
Geography and geology of the Site	Remedy is consistent
Current Institutional Controls	None currently present

Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and,
- Integrating the remedy with the end use where possible.

6.0 REMEDIAL ACTION PROGRAM

6.1 Governing Documents

6.1.1 Site Specific Health and Safety Plan

A Site Specific HASP has been created for the Site and is included in Appendix B. All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA. An emergency contact sheet with names and phone numbers is included in Table 1 of the HASP and defines the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency. The HASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

6.1.2 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) has been created for the site to address quality control and quality assurance procedures for all site sampling, including post excavation end-point sampling, and is included in Appendix D.

6.1.3 Soil/Materials Management Plan

The Soil/Materials Management Plan (SMMP) includes plans for managing all soils/materials that are disturbed at the Site. The SMMP includes provisions for sediment and erosion control and stormwater management. The development is less than one acre in area and a Stormwater Pollution Prevention Plan (SWPPP) is not required.

The SMMP, which describes procedures for excavation, handling, storage, and transport and disposal, is included in Appendix C.

6.1.4 Community Air Monitoring Plan

The purpose of the Community Air Monitoring Plan (CAMP) is to protect downwind receptors (e.g., residences, businesses, schools, nearby workers, and the public) from potential airborne contaminants released as a direct result of the Remedial Action being performed at the Site. A summary of the CAMP plan is included in Appendix A.

6.1.5 Citizen Participation Plan

The Citizen Participation Plan (CPP) enables citizens to participate more fully in decisions that affect their health, environment, and social well-being. The CPP will be updated throughout the Remedial Action in response to any community feedback.

6.1.6 Site Operations Plan

The Remedial Engineer is responsible to ensure that all submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

6.2 General Remedial Construction Information

6.2.1 Project Organization and Emergency Contacts

The following are the principal personnel who will be assist in the management, oversight and completion of this project:

Remedial Engineer
Matthew M. Carroll, PE
862 Union Street, 1D
Brooklyn, NY 11215
(917) 510-6767

Tenen Environmental, LLC
121 West 27th Street, Suite 702, New York, NY 10001
(646) 606-2332

- Alana Carroll, Professional Geologist: responsible for overall coordination and management of the project.
- Mohamed Ahmed, Professional Geologist: responsible for quality assurance of sampling procedures and laboratory data.
- Claire Zaccheo, Project Engineer: responsible for the day-to-day field monitoring activities, including soil excavation and load-out, dust monitoring and PID monitoring. Report preparation will be the function of a Project Engineer from Tenen.

Subcontractors
Laboratory:
Alpha Analytical, Inc., 8 Walkup Drive in Westborough, MA
(800) 624-9220
NYSDOH Environmental Laboratory Approval Program (ELAP) Certification No. 11148 for solid and hazardous waste

Driller:
Cascade, 30 N. Prospect Avenue, Lynbrook NY 11563
(516) 596-6300

Data Validation:
L.A.B Validation Corp., 14 West Point Drive, East Northport, NY 11731
(516) 523-7891

Remedial Party:
Eastchester-Astor, LLC
1760 White Plains Road, Scarsdale, NY 10583
Attn: Jamal Hadi
914-713-3270

Resumes of key personnel involved in the Remedial Action are presented in the QAPP, included as Appendix D.

6.2.2 Remedial Engineer

The Remedial Engineer (RE) for this project will be Matthew M. Carroll, P.E. The RE is a registered professional engineer (PE) licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the 1500 Astor Avenue site (NYSDEC BCA Index No. C203105-01-18; Site No. C203105). The RE will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in conformance with that Plan. Other RE certification requirements are listed later in this RAWP.

The RE will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal, air monitoring, emergency spill response, import of back fill material (if any), and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

6.2.3 Remedial Action Construction Schedule

A general Remedial Action construction schedule is included in Table 8.

6.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteer of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

6.2.5 Mobilization

Mobilization includes field personnel orientation, equipment mobilization (including CAMP equipment), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures. The contractor will mobilize all necessary materials and equipment on Site directly prior to the initiation of any remedial activities. Material stockpile and equipment decontamination areas will be designated.

6.2.6 Erosion and Sedimentation Controls

All work will be completed within the existing parking lot and all catch basins that could receive sediment-laden stormwater will be protected.

6.2.7 Equipment and Material Staging

All equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. There will be no specific material or equipment staging area; any staging will be in areas where space permits. Soil will be placed in lined containers and covered at the end of each day, in accordance with Section 1.2 of the Soil/Materials Management Plan included as Appendix C.

6.2.8 Demobilization

Disturbed areas resulting from remediation activities will be restored or addressed during construction activities. Restoration of disturbed access areas to pre-remediation conditions will include decommissioning any temporary curb supports for equipment access, if applicable.

Equipment decontamination will take place on-Site in order to prevent dispersion of any contaminating materials.

All remediation and construction materials will be disposed of in accordance with the applicable rules and regulations. General refuse will be handled in accordance with the rules and regulations of the New York City Department of Sanitation.

6.2.9 Utility Markout and Easement Layout

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

6.2.10 Required Permits

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is included as Table 9. This list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the FER.

6.2.11 Site Security

The work zone in the parking area will be maintained with barriers, as necessary, to protect the public.

6.2.12 Pre-Construction Meeting with NYSDEC

The NYSDEC project manager will be invited to attend a pre-remedial action meeting at the Site with all parties involved in the remedial process prior to implementation of the RAWP.

6.2.13 Estimated Remedial Action Costs

The estimated cost to implement the Remedial Action is approximately $105,000. Additional costs, approximately $90,000, would be incurred for reporting and long-term monitoring. An itemized summary of estimated costs is included as Table 7. This table will be revised based on actual costs and included in the FER.

6.2.14 Deviations from the Remedial Action Plan

During the implementation of the RAWP, any material deviation from the RAWP will be noted and immediately brought to the attention of the RE. The RE or his/her representative will contact the NYSDEC Project Manager and determine if the deviation necessitates a formal RAWP modification and NYSDEC approval. If no formal RAWP modification is required, the deviation will be noted in the Site reports and explained in the FER.

6.3 Reporting

6.3.1 Daily Reporting

Daily reports will be submitted to the NYSDEC Project Manager by the end of each day following the reporting period and will include:

- An update of progress made during each day;
- Locations of work and quantities of material imported and exported from the Site;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions; and,
- An explanation of notable Site conditions.

Daily reporting will be conducted during active Site remediation periods including air monitoring, off-Site disposal of material, crack sealing and sub-slab soil vapor venting.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill, etc.), requests for changes to the Remedial Action Plan or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the Remedial Action Plan will be addressed directly to NYSDEC Project Manager via personal communication.

Daily reports will include a description of daily activities keyed to a map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and any complaints received from the public. All complaints received will immediately be reported to NYSDEC.

The NYSDEC assigned project number will appear on all reports.

6.3.2 Monthly Reporting

Monthly reports will be submitted to NYSDEC Project Manager by the 10th day of the following month and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., tons of material exported and imported, etc.);
- Photographs of the work completed during the reporting period;
- Description of approved activity modifications, including changes to work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

6.3.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the Final Engineering Report.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC staff.

7.0 REMEDIAL ACTION IMPLEMENTATION: EXCAVATION

As discussed in Section 5.3, the components of the remedial action include the excavation and off-Site disposal of soil for attainment of Commercial Use SCOs for non-PCE constituents and the Protection of Groundwater SCOs for PCE and its breakdown products in select hot spot areas. The applicable SCOs are presented in Table 2.

In the event that Track 2 SCOs are not met in accordance with the preferred remedy, a Contingent Track 4 remedy will be implemented consisting of the following: Soil Alternative 3 (capping and hot spot excavation). The landscaped area of the Site (~920 SF) will be excavated to 12" below grade [~34 cubic yards (CY)] and capped with imported material meeting the lower of the Protection of Groundwater and Commercial Use SCOs. This cap would serve as a permanent engineering control for the Site and would be subject to the SMP. The PCE hot spot area would be excavated and sampled in accordance with Soil Alterative 1.

No redevelopment is currently proposed at the Site. As further described below, the major components of the excavation remedial action include characterization for disposal, implementation of the SMMP and CAMP, excavation and off-Site disposal of impacted materials, closure of any encountered USTs, and end-point sampling.

Based on the maximum detected concentration of PCE, the material from the hot-spot will be disposed as F-002 hazardous waste. A contained-in determination will be requested for any material excavated and disposed off-site from the landscaped area.

7.1 Estimated Material Removal Quantities

The estimated quantity of soil/fill to be removed from the Site for remedial and development purposes is approximately 40 CY. If landscaped area needs to be capped, an additional 34 CY of material will be required.

7.2 Soil Characterization

Soil characterization is not currently proposed prior to excavation. Excavated materials will be containerized on Site and staged for pickup. The soil will be characterized at that time and the results provided to NYSDEC. A sample will be collected from the soil and tested in a manner that is consistent with disposal facility requirements, which generally require the following:

- Total petroleum hydrocarbons (TPH) by gas chromatograph/photoionization device (GC/PID);
- Total VOCs via USEPA Method 8260C;
- Total SVOCs via USEPA Method 8270D;
- TAL Metals via USEPA Method 6010B/7470A;
- Total PCBs via USEPA Method 8082;
- Pesticides via USEPA Method 8081A;
- Total Cyanide via USEPA Method 9013A;
- Hexavalent Chromium via USEPA Method 3060A;
- Paint Filter via USEPA Method 9095B;

- SPLP for NJ IGW;
- RCRA Characteristics (ignitability (USEPA Method 1030), corrosivity (USEPA Method 1110A), and reactivity);
- Toxic Characteristics Leaching Procedure (TCLP) VOCs, SVOCs, metals, pesticides, and herbicides via USEPA Method 1311; and
- Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) via USEPA Method 8015C.

Depending on the selected facility, additional analyses may be required. Characterization samples will be submitted to an ELAP-approved laboratory (also holding accreditation for the disposal facility state) for analysis. Analytical reports will be maintained, and copies will be available for inspection in the field and will be included in the FER (described in Section 11.0).

7.3 Soil/Materials Management Plan (SMMP)

Soil and materials management on-Site will be conducted in accordance with the SMMP and as described below. The main goal of the SMMP is to handle all potentially contaminated soil and manage activities associated with soil in a manner that prevents contamination from reaching the community, workers, future occupants and workers, and the environment. Contaminated soil must be managed in a manner that ensures removal, transport, and disposal such that it fulfills applicable regulatory requirements. The means and methods to meet this goal are included in the SMMP, included as Appendix C.

7.4 Community Air Monitoring Plan (CAMP)

The main goal of the CAMP is to keep objectionable odors, VOCs and/or particulates from reaching the surrounding community. The NYSDOH Generic CAMP, which includes monitoring for VOCs and particulates, will be implemented.

Should objectionable odors be produced during excavation, the area to be disturbed at any one time will be limited and, if necessary, foam cover will be utilized (Rusmar Incorporated AC-645 Long Duration Foam or approved equivalent), following the manufacturer's recommended application rate.

The CAMP is included as Appendix A.

7.5 Materials Transport Off-Site

Due to the limited quantity of fill/soil to be generated, material will be placed in a roll-off container prior to off-site disposal. The containers will be lined with plastic sheeting and covered with a heavy duty tarp at night and during transportation. If excavation if required in the landscaped area, this soil will be segregated and disposed of separate from the F-002 hazardous waste.

All transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations, including 6NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

The roll-off container will be loaded in the parking area, which exits to the two-way Eastchester Road. Trucks will make a left (south) on Eastchester Road and continue to make a right (west) on the Pelham Parkway service road, which is a local truck through route. Note that trucks are prohibited from going east on Pelham Parkway for access to Route 95 (New England Thruway).

7.6 Dewatering and Fluids Management

Due to the shallow perched water table, dewatering may be required during remedial action implementation. Dewatering would be accomplished via a sump pump and all liquids would be drummed, sampled, and managed for transportation and disposal at an off Site treatment facility.

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable local, state, and federal regulations.

Dewatering fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off Site.

Discharge of water generated during remedial action implementation to surface waters (e.g., a local pond, stream, or river) is prohibited without a SPDES permit.

7.7 UST Removal

No known USTs are present at the Site. A fill port was observed in the front of the Eastchester Road building; the basement in this area is a crawl space. The crawl space will be accessed to determine if a UST is currently present. Any encountered USTs will be registered and closed in conformance with all applicable federal, state and local regulations, including those defined in DER-10 and 6NYCRR Parts 612 and 613. USTs will be registered with NYSDEC. NYSDEC will be notified seven days prior to removal of any USTs. USTs will be removed by a contractor licensed by the New York City Fire Department (FDNY) in accordance with the procedures set forth in the American Petroleum Institute (API) Recommended Practice 1604 entitled “Removal and Disposal of Used Underground Storage Tanks”.

7.8 Monitoring Well Decommissioning

Existing monitoring wells that will not be part of the long-term monitoring will be decommissioned in accordance with NYSDEC Groundwater Monitoring Well Decommissioning Policy (CP-43), dated November 3, 2009.

7.9 Remedial Performance Evaluation

Post-Excavation End-Point Sampling

End-point samples will be collected from the base and sidewalls of the hot spot excavation and, if applicable, within the landscaped area. End-point samples will be analyzed for VOCs within the hot-spot and, if necessary, SVOCs within the landscaped area. Figure 8 present a generalized post-excavation sampling location map.

Additional cap verification sampling for PAHs will also be completed to determine if the cap is appropriate for commercial use landscaping, as shown on Figure 6.

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

All post-excavation sample results will be compared with the Commercial Use SCOs for non-PCE compounds and the Protection of Groundwater SCO for PCE and its breakdown products. Any soils not meeting the applicable SCOs within the excavation will be removed and the area backfilled with clean fill meeting the criteria outlined in this RAWP. The Commercial Use and Protection of Groundwater SCOs are listed in Table 2.

7.9.1 Quality Assurance / Quality Control (QA/QC)

A Quality Assurance Project Plan (QAPP) detailing the frequency of sample collection, analytical methods and the quality standards that must be achieved by the analytical laboratory is included as Appendix D.

The QAPP includes provisions for trip blanks, field blanks, duplicates, matrix spike and matrix spike duplicate (MS/MSD) samples. The QAPP also describes field sampling procedures.

7.9.2 Data Usability Summary Report (DUSR)

A qualified data validator will prepare a Data Usability Report (DUSR). The DUSR will be prepared according to the guidelines contained in Appendix 2B of DER-10.

7.9.3 Reporting of End-Point Data in FER

The FER will provide a tabular and map summary of all end-point sample results and any exceedances of SCOs.

7.10 Import of Materials

Approximately 40 to 70 cubic yards of soil will be required for backfill and cover after excavation of hot spot areas. Import of materials will be in compliance with: (1) the Part 375-6.7(d) and (2) all Federal, State and local rules and regulations for handling and transport of material, and is further discussed in Section 1.9 of the SMMP in Appendix C.

8.0 REMEDIAL ACTION IMPLEMENTATION: IN-SITU CHEMICAL TREATMENT AND SUMP DISCHARGE TREATMENT

As discussed in Section 5.1.2, the components of the remedial action to address groundwater impacts include in-situ chemical oxidation. In addition, to be conservative, a drum of granular activated carbon will be retrofitted to the sump to treat the effluent prior to discharge to the sewer system and a tightfitting cover and/or rubber gasket will be installed to mitigate potential soil vapor intrusion into the building. Specifications for the ISCO treatment and sump discharge treatment are included in Appendix E.

8.1 ISCO Implementation

The goal of the in-situ chemical oxidation treatment for the Site is to break down contaminant CVOCs into less toxic compounds through the introduction of oxidants into the subsurface via an encapsulated reactant cylinder emplaced into three existing on-site groundwater monitoring wells (MW-1S, MW-5 and MW-11) and two newly installed groundwater monitoring wells (MW-13 and MW-14). Each cylinder is 1.35-inches in diameter and is two-feet long, with approximately 2.6 pounds of solid form crystalline particles of the oxidant potassium permanganate, mixed with a benign paraffin wax. The cylinders are manufactured by Hepure and the specifications are included in Appendix E.

Paraffin wax is biodegradable and insoluble in water, but is soluble in chlorinated solvents such as PCE. This results in the potassium permanganate being released very slowly into water from the encapsulating matrix while releasing rapidly into PCE. The release of potassium permanganate is typically characterized by an initial rapid release (less than ten minutes) followed by a sustained release for the remaining life cycle of the cylinder. Two cylinders will be placed in a PVC holder and lowered within the full, saturated screen interval (approximately three feet) of monitoring wells MW-1S, MW-5, MW-11, MW-13 and MW-14. Based upon the size of the PCE plume, it is anticipated that cylinders will only need to be placed within these monitoring wells to effectively remediate the Site. A total of approximately 15.6 pounds of potassium permanganate will be released into the aquifer. The cylinders will remain within the well for their life cycle, other than for sampling, typically between two to five years depending upon the groundwater flow.

The design goal is to decrease the concentrations of PCE to below the Class GA Standard. Groundwater monitoring will be completed in accordance with an SMP.

8.2 Sump Discharge Treatment

Based on the distribution of dissolved PCE in groundwater, the concentrations in the area of the existing sump are assumed to be above the 20 ug/L NYCDEP Limitation for Effluent to Sanitary or Combined Sewers. The estimated concentration is between 70 and 100 ug/L, as the sump effluent has not been sampled. Given the perched groundwater condition and the potential for stormwater infiltration to the sump, the concentrations are likely diluted prior to discharge.

A FLOWSORB® Liquid Phase Adsorption Canister containing granular activated carbon (GAC) will be plumbed into the discharge line from the sump pump. This unit is designed for low flow

applications and can treat over 1 million gallons of water at the estimated PCE concentrations. Sump effluent will then be sampled and analyzed for CVOCs prior to discharge into the New York City sewer system to confirm it meets the NYCDEP Limitation for Effluent to Sanitary or Combined Sewers. FLOWSORB® specifications are included in Appendix E.

9.0 REMEDIAL ACTION IMPLEMENTATION: SOIL VAPOR VENTING

Following completion of the soil and groundwater remediation (Sections 8 and 9, respectively), the trapped soil vapor beneath the slab will be vented. Soil excavation will be completed to remove soil with PCE above the Protection of Groundwater SCO, which is also the Unrestricted Use SCO. Groundwater will be treated to decrease the concentrations of dissolved PCE. Soil vapor venting will be completed after soil excavation is completed and a decrease in dissolved PCE concentrations are measured in monitoring wells MW-1S and MW-11.

Several soil vapor and/or indoor air samples have been collected at the Site. All indoor air concentrations of CVOCs are below applicable AGVs. With the exception of one pre-RI sub-slab soil vapor sample (SV-04, no corresponding indoor air sample), all sampling indicates that mitigation is not required. PCE was detected in sub-slab soil vapor sample SV-04 at a concentration of 6,630 ug/m3. Based on Matrix B this soil vapor result would require mitigation regardless of any paired indoor air result.

Groundwater is located approximately one inch to one foot below the existing slab under the Eastchester Avenue building slab, which is where the elevated sub-slab soil vapor concentration was detected. This limits the ability to use an active sub-slab depressurization system (SSDS).

Following remediation of soil and groundwater and venting of soil vapor, as described below, post-remedial sub-slab soil vapor and indoor air confirmation testing will be completed.

9.1 Soil Vapor Venting

Several one-inch diameter holes will be drilled through the existing slab, as shown on Figure 9, and a PVC header system, moisture knock-out drum and blower, as shown in Appendix F, will be used to exhaust the trapped soil vapor above the Eastchester Road building roofline. Pressure field extension testing will be completed to ensure that the radius of influence around former sample SV-04 extends to the parking area, Eastchester Road and sub-slab soil vapor sample locations SV-05 and TSV-2. The pressure field will be tested using a manometer; readings of greater than 0.01 inches of water column will indicate a successful pressure field application. Additional extraction points will be added as necessary.

The venting system will act as a short term engineering control at the Site. The system will run for approximately five days, at which point it will be shut down for indoor air testing. The system will continue to be operated as necessary.

9.2 Remedial Performance Evaluation (Post-Remediation Sub-Slab Soil Vapor and Indoor Air Sampling)

Four sets of paired sub-slab soil vapor and indoor air samples will be collected one month after the soil vapor venting is completed, as shown on Figure 10. In addition, one indoor air sample will be collected in proximity to the sump to evaluate potential soil vapor migration into the building from this area. The sump will be retrofitted with a tightfitting cover and/or rubber gasket as part of the remedy to mitigate the potential for vapor intrusion into the Site building. Quarterly rounds of

paired, post-venting sub-slab soil vapor and indoor air sampling events will continue to confirm the efficacy of this approach, in coordination with NYSDEC and NYSDOH. Sampling will be completed in accordance with the NYSDOH Soil Vapor Guidance.

10.0 REMAINING CONTAMINATION TO REMAIN ON-SITE

The successful implementation of the Remedial Action will result in the following:

- All soil left on-Site will meet the Commercial Use SCOs.
- Remaining contamination may remain in the groundwater and soil vapor but the bulk of the CVOC contaminant mass will be removed.
- Groundwater will be treated using ISCO with a design goal of meeting the Class GA Standard for PCE.
- Soil venting will remove trapped impacted soil vapor.

It is not known if all objectives will be met without the aid of Engineering and Institutional Controls (ECs and ICs). If ECs or ICs are needed to complete the remedy, a Site-specific Management Plan (SMP) will be submitted with the FER for long-term management of the Site.

11.0 Engineering Controls

In the event that a Track 2 remedy is not achieved, the contingent Track 4 area discussed throughout this document would require a cap that would serve as a permanent, long-term engineering control for the Site.

A Soil Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the cover system or underlying residual contamination are disturbed after the Remedial Action is complete. Maintenance of this cover system would be described in the Site Management Plan in the FER. Additionally, the EC would be established in an Environmental Easement assigned to the property by the titleholder and would be implemented under a SMP.

11.1 Description of Engineering Control – Cover System

Exposure to residual contaminated soils within the landscaped area on-site would be prevented by installation of a one-foot soil cover system. The cover system will consist of imported material meeting the lower of the Protection of Groundwater and Commercial Use SCOs. Approximately 34 CY of material will be imported to the Site for construction of this EC.

12.0 INSTITUTIONAL CONTROLS

In the event that a Track 2 remedy is not achieved an Institutional Control (IC) will be required to manage residual contamination on Site and off-site and to ensure that the ECs remain protective of public health and the environment. The ICs consist of two elements designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, will be recorded with Queens County for the Site and any off-site property requiring mitigation to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

12.1 Environmental Easement

The Environmental Easement renders the Site and any property requiring mitigation as Controlled Properties. The Environmental Easements must be recorded with the Queens County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to commercial or industrial use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to, [groundwater monitor wells and soil vapor probes], must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site and off-site properties requiring mitigation is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;
- The Controlled Property may be used for commercial or industrial use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as unrestricted use without an amendment or extinguishment of the Environmental Easement;
- Grantor agrees to 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. This [time period] statement must be certified by an expert that the NYSDEC finds acceptable.

The Environmental Easement will incorporate the ICs required to implement, maintain and monitor the ECs, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restrict the use of the Site to commercial uses only, unless discontinued or modified with the approval of NYSDEC.

The Environmental Easement for the controlled property will include the following requirements:

- requires the remedial party or Site owner to complete and submit to NYSDEC a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health (NYCDOH); and
- requires compliance with the NYSDEC-approved SMP.

12.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The SMP is submitted as part of the FER, but will be written as a complete and independent document. Site management requirements continue in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site and off-site management responsibilities defined in the Environmental Easement and SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site and off-site properties requiring mitigation following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); and (3) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of site monitoring; (3) an Operation and Maintenance (O&M) Plan for implementation of remedial containment systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Periodic Review Report (PRR) submitted under the SMP will be based on a calendar year. The first PRR will be submitted to the NYSDEC within 15 months after the date of COC issuance. Any lapses in the engineering or institutional controls noted in the PRR will be required to be corrected expeditiously and the NYSDEC notified of the correction. The SMP will include the following:

1. Introduction with purpose, summary of remediation and site conditions;
2. Institutional and Engineering Control Plan;
3. O&M Plan;
4. Site Monitoring Plan;
5. Site maintenance requirements;
6. Citizen Participation Plan;
7. Personnel organization and responsibilities;
8. Health and Safety Plan;
9. Records and forms;

10. Emergency Contingency Plan; and
11. Copies of Environmental Easement and applicable Site plans, including electronic versions.

The Institutional and Engineering Control Plan will include, but is not limited to:

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls; and,
- maintaining site access controls and NYSDEC notification; and the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

The OM&M Plan will include, but is not limited to:

- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining access controls and Department notification; and
- providing NYSDEC access to the site and O&M records.

The Site Monitoring Plan will include, but is not limited to:

- monitoring of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to NYSDEC; and,
- monitoring for soil vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

The Site Management Reporting Plan will include, but is not limited to:

- Details regarding post-COC reporting requirements, including a schedule
- The contents of the annual report, including:
    - an evaluation of the EC/ICs, EC/IC certifications, results of period Site inspections and deliverables to be generated;
    - frequency and type of the EC/IC and Site inspections;
    - inspection forms, sampling data and maintenance reports;
    - an evaluation of records and reporting; and,
    - corrective measure plans.

13.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) will be submitted to the NYSDEC Project Manager within 90 days of completing the remedial action. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The Final Engineering Report will include as-built drawings for all constructed elements, calculation and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

The Final Engineering Report will include written and photographic documentation of all remedial work performed under this remedy. Photographs will be taken of all remedial activities and submitted to NYSDEC in digital format after completion of active Site remediation. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). Each CD will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Measure components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

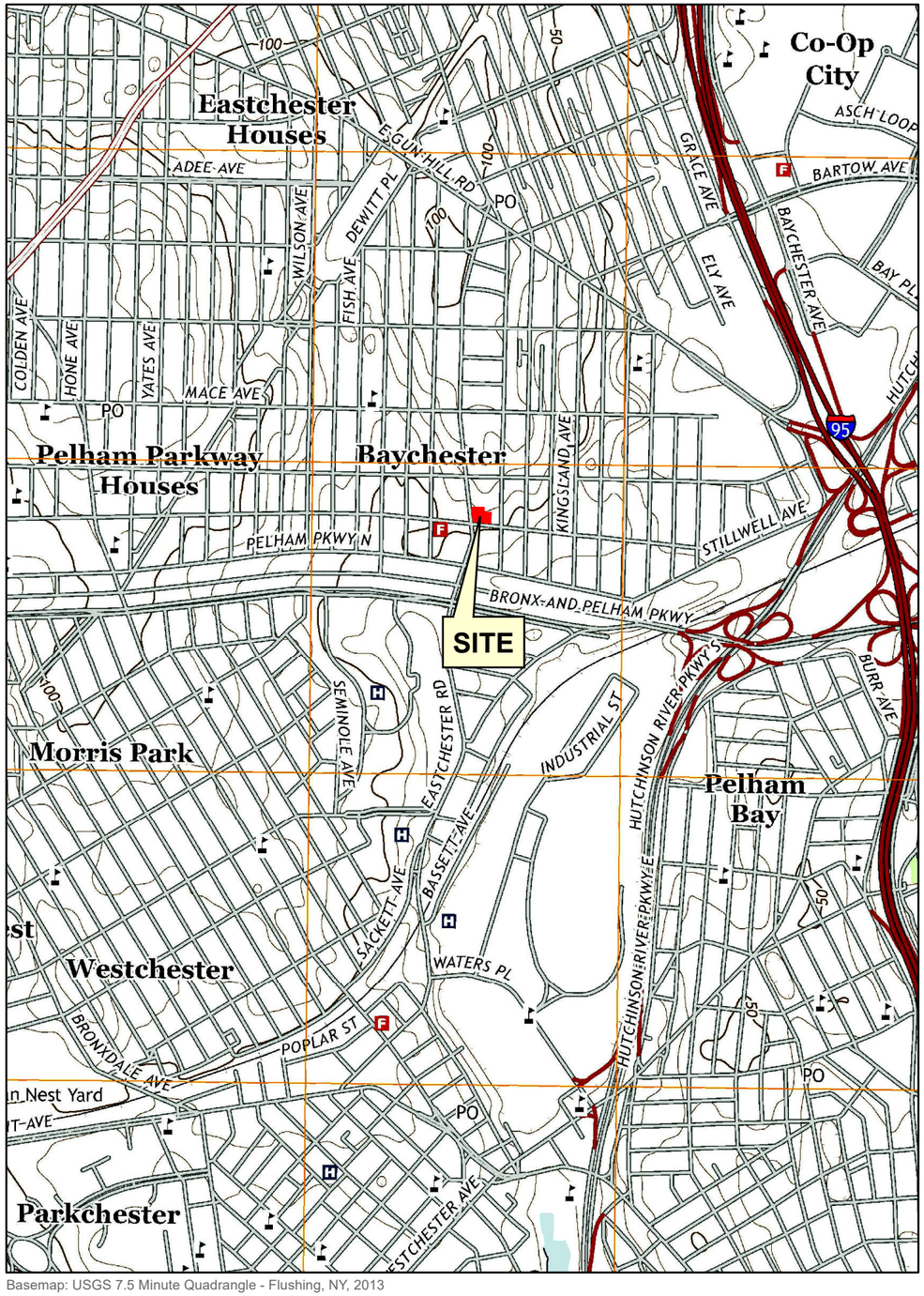
The FER will provide a thorough summary of all remaining contamination left on the Site after the remedy is complete. Remaining contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.
This FER will include the following:

1. Certification by the RE that the data generated is useable and meets the remedial requirements;
2. Certification by the RE that any financial assurance mechanisms required by the NYSDEC have been executed;
3. Certification by the RE that the remedial work conformed to the RAWP;
4. Certification by the RE that dust, odor, and vapor control measures were implemented during invasive work and conformed with the RAWP;
5. Certification by the RE that all the remedial waste was transported and disposed in accordance with the RAWP;
6. Certification by the RE that the source approval and sampling of imported acceptable fill was completed in a manner consistent with the methodology of the RAWP;
7. Summary of the remedy and all remedial actions completed;
8. Description of any problems encountered and their resolutions;
9. Description of the deviations from the approved RAWP;
10. Listing of waste streams, quantity of materials disposed, and where they were disposed;
11. Analytical QA/QC completed for the environmental media sampling during the remedial activities, including DUSR or other data validation;
12. List of the remediation standards applied to the remedial actions;
13. List of all applicable local, regional, and national governmental permits, certificates, or other approvals required for the remedial and development work;
14. Tables and figures containing all pre- and post-remedial data, including volumes of soil removed (as applicable);
15. Description of source and quality of fill (as applicable);
16. "As-built" drawings including remediation areas;
17. Air quality and dust monitoring data, including any supporting documentation on the decisions made based on the data;
18. Copies of all the submitted periodic reports; and
19. Copies of all manifests of off-site transport of waste material.

Before approval of a FER and issuance of a Certificate of Completion, all documents and reports will be submitted to the NYSDEC will be in both hard copy and in digital format on CD. These digital documents shall be in PDF form and, where appropriate, supplemented by photos and Microsoft Excel files. Laboratory analytical data will be submitted in an electronic data deliverable (EDD) format that complies with the NYSDEC's electronic data warehouse standards.

FIGURES



Basemap: USGS 7.5 Minute Quadrangle - Flushing, NY, 2013

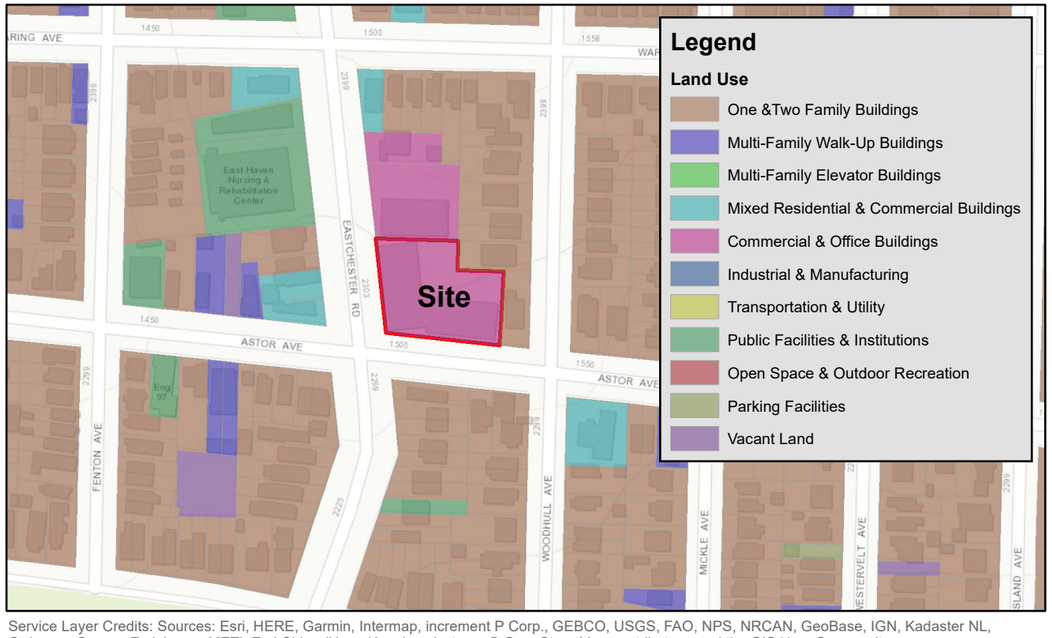
Site Location

0 750 1,500 3,000 Feet

http://gis.nyc.gov/taxmap/map.htm

Department of Finance Digital Tax Map

0 125 250 500 Feet



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NYC Department of City Planning, Information Technology Division

Department of City Planning MapPLUTO - 2018 v1

0 125 250 500 Feet

Revised 11/21/2017 Per NYSDEC Comments

Site

Remedial Action Work Plan
1500 Astor Avenue
Bronx, New York
Block 4393, Lot 1

TENEN ENVIRONMENTAL

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Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Site Location Map**

Drawing No: **Figure 1**

Legend

Site Boundary

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division

Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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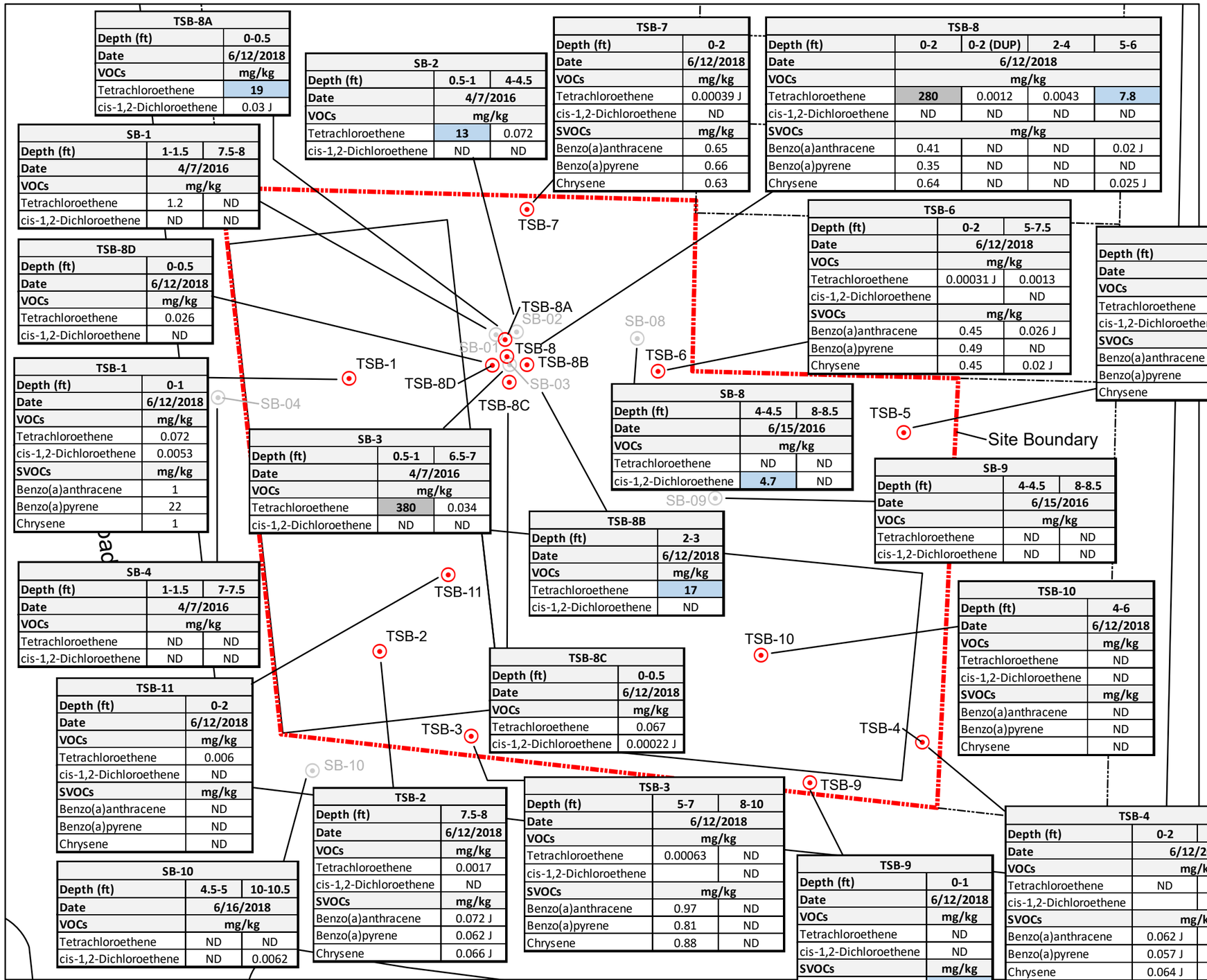
Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Site Layout**

Drawing No: **Figure 2**



TSB-8A	
Depth (ft)	0-0.5
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	19
cis-1,2-Dichloroethene	0.03 J

SB-2		
Depth (ft)	0.5-1	4-4.5
Date	4/7/2016	
VOCs	mg/kg	
Tetrachloroethene	13	0.072
cis-1,2-Dichloroethene	ND	ND

TSB-7	
Depth (ft)	0-2
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.00039 J
cis-1,2-Dichloroethene	ND
SVOCs	mg/kg
Benzo(a)anthracene	0.65
Benzo(a)pyrene	0.66
Chrysene	0.63

TSB-8				
Depth (ft)	0-2	0-2 (DUP)	2-4	5-6
Date	6/12/2018			
VOCs	mg/kg			
Tetrachloroethene	280	0.0012	0.0043	7.8
cis-1,2-Dichloroethene	ND	ND	ND	ND
SVOCs	mg/kg			
Benzo(a)anthracene	0.41	ND	ND	0.02 J
Benzo(a)pyrene	0.35	ND	ND	ND
Chrysene	0.64	ND	ND	0.025 J

SB-1		
Depth (ft)	1-1.5	7.5-8
Date	4/7/2016	
VOCs	mg/kg	
Tetrachloroethene	1.2	ND
cis-1,2-Dichloroethene	ND	ND

TSB-6		
Depth (ft)	0-2	5-7.5
Date	6/12/2018	
VOCs	mg/kg	
Tetrachloroethene	0.00031 J	0.0013
cis-1,2-Dichloroethene		ND
SVOCs	mg/kg	
Benzo(a)anthracene	0.45	0.026 J
Benzo(a)pyrene	0.49	ND
Chrysene	0.45	0.02 J

TSB-5		
Depth (ft)	0-3.5	6-8
Date	6/12/2018	
VOCs	mg/kg	
Tetrachloroethene	0.00067	ND
cis-1,2-Dichloroethene		ND
SVOCs	mg/kg	
Benzo(a)anthracene	0.2	ND
Benzo(a)pyrene	0.21	ND
Chrysene	0.2	ND

TSB-8D	
Depth (ft)	0-0.5
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.026
cis-1,2-Dichloroethene	ND

TSB-1	
Depth (ft)	0-1
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.072
cis-1,2-Dichloroethene	0.0053
SVOCs	mg/kg
Benzo(a)anthracene	1
Benzo(a)pyrene	22
Chrysene	1

SB-8		
Depth (ft)	4-4.5	8-8.5
Date	6/15/2016	
VOCs	mg/kg	
Tetrachloroethene	ND	ND
cis-1,2-Dichloroethene	4.7	ND

SB-3		
Depth (ft)	0.5-1	6.5-7
Date	4/7/2016	
VOCs	mg/kg	
Tetrachloroethene	380	0.034
cis-1,2-Dichloroethene	ND	ND

SB-9		
Depth (ft)	4-4.5	8-8.5
Date	6/15/2016	
VOCs	mg/kg	
Tetrachloroethene	ND	ND
cis-1,2-Dichloroethene	ND	ND

TSB-8B	
Depth (ft)	2-3
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	17
cis-1,2-Dichloroethene	ND

SB-4		
Depth (ft)	1-1.5	7-7.5
Date	4/7/2016	
VOCs	mg/kg	
Tetrachloroethene	ND	ND
cis-1,2-Dichloroethene	ND	ND

TSB-10	
Depth (ft)	4-6
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	ND
cis-1,2-Dichloroethene	ND
SVOCs	mg/kg
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Chrysene	ND

TSB-8C	
Depth (ft)	0-0.5
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.067
cis-1,2-Dichloroethene	0.00022 J

TSB-11	
Depth (ft)	0-2
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.006
cis-1,2-Dichloroethene	ND
SVOCs	mg/kg
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Chrysene	ND

TSB-2	
Depth (ft)	7.5-8
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	0.0017
cis-1,2-Dichloroethene	ND
SVOCs	mg/kg
Benzo(a)anthracene	0.072 J
Benzo(a)pyrene	0.062 J
Chrysene	0.066 J

TSB-3		
Depth (ft)	5-7	8-10
Date	6/12/2018	
VOCs	mg/kg	
Tetrachloroethene	0.00063	ND
cis-1,2-Dichloroethene		ND
SVOCs	mg/kg	
Benzo(a)anthracene	0.97	ND
Benzo(a)pyrene	0.81	ND
Chrysene	0.88	ND

TSB-9	
Depth (ft)	0-1
Date	6/12/2018
VOCs	mg/kg
Tetrachloroethene	ND
cis-1,2-Dichloroethene	ND
SVOCs	mg/kg
Benzo(a)anthracene	1.5
Benzo(a)pyrene	1.1
Chrysene	1.5

TSB-4		
Depth (ft)	0-2	7-9
Date	6/12/2018	
VOCs	mg/kg	
Tetrachloroethene	ND	ND
cis-1,2-Dichloroethene		ND
SVOCs	mg/kg	
Benzo(a)anthracene	0.062 J	ND
Benzo(a)pyrene	0.057 J	ND
Chrysene	0.064 J	ND

SB-10		
Depth (ft)	4.5-5	10-10.5
Date	6/16/2018	
VOCs	mg/kg	
Tetrachloroethene	ND	ND
cis-1,2-Dichloroethene	ND	0.0062

Analyte	Part 375 Protection of Groundwater SCOs*	Part 375 Restricted Commercial SCOs**
VOCs	mg/kg	
Tetrachloroethene	1.3	150
cis-1,2-Dichloroethene	0.25	500
SVOCs	mg/kg	
Benzo(a)anthracene	1	5.6
Benzo(a)pyrene	22	1
Chrysene	1	56

NOTES:
1. Sample locations are approximate

2. Bold and shaded blue values indicate exceedance of 6 NYCRR Part 375 Restricted Protection of Groundwater SCOs

3. Bold and shaded gray values indicate exceedance of 6 NYCRR Part 375 Restricted Commercial Use SCOs

4. J = Estimated Value

5. ND = Not Detected

6. - = Not Analyzed

7. * = 6 NYCRR Part 375 Restricted Protection of Groundwater Soil Cleanup Objectives

8. ** = 6 NYCRR Part 375 Restricted Commercial Soil Cleanup Objectives

Legend

- Soil Boring Locations
- Previous Soil Boring Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division

Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Site

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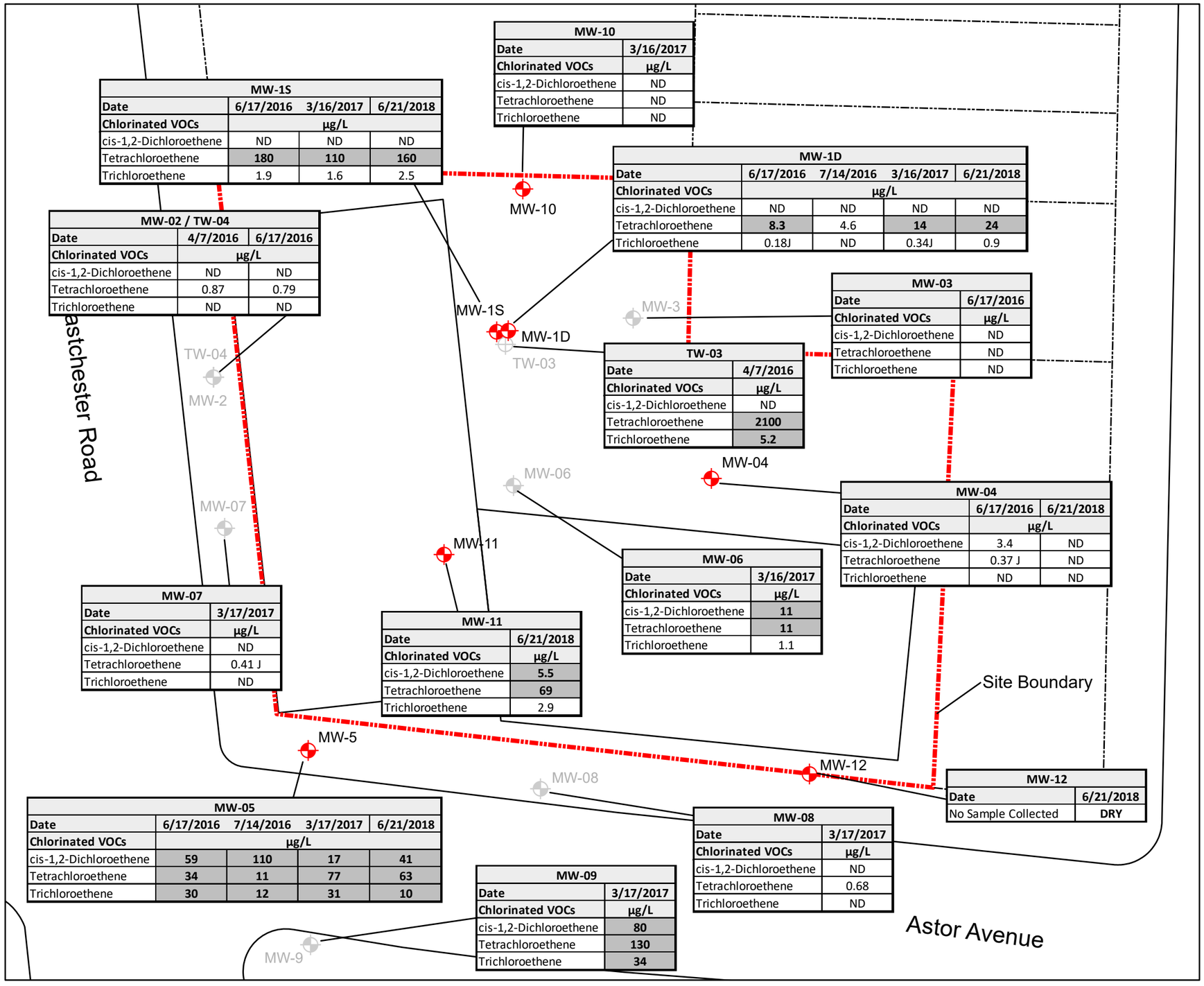
Drawn By	Checked By	Date	Scale
LM	MC	February 2019	As Noted

Drawing Title: Summary of Soil Concentrations above Protection of GW and Commercial Use SCOs

Drawing No: Figure 3



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Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Analyte	TOGS AWQS*
Chlorinated VOCs	**µg/L**
cis-1,2-Dichloroethene	5
Tetrachloroethene	5
Trichloroethene	5

NOTES:

1. Bold and shaded value indicates concentration exceeds TOGS AWQS*

2. * = NYSDEC Division of Technical Operational Guidance Series (TOGS) 1.1.1, Class GA Water Quality Standards (AWQS) and Guidance Values

3. J = Estimated value

4. ND = Not Detected

5. DUP = Duplicate

Legend

- Monitoring Well Sampled During RI
- Monitoring Well Not Sampled During RI
- Previous Temporary Monitoring Well Location

0 15 30 60 Feet

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Drawn By: LM

Checked By: MC

Date: February 2019

Scale: As Noted

Drawing Title: Summary of Groundwater Concentrations above Class GA Standards

Drawing No: Figure 4

Date	2118-SV-01 4/7/2016	2118-IA-01 6/17/2016	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	**1950**	**10.2**	Mitigate
Trichloroethene	ND	0.21	No Further Action
cis-1,2-Dichloroethene	ND	0.091	No Further Action

Date	1494-SV-06 3/2/2017
VOCs	µg/m³
Tetrachloroethene	12.3
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Date	2118-SV-02 4/7/2016	2118-IA-02 6/17/2016	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	**5210**	**7.32**	Mitigate
Trichloroethene	ND	0.15	No Further Action
cis-1,2-Dichloroethene	ND	0.079	No Further Action

Date	TSV-3 6/21/2018
VOCs	µg/m³
Tetrachloroethene	26.3
Trichloroethene	4.19
cis-1,2-Dichloroethene	ND

Analyte	Matrix	NYSDOH AGV
VOCs	µg/m³	µg/m³
Tetrachloroethene	B	30
Trichloroethene	A	2
cis-1,2-Dichloroethene	A	--

Date	1494-AA-01 3/3/2017
VOCs	µg/m³
Tetrachloroethene	0.142
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Date	1494-SV-03 3/2/2017
VOCs	µg/m³
Tetrachloroethene	24.3
Trichloroethene	13.5
cis-1,2-Dichloroethene	73

Date	TSV-2 3/29/2018	TIA-2 3/29/2018	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	33.4	2.15	No Further Action
Trichloroethene	ND	ND	No Further Action
cis-1,2-Dichloroethene	ND	ND	No Further Action

Date	1494-SV-09 3/2/2017
VOCs	µg/m³
Tetrachloroethene	317
Trichloroethene	5.15
cis-1,2-Dichloroethene	ND

Date	1494-SV-07 3/2/2017
VOCs	µg/m³
Tetrachloroethene	332
Trichloroethene	6.5
cis-1,2-Dichloroethene	ND

Date	1494-SV-10 3/2/2017
VOCs	µg/m³
Tetrachloroethene	14.6
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Date	1494-SV-08 3/3/2017
VOCs	µg/m³
Tetrachloroethene	18.2
Trichloroethene	ND
cis-1,2-Dichloroethene	2.26

Date	TSV-4 6/21/2018
VOCs	µg/m³
Tetrachloroethene	42.7
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Date	1494-SV-05 3/3/2017	1494-IA-03 3/16/2017	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	5.6	2.42	No Further Action
Trichloroethene	ND	ND	No Further Action
cis-1,2-Dichloroethene	ND	ND	No Further Action

Date	1494-SV-04 3/3/2017	1491-IA-04 3/3/2017	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	**6630**	**5.02**	Mitigate
Trichloroethene	**288**	**0.118**	Mitigate
cis-1,2-Dichloroethene	9.12	ND	No Further Action

Date	TSV-1 3/29/2018	TIA-1 3/29/2018	DOH Matrix Determination
VOCs	µg/m³	µg/m³	
Tetrachloroethene	154	5.74	Monitor
Trichloroethene	14.7	0.156	No Further Action
cis-1,2-Dichloroethene	2.43	ND	No Further Action

Notes:

1. NYSDOH AGV = New York State Department of Health Air Guidance Values, Table 3.1 in NYSDOH Guidance for Evaluating Soil Vapor Intrustion in the State of New York, October 2006 with May 2017 updates
2. **Bold and blue shaded values indicate Mitigate matrix decision**
3. **Bold and gray shaded values indicate the indoor air concentration exceeds NYSDOH Air Guidance Values**
4. NYSDOH matrix determinations are described in the report narrative and the NYSDOH Soil Vapor Guidance, with May 2017 updates
5. ND = Not Detected
6. -- = No standard

Legend

- Ambient Air
- Indoor Air Sample Location
- Soil Vapor Sample Location

0 15 30 60 Feet

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Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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Drawn By: LM
Checked By: MC
Date: February 2019
Scale: As Noted

Drawing Title: Summary of Soil Vapor Concentrations

Drawing No: Figure 5

Legend

- Pre-Remedy Delineation Sample
- Previous Soil Boring Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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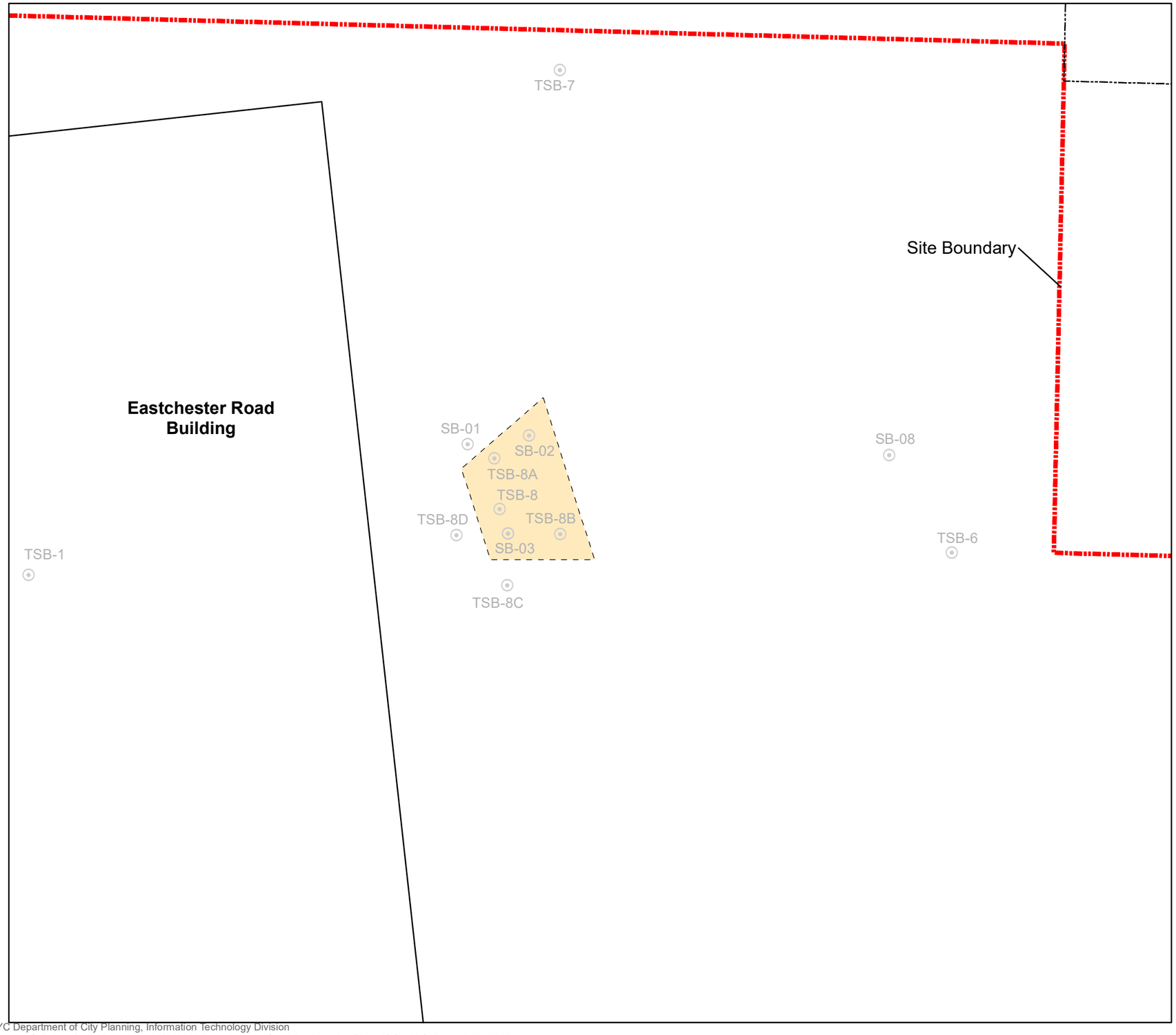
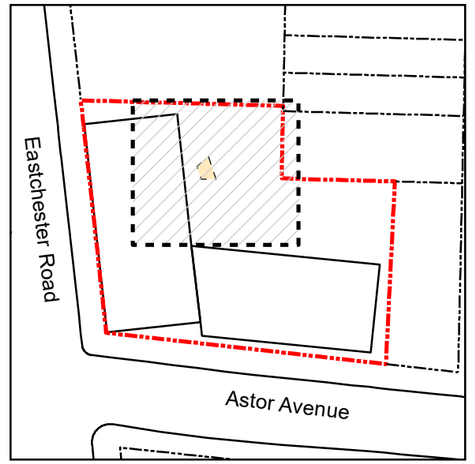
Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Pre-Remedy Delineation Samples**

Drawing No: **Figure 6**





Inset Map

Legend

- Previous Soil Boring Location
- Proposed Remedial ExcavationExtents

0 5 10 20 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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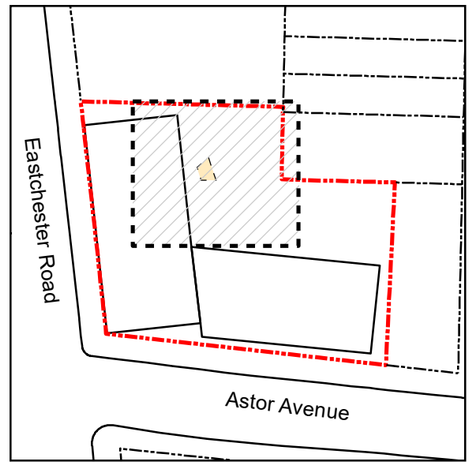
Drawn By	Checked By	Date	Scale
LM	AC	June 2019	As Noted

Drawing Title: **Proposed Remedial Excavation Extents**

Drawing No: **Figure 7**



Inset Map

Legend

- Bottom Sample
- Sidewall Sample
- Previous Soil Boring Location
- Proposed Remedial ExcavationExtents

0 5 10 20 Feet

NYC Department of City Planning, Information Technology Division
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Drawn By	Checked By	Date	Scale
LM	AC	June 2019	As Noted

Drawing Title: **Proposed Post-Remedial End-Point Sample Locations**

Drawing No: **Figure 8**

Legend

- Proposed Soil Vapor Venting Location
- Previous Soil Vapor Sample Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Soil Vapor Venting Locations**

Drawing No: **Figure 9**

Legend

- Post Remedial Indoor Air Sample
- Post Remedial Sub-Slab Soil Vapor Sample
- Previous Indoor Air Sample Location
- Previous Soil Vapor Sample Location

0 15 30 60 Feet

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Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Post-Remedial Soil Vapor/Indoor Air Sample Locations**

Drawing No: **Figure 10**

Legend

- Treatment Well to be Installed During Remedial Action
- Monitoring Well Location
- Previous Temporary Monitoring Well Location

Note: Monitoring wells shown in red will be treated

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
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Drawn By	Checked By	Date	Scale
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Drawing Title: **Proposed Groundwater Chemical Oxidation Treatment Locations**

Drawing No: **Figure 11**

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Legend

- Monitoring Well Location
- Previous Temporary Monitoring Well Location

0 15 30 60 Feet

Site

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Drawn By	Checked By	Date	Scale
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Drawing Title: **Proposed Sump Discharge Treatment**

Drawing No: **Figure 12**

Legend

- Proposed Treatment Well Location
- Previous Monitoring Well Location
- Previous Temporary Monitoring Well Location

Note: Monitoring wells shown in red will be Sampled

0 15 30 60 Feet

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Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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Drawn By	Checked By	Date	Scale
LM	AC	June 2019	As Noted

Drawing Title: **Proposed Post-Remedial Groundwater Sample Locations**

Drawing No: **Figure 13**

TABLES

1500 Astor Avenue - Bronx, NY
BCP Site C203105
Table 1
Unrestricted Use Soil Cleanup Objectives (SCOs)

From Table 375-6.8(a) Unsrestricted Use Soil Cleanup Objectives

Contaminant	CAS Number	SCO
Metals		
Arsenic	7440-38-2	13[c]
Barium	7440-39-3	350[c]
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5[c]
Chromium, hexavalent[e]	18540-29-9	1[b]
Chromium, trivalent[e]	16065-83-1	30[c]
Copper	7440-50-8	50
Total Cyanide[e,f]		27
Lead	7439-92-1	63[c]
Manganese	7439-96-5	1,600[c]
Total Mercury		0.18[c]
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9[c]
Silver	7440-22-4	2
Zinc	7440-66-6	109[c]
PCBs/Pesticides		
2,4,5-TP Acid (Silvex)[f]	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033[b]
4,4'-DDT	50-29-3	0.0033[b]
4,4'-DDD	72-54-8	0.0033[b]
Aldrin	309-00-2	0.005[c]
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094
delta-BHC[g]	319-86-8	0.04
Dibenzofuran[f]	132-64-9	7
Dieldrin	60-57-1	0.005[e]
Endosulfan I[d,f]	959-98-8	2.4
Endosulfan Ii[d,f]	33213-65-9	2.4
Endosulfan sulfate[d,f]	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042
Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1

Contaminant	CAS Number	SCO
Semivolatiles		
Acenaphthene	83-32-9	20
Acenapthylene[f]	208-96-8	100[a]
Anthracene[f]	120-12-7	100[a]
Benz(a)anthracene[f]	56-55-3	1[c]
Benzo(a)pyrene	50-32-8	1[c]
Benzo(b)fluoranthene[f]	205-99-2	1[c]
Benzo(g,h,i)perylene[f]	191-24-2	100
Benzo(k)fluoranthene[f]	207-08-9	0.8[c]
Chrysene[f]	218-01-9	1[c]
Dibenz(a,h)anthracene[f]	53-70-3	0.33[b]
Fluoranthene[f]	206-44-0	100[a]
Fluorene[f]	86-73-7	30
Indeno(1,2,3-cd)pyrene[f]	193-39-5	0.5[c]
m-Cresol[f]	108-39-4	0.33[b]
Naphthalene[f]	91-20-3	12
o-Cresol[f]	95-48-7	0.33[b]
p-Cresol[f]	106-44-5	0.33[b]
Pentachlorophenol	87-86-5	0.8[b]
Phenanthrene[f]	85-01-8	100
Phenol	108-95-2	0.33[b]
Pyrene[f]	129-00-0	100
Volatiles		
1,1,1-Trichloroethane[f]	71-55-6	0.68
1,1-Dichloroethane[f]	75-34-3	0.27
1,1-Dichloroethene[f]	75-35-4	0.33
1,2-Dichlorobenzene[f]	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.2[c]
cis-1,2-Dichloroethene[f]	156-59-2	0.25
trans-1,2-Dichloroethene[f]	156-60-5	0.19
1,3-Dichlorobenzene[f]	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1[b]
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
n-Butylbenzene[f]	104-51-8	12
Carbon tetrachloride[f]	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene[f]	100-41-4	1
Hexachlorobenzene[f]	118-74-1	0.33[b]
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether[f]	1634-04-4	0.93
Methylene chloride	75-09-2	0.05
n-Propylbenzene[f]	103-65-1	3.9
sec-Butylbenzene[f]	135-98-8	11
tert-Butylbenzene[f]	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.07
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene[f]	95-63-6	3.6
1,3,5- Trimethylbenzene[f]	108-67-8	8.4
Vinyl chloride[f]	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26

Notes:
All soil cleanup objectives (SCOs) are in parts per million (ppm). NS=Not specified.
Footnotes (designations are from Table in Part 375). See Technical Support Document (TSD).
a The SCOs for unrestricted use were capped at a maximum value of 100 ppm. See TSD section 9.3.
b For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

c For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.
d SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.
e The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
f Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

1500 Astor Avenue - Bronx, NY
BCP Site C203105
Table 2
Restricted Commercial Use and Protection of Groundwater Soil Cleanup Objectives (SCOs)

From Table 375-6.8(b) or CP51 Table 1: Restricted Commercial Use and Protection of Groundwater Soil Cleanup Objectives.

Contaminant	CAS Number	Restricted Commercial	Protection of GW
Metals			
Arsenic	7440-38-2	16[d]	16[f]
Barium	7440-39-3	400	820
Beryllium	7440-41-7	590	47
Cadmium	7440-43-9	9.3	7.5
Chromium, hexavalent[b]	18540-29-9	400	19
Chromium, trivalent[b]	16065-83-1	1,500	36
Copper	7440-50-8	270	1720
Total Cyanide[b]		27	40
Lead	7439-92-1	1,000	450
Manganese	7439-96-5	10,000[d]	2,000[f]
Total Mercury		2.8[j]	0.73
Nickel	7440-02-0	310	130
Selenium	7782-49-2	1,500	4[f]
Silver	7440-22-4	1,500	8
Zinc	7440-66-6	10,000[d]	2,480
PCBs/Pesticides			
2,4,5-TP Acid (Silvex)	93-72-1	500[b]	3.8
4,4'-DDE	72-55-9	62	17
4,4'-DDT	50-29-3	47	136
4,4'-DDD	72-54-8	92	14
Aldrin	309-00-2	0.68	0.19
alpha-BHC	319-84-6	3.4	0.02
beta-BHC	319-85-7	3	0.009
Chlordane (alpha)	5103-71-9	24	2.9
delta-BHC	319-86-8	500[b]	0.25
Dibenzofuran	132-64-9	350	6.2
Dieldrin	60-57-1	1.4	0.1
Endosulfan I	959-98-8	200[i]	102
Endosulfan II	33213-65-9	200[i]	102
Endosulfan sulfate	1031-07-8	200[i]	1000[c]
Endrin	72-20-8	89	0.06
Heptachlor	76-44-8	15	0.38
Lindane	58-89-9	9.2	0.1
Polychlorinated biphenyls	1336-36-3	1	3.2

Contaminant	CAS Number	Restricted Commercial	Protection of GW
Semivolatiles			
Acenaphthene	83-32-9	500[b]	98
Acenapthylene	208-96-8	500[b]	107
Anthracene	120-12-7	500[b]	1000[c]
Benz(a)anthracene	56-55-3	6	1[f]
Benzo(a)pyrene	50-32-8	1[f]	22
Benzo(b)fluoranthene	205-99-2	6	2
Benzo(g,h,i)perylene	191-24-2	500[b]	1000[c]
Benzo(k)fluoranthene	207-08-9	56	2
Chrysene	218-01-9	56	1[f]
Dibenz(a,h)anthracene	53-70-3	1	1000[c]
Fluoranthene	206-44-0	500[b]	1000[c]
Fluorene	86-73-7	500[b]	386
Indeno(1,2,3-cd)pyrene	193-39-5	6	8
m-Cresol	108-39-4	500[b]	0.33[e]
Naphthalene	91-20-3	500[b]	12
o-Cresol	95-48-7	500[b]	0.33[e]
p-Cresol	106-44-5	500[b]	0.33[e]
Pentachlorophenol	87-86-5	6.7	0.8[e]
Phenanthrene	85-01-8	500[b]	1000[c]
Phenol	108-95-2	500[b]	0.33[e]
Pyrene	129-00-0	500[b]	1000[c]

Contaminant	CAS Number	Restricted Commercial	Protection of GW
Volatiles			
1,1,1-Trichloroethane	71-55-6	500[b]	0.68
1,1-Dichloroethane	75-34-3	240	0.27
1,1-Dichloroethene	75-35-4	500b	0.33
1,2-Dichlorobenzene	95-50-1	500[b]	1.1
1,2-Dichloroethane	107-06-2	30	0.02[f]
cis-1,2-Dichloroethene	156-59-2	500b	0.25
trans-1,2-Dichloroethene	156-60-5	500[b]	0.19
1,3-Dichlorobenzene	541-73-1	280	2.4
1,4-Dichlorobenzene	106-46-7	130	1.8
1,4-Dioxane	123-91-1	130	0.1[e]
Acetone	67-64-1	500[b]	0.05
Benzene	71-43-2	44	0.06
n-Butylbenzene	104-51-8	500[b]	12
Carbon tetrachloride	56-23-5	22	0.76
Chlorobenzene	108-90-7	500[b]	1.1
Chloroform	67-66-3	350	0.37
Ethylbenzene	100-41-4	390	1
Hexachlorobenzene	118-74-1	6	3
Methyl ethyl ketone	78-93-3	500[b]	0.12
Methyl tert-butyl ether	1634-04-4	500[b]	0.93
Methylene chloride	75-09-2	500[b]	0.05
n-Propylbenzene	103-65-1	500[b]	3.9
sec-Butylbenzene	135-98-8	500[b]	11
tert-Butylbenzene	98-06-6	500[b]	5.9
Tetrachloroethene	127-18-4	150	1.3
Toluene	108-88-3	500[b]	0.7
Trichloroethene	79-01-6	200	
1,2,4-Trimethylbenzene	95-63-6	190	3.6
1,3,5- Trimethylbenzene	108-67-8	190	8.4
Vinyl chloride	75-01-4	13	0.02
Xylene (mixed)	1330-20-7	500[b]	1.6

Notes:
All soil cleanup objectives (SCOs) are in parts per million (ppm). NS=Not specified.
Footnotes (designations are from Table in Part 375). See Technical Support Document (TSD).
a The SCOs for restricted-
b the SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.
d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.
e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.
f For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
i This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.
j This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts). See TSD Table 5.6-1.

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Table 3
NYSDEC Division of Water TOGS 1.1.1 Class GA Standards

From Table 1: New York State Ambient Water Quality Standards and Guidance Values
(Division of Water Technical and Operational Guidance Series (1.1.1), June 1998)

Contaminant	CAS Number	Class GA Standard
Volatiles		
1,1,1,2-Tetrachloroethane	630-20-6	5*
1,1,1-Trichloroethane	71-55-6	5*
1,1,2,2-Tetrachloroethane	79-34-5	5*
1,1,2-Trichloroethane	79-00-5	1
1,1-Dichloroethane	75-34-3	5*
1,1-Dichloroethene	75-35-4	5*
1,1-Dichloropropene	563-58-6	5*
1,2,3-Trichloropropane	96-18-4	0.04
1,2,4,5-Tetramethylbenzene	95-93-2	5*
1,2,4-Trimethylbenzene	95-63-6	5*
1,2-Dibromo-3-chloropropane	96-12-8	0.04
1,2-Dichlorobenzene	95-50-1	3
1,2-Dichloroethane	107-06-2	0.6
1,2-Dichloropropane	78-87-5	1
1,3,5-Trimethylbenzene	108-67-8	5*
1,3-Dichlorobenzene	541-73-1	3
1,3-Dichloropropane	142-28-9	5*
1,4-Dichlorobenzene	106-46-7	3
2,2-Dichloropropane	594-20-7	5*
2-Hexanone	591-78-6	50**
Acetone	67-64-1	50**
Acrylonitrile	107-13-1	5*
Benzene	71-43-2	1
Bromobenzene	108-86-1	5*
Bromochloromethane	74-97-5	5*
Bromodichloromethane	75-27-4	50**
Bromoform	75-25-2	50**
Bromomethane	74-83-9	5*
Butylbenzene	104-51-8	5*
Carbon tetrachloride	56-23-5	5
Chlorobenzene	108-90-7	5*
Chloroethane	75-00-3	5*
Chloroform	75-34-3	7
Chloromethane (Methyl Chloride)	74-87-3	5*
cis-1,2-Dichloroethene	156-59-2	5*
Dibromochloromethane	124-48-1	50**
Dibromomethane	74-95-3	5*
Dichlorodifluoromethane	75-71-8	5*
Ethylbenzene	100-41-4	5*
Hexachlorobenzene	87-68-3	0.04
Hexachlorobutadiene	87-68-3	0.5
Isopropylbenzene	98-82-8	5*
Methylene chloride	75-09-2	5*
m-Xylene (1,3-Xylene)	108-38-3	5*
Naphthalene	91-20-3	10**
n-Propylbenzene	103-65-1	5*
o-Chlorotoluene	95-49-8	5*
o-Xylene (1,2-Xylene)	95-47-6	5*
p-Chlorotoluene	106-43-4	5*
p-Isopropyltoluene	99-87-6	5*
p-Xylene (1,4-Xylene)	106-42-3	5*
sec-Butylbenzene	135-98-8	5*
Styrene	100-42-5	5*
tert-Butylbenzene	98-06-6	5*
Tetrachloroethene	127-18-4	5*
Toluene	108-88-3	5*

Contaminant	CAS Number	Class GA Standard
Volatiles		
Total 1,3-Dichloropropene	542-75-6	0.4 (1)
trans-1,2-Dichloroethene	156-60-5	5*
trans-1,4-Dichloro-2-butene	110-57-6	5*
Trichloroethene	79-01-6	5*
Trichlorofluoromethane	75-69-4	5*
Vinyl chloride	75-01-4	2
Semivolatiles		
1,2,4,5-Tetrachlorobenzene	95-94-3	5*
1,2-Dichlorobenzene	95-50-1	3
1,3-Dichlorobenzene	541-73-1	3
1,4-Dichlorobenzene	106-46-7	3
3,3'-Dichlorobenzidine	91-94-1	5*
2,4-Dichlorophenol	120-83-2	5*
2,4-Dimethylphenol	105-67-9	50**
2,4-dinitrophenol	51-28-5	10**
2,4-Dinitrotoluene	121-14-2	5*
2,6-Dinitrotoluene	606-20-2	5*
2-Chloronaphthalene	91-58-7	10**
2-Nitroaniline	88-74-4	5*
3-Nitroaniline	99-09-2	5*
4-Chloroaniline	106-47-8	5*
4-Nitroaniline	100-01-6	5*
Acenaphthene	83-32-9	20**
Aniline	62-53-3	5*
Anthracene	120-12-7	50**
Benzo(a)anthracene	56-55-3	0.002**
Benzo(a)pyrene	50-32-8	0
Benzo(b)fluoranthene	205-99-2	0.002**
Benzo(k)fluoranthene	207-08-9	0.002**
Biphenyl	92-52-4	5*
Bis(2-chloroethoxy)methane	111-91-1	5*
Bis(2-chloroethyl)ether	111-44-4	1.0
Bis(2-Ethylhexyl)phthalate	117-81-7	5
Butyl benzyl phthalate	85-68- 7	50**
Chrysene	218-01-9	0.002
Diethyl phthalate	84-66-2	50**
Dimethyl phthalate	131-11-3	50**
Di-n-butylphthalate	84-74-2	50
Di-n-octylphthalate	117-84-0	50**
Fluoranthene	206-44-0	50**
Fluorene	86-73-7	50**
Hexachlorobenzene	118-74-1	0.04
Hexachlorobutadiene	87-68-3	0.5
Hexachlorocyclopentadiene	77-47-4	5*
Hexachloroethane	67-72-1	5*
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002
Isophorone	78-59-1	50**
Naphthalene	91-20-3	10**
Nitrobenzene	98-95-3	0.4
NitrosoDiPhenylAmine(NDPA)	86-30-6	50**
Pentachlorophenol	87-86-5	1(2)
Phenanthrene	85-01-8	50**
Phenol	108-95-2	1 (2)
Pyrene	129-00-0	50**

Notes:
All Class GA Standards are in micrograms per liter (ug/l). Compounds without standards or guideline values are not shown.
*The principal organic contaminant standard for groundwater of 5 ug/l applies to this substance.
** The value shown is a Guidance Value
(1) refers to sum of cis- and trans-1,3-dichloropropene.
(2) refers to the sum of Total Phenols (phenolic compounds)

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Table 4

Soil Analytical Results

CLIENT SAMPLE ID					TSB-6 (0-2)		TSB-6 (5-7.5)		TSB-5 (0-3.5)		TSB-5 (6-8)		TSB-7 (0-2)		TSB-8 (0-2)		TSB-8 (2-4)		TSB-8 (5-6)		TSB-8A (0-0.5)		TSB-8B (2-3)		TSB-8C (0-0.5)	
SAMPLING DATE					12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18	
DEPTH (ft)					0-2		5-7.5		0-3.5		6-8		0-2		0-2		2-4		5-6		0-0.5		2-3		0-0.5	
	NY-UNRES*	NY-RESC**	NY-RESGW***	Units		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual
General Chemistry																										
Chromium, Trivalent	30	1500	NS	mg/kg	26		23		**36**	J	**32**	J	16		**40**		21	J	23	J	-		-		-	
Solids, Total				%	87.4		88		89.6		84.1		91.6		86.1		90.8		91.3		89.6		90.5		91.2	
Cyanide, Total	27	27	40	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Chromium, Hexavalent	1	400	19	mg/kg	ND		ND		0.212	J	0.499	J	ND		ND		0.628	J	0.34	J	-		-		-	
Total Metals																										
Aluminum, Total	NS	NS	NS	mg/kg	6700		6440		10300		10100		7210		11700		7960		6750		-		-		-	
Antimony, Total	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Arsenic, Total	13	16	16	mg/kg	2.82		2		2.78		0.874	J	3.17		2.26		1.33		1.03		-		-		-	
Barium, Total	350	400	820	mg/kg	50.3		42.1		79.2		67.1		75		67.2		36.6		33.3		-		-		-	
Beryllium, Total	7.2	590	47	mg/kg	0.155	J	0.122	J	0.26	J	0.126	J	0.195	J	0.288	J	0.163	J	0.11	J	-		-		-	
Cadmium, Total	2.5	9.3	7.5	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Calcium, Total	NS	NS	NS	mg/kg	23100		22800		3650		1680		38600		1520		1480		2720		-		-		-	
Chromium, Total	NS	NS	NS	mg/kg	26		23.3		36.8		32.9		16		39.5		21.8		23.1		-		-		-	
Cobalt, Total	NS	NS	NS	mg/kg	7.15		6.44		8.72		10.5		6.5		10.2		6.07		6.88		-		-		-	
Copper, Total	50	270	1720	mg/kg	24.3		21.5		25.2		24.2		24.7		24.8		18.5		18.8		-		-		-	
Iron, Total	NS	NS	NS	mg/kg	13100		12000		16200		16700		12300		18300		12000		10700		-		-		-	
Lead, Total	63	1000	450	mg/kg	40.4		28.1		**66.3**		3.55	J	46.9		13.6		2.62	J	7.28		-		-		-	
Magnesium, Total	NS	NS	NS	mg/kg	5660		2660		2610		3640		5610		2400		1570		2090		-		-		-	
Manganese, Total	1600	10000	2000	mg/kg	254		240		322		228		193		418		290		219		-		-		-	
Mercury, Total	0.18	2.8	0.73	mg/kg	0.082		0.029	J	0.08		0.024	J	0.091		0.016	J	ND		ND		-		-		-	
Nickel, Total	30	310	130	mg/kg	18.3		15.3		18.2		17.7		10.8		17.7		12.2		12.8		-		-		-	
Potassium, Total	NS	NS	NS	mg/kg	943		741		1760		3980		2040		1210		812		682		-		-		-	
Selenium, Total	3.9	1500	4	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Silver, Total	2	1500	8.3	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Sodium, Total	NS	NS	NS	mg/kg	350		282		130	J	151	J	237		159	J	117	J	238		-		-		-	
Thallium, Total	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Vanadium, Total	NS	NS	NS	mg/kg	25.4		25.7		36.3		34.8		22.7		37.9		25		25.2		-		-		-	
Zinc, Total	109	10000	2480	mg/kg	56.2		26.6		53.7		77.6		61.6		29.8		16.2		18.4		-		-		-	
Chlorinated Herbicides by GC																										
2,4,5-T	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4,5-TP (Silvex)	3.8	500	3.8	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4-D	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Volatile Organics by 8260/5035																										
1,1,1,2-Tetrachloroethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	0.68	500	0.68	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	0.27	240	0.27	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethene	0.33	500	0.33	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloropropene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,3-Trichlorobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,3-Trichloropropane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4,5-Tetramethylbenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	3.6	190	3.6	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dibromo-3-chloropropane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dibromoethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	1.1	500	1.1	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethane	0.02	30	0.02	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene, Total	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		0.03	J	ND		0.00022	J
1,2-Dichloropropane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3,5-Trimethylbenzene	8.4	190	8.4	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	2.4	280	2.4	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichloropropane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichloropropene, Total	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	1.8	130	1.8	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dioxane	0.1	130	0.1	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,2-Dichloropropane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Butanone	0.12	500	0.12	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Hexanone	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Methyl-2-pentanone	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Acetone	0.05	500	0.05	mg/kg	ND		0.015		ND		0.0066	J	ND		ND		ND		ND		ND		ND		ND	
Acrylonitrile	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzene	0.06	44	0.06	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromochloromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromoform	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromomethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbon disulfide	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbon tetrachloride	0.76	22	0.76	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chlorobenzene	1.1	500	1.1	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloroethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		0.0011	J
Chloroform	0.37	350	0.37	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	0.25	500	0.25	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		0.03	J	ND		0.00022	J
cis-1,3-Dichloropropene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibromomethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dichlorodifluoromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Ethyl ether	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Ethylbenzene	1	390	1	mg/kg	0.00016	J	0.00013	J	ND		ND		0.00077	J	ND		ND		ND		ND		ND		0.00025	J
Hexachlorobutadiene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Isopropylbenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Methyl tert butyl ether	0.93	500	0.93	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Methylene chloride	0.05	500	0.05	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
n-Butylbenzene	12	500	12	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
n-Propylbenzene	3.9	500	3.9	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Naphthalene	12	500	12	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
o-Chlorotoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
o-Xylene	NS	NS	NS	mg/kg	ND		ND		ND		ND		0.00095	J	ND		ND		ND		ND		ND		0.00027	J
p-Chlorotoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Diethylbenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Ethyltoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Isopropyltoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p/m-Xylene	NS	NS	NS	mg/kg	ND		ND		ND		ND		0.0026		ND		ND		ND		ND		ND		0.00082	J
sec-Butylbenzene	11	500	11	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Styrene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
tert-Butylbenzene	5.9	500	5.9	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene	1.3	150	1.3	mg/kg	0.00031	J	0.0013		0.00067		ND		0.00039	J	**280**		0.0043		**7.8**		**19**		**17**		0.067	
Toluene	0.7	500	0.7	mg/kg	0.0034		0.0028		0.0039		0.0043		0.0024		ND		0.0029		ND		ND		ND		0.0044	
trans-1,2-Dichloroethene	0.19	500	0.19	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,4-Dichloro-2-butene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Trichloroethene	0.47	200	0.47	mg/kg	ND		ND		ND		ND		0.00043	J	ND		0.0002	J	ND		0.43		0.088		0.0015	
Trichlorofluoromethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl acetate	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl chloride	0.02	13	0.02	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Xylenes, Total	0.26	500	1.6	mg/kg	ND		ND		ND		ND		0.0036	J	ND		ND		ND		ND		ND		0.0011	J
Semivolatile Organics by GC/MS																										
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
1,2,4-Trichlorobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		0.028	J	ND		ND		-		-		-	
1,2-Dichlorobenzene	1.1	500	1.1	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
1,3-Dichlorobenzene	2.4	280	2.4	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
1,4-Dichlorobenzene	1.8	130	1.8	mg/kg	ND		ND		ND		ND		ND		0.065	J	ND		ND		-		-		-	
2,4,5-Trichlorophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4,6-Trichlorophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4-Dichlorophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4-Dimethylphenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4-Dinitrophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,4-Dinitrotoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2,6-Dinitrotoluene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2-Chloronaphthalene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2-Chlorophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2-Methylnaphthalene	NS	NS	NS	mg/kg	ND		ND		ND		ND		0.039	J	ND		ND		ND		-		-		-	
2-Methylphenol	0.33	500	0.33	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2-Nitroaniline	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
2-Nitrophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
3,3'-Dichlorobenzidine	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
3-Methylphenol/4-Methylphenol	0.33	500	0.33	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
3-Nitroaniline	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4,6-Dinitro-o-cresol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4-Bromophenyl phenyl ether	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4-Chloroaniline	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4-Chlorophenyl phenyl ether	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4-Nitroaniline	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
4-Nitrophenol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Acenaphthene	20	500	98	mg/kg	0.027	J	ND		ND		ND		0.024	J	ND		ND		ND		-		-		-	
Acenaphthylene	100	500	107	mg/kg	0.082	J	ND		0.033	J	ND		0.11	J	0.12	J	ND		ND		-		-		-	
Acetophenone	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		0.042	J	ND		ND		-		-		-	
Anthracene	100	500	1000	mg/kg	0.085	J	ND		0.042	J	ND		0.12		0.14		ND		ND		-		-		-	
Benzo(a)anthracene	1	5.6	1	mg/kg	0.45		0.026	J	0.2		ND		0.65		0.41		ND		0.02	J	-		-		-	
Benzo(a)pyrene	1	1	22	mg/kg	0.49		ND		0.21		ND		0.66		0.35		ND		ND		-		-		-	
Benzo(b)fluoranthene	1	5.6	1.7	mg/kg	0.67		ND		0.28		ND		0.88		**1.7**		ND		0.064	J	-		-		-	
Benzo(ghi)perylene	100	500	1000	mg/kg	0.29		ND		0.12	J	ND		0.4		1		ND		0.043	J	-		-		-	
Benzo(k)fluoranthene	0.8	56	1.7	mg/kg	0.21		ND		0.093	J	ND		0.32		0.49		ND		ND		-		-		-	
Benzoic Acid	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Benzyl Alcohol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Biphenyl	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Bis(2-chloroethoxy)methane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Bis(2-chloroethyl)ether	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Bis(2-chloroisopropyl)ether	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Bis(2-ethylhexyl)phthalate	NS	NS	NS	mg/kg	ND		ND		ND		ND		0.066	J	6.6		ND		0.52		-		-		-	
Butyl benzyl phthalate	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Carbazole	NS	NS	NS	mg/kg	0.04	J	ND		ND		ND		0.025	J	0.051	J	ND		ND		-		-		-	
Chrysene	1	56	1	mg/kg	0.45		0.02	J	0.2		ND		0.63		0.64		ND		0.025	J	-		-		-	
Di-n-butylphthalate	NS	NS	NS	mg/kg	0.039	J	ND		ND		ND		ND		ND		ND		ND		-		-		-	
Di-n-octylphthalate	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		0.27		ND		ND		-		-		-	
Dibenzo(a,h)anthracene	0.33	0.56	1000	mg/kg	0.088	J	ND		0.035	J	ND		0.11		0.26		ND		ND		-		-		-	
Dibenzofuran	7	350	210	mg/kg	ND		ND		ND		ND		0.023	J	0.021	J	ND		ND		-		-		-	
Diethyl phthalate	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Dimethyl phthalate	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Fluoranthene	100	500	1000	mg/kg	0.7		0.033	J	0.35		ND		1		0.95		ND		0.029	J	-		-		-	
Fluorene	30	500	386	mg/kg	ND		ND		ND		ND		0.02	J	ND		ND		ND		-		-		-	
Hexachlorobenzene	0.33	6	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Hexachlorobutadiene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Hexachlorocyclopentadiene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Hexachloroethane	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Indeno(1,2,3-cd)pyrene	0.5	5.6	8.2	mg/kg	0.34		ND		0.14	J	ND		0.44		**1.1**		ND		0.039	J	-		-		-	
Isophorone	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
n-Nitrosodi-n-propylamine	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Naphthalene	12	500	12	mg/kg	ND		ND		ND		ND		0.053	J	0.037	J	ND		ND		-		-		-	
NDPA/DPA	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Nitrobenzene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
p-Chloro-m-cresol	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Pentachlorophenol	0.8	6.7	0.8	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Phenanthrene	100	500	1000	mg/kg	0.27		ND		0.15		ND		0.32		0.21		ND		0.52		-		-		-	
Phenol	0.33	500	0.33	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Pyrene	100	500	1000	mg/kg	0.63		0.031	J	0.32		ND		0.95		0.74		ND		0.024	J	-		-		-	
Polychlorinated Biphenyls by GC																										
Aroclor 1016	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1221	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1232	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1242	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1248	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1254	0.1	1	3.2	mg/kg	0.0314	J	0.0117	J	0.0344	J	ND		0.0201	J	**0.202**		ND		0.031	J	-		-		-	
Aroclor 1260	0.1	1	3.2	mg/kg	0.0154	J	0.00454	J	0.00974	J	ND		0.00794	J	0.0767		ND		0.011	J	-		-		-	
Aroclor 1262	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Aroclor 1268	0.1	1	3.2	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
PCBs, Total	0.1	1	3.2	mg/kg	0.0468	J	0.0162	J	0.0441	J	ND		0.028	J	**0.279**		ND		0.042	J	-		-		-	
Organochlorine Pesticides by GC																										
4,4'-DDD	0.0033	92	14	mg/kg	**0.0402**		**0.0112**	J	**0.062**		ND		**0.019**		**0.208**		ND		**0.0773**		-		-		-	
4,4'-DDE	0.0033	62	17	mg/kg	**0.0126**		ND		**0.0664**		0.00101	J	**0.0164**	J	**0.0697**		ND		**0.0262**		-		-		-	
4,4'-DDT	0.0033	47	136	mg/kg	**0.0094**		ND		**0.0861**		ND		ND		**0.189**		ND		**0.0679**		-		-		-	
Aldrin	0.005	0.68	0.19	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Alpha-BHC	0.02	3.4	0.02	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Beta-BHC	0.036	3	0.09	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Chlordane	NS	NS	NS	mg/kg	0.0863		ND		0.36		ND		ND		0.282		ND		0.0949	J	-		-		-	
cis-Chlordane	0.094	24	2.9	mg/kg	0.0162		ND		0.0561		ND		0.00883	J	0.0385		ND		0.0143	J	-		-		-	
Delta-BHC	0.04	500	0.25	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Dieldrin	0.005	1.4	0.1	mg/kg	**0.00851**		ND		**0.00741**		ND		ND		**0.0295**		ND		**0.0111**		-		-		-	
Endosulfan I	2.4	200	102	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Endosulfan II	2.4	200	102	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Endosulfan sulfate	2.4	200	1000	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Endrin	0.014	89	0.06	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Endrin aldehyde	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Endrin ketone	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Heptachlor	0.042	15	0.38	mg/kg	ND		ND		0.00117		ND		ND		ND		ND		ND		-		-		-	
Heptachlor epoxide	NS	NS	NS	mg/kg	0.00285	J	ND		0.0202		ND		ND		0.0167	J	ND		ND		-		-		-	
Lindane	0.1	9.2	0.1	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Methoxychlor	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
Toxaphene	NS	NS	NS	mg/kg	ND		ND		ND		ND		ND		ND		ND		ND		-		-		-	
trans-Chlordane	NS	NS	NS	mg/kg	0.0172		ND		0.0687		ND		0.00662	J	0.0249		ND		0.00902	J	-		-		-	

CLIENT SAMPLE ID	TSB-8D (0-0.5)		TSB-8 (2-4) DUP		TSB-3 (5-7)		TSB-3 (8-10)		TSB-4 (0-2)		TSB-4 (7-9)		TSB-10 (4-6)		TSB-11 (0-2)		TSB-2 (0-2)		TSB-9 (0-1)		TSB-1 (0-1)	
SAMPLING DATE	12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18		12-JUN-18	
DEPTH (ft)	0-0.5		2-4		5-7		8-10		0-2		7-9		4-6		0-2		0-2		0-1		0-1	
		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual
General Chemistry																						
Chromium, Trivalent	-		20	J	22		15	J	**31**		26	J	17	J	**35**		23	J	**36**		17	
Solids, Total	86.6		90.7		89.1		90.5		90.4		91.8		90.9		86		82.1		89.7		82	
Cyanide, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chromium, Hexavalent	-		0.22	J	ND		0.221	J	**1.2**		0.327	J	0.275	J	ND		0.512	J	ND		ND	
Total Metals																						
Aluminum, Total	-		7570		8990		5290		10600		10400		6080		20300		10100		11600		6690	
Antimony, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Arsenic, Total	-		1.36		1.48		0.834	J	1.41		1.12		1.17		0.406	J	2.99		5.55		1.58	
Barium, Total	-		36.7		55.9		47.7		67.5		59.4		33.6		178		59.9		81.6		55.9	
Beryllium, Total	-		0.183	J	0.202	J	0.076	J	0.228	J	0.1	J	0.133	J	0.496		0.287	J	0.334	J	0.288	J
Cadmium, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Calcium, Total	-		1210		1320		1320		1370		1790		1760		968		2100		2290		2010	
Chromium, Total	-		20.4		21.9		15.1		32		26.8		17.2		34.7		23.3		36.5		16.6	
Cobalt, Total	-		6.81		8		6.91		9.58		13		6.46		20.7		13.5		6.02		16.3	
Copper, Total	-		18.6		22		18.5		20.7		32.1		18.9		26.7		18.3		30.4		29.9	
Iron, Total	-		12100		14400		10800		14800		17800		11100		27600		15700		21300		11800	
Lead, Total	-		2.55	J	10.4		1.89	J	3.18	J	2.23	J	2.56	J	8.2		**66.7**		47.1		12.6	
Magnesium, Total	-		1480		2270		1810		2100		4700		1720		7240		2290		2220		1410	
Manganese, Total	-		299		306		206		356		220		292		593		247		168		136	
Mercury, Total	-		ND		0.017	J	ND		ND		ND		ND		ND		0.069	J	0.08		0.168	
Nickel, Total	-		12		13.3		11.5		18.8		19.3		12.8		28.5		13.7		15.2		14.6	
Potassium, Total	-		912		1610		1720		1300		3250		746		10200		1430		1330		1040	
Selenium, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		0.421	J	ND	
Silver, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Sodium, Total	-		118	J	179		192		167	J	97.8	J	185		220		268		139	J	260	
Thallium, Total	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vanadium, Total	-		26		30		25		31.5		34.3		23.7		51.6		29.7		38.4		22.6	
Zinc, Total	-		15.9		28.2		18.4		21		46.2		16.8		73.9		36.5		39.5		28.3	
Chlorinated Herbicides by GC																						
2,4,5-T	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4,5-TP (Silvex)	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-D	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Volatile Organics by 8260/5035																						
1,1,1,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloropropene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,3-Trichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,3-Trichloropropane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4,5-Tetramethylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dibromo-3-chloropropane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene, Total	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		0.0058	J
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3,5-Trimethylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichloropropane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichloropropene, Total	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dioxane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Hexanone	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Methyl-2-pentanone	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Acetone	ND		0.01		0.017		0.009		0.013		0.0062	J	0.0099		0.0095	J	ND		ND		0.01	
Acrylonitrile	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromochloromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbon disulfide	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbon tetrachloride	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloroethane	ND		ND		0.00058	J	0.00049	J	ND		ND		0.00056	J	ND		ND		0.0013	J	0.0012	J
Chloroform	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		0.0053	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibromomethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dichlorodifluoromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Ethyl ether	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Isopropylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Methyl tert butyl ether	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Methylene chloride	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
n-Butylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
n-Propylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Naphthalene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
o-Chlorotoluene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
o-Xylene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Chlorotoluene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Diethylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Ethyltoluene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Isopropyltoluene	ND		ND		0.16		0.00053	J	ND		0.00012	J	ND		ND		ND		0.00015	J	ND	
p/m-Xylene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
sec-Butylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Styrene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
tert-Butylbenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene	0.026		0.0012		0.00063		ND		ND		ND		ND		0.006		0.017		ND		0.072	
Toluene	0.0021		0.0038		0.0037		0.004		0.0027		0.0028		0.0022		0.0034		0.0026		0.003		0.0014	
trans-1,2-Dichloroethene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		0.00045	J
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,4-Dichloro-2-butene	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Trichloroethene	ND		ND		ND		ND		ND		ND		ND		0.00028	J	ND		ND		0.0067	
Trichlorofluoromethane	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl acetate	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl chloride	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Xylenes, Total	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organics by GC/MS																						
1,2,4,5-Tetrachlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4,5-Trichlorophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4,6-Trichlorophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-Dichlorophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-Dimethylphenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-Dinitrophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-Dinitrotoluene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,6-Dinitrotoluene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Chloronaphthalene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Chlorophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Methylnaphthalene	-		ND		ND		ND		ND		ND		ND		ND		ND		0.06	J	ND	
2-Methylphenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Nitroaniline	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Nitrophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
3,3'-Dichlorobenzidine	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
3-Methylphenol/4-Methylphenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
3-Nitroaniline	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4,6-Dinitro-o-cresol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Bromophenyl phenyl ether	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Chloroaniline	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Chlorophenyl phenyl ether	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Nitroaniline	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Nitrophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Acenaphthene	-		ND		0.022	J	ND		ND		ND		ND		ND		ND		0.29		ND	
Acenaphthylene	-		ND		0.17		ND		ND		ND		ND		ND		ND		0.1	J	ND	
Acetophenone	-		ND		ND		ND		ND		ND		ND		ND		ND		0.029	J	ND	
Anthracene	-		ND		0.2		ND		ND		ND		ND		ND		ND		0.61		ND	
Benzo(a)anthracene	-		ND		0.97		ND		0.062	J	ND		ND		ND		0.072	J	**1.5**		ND	
Benzo(a)pyrene	-		ND		0.81		ND		0.057	J	ND		ND		ND		0.062	J	**1.1**		ND	
Benzo(b)fluoranthene	-		ND		**1.1**		ND		0.076	J	ND		ND		ND		0.081	J	**1.6**		ND	
Benzo(ghi)perylene	-		ND		0.43		ND		0.036	J	ND		ND		ND		0.041	J	0.65		ND	
Benzo(k)fluoranthene	-		ND		0.45		ND		0.029	J	ND		ND		ND		0.036	J	0.59		ND	
Benzoic Acid	-		ND		ND		ND		ND		ND		ND		ND		ND		1.2		ND	
Benzyl Alcohol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Biphenyl	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bis(2-chloroethoxy)methane	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bis(2-chloroethyl)ether	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bis(2-chloroisopropyl)ether	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bis(2-ethylhexyl)phthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		0.35		ND	
Butyl benzyl phthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbazole	-		ND		0.045	J	ND		ND		ND		ND		ND		ND		0.25		ND	
Chrysene	-		ND		0.88		ND		0.064	J	ND		ND		ND		0.066	J	**1.5**		ND	
Di-n-butylphthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		0.14	J	ND	
Di-n-octylphthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibenzo(a,h)anthracene	-		ND		0.14		ND		ND		ND		ND		ND		ND		0.21		ND	
Dibenzofuran	-		ND		ND		ND		ND		ND		ND		ND		ND		0.14	J	ND	
Diethyl phthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dimethyl phthalate	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Fluoranthene	-		ND		1.6		ND		0.1	J	ND		ND		ND		0.16		2.6		ND	
Fluorene	-		ND		0.042	J	ND		ND		ND		ND		ND		ND		0.27		ND	
Hexachlorobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorobutadiene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorocyclopentadiene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachloroethane	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Indeno(1,2,3-cd)pyrene	-		ND		**0.54**		ND		0.041	J	ND		ND		ND		0.048	J	**0.76**		ND	
Isophorone	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
n-Nitrosodi-n-propylamine	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Naphthalene	-		ND		ND		ND		ND		ND		0.026	J	ND		ND		0.071	J	ND	
NDPA/DPA	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Nitrobenzene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
p-Chloro-m-cresol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Pentachlorophenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Phenanthrene	-		ND		0.54		ND		0.052	J	ND		ND		ND		0.088	J	2.6		ND	
Phenol	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Pyrene	-		ND		1.4		ND		0.098	J	ND		ND		ND		0.13		2.3		ND	
Polychlorinated Biphenyls by GC																						
Aroclor 1016	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1221	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1232	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1242	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1248	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1254	-		ND		ND		ND		ND		ND		0.0254	J	ND		ND		ND		ND	
Aroclor 1260	-		ND		ND		ND		ND		ND		ND		ND		ND		0.0549		ND	
Aroclor 1262	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1268	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PCBs, Total	-		ND		ND		ND		ND		ND		0.0254	J	ND		ND		0.0549		ND	
Organochlorine Pesticides by GC																						
4,4'-DDD	-		ND		ND		ND		ND		ND		ND		0.000966	J	**0.0072**		0.00282		**0.0699**	
4,4'-DDE	-		ND		ND		ND		0.000805	J	ND		0.00054	J	0.000818	J	**0.00685**		**0.00889**		**0.0169**	
4,4'-DDT	-		ND		0.00214	J	ND		ND		ND		0.00221	J	ND		**0.0468**		**0.0274**		ND	
Aldrin	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Alpha-BHC	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Beta-BHC	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chlordane	-		ND		ND		ND		ND		ND		ND		ND		0.0348		ND		ND	
cis-Chlordane	-		ND		ND		ND		0.00113	J	ND		ND		ND		0.00331		0.00487		0.00432	J
Delta-BHC	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dieldrin	-		ND		ND		ND		0.000722	J	ND		ND		ND		ND		ND		ND	
Endosulfan I	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Endosulfan II	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Endosulfan sulfate	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Endrin	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Endrin aldehyde	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Endrin ketone	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Heptachlor	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Heptachlor epoxide	-		ND		ND		ND		ND		ND		ND		0.00119	J	ND		0.00207	J	ND	
Lindane	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Methoxychlor	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Toxaphene	-		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
trans-Chlordane	-		ND		ND		ND		0.00189	J	ND		ND		ND		ND		0.00811		ND	

Notes:

Bold and shaded green value indicates concentration exceeds 6NYCRR Part 375 Unrestricted SCOs

Bold and shaded blue value indicates concentration exceeds 6NYCRR Part 375 Restricted Protection of Groundwater SCOs

Bold and shaded gray value indicates concentration exceeds 6NYCRR Part 375 Restricted Commercial SCOs

J = Estimated value

ND = Not detected

- = Not analyzed

NS = No standard

* = 6NYCRR Part 375 Unrestricted Soil Cleanup Objectives

** = 6NYCRR Part 375 Restricted Commercial Soil Cleanup Objectives

*** = 6NYCRR Part 375 Restricted Protection of Groundwater Soil Cleanup Objectives

1500 Astor Avenue - Bronx, NY
BCP Site #C203105
Table 5
Groundwater Analytical Results

CLIENT SAMPLE ID			MW-1D		MW-1S		MW-10		DUP_06212018		MW-04		MW-05		MW-11		TRIP BLANK		FIELD BLANK	
SAMPLING DATE			21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18		21-JUN-18	
LAB SAMPLE ID			L1823669-01		L1823669-02		L1823669-03		L1823669-04		L1823669-05		L1823669-06		L1823669-07		L1823669-08		L1823672-05	
	NY-AWQS*	Units		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual		Qual
General Chemistry																				
Cyanide, Total	200	ug/l	ND		ND		ND		ND		ND		3	J	ND		-		-	
Chromium, Hexavalent	50	ug/l	ND		ND		ND		ND		4	J	ND		ND		-		-	
Volatile Organics by GC/MS																				
1,1,1,2-Tetrachloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1,1-Trichloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1,2,2-Tetrachloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1,2-Trichloroethane	1	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1-Dichloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1-Dichloroethene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,1-Dichloropropene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2,3-Trichlorobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2,3-Trichloropropane	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2,4,5-Tetramethylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2,4-Trichlorobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2,4-Trimethylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2-Dibromo-3-chloropropane	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2-Dibromoethane	0.0006	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2-Dichloroethane	0.6	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,2-Dichloroethene, Total	NS	ug/l	ND		ND		ND		ND		ND		41		5.5		ND		-	
1,2-Dichloropropane	1	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,3,5-Trimethylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,3-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,3-Dichloropropane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,3-Dichloropropene, Total	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,4-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
1,4-Dioxane	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
2,2-Dichloropropane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
2-Butanone	50	ug/l	2.5	J	ND		ND		ND		ND		ND		ND		ND		-	
2-Hexanone	50	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
4-Methyl-2-pentanone	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Acetone	50	ug/l	49		1.6	J	2	J	ND		ND		ND		1.6	J	ND		-	
Acrylonitrile	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Benzene	1	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Bromobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Bromochloromethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Bromodichloromethane	50	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Bromoform	50	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Bromomethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Carbon disulfide	60	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Carbon tetrachloride	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Chlorobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Chloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Chloroform	7	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Chloromethane	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
cis-1,2-Dichloroethene	5	ug/l	ND		ND		ND		ND		ND		41		5.5		ND		-	
cis-1,3-Dichloropropene	0.4	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Dibromochloromethane	50	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Dibromomethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Dichlorodifluoromethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Ethyl ether	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Ethylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Hexachlorobutadiene	0.5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Isopropylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Methyl tert butyl ether	10	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Methylene chloride	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
n-Butylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
n-Propylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Naphthalene	10	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
o-Chlorotoluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
o-Xylene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
p-Chlorotoluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
p-Diethylbenzene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
p-Ethyltoluene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
p-Isopropyltoluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
p/m-Xylene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
sec-Butylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Styrene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
tert-Butylbenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Tetrachloroethene	5	ug/l	24		160		0.22	J	0.28	J	ND		63		69		ND		-	
Toluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
trans-1,2-Dichloroethene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
trans-1,3-Dichloropropene	0.4	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
trans-1,4-Dichloro-2-butene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Trichloroethene	5	ug/l	0.9		2.5		ND		ND		ND		10		2.9		ND		-	
Trichlorofluoromethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Vinyl acetate	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Vinyl chloride	2	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Xylenes, Total	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		ND		-	
Total Metals																				
Aluminum, Total	NS	ug/l	5280		462		72		22.7		49.5		3.6	J	6.99	J	-		-	
Antimony, Total	3	ug/l	0.82	J	ND		0.62	J	0.56	J	ND		ND		ND		-		-	
Arsenic, Total	25	ug/l	0.5		ND		0.21	J	0.19	J	ND		0.24	J	0.17	J	-		-	
Barium, Total	1000	ug/l	155.3		174.2		122.1		126.2		31.8		117.1		118.3		-		-	
Beryllium, Total	3	ug/l	0.12	J	ND		ND		ND		ND		ND		ND		-		-	
Cadmium, Total	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Calcium, Total	NS	ug/l	73100		49600		50100		51400		43900		128000		78900		-		-	
Chromium, Total	50	ug/l	12.91		2.67		1.88		4.57		6.75		1.19		1.02		-		-	
Cobalt, Total	NS	ug/l	4.8		0.47	J	0.17	J	ND		ND		0.21	J	0.5		-		-	
Copper, Total	200	ug/l	8.97		1.53		1.66		2.15		0.84	J	2.3		0.53	J	-		-	
Iron, Total	300	ug/l	8960		744		137		72		53.5		26.5	J	ND		-		-	
Lead, Total	25	ug/l	2.43		ND		ND		ND		ND		ND		ND		-		-	
Magnesium, Total	35000	ug/l	15800		8450		7570		8320		12900		28700		12600		-		-	
Manganese, Total	300	ug/l	298.5		6.27		1.35		2.59		1.41		0.6	J	2.15		-		-	
Mercury, Total	0.7	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Nickel, Total	100	ug/l	11.37		1.09	J	ND		1.19	J	1.81	J	1.65	J	ND		-		-	
Potassium, Total	NS	ug/l	10800		3330		4800		4400		3130		5000		5680		-		-	
Selenium, Total	10	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Silver, Total	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Sodium, Total	20000	ug/l	134000		142000		132000		131000		15000		190000		141000		-		-	
Thallium, Total	0.5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Vanadium, Total	NS	ug/l	14.73		2.4	J	3.12	J	2.9	J	ND		ND		2.11	J	-		-	
Zinc, Total	2000	ug/l	36.8		3.92	J	ND		ND		ND		ND		ND		-		-	
Chlorinated Herbicides by GC																				
2,4,5-T	35	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4,5-TP (Silvex)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4-D	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Semivolatile Organics by GC/MS																				
1,2,4,5-Tetrachlorobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
1,2,4-Trichlorobenzene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
1,2-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
1,3-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
1,4-Dichlorobenzene	3	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4,5-Trichlorophenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4,6-Trichlorophenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4-Dichlorophenol	1	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4-Dimethylphenol	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4-Dinitrophenol	10	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,4-Dinitrotoluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2,6-Dinitrotoluene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2-Chlorophenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2-Methylphenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2-Nitroaniline	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2-Nitrophenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
3,3'-Dichlorobenzidine	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
3-Methylphenol/4-Methylphenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
3-Nitroaniline	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4,6-Dinitro-o-cresol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4-Bromophenyl phenyl ether	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4-Chloroaniline	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4-Chlorophenyl phenyl ether	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4-Nitroaniline	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4-Nitrophenol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Acetophenone	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzoic Acid	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzyl Alcohol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Biphenyl	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Bis(2-chloroethoxy)methane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Bis(2-chloroethyl)ether	1	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Bis(2-chloroisopropyl)ether	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Bis(2-ethylhexyl)phthalate	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Butyl benzyl phthalate	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Carbazole	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Di-n-butylphthalate	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Di-n-octylphthalate	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Dibenzofuran	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Diethyl phthalate	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Dimethyl phthalate	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Hexachlorocyclopentadiene	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Isophorone	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
n-Nitrosodi-n-propylamine	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
NDPA/DPA	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Nitrobenzene	0.4	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
p-Chloro-m-cresol	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Phenol	1	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Semivolatile Organics by GC/MS-SIM																				
2-Chloronaphthalene	10	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
2-Methylnaphthalene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Acenaphthene	20	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Acenaphthylene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Anthracene	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzo(a)anthracene	0.002	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzo(a)pyrene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzo(b)fluoranthene	0.002	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzo(ghi)perylene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Benzo(k)fluoranthene	0.002	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Chrysene	0.002	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Dibenzo(a,h)anthracene	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Fluoranthene	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Fluorene	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Hexachlorobenzene	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Hexachlorobutadiene	0.5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Hexachloroethane	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Indeno(1,2,3-cd)pyrene	0.002	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Naphthalene	10	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Pentachlorophenol	1	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Phenanthrene	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Pyrene	50	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
1,4 Dioxane by 8270D-SIM																				
1,4-Dioxane	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Perfluorinated Alkyl Acids by Isotope Dilution																				
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	ug/l	0.161		0.00053	J	0.000522	J	0.00112	J	0.00241		0.000344	J	ND		-		0.000468	J
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluorobutanesulfonic Acid (PFBS)	NS	ug/l	0.00167	J	0.00286		0.00342		0.00343		0.0156		0.0105		0.00658		-		ND	
Perfluorobutanoic Acid (PFBA)	NS	ug/l	0.00894		0.00383		0.00558		0.00558		0.00536		0.0185		0.00616		-		ND	
Perfluorodecanesulfonic Acid (PFDS)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluorodecanoic Acid (PFDA)	NS	ug/l	0.00128	J	0.00108	J	0.00114	J	0.000993	J	ND		0.00213		0.00128	J	-		ND	
Perfluorododecanoic Acid (PFDoA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluoroheptanesulfonic Acid (PFHpS)	NS	ug/l	ND		ND		ND		ND		ND		0.003		0.000996	J	-		ND	
Perfluoroheptanoic Acid (PFHpA)	NS	ug/l	0.00916		0.00429		0.00781		0.00766		0.00717		0.0183		0.0075		-		ND	
Perfluorohexanesulfonic Acid (PFHxS)	NS	ug/l	0.000659	J	0.00164	J	0.00252		0.00228		0.0051		0.0151		0.00495		-		ND	
Perfluorohexanoic Acid (PFHxA)	NS	ug/l	0.0247		0.00305		0.00487		0.00478		0.00916		0.0233		0.00615		-		ND	
Perfluorononanoic Acid (PFNA)	NS	ug/l	0.0015	J	0.00119	J	0.000896	J	0.000832	J	0.00777		0.0062		0.00413		-		ND	
Perfluorooctanesulfonamide (FOSA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluorooctanesulfonic Acid (PFOS)	NS	ug/l	0.0189		0.014		0.0106		0.0109		0.0176		0.103		0.0596		-		0.000321	J
Perfluorooctanoic Acid (PFOA)	NS	ug/l	0.00876		0.015		0.0232		0.0239		0.0452		0.0867		0.0323		-		0.000275	J
Perfluoropentanoic Acid (PFPeA)	NS	ug/l	0.0357		0.0025		0.00367		0.00364		0.00566		0.0211		0.00563		-		ND	
Perfluorotetradecanoic Acid (PFTA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluorotridecanoic Acid (PFTrDA)	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		ND	
Perfluoroundecanoic Acid (PFUnA)	NS	ug/l	0.00037	J	ND		ND		ND		ND		ND		ND		-		ND	
Polychlorinated Biphenyls by GC																				
Aroclor 1016	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1221	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1232	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1242	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1248	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1254	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1260	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1262	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Aroclor 1268	0.09	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
PCBs, Total	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Organochlorine Pesticides by GC																				
4,4'-DDD	0.3	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4,4'-DDE	0.2	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
4,4'-DDT	0.2	ug/l	ND		0.039		ND		ND		ND		0.039		ND		-		-	
Aldrin	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Alpha-BHC	0.01	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Beta-BHC	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Chlordane	0.05	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
cis-Chlordane	NS	ug/l	ND		ND		0.035		0.017		0.966		0.04		ND		-		-	
Delta-BHC	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Dieldrin	0.004	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endosulfan I	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endosulfan II	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endosulfan sulfate	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endrin	NS	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endrin aldehyde	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Endrin ketone	5	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Heptachlor	0.04	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Heptachlor epoxide	0.03	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Lindane	0.05	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Methoxychlor	35	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
Toxaphene	0.06	ug/l	ND		ND		ND		ND		ND		ND		ND		-		-	
trans-Chlordane	NS	ug/l	ND		ND		ND		ND		0.356		ND		ND		-		-	

Notes:

Bold and shaded value indicates concentration exceeds TOGS AWQS*

J = Estimated value

ND = Not detected

- = Not Analyzed

NS = No Standard

* = NYSDEC TOGS 1.1.1. Ambient Water Quality Standards (AWQS)

1500 Astor Avenue - Bronx, NY
BCP Site #C203105
Table 6
Sub-slab Soil Vapor, Indoor Air and Ambient Air Analytical Results

SAMPLE ID:	Matrix	NYSDOH Air Guidance Value	TSV-1		TIA-1		TSV-2		TIA-2		TAA		AMBIENT		TSV-3		TSV-4		Matrix Action
LAB ID:			L1811080-01		L1811080-02		L1811080-03		L1811080-04		L1811080-05		L1823655-01		L1823655-02		L1823655-03		
COLLECTION DATE:			3/29/2018		3/29/2018		3/29/2018		3/29/2018		3/29/2018		6/21/18		6/21/18		6/21/18		
			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	
Volatile Organic Compounds																			
Dichlorodifluoromethane	--	--	ND		2.09		2.03		2.06		1.99		3.41		54.9		3.66		
Chloromethane	--	--	1.55		1.51		0.582		1.13		1.09		1.42		0.7		0.931		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Vinyl chloride	C	--	ND		ND		ND		ND		ND		ND		ND		ND		No further action
1,3-Butadiene	--	--	ND		ND		ND		ND		ND		ND		2.7		ND		
Bromomethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Chloroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Ethyl Alcohol	--	--	398		1750	E	112		79.9		12.5		10.1		279		407		
Vinyl bromide	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Acetone	--	--	83.4		171		46.3		65.1		9.19		10.2		124		170		
Trichlorofluoromethane	--	--	ND		1.58		ND		ND		ND		1.85		3.14		2.11		
iso-Propyl Alcohol	--	--	124		1960	E	55.1		197		11.9		1.84		11.3		17		
1,1-Dichloroethene	A	--	ND		ND		ND		ND		ND		ND		ND		ND		No further action
tert-Butyl Alcohol	--	--	ND		ND		2.06		ND		ND		ND		8		12.5		
Methylene chloride	B	60	ND		ND		ND		ND		ND		ND		ND		ND		No further action
3-Chloropropene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Carbon disulfide	--	--	ND		ND		ND		ND		ND		ND		28.1		3.52		
1,1,2-Trichloro-1,2,2-Trifluoroethane	--	--	ND		2.66		ND		ND		ND		ND		ND		ND		
trans-1,2-Dichloroethene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,1-Dichloroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Methyl tert butyl ether	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
2-Butanone	--	--	ND		1.47		1.55		ND		ND		ND		28.3		53.4		
cis-1,2-Dichloroethene	A	--	2.43		ND		ND		ND		ND		ND		ND		ND		No further action
Ethyl Acetate	--	--	ND		2.57		ND		ND		ND		ND		2.92		2.44		
Chloroform	--	--	ND		ND		ND		ND		ND		ND		1.44		5.18		
Tetrahydrofuran	--	--	5.07		ND		2.47		ND		ND		ND		1.95		ND		
1,2-Dichloroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
n-Hexane	--	--	3.18		1.06		4.79		1.83		ND		0.895		6.13		2.5		
1,1,1-Trichloroethane	B	--	ND		ND		ND		ND		ND		ND		ND		ND		No further action
Benzene	--	--	2.39		1.27		2.97		1.68		0.962		ND		19.4		9.33		
Carbon tetrachloride	A	--	ND		0.598		ND		0.453		0.44		ND		ND		ND		No further action
Cyclohexane	--	--	ND		ND		2.01		ND		ND		ND		2.51		1.12		
1,2-Dichloropropane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Bromodichloromethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,4-Dioxane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Trichloroethene	A	5	**14.7**		0.156		ND		ND		ND		ND		4.19		ND		No further action
2,2,4-Trimethylpentane	--	--	ND		1.29		3.59		1.42		ND		ND		4.56		1.75		
Heptane	--	--	4.07		2.64		6.76		0.963		ND		ND		2.26		1.06		
cis-1,3-Dichloropropene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
4-Methyl-2-pentanone	--	--	ND		ND		ND		ND		ND		ND		5.41		3.29		
trans-1,3-Dichloropropene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,1,2-Trichloroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Toluene	--	--	4.67		6.26		7.61		4.64		2.14		1.18		14.9		4.26		
2-Hexanone	--	--	ND		ND		ND		ND		ND		ND		ND		3.61		
Dibromochloromethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,2-Dibromoethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Tetrachloroethene	B	30	**154**		**5.74**		**33.4**		2.15		0.875		ND		26.3		**42.7**		Monitor
Chlorobenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Ethylbenzene	--	--	ND		17.9		0.999		ND		ND		ND		4.39		ND		
p/m-Xylene	--	--	ND		65.2		3.21		2.78		ND		ND		13.7		2.15		
Bromoform	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Styrene	--	--	ND		ND		2.47		ND		ND		ND		6.3		4.68		
1,1,2,2-Tetrachloroethane	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
o-Xylene	--	--	ND		23.2		1.25		1.04		ND		ND		4.95		ND		
4-Ethyltoluene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,3,5-Trimethylbenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,2,4-Trimethylbenzene	--	--	4.91		1.95		ND		1.4		ND		ND		1.09		ND		
Benzyl chloride	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,3-Dichlorobenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,4-Dichlorobenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,2-Dichlorobenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
1,2,4-Trichlorobenzene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		
Hexachlorobutadiene	--	--	ND		ND		ND		ND		ND		ND		ND		ND		

Notes:
NYSDOH AGV = New York State Department of Health Air Guidance Values
Matrix actions are described in the report narrative and the NYSDOH Soil Vapor Guidance, with May 2017 updates
Bold and blue shaded values indicate Monitor matrix decision
Bold and gray shaded value indicates concentration exceeds NYSDOH Air Guidance Values
Q = Laboratory Data Qualifier
ND = Not Detected
E = Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
Results are in micrograms per cubic meter (ug/m^3)

1500 Astor Avenue - Bronx, NY
BCP Site #C203105
Table 7
Estimated Remedial Costs

Alternative 2: Track 2 Soil Cleanup Objectives (SCOs) with Hot-Spot Excavation for PCE, groundwater and soil vapor remediation		
Remedial Tasks		
Remedial Oversight and Design	$15,000	Remedial oversight of hot-spot excavation (one week)
Soil Disposal	$24,000	Soil characterization sampling; off-site disposal of 160 SF by 7 ft deep (40 CY, 60 tons) @ $300/ton in a rolloff plus $4,500 transportation
Labor and Equipment	$15,000	Cut asphalt, excavate and backfill using a tire-mounted excavator with HAZWOPER-trained laborers; estimated one week
End-point Sampling	$10,500	Five full-scan samples, including QA/QC, DUSR
Asphalt Repair	$1,000	Repair asphalt after hot spot excavation: 160 SF @ $6.25 / SF
Clean Soil Import	$3,500	Soil characterization sampling; backfill 40 CY @ $30/CY
Cap Confirmation Sampling	$5,000	Collect eight soil samples for SVOCs from existing cap to confirm conditions
Groundwater Remediation	$5,000	Permanganate candles
Groundwater Sampling	$8,000	Labor, equipment and laboratory analysis to confirm dosing
Monitoring Well Re-installation	$2,000	Install injection sump in excavation following hot-spot removal
Soil Vapor Venting and Re-sampling	$11,000	Vent soil vapor above building following soil and ground remediation, resample at three locations, for two rounds
Treatment of Sump Discharge	$5,000	Install one drum of granular activated carbon (GAC) and replumb; dispose of one drum of GAC.
Post-Remedial Reporting and Long-term Groundwater Monitoring		
Reporting (FER, SMP)	$50,000	Reporting
Long-term Groundwater Monitoring	$40,000	Eight quarters of groundwater sampling for VOCs from four wells; annual reporting

Estimated Remedial Costs	$105,000
Estimated Reporting and Long-Term Monitoring Costs	$90,000
Total Estimated Remedial Costs	$195,000

1500 Astor Avenue - Bronx, NY
BCP Site #C203105
Table 8
Remedial Action Construction Schedule

Milestone	Weeks from Remedial Action Start	Duration (weeks)	Estimated End Date
Approval of RAWP	--	0	8/19/2019
Fact Sheet Announcing Start of Remedial Action	0	1	8/23/2019
Mobilization	2	1	8/30/2019
Remedial Action (Excavation, Soil Vapor Venting, Groundwater Treatment)	6	4	9/27/2019
First Round of Groundwater Sampling and Indoor Air Sampling	19	--	12/1/2019
Second Round of Groundwater Sampling and Indoor Air Sampling	32	--	3/1/2019
Submittal of Draft Site Management Plan (SMP), if necessary	36	--	4/1/2019
Submit Final Engineering Report (FER)	36	--	4/1/2019
Obtain Certificate of Completion (COC)	40	--	5/1/2019

1500 Astor Avenue - Bronx, NY
BCP Site #C203105
Table 9
Required Permits

Permit	Law, Statute or Code	Contact
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APPENDIX A

NYSDOH Generic CAMP

New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX B

Health and Safety Plan

Health and Safety Plan
for
1500 Astor Avenue
Remedial Action Work Plan

1500 Astor Avenue
Bronx, New York 10469
BCP Site # C203105

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 2
47-40 21st Street
Long Island City, NY 11101

Prepared for:
Eastchester-Astor LLC
760 White Plains Road
Scarsdale, NY 10583

Prepared by:
TENEN ENVIRONMENTAL
121 West 27th Street, Suite 702
New York, NY 10001

August 2018

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared in conformance with the Occupational Safety and Health Administration (OSHA) standards and guidance that govern site investigation activities, other applicable regulations, and Tenen Environmental LLC (Tenen) health and safety policies and procedures. The purpose of this HASP is the protection of Tenen field personnel and others during the implementation of the Remedial Action.

The Site is located at the northwest corner of the intersection of Astor Avenue and Eastchester Road in the Pelham Gardens section of the Bronx, New York.

The Site is comprised of two adjoined buildings, one of which fronts on Astor Avenue (1500 Astor Avenue) and the second on Eastchester Road (2300-2314 Eastchester Road). The property lot is an L-shaped 0.66-acre parcel located in the Bronx Community Board 11 and is generally identified as Block 4393, Lot 1.

The Astor Avenue building is two stories and is currently occupied by medical offices. The Eastchester Road building is one story and is currently divided into five commercial units. The Eastchester Road building has a full basement, which is used for storage only. On the ground floor, two of the units are vacant (2308 & 2314). Units 2310 and 2312 are combined into one leased unit, occupied by a doctor's office. Units 2300 and 2302 are also combined, and occupied by a realtor's office (current property owner). Unit 2304 is occupied by an urgent-care medical office.

1.1 Scope of HASP

This HASP includes safety procedures to be used by Tenen staff during the following activities:

- Collection of soil samples;
- Collection of groundwater samples; and
- Installation of soil vapor probes and collection of soil vapor samples.

Subcontractors will ensure that performance of the work is in compliance with this HASP and applicable laws and regulations.

2.0 PROJECT SAFETY AUTHORITY

The following personnel are responsible for project health and safety under this HASP.

- Project Manager, Matthew Carroll
- Health and Safety Officer (HSO), Mohamed Ahmed

In addition, each individual working at the Site will be responsible for compliance with this HASP and general safe working practices. All Site workers will have the authority to stop work if a potentially hazardous situation or event is observed.

2.1 Designated Personnel

The Project Manager is responsible for the overall operation of the project, including compliance with the HASP and general safe work practices. The Project Manager may also act as the Health and Safety Officer (HSO) for this project.

Tenen will appoint one of its on-site personnel as the on-site HSO. This individual will be responsible for the implementation of the HASP. The HSO will have a 4-year college degree in occupational safety or a related science/engineering field, and at least two (2) years of experience in implementation of air monitoring and hazardous materials sampling programs. The HSO will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards.

The HSO will be present on-site during all field operations involving drilling or other subsurface disturbance, and will be responsible for all health and safety activities and the delegation of duties to the field crew. The HSO has stop-work authorization, which he/she will execute on his/her determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the HSO must be absent from the field, a replacement who is familiar with the Construction Health and Safety Plan, air monitoring and personnel protective equipment (PPE) will be designated.

3.0 HAZARD ASSESSMENT AND CONTROL MEASURES

Known previous and current uses of the site include operations that used chlorinated solvents. The following previous investigation summarizes contaminants of concern detected on the site:

Phase I Environmental Site Assessment Report, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York, Property Solutions, February 4, 2016.

Property Solutions conducted a Phase I ESA of the property in 2016. The following environmental concerns in relation to the Site were identified in the Phase I ESA:

- Historical use of the site for dry cleaning operations

Limited Phase II Subsurface Investigation, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York, Property Solutions, July 22, 2016.

Property Solutions conducted a soil, soil vapor and groundwater investigation at the Site in June 2016, which included the collection of 14 soil samples, eight groundwater samples, two soil vapor and two indoor air samples for laboratory analysis. The results were as follows:

- PCE in six of the 14 soil samples at concentrations (max: 380 milligrams per kilogram (mg/kg)) above the Commercial Use Soil Cleanup Objectives (SCOs);
- PCE was detected in six groundwater samples at concentrations (max: 2,100 micrograms per liter (ug/L)) above the Class GA Standard of 5 ug/L;
- TCE was detected in two groundwater samples at concentrations (max: 30 ug/L) above the Class GA Standard of 5 ug/L;
- PCE was detected in sub-slab soil vapor samples at concentrations (max: 5,210 ug/m3) above the NYSDOH air guidance value (AGV); and,
- PCE was not detected in indoor air above the NYSDOH AGV.

The concentrations of PCE are above the NYSDOH AGV of 30 ug/m3. The Matrix 2 action based on the sub-slab and indoor air concentrations is “Mitigate”.

Limited Phase II Subsurface Investigation Addendum, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York, Property Solutions, August 8, 2016.

Property Solutions performed an investigation at the site in June of 2016, which included collection and analysis of two groundwater samples from two permanent monitoring wells. The results are as follows:

- PCE was detected at concentrations (max: 11.0 ug/L) above the Class GA Standard of 5 ug/L;
- Cis-1,2-dichloroethene and TCE were detected in one sample at concentrations (max: 11 ug/L and 12 ug/L) above their Class GA Standards of 5 ug/L.

Summary of Investigation Activities – March 2017, 1500 Astor Avenue and 2302-2314 Eastchester Road, Bronx, New York, Property Solutions, May 5, 2017.

Property Solutions conducted a soil vapor and groundwater investigation at the Site in March 2017, which included the collection of eleven groundwater samples, seven soil vapor and one indoor air sample for laboratory analysis. The results were as follows:

- PCE was detected in five groundwater samples at concentrations (max: 110 micrograms per liter (ug/L)) above the Class GA Standard of 5 ug/L;
- TCE was detected in two groundwater samples at concentrations (max: 31 ug/L) above the Class GA Standard of 5 ug/L;
- Cis-1,2-DCE was detected in three groundwater samples at concentrations (max: 80 ug/L) above the Class GA Standard of 5 ug/L;
- PCE was detected in four sub-slab soil vapor samples at concentrations (max: 6,630 ug/m3) above the NYSDOH AGVs;
- TCE was detected in four soil vapor samples at concentrations (max: 288 ug/m3) above the NYSDOH AGVs; and
- PCE and TCE were detected in indoor air below the NYSDOH AGV.

Remedial Investigation Report - 1500 Astor Avenue, Bronx, NY, Tenen Environmental, July 2018.

Tenen Environmental conducted a remedial investigation (RI) at the Site in March and May 2018. The RI consisted of the collection of twenty-two soil samples, six groundwater samples, four soil vapor and two indoor air samples for laboratory analysis. The results were as follows:

<u>Soil:</u>

- One chlorinated VOC, tetrachloroethene, was detected in four samples [TSB-8A(0-0.5), TSB-8B(2-3), TSB-8(0-2), and TSB-8(5-6)] at concentrations above Unrestricted Use SCOs and the Protection of Groundwater SCOs. One sample [TSB-8(0-2)] contained a concentration of tetrachloroethene above the Restricted Commercial Use SCO.
- SVOCs were detected in two samples [TSB-3(5-7) and TSB-8(0-2)] at concentrations above Unrestricted Use SCOs, but below the Protection of Groundwater SCOs and Restricted Commercial Use SCOs. Benzo(a)pyrene was detected in one sample [TSB-9(0-1)] at a concentration slightly above Restricted Commercial Use SCOs, but below Protection of Groundwater SCOs.
- Pesticides were detected in nine of 21 samples above the Unrestricted Use SCOs, but below the Protection of Groundwater SCOs and Restricted Commercial Use SCOs.
- One PCB, Aroclor 1254, was detected in one sample, TSB-8(0-2) at concentrations above the Unrestricted Use SCOs, but below the Protection of Groundwater SCOs and Restricted Commercial Use SCOs.
- One metal, lead, was detected in two samples [TSB-2(0-2) and TSB-5(0-3.5)] above the Unrestricted Use SCOs, but below the Protection of Groundwater SCOs and Restricted Commercial Use SCOs. Hexavalent and/or trivalent chromium were detected in six of 21 samples above the Unrestricted Use SCOs but below the Protection of Groundwater SCOs and Restricted Commercial Use SCOs.

Groundwater:

- PCE was detected in four groundwater samples (MW-1S, MW-1D, MW-05, and MW-11) at concentrations exceeding Class GA Standards. TCE was detected in one groundwater sample (MW-05) at a concentration exceeding Class GA Standards. Cis-1,2-Dichloroethene was detected in two groundwater samples (MW-05 and MW-11) at concentrations exceeding Class GA Standards.
- No SVOCs, PCBs or pesticides were detected above Class GA Standards.
- Sodium was detected in above its Class GA Standard in five of six groundwater samples. Iron was detected above its Class GA Standard in two of six groundwater samples.

Soil Vapor:

- Elevated (above ambient levels) concentrations of PCE in soil vapor were detected at all four soil vapor locations and both indoor air locations, with a maximum concentration of 154 ug/m^3. Concentrations of TCE in soil vapor were also detected above ambient concentrations.
- Comparison of PCE concentrations in one set of corresponding indoor air and sub-slab soil vapor samples indicates that monitoring is necessary.
- Several petroleum-related compounds, including benzene, xylenes, and trimethylbenzene, were detected in soil vapor and indoor air at concentrations above the ambient concentrations.

3.1 Human Exposure Pathways

The media of concern at the Site include potentially-impacted soil, groundwater and soil vapor. Potential exposure pathways include dermal contact, incidental ingestion and inhalation of vapors. The risk of dermal contact and incidental ingestion will be minimized through general safe work practices, a personal hygiene program and the use of PPE. The risk of inhalation will be minimized through the use of an air monitoring program for VOCs and particulates.

3.2 Chemical Hazards

Based on historic uses, the following contaminants of concern may be present at the Site:

Chlorinated Solvents

- Tetrachloroethylene (PCE)
- Trichloroethene (TCE)
- Cis-1,2-Dichloroehtene (cis-1,2-DCE)

Material Safety Data Sheets (MSDSs) for each contaminant of concern are included in Appendix C. All personnel are required to review the MSDSs included in this HASP.

3.3 Physical Hazards

The physical hazards associated with the field activities likely present a greater risk of injury than

the chemical constituents at the Site. Activities within the scope of this project shall comply with New York State and Federal OSHA construction safety standards.

Head Trauma
To minimize the potential for head injuries, field personnel will be required to wear National Institutes of Occupational Safety and Health (NIOSH)-approved hard hats during field activities. Hats must be worn properly and not altered in any way that would decrease the degree of protection provided.

Foot Trauma
To avoid foot injuries, field personnel will be required to wear steel-toed safety shoes while field activities are being performed. To afford maximum protection, all safety shoes must meet American National Standards Institute (ANSI) standards.

Eye Trauma
Field personnel will be required to wear eye protection (safety glasses with side shields) while field activities are being performed to prevent eye injuries caused by contact with chemical or physical agents.

Noise Exposure
Field personnel will be required to wear hearing protection (ear plugs or muffs) in high noise areas (noise from heavy equipment) while field activities are being performed.

Buried Utilities and Overhead Power Lines
Boring locations will be cleared by an underground utility locator service. In addition, prior to intrusive activities, the drilling subcontractor will contact the One Call Center to arrange for a utility mark-out, in accordance with New York State requirements. Protection from overhead power lines will be accomplished by maintaining safe distances of at least 15 feet at all times.

Thermal Stress
The effects of ambient temperature can cause physical discomfort, personal injury, and increase the probability of accidents. In addition, heat stress due to lack of body ventilation caused by protective clothing is an important consideration. Heat-related illnesses commonly consist of heat stroke and heat exhaustion.

The symptoms of heat stroke include: sudden onset; change in behavior; confusion; dry, hot and flushed skin; dilated pupils; fast pulse rate; body temperature reaching 105° or more; and/or, deep breathing later followed by shallow breathing.

The symptoms of heat exhaustion include: weak pulse; general weakness and fatigue; rapid shallow breathing; cold, pale and clammy skin; nausea or headache; profuse perspiration; unconsciousness; and/or, appearance of having fainted.

Heat-stress monitoring will be conducted if air temperatures exceed 70 degrees Fahrenheit. The initial work period will be set at 2 hours. Each worker will check his/her pulse at the wrist for 30 seconds early in each rest period. If the pulse rate exceeds 110 beats per minute, the next work period will be shortened by one-third.

One or more of the following precautions will reduce the risk of heat stress on the Site:

- Provide plenty of liquids to replace lost body fluids; water, electrolytic drinks, or both will be made available to minimize the risk of dehydration and heat stress
- Establish a work schedule that will provide appropriate rest periods
- Establish work regimens consistent with the American Conference of Governmental Industrial Hygienists (ACGIH) guidelines
- Provide adequate employee training on the causes of heat stress and preventive measures

In the highly unlikely event of extreme low temperatures, reasonable precautions will be made to avoid risks associated with low temperature exposure.

Traffic

Field activities will occur near public roadways. As a result, vehicular traffic will be a potential hazard during these activities and control of these areas will be established using barricades or traffic cones. Additional staff will be assigned, as warranted, for the sole purpose of coordinating traffic. Personnel will also be required to wear high-visibility traffic vests while working in the vicinity of the public roadways and local requirements for lane closure will be observed as needed. All work in public rights-of-way will be coordinated with local authorities and will adhere to their requirements for working in traffic zones.

Hazardous Weather Conditions

All Site workers will be made aware of hazardous weather conditions, specifically including extreme heat, and will be requested to take the precautions described herein to avoid adverse health risks. All workers are encouraged to take reasonable, common sense precautions to avoid potential injury associated with possible rain or high wind, sleet, snow or freezing.

Slip, Trip and Fall

Areas at the Site may be slippery from mud or water. Care should be taken by all Site workers to avoid slip, trip, and fall hazards. Workers shall not enter areas that do not have adequate lighting. Additional portable lighting will be provided at the discretion of the HSO.

Biological Hazards

Drugs and alcohol are prohibited from the Site. Any on-site personnel violating this requirement will be immediately expelled from the site.

Any worker or oversight personnel with a medical condition that may require attention must inform the HSO of such condition. The HSO will describe appropriate measures to be taken if the individual should become symptomatic.

Due to the Site location in an urban area, it is highly unlikely that poisonous snakes, spiders, plants and insects will be encountered. However, other animals (dogs, cats, etc.) may be encountered and care should be taken to avoid contact.

4.0 AIR MONITORING

The NYSDOH Generic Community Air Monitoring Plan (CAMP), included as Appendix 1A of DER-10, will be implemented during all ground-intrusive activities.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring should be performed using equipment appropriate for the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.
4. All 15-minute readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

The NYSDOH Generic CAMP is included as Appendix A of the RAWP.

5.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protection equipment required for various kinds of site investigation tasks is based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, "General Description and Discussion of the Levels of Protection and Protective Gear."

Tenen field personnel and other site personnel will wear Level D personal protective equipment. During activities such as drilling, well installation, or sampling, where there is a chance of contact with contaminated materials, modified Level D equipment will be worn. The protection will be upgraded to Level C if warranted by the results of the air monitoring. A description of the personnel protective equipment for Levels D and C is provided below.

Level D
Respiratory Protection: None
Protective Clothing: Hard hat, steel-toed shoes, long pants, nitrile gloves

Modified Level D
Respiratory Protection: None
Protective Clothing: Hard hat, steel-toed shoes, coveralls/tyvek, nitrile gloves

Level C
Respiratory Protection: Air purifying respirator with organic vapor cartridges and filters.
Protective Clothing: Same as modified Level D

6.0 EXPOSURE MONITORING

Selective monitoring of workers in the exclusion area may be conducted, as determined by the HSO, if sources of hazardous materials are identified. Personal monitoring may be conducted in the breathing zone at the discretion of the Project Manager or HSO and, if workers are wearing respiratory protective equipment, outside the face-piece.

7.0 SITE ACCESS

Access to the Site during the investigation will be controlled by the Project Manager or HSO. Unauthorized personnel will not be allowed access to the sampling areas.

8.0 WORK AREAS

During any activities involving drilling or other subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, clarify the type of protective equipment needed, and provide an area for decontamination.

The Exclusion Zone is defined as the area where potentially contaminated materials are generated as the result of drilling, sampling, or similar activities. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located adjacent to the Exclusion Zone. The Support Zone is the area where support facilities such as vehicles, a field phone, fire extinguisher and/or first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all Site workers will assemble in the event of an emergency. These zones shall be designated daily, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Control measures such as "Caution" tape and traffic cones will be placed around the perimeter of the work area when work is being done in the areas of concern (i.e., areas with exposed soil) to prevent unnecessary access.

9.0 DECONTAMINATION PROCEDURES

Personnel Decontamination
Personnel decontamination (decon), if deemed necessary by the HSO, will take place in the designated decontamination area delineated for each sampling location. Personnel decontamination will consist of the following steps:

- Soap and potable water wash and potable water rinse of gloves;
- Tyvek removal;
- Glove removal;
- Disposable clothing removal; and
- Field wash of hands and face.

Equipment Decontamination
Sampling equipment, such as split-spoons and bailers, will be decontaminated in accordance with U.S. Environmental Protection Agency methodologies, as described in the work plan.

Disposal of Materials
Purged well water, water used to decontaminate any equipment and well cuttings will be containerized and disposed off-site in accordance with federal, state and local regulations.

10.0 GENERAL SAFE WORK PRACTICES

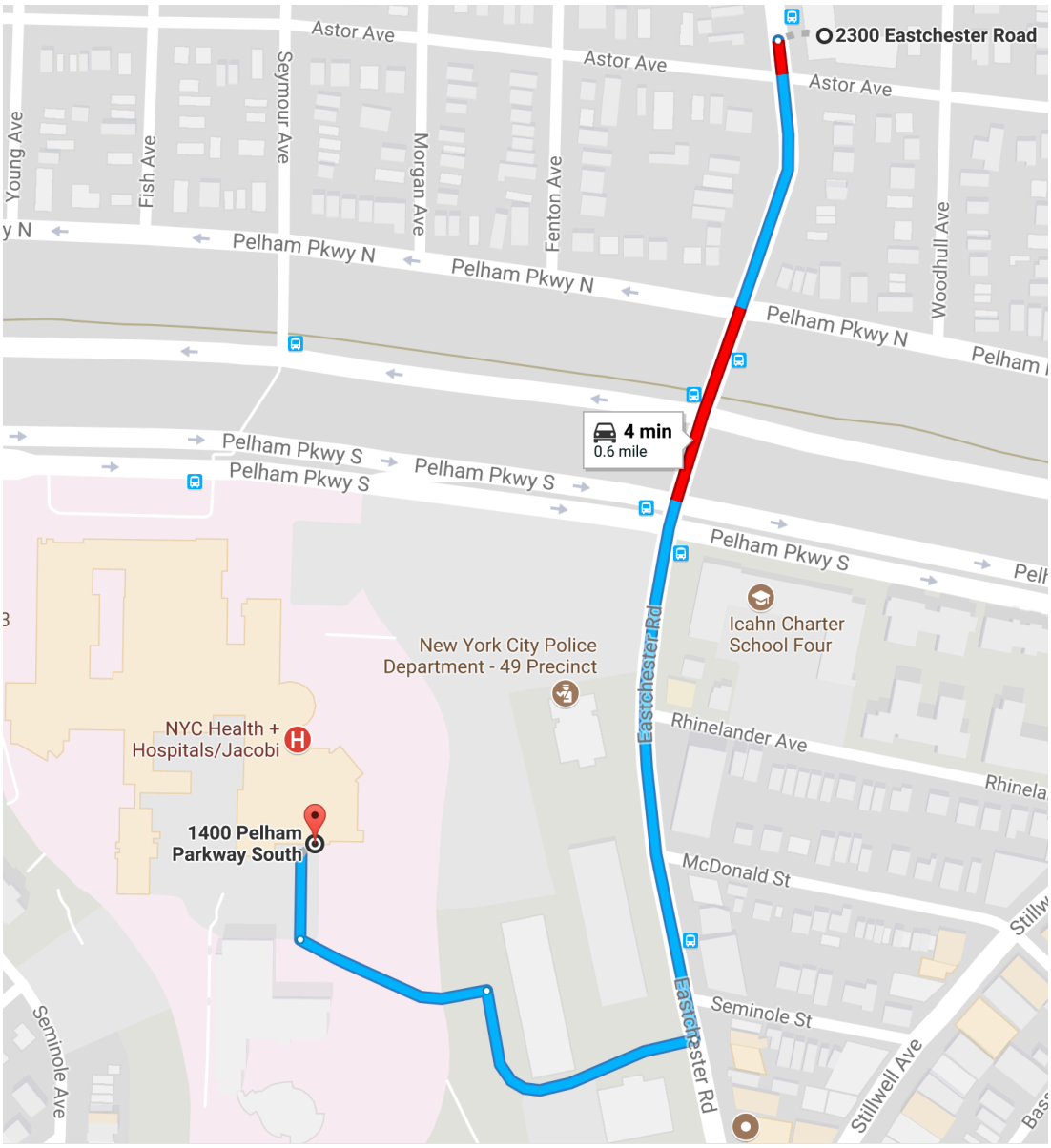
To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance.

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the HSO.
- Workers must wash their hands and face thoroughly on leaving the work area and before eating, drinking, or any other such activity. The workers should shower as soon as possible after leaving the site.
- Removal of potential contamination from PPE and equipment by blowing, shaking or any means that may disperse materials into the air is prohibited.
- Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat stress.
- Personnel will be cautioned to inform each other of symptoms of chemical exposure such as headache, dizziness, nausea, and irritation of the respiratory tract and heat stress.
- No excessive facial hair that interferes with a satisfactory fit of the face-piece of the respirator to the face will be allowed on personnel required to wear respiratory protective equipment.
- On-site personnel will be thoroughly briefed about the anticipated hazards, equipment requirements, safety practices, emergency procedures, and communications methods.

11.0 EMERGENCY PROCEDURES

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the HSO will determine the nature of the emergency and will have someone call for an ambulance, if needed. If the nature of the injury is not serious—i.e., the person can be moved without expert emergency medical personnel—onsite personnel should drive injured person to a hospital. **The nearest emergency room is located at NYC Health + Hospitals Jacobi located at 1400 Pelham Parkway South, Bronx, NY 10461. The emergency room entrance is on Eastchester Road. The phone number is (718) 918-5000.** The route to the hospital is shown and detailed on the next page.

11.1 Route to Hospital



Driving directions to **NYC Health + Jacobi** from **1500 Astor Avenue, Bronx, New York.**

Driving Directions

1. Head west onto Astor Ave toward Eastchester Road
2. Turn left at the first cross street onto Eastchester Road, pass Pelham Parkway
3. Turn right into the service entrance, after Seminole Street
4. Go straight until the road turns to the right behind the second building
5. Take first left, proceed to emergency room

11.2 Emergency Contacts

There will be an on-site field phone. Emergency and contact telephone numbers are listed below:

Table 1 – Emergency Contacts	
Ambulance	911
Emergency Room	(718) 918-5000
NYSDEC Spill Hotline	(800) 457-7362
NYSDEC	(518) 402-8013
Tenen QEP, Mohamed Ahmed	(917) 612-6018
Project Manager, Matthew Carroll	(917) 510-6767
On-site Personnel, Claire Zaccheo	(917) 744-5421
Client representative	(914) 438-7528

12.0 TRAINING

All personnel performing the field activities described in this HASP will have received the initial safety training required by 29 CFR, 1910.120. Current refresher training status also will be required for all personnel engaged in field activities.

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All field personnel must attend a training program covering the following areas:

- potential hazards that may be encountered;
- the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- the purpose and limitations of safety equipment; and
- protocols to enable field personnel to safely avoid or escape from emergencies.

Each member of the field crew will be instructed in the above objectives before he/she goes onto the site. The HSO will be responsible for conducting the training program.

13.0 MEDICAL SURVEILLANCE

All Tenen and subcontractor personnel performing field work involving drilling or other subsurface disturbance at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). The medical examination for Tenen employees will, at a minimum, be provided annually and upon termination of hazardous waste site work.

Appendix A

Acknowledgement of HASP

ACKNOWLEDGMENT OF HASP

Below is an affidavit that must be signed by all Tenen Environmental employees who enter the site. A copy of the HASP must be on-site at all times and will be kept by the HSO.

AFFIDAVIT

I have read the Construction Health and Safety Plan (HASP) for the 1500 Astor Avenue site Bronx, NY. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signature: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____

Appendix B

Injury Reporting Form (OSHA Form 300)

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name ____________________

City ____________________ State __________

Identify the person			Describe the case			Classify the case: CHECK ONLY ONE box for each case based on the most serious outcome for that case:				Enter the number of days the injured or ill worker was:		Check the "Injury" column or choose one type of illness: (M)					
								Remained at Work									
(A) Case no.	(B) Employee's name	(C) Job title (*e.g., Welder*)	(D) Date of injury or onset of illness	(E) Where the event occurred (*e.g., Loading dock north end*)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (*e.g., Second degree burns on right forearm from acetylene torch*)	Death (G)	Days away from work (H)	Job transfer or restriction (I)	Other record-able cases (J)	Away from work (K)	On job transfer or restriction (L)	Injury (1)	Skin disorder (2)	Respiratory condition (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)
			/ month/day			☐	☐	☐	☐	___ days	___ days	☐	☐	☐	☐	☐	☐
			/ month/day			☐	☐	☐	☐	___ days	___ days	☐	☐	☐	☐	☐	☐
			/ month/day			☐	☐	☐	☐	___ days	___ days	☐	☐	☐	☐	☐	☐
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					Page totals ➤	___	___	___	___	___	___	___	___	___	___	___	___
												Injury (1)	Skin disorder (2)	Respiratory condition (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Appendix C

Material Safety Data Sheets (MSDS)

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **cis-1,2-Dichloroethylene**

Cat No. : **AC113380000; AC113380025; AC113380100; AC113380500**

Synonyms cis-Acetylene dichloride.

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed
Harmful if inhaled
Causes serious eye irritation
Causes skin irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Avoid breathing dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Take precautionary measures against static discharge
Do not eat, drink or smoke when using this product
Response
Call a POISON CENTER or doctor/physician if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
Rinse mouth
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Fire
Explosion risk in case of fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store in a well-ventilated place. Keep cool
Store in a closed container
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
cis-1,2-Dichloroethylene	156-59-2	97

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects Breathing difficulties. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 6 °C / 42.8 °F
Method - No information available

Autoignition Temperature 440 °C / 824 °F

Explosion Limits
Upper 12.80%
Lower 9.70%
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products
Hydrogen chloride gas Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing.

Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Ensure adequate ventilation. Wear personal protective equipment. Use explosion-proof equipment. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
cis-1,2-Dichloroethylene	TWA: 200 ppm		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
cis-1,2-Dichloroethylene			TWA: 200 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-80 °C / -112 °F
Boiling Point/Range	60 °C / 140 °F @ 760 mmHg
Flash Point	6 °C / 42.8 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	12.80%
Lower	9.70%
Vapor Pressure	201 mmHg @ 25 °C
Vapor Density	3.34 (Air = 1.0)
Relative Density	1.280
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.

Incompatible Materials Bases

Hazardous Decomposition Products Hydrogen chloride gas, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
cis-1,2-Dichloroethylene	156-59-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
cis-1,2-Dichloroethylene	Not listed	Not listed	EC50 = 721 mg/L 5 min EC50 = 905 mg/L 30 min	Not listed

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN1150
Proper Shipping Name	1,2-DICHLOROETHYLENE
Hazard Class	3
Packing Group	II

TDG

UN-No	UN1150
Proper Shipping Name	1,2-DICHLOROETHYLENE
Hazard Class	3
Packing Group	II

IATA

UN-No	1150
Proper Shipping Name	1,2-DICHLOROETHYLENE
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	1150
Proper Shipping Name	1,2-DICHLOROETHYLENE
Hazard Class	3
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
cis-1,2-Dichloroethylene	X	-	X	205-859-7	-		-	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes

Sudden Release of Pressure Hazard No
Reactive Hazard No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

Component	Hazardous Substances RQs	CERCLA EHS RQs
cis-1,2-Dichloroethylene	1000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
cis-1,2-Dichloroethylene	X	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B2 Flammable liquid
D1B Toxic materials
D2B Toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 22-Sep-2009
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally

Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

21 VOC

Material Safety Data Sheet
Tetrachloroethylene

ACC# 22900

Section 1 - Chemical Product and Company Identification

MSDS Name: Tetrachloroethylene
Catalog Numbers: C182 20, C182 4, C182-20, C182-4, C18220, C1824, O4586 4, O4586-4, O45864
Synonyms: Ethylene tetrachloride; Tetrachlorethylene; Perchloroethylene; Perchlorethylene
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
127-18-4	Tetrachloroethylene	99.0+	204-825-9

Hazard Symbols: XN N
Risk Phrases: 40 51/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Irritant. May cause severe eye and skin irritation with possible burns. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May cause cancer based on animal studies. **Caution!** May cause respiratory tract irritation.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects
Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: May cause severe irritation and possible burns.
Ingestion: May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Inhalation of vapor may cause respiratory tract irritation. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause respiratory tract cancer. May cause

adverse nervous system effects including muscle tremors and incoordination. May cause liver and kidney damage. May cause reproductive and fetal effects.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Flush down the spill with a large amount of water. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not reuse this container. Avoid breathing vapors from heated material. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from flames

and other sources of high temperatures that may cause material to form vapors or mists.
Storage: Keep away from heat and flame. Store in a cool, dry place. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetrachloroethylene	25 ppm TWA; 100 ppm STEL	150 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

OSHA Vacated PELs: Tetrachloroethylene: 25 ppm TWA; 170 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweetish odor
pH: Not available.
Vapor Pressure: 15.8 mm Hg
Vapor Density: 5.2
Evaporation Rate:9 (ether=100)
Viscosity: 0.89 mPa s 20 deg C
Boiling Point: 121 deg C
Freezing/Melting Point:-22.3 deg C
Decomposition Temperature:150 deg C
Solubility: Nearly insoluble in water.
Specific Gravity/Density:1.623
Molecular Formula:C2Cl4
Molecular Weight:165.812

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong bases, metals, liquid oxygen, dinitrogen tetroxide.

Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 127-18-4: KX3850000
LD50/LC50:
CAS# 127-18-4:
Draize test, rabbit, eye: 162 mg Mild;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 810 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 5200 ppm/4H;
Inhalation, rat: LC50 = 34200 mg/m3/8H;
Oral, mouse: LD50 = 8100 mg/kg;
Oral, rat: LD50 = 2629 mg/kg;
Carcinogenicity:
CAS# 127-18-4:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen
Epidemiology: Epidemiologic studies have given inconsistent results. Studi es have shown that tetrachloroethylene has not caused canc er in exposed workers. The studies have serious weakne sses such as mixed exposures. In tests with rats and mice, i t appeared that tissue destruction or peroxisome prolifera tion rather than genetic mechanisms were the cause of the observed increases in normally occurring cancers. The oral mouse TDLo that was tumorigenic was 195 gm/kg/50W-I.
Teratogenicity: Has caused musculoskeletal abnormalities. Has caused morphological transformation at a dose of 97mol/L in a study using rat embryos.
Reproductive Effects: Has caused behavioral, biochemical, and metabolic effects on newborn rats when the mother was exposed to the TCLo of 900 ppm/7H at 7-13 days after conception. A dose of 300 ppm/7H 6-15 days after conception caused post-implantation mortality.
Neurotoxicity: No information available.
Mutagenicity: Not mutagenic in Escherichia coli. No mutagenic effects were seen in rat liver after exposure at 200 ppm for 10 weeks. No chromosome changes were seen in the bone marrow cells of exposed mice.
Other Studies: A case of 'obstructive jaundice' in a 6-week old infant has been attributed to tetrachloroethylene in breast milk.

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 5.28 mg/L; 96 Hr.; Static Condition, 12 degrees C Fathead Minnow: LC50 = 18.4 mg/L; 96 Hr.; Flow-through condition Bluegill/Sunfish: LC50 = 12.9 mg/L; 96 Hr.; Static Condition ria: Phytobacterium phosphoreum: EC50 = 120.0 mg/L; 30 minutes; Microtox test No data available.

Environmental: In soil, substance will rapidly evaporate. In water, it will evaporate. In air, it can be expected to exist in the vapor phase.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 127-18-4: waste number U210.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TETRACHLOROETHYLENE				TETRACHLOROETHYLENE
Hazard Class:	6.1				6.1
UN Number:	UN1897				UN1897
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 127-18-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 127-18-4: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 127-18-4: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 127-18-4: acute.
Section 313
This material contains Tetrachloroethylene (CAS# 127-18-4, 99 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:
CAS# 127-18-4 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 127-18-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 127-18-4 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 127-18-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Tetrachloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 127-18-4: 14 ug/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 40 Limited evidence of a carcinogenic effect.
R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 23 Do not inhale gas/fumes/vapour/spray.
S 36/37 Wear suitable protective clothing and gloves.
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 127-18-4: 3
Canada - DSL/NDSL
CAS# 127-18-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D1B, D2A.
Canadian Ingredient Disclosure List
CAS# 127-18-4 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 127-18-4: OEL-ARAB Republic of Egypt:TWA 5 ppm (35 mg/m3);Skin OEL-AUSTRALIA:TWA 50 ppm (335 mg/m3);STEL 150 ppm;CAR OEL-BELGIUM:TWA 50 ppm (339 mg/m3);STEL 200 ppm (1368 mg/m3) OEL-CZECHOSLOVAKIA:TWA 250 mg/m3;STEL 1250 mg/m3 OEL-DENMARK:TWA 30 ppm (200 mg/m3);Skin OEL-FINLAND:TWA 50 ppm (335 mg/m3);STEL 75 ppm (520 mg/m3);Skin OEL-FRANCE:TWA 50 ppm (335 mg/m3) OEL-GERMANY:TWA 50 ppm (345 mg/m3);Carcinogen OEL-HUNGARY:STEL 50 mg/m3;Skin;Carcinogen OEL-JAPAN:TWA 50 ppm (340 mg/m3) OEL-THE NETHERLANDS:TWA 35 ppm (240 mg/m3);Skin OEL-THE PHILIPPINES:TWA 100 ppm (670 mg/m3) OEL-POLAND:TWA 60 mg/m3 OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m3 OEL-SWEDEN:TWA 10 ppm (70 mg/m3);STEL 25 ppm (170 mg/m3) OEL-SWITZERLAND:TWA 50 ppm (345 mg/m3);STEL 100 ppm;Skin OEL-THAILAND:TWA 100 ppm;STEL 200 ppm OEL-UNITED KINGDOM:TWA 50 ppm (335 mg/m3);STEL 15 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA

check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 6/17/1999
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

2D

VOC

Material Safety Data Sheet
Trichloroethylene

ACC# 23850

Section 1 - Chemical Product and Company Identification

MSDS Name: Trichloroethylene
Catalog Numbers: S80232, S80327ACS-1, S80327ACS-2, NC932384B, NC9494003, NC9494591, NC9981849, S80237ACS-1, S80237ACS-2, T340-4, T341-20, T341-4, T341-500, T341J4, T403-4, XXT341SK4LIX48
Synonyms: Ethylene trichloride; triclene; trichloroethene; benzinol cecolene
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
79-01-6	Trichloroethylene	99.5	201-167-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.
Warning! Causes eye and skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression. May cause cancer based on animal studies. Potential cancer hazard. May cause liver damage.
Target Organs: Central nervous system, liver, eyes, skin.

Potential Health Effects
Eye: Causes moderate eye irritation. May result in corneal injury. Contact produces irritation, tearing, and burning pain.
Skin: Causes mild skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.
Ingestion: Aspiration hazard. May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory tract irritation. May cause liver abnormalities. May cause peripheral nervous system effects.
Chronic: Possible cancer hazard based on tests with laboratory animals. Chronic inhalation may

cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Combustion generates toxic fumes. Containers may explode in the heat of a fire.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: 778 deg F (414.44 deg C)
Explosion Limits, Lower:12.5
Upper: 90.0
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Keep from

contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Trichloroethylene	50 ppm TWA; 100 ppm STEL	1000 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

OSHA Vacated PELs: Trichloroethylene: 50 ppm TWA; 270 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: sweetish odor - chloroform-like

pH: Not available.

Vapor Pressure: 58 mm Hg @20C

Vapor Density: 4.53

Evaporation Rate:0.69 (CCl4=1)

Viscosity: 0.0055 poise

Boiling Point: 189 deg F

Freezing/Melting Point:-121 deg F

Decomposition Temperature: Not available.

Solubility: Insoluble in water.

Specific Gravity/Density:1.47 (water=1)

Molecular Formula:C2HCl3

Molecular Weight:131.366

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, ignition sources, oxidizers.

Incompatibilities with Other Materials: Alkalis (sodium hydroxide), chemically active metals (aluminum, beryllium, lithium, magnesium), epoxies and oxidants. Can react violently with aluminum, barium, lithium, magnesium, liquid oxygen, ozone, potassium hydroxide, potassium nitrate, sodium, sodium hydroxide, titanium, and nitrogen dioxide. Reacts with water under heat

and pressure to form hydrogen chloride gas.
Hazardous Decomposition Products: Hydrogen chloride, carbon dioxide, chloride fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 79-01-6: KX4550000
LD50/LC50:
CAS# 79-01-6:
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 2 mg/24H Severe;
Inhalation, mouse: LC50 = 8450 ppm/4H;
Inhalation, mouse: LC50 = 220000 mg/m3/20M;
Inhalation, mouse: LC50 = 262000 mg/m3/30M;
Inhalation, mouse: LC50 = 40000 mg/m3/4H;
Inhalation, rat: LC50 = 140700 mg/m3/1H;
Oral, mouse: LD50 = 2402 mg/kg;
Oral, mouse: LD50 = 2400 mg/kg;
Oral, rat: LD50 = 4920 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rabbit: LD50 = 20 mL/kg;
Carcinogenicity:
CAS# 79-01-6:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/1/88
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

Epidemiology: Suspected carcinogen with experimental carcinogenic, tumorigenic, and teratogenic data.
Teratogenicity: No information available.
Reproductive Effects: Experimental reproductive effects have been observed.
Mutagenicity: Human mutation data has been reported. IARC and the National Toxicology Program (NTP) stated that variability in the mutagencity test results with trichloroethylene may be due to the presence of various stabilizers used in TCEwhich are mutagens (e.g.epoxybutane, epichlorohydrin).See actual entry in RTECS for complete infomation.R68 Mutagen Category 3 (CHIP 2002, UK).
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Bluegill sunfish, LD50= 44,700 ug/L/96Hr. Fathead minnow, LC50=40.7 mg/L/96Hr.
Environmental: In air, substance is photooxidized and is reported to form phosgene, dichloroacetyl chloride, and formyl chloride. In water, it evaporates rapidly.
Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 79-01-6: waste number U228.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TRICHLOROETHYLENE	TRICHLOROETHYLENE
Hazard Class:	6.1	6.1(9.2)
UN Number:	UN1710	UN1710
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 79-01-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 79-01-6: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 79-01-6: acute, chronic, reactive.
Section 313
This material contains Trichloroethylene (CAS# 79-01-6, 99.5%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR
Clean Air Act:
CAS# 79-01-6 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 79-01-6 is listed as a Hazardous Substance under the CWA. CAS# 79-01-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 79-01-6 is listed as a Toxic Pollutant under

the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 79-01-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Trichloroethylene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 79-01-6: 50 æg/day NSRL (oral); 80 æg/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 36/38 Irritating to eyes and skin.
R 45 May cause cancer.
R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 67 Vapours may cause drowsiness and dizziness.
R 68 Possible risk of irreversible effects.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 79-01-6: 3

Canada - DSL/NDSL

CAS# 79-01-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.

Canadian Ingredient Disclosure List

CAS# 79-01-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 2/01/1999
Revision #5 Date: 5/31/2005

APPENDIX C

Soil Materials Management Plan

SOIL/MATERIALS MANAGEMENT PLAN

for
1500 Astor Avenue
Remedial Action Work Plan

2300-2314 Eastchester Avenue, Bronx, New York
Block 4393, Lot 1
BCP Site #C203105

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 2
47- 40 21st Street
Long Island City, NY 11101

Prepared for:
Eastchester-Astor, LLC
760 White Plains Road
Scarsdale, New York 10583

Prepared by:
TENEN ENVIRONMENTAL
121 West 27th Street, Suite 702
New York, NY 10001

August 2018

TABLE OF CONTENTS

1.0 INTRODUCTION

This Soil/Materials Management Plan (SMMP) has been developed for the Remedial Action Work Plan (RAWP) prepared for 1500 Astor Avenue (the Site).

The Site is located at 1500 Astor Avenue and 2300-2314 Eastchester Road in the Pelham Gardens neighborhood of the Bronx, New York. The Site is an L-shaped 0.66-acre parcel located in the Bronx Community Board 11 and is identified as Block 4393, Lot 1 on New York City Tax Maps. The Site is located on the northeast corner of Astor Avenue and Eastchester Avenue.

The Site is currently improved with two buildings: the Astor Avenue building is two stories and is currently occupied by medical offices. The Eastchester Road building is one story and is currently divided into five commercial units. The Eastchester Road building has a full basement, which is used for storage only. A location map for the Site is provided as Figure 1. A map of the current Site layout is included as Figure 2.

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the supervision of the Remedial Engineer (RE) and will be reported in the Final Engineering Report (FER). Soil Screening will be performed during all remedial excavations into known or potentially contaminated material regardless of when the invasive work is done prior to issuance of a COC.

1.2 Soil Staging Methods

Excavated soil from hot spot excavations will be placed in lined containers staged on-site. While containers are on-site and work is occurring, they will be inspected daily. All container and soil management will be compliant with applicable laws and regulations.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off the Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils are not proposed for reuse on-Site.

1.4 Materials Excavation, Load-Out and Departure

The RE overseeing the remedial activities, or a qualified environmental professional under his/her supervision, will:

- Oversee remedial work and the excavation and load-out of excavated material;
- Ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;

- Ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- Ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this RAWP are properly addressed by appropriate parties;
- Ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- Ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials. Mechanical processing of historical fill and contaminated soil on the Site is prohibited.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364.

Trucks removing soil from the Site will be loaded on-site and exit the Site to the right turning onto Eastchester Road. Trucks will make a right on East Gun Hill Road and will continue towards the New England Thruway (Interstate-95).

These are the most appropriate routes and take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) limiting total distance to major highways; (d) promoting safety in access to highways; and, (e) overall safety in transport. All trucks loaded with Site materials will exit the vicinity of the Site using only the most-current New York City Department of Transportation (NYCDOT)-approved truck routes (currently the 2015 New York City Truck Route Map).

All trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

To document that the disposal of regulated material exported from the Site complies with applicable laws and regulations, the following documentation will be established and reported by the RE for each disposal destination used in this project:

(1) a letter from the RE or Applicant to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that

material to be disposed is regulated material generated at an environmental remediation Site in New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the RE or Applicant, and will include as an attachment a summary of all chemical data for the material being transported; and

(2) a letter from each disposal facility stating it is in receipt of the correspondence, (1) above, and is approved to accept the material.

These documents will be included in the FER.

The FER will include an itemized account of the destination of all material removed from the Site during the remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the FER.

All soil, fill and other waste excavated and removed from the Site will be managed as regulated material (municipal solid waste per 6NYCRR Part 360-1.2) and will be disposed in accordance with applicable laws and regulations. Historic fill and material that does not meet Track 1 Unrestricted Use soil cleanup objectives (SCOs) is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility). Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Approximately forty (40) cubic yards (CY) of soil is proposed for off-Site disposal. Final disposal facilities will be identified to NYSDEC prior to shipping material to any facility. Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the Final Engineering Report (FER). A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the FER. Hazardous wastes derived from on-Site will be stored, transported and disposed of in compliance with applicable laws and regulations.

If disposal of soil and fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by NYSDEC with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6 NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse

Soil reuse is not proposed on-Site.

1.8 Import of Backfill Soil from Off-Site Sources

Approximately forty (40) cubic yards of soil is anticipated to be imported to the Site for use as clean cover after excavation of hot spot areas. Import of materials will be in compliance with: (1) the Part 375-6.7(d) and (2) all Federal, State and local rules and regulations for handling and transport of material.

The following presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. The backfill and cover soil quality objectives will be the lower of the Protection of Groundwater or Commercial Use SCOs.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with applicable City, State and Federal laws and requirements. The source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed will be reported to NYSDEC at the end of construction activities and before obtaining a Certificate of Occupancy or Department of Building Letter of Completion.

Source Screening and Testing
Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite and discrete samples of imported material will be taken consistent with Table 5.4(e)10 of DER-10. Once it is determined that the fill material meets imported backfill or cover soil

chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be reported to NYSDEC at the end of construction activities and before obtaining a Certificate of Occupancy or Department of Building Letter of Completion. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.9 Fluids Management

All liquids to be removed from the Site will be handled, transported and disposed in accordance with applicable laws and regulations. No liquids are expected to be generated as part of the implementation of this RAWP, however there exists a perched water condition on-site which may be encountered during hot spot excavation. If perched water is encountered, it will be drummed, sampled and managed for transportation and disposal at an off-Site treatment facility.

1.10 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Since Site disturbance is less than one acre in area, a Stormwater Pollution Prevention Plan (SWPPP) is not required to be submitted to NYSDEC Division of Water.

1.11 Erosion and Sediment Control Measures

Soil from localized hot spot excavation will be stored in lined containers (i.e., not stockpiled on flat land); erosion and sediment control measures are not required.

1.12 Contingency Plan

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to the NYSDEC Project Manager. Petroleum spills will be reported to the NYSDEC Spill Hotline. These findings will be included in applicable daily report(s). If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to NYSDEC. Analysis will be performed for Full List volatiles and semi-volatiles, pesticides/PCBs, and TAL metals, as appropriate.

1.13 Odor, Dust and Nuisance Control

A Site-specific Community Air Monitoring Plan (CAMP) is included in the Health and Safety Plan (HASP) included as Appendix A and B, respectively, of the RAWP.

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and may include (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) live loading of soils into trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

Dust Control

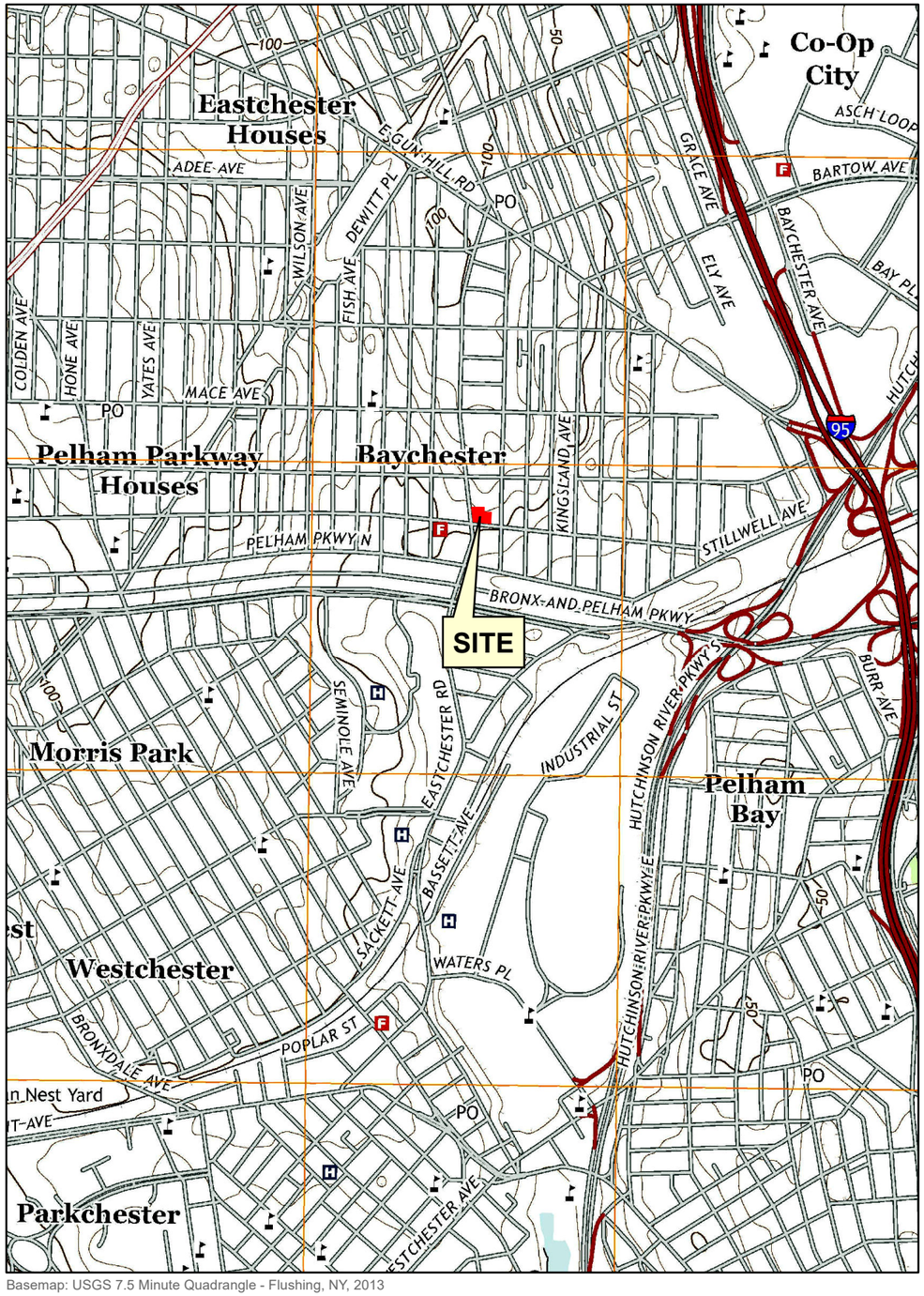
Dust management during invasive on-Site work will include, as necessary:

- Use of a dedicated water spray method for roads and excavation areas; and,
- Identification of air intakes on adjoining residential properties.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. NYSDEC will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the RE.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.



Basemap: USGS 7.5 Minute Quadrangle - Flushing, NY, 2013

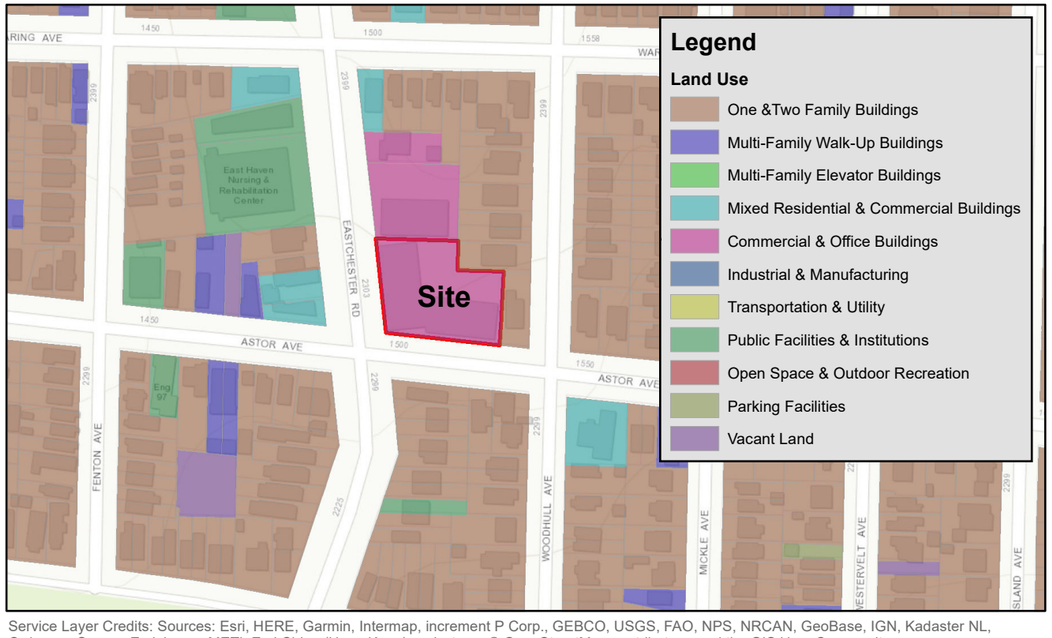
Site Location

0 750 1,500 3,000 Feet

http://gis.nyc.gov/taxmap/map.htm

Department of Finance Digital Tax Map

0 125 250 500 Feet



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
NYC Department of City Planning, Information Technology Division

Department of City Planning MapPLUTO - 2018 v1

0 125 250 500 Feet

Revised 11/21/2017 Per NYSDEC Comments

Site

Remedial Action Work Plan
1500 Astor Avenue
Bronx, New York
Block 4393, Lot 1

TENEN ENVIRONMENTAL

Tenen Environmental, LLC
121 West 27th Street
Suite 702
New York, NY 10001
O: (646) 606-2332
F: (646) 606-2379

Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Site Location Map**

Drawing No: **Figure 1**

Legend

Site Boundary

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division

Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

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Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Site Layout**

Drawing No: **Figure 2**

APPENDIX D

Quality Assurance Project Plan

Quality Assurance Project Plan
for
1500 Astor Avenue
Remedial Action Work Plan

2300-2314 Eastchester Avenue, Bronx, New York
Block 4393, Lot 1
BCP Site #C203105

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 2
47-40 21st Street
Long Island City, NY 11101

Prepared for:
Eastchester-Astor, LLC
760 White Plains Road
Scarsdale, New York 10583

Prepared by:
TENEN ENVIRONMENTAL
121 West 27th Street, Suite 702
New York, NY 10001

August 2018

TABLE OF CONTENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed for the Remedial Action Work Plan (RAWP) prepared for 1500 Astor Avenue (the Site).

The Site is located at 1500 Astor Avenue and 2300-2314 Eastchester Road in the Pelham Gardens neighborhood of the Bronx, New York. The Site is an L-shaped 0.66-acre parcel located in the Bronx Community Board 11 and is identified as Block 4393, Lot 1 on New York City Tax Maps. The Site is located on the northeast corner of Astor Avenue and Eastchester Avenue. A location map for the Site is provided as Figure 1 of the RAWP. A map of the current Site layout is included as Figure 2 of the RAWP.

The Astor Avenue building is two stories and is currently occupied by medical offices. The Eastchester Road building is one story and is currently divided into five commercial units. The Eastchester Road building has a full basement, which is used for storage only.

1.1 Project Scope and QAPP Objective

The proposed scope of work includes the following:

- Excavation of soil/fill to remove chlorinated solvent-impacted soil. Excavated soil will be screened for indications of contamination with a photoionization detector (PID) and for nuisance conditions (odor or staining);
- Characterization and disposal of impacted material from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
- Collection of pre-remedial shallow soil samples for PAH distribution and average concentration to evaluate areas in which, as necessary, the top one foot of soil would be removed and replaced so that the cap is appropriate for commercial use;
- Collection and analysis of post-remedial end-point samples to document remaining concentrations of contaminants. Samples will be evaluated for attainment of applicable Part 375 Restricted Commercial Use soil cleanup objectives (SCOs) for non-PCE constituents and the Protection of Groundwater SCO for PCE, which would support a Track 2 remedy;
- Collection and analysis of post-remedial groundwater samples to evaluate the efficacy of the groundwater remedy;
- Collection and analysis of post-remedial soil vapor samples to evaluate whether engineering controls are required; and
- Import of materials to be used for backfill and cover in compliance with: (1) Part 375-6.7(d) requirements and (2) all Federal, State and local rules and regulations for handling and transport of material.

The objective of the QAPP is to detail the policies, organization, objectives, functional activities and specific quality assurance/quality control activities designed to achieve the data quality goals or objectives of the Remedial Action Work Plan (RAWP). This QAPP addresses how the acquisition and handling of samples and reporting of data will be documented for quality control (QC) purposes. Specifically, this QAPP addresses the following:

- The procedures to be used to collect, preserve, package, and transport samples;
- Field data collection and record keeping;
- Data management;
- Chain-of-custody procedures; and,
- Determination of precision, accuracy, completeness, representativeness, decision rules, comparability and level of quality control effort.

2.0 PROJECT ORGANIZATION

The personnel detailed are responsible for the implementation of the QAPP. Tenen Environmental, LLC (Tenen) will implement the RAWP on behalf of Eastchester-Astor, LLC (the Volunteer) once it has been approved by the New York State Department of Environmental Conservation (NYSDEC).

The Remedial Engineer for the project will be Mr. Matthew Carroll, P.E. Mr. Carroll is an environmental engineer experienced in all aspects of site assessment and development and implementation of remedial strategies. His experience involves projects from inception through investigation, remediation and closure. His expertise includes soil, soil vapor and groundwater remediation; remedial selection and design; field/health and safety oversight and preparation of work plans and reports to satisfy the requirements of various regulatory agencies. Mr. Carroll received his Bachelor of Engineering from Stevens Institute of Technology and Bachelor of Science in Chemistry from New York University and is a New York State professional engineer; his resume is included in Appendix A.

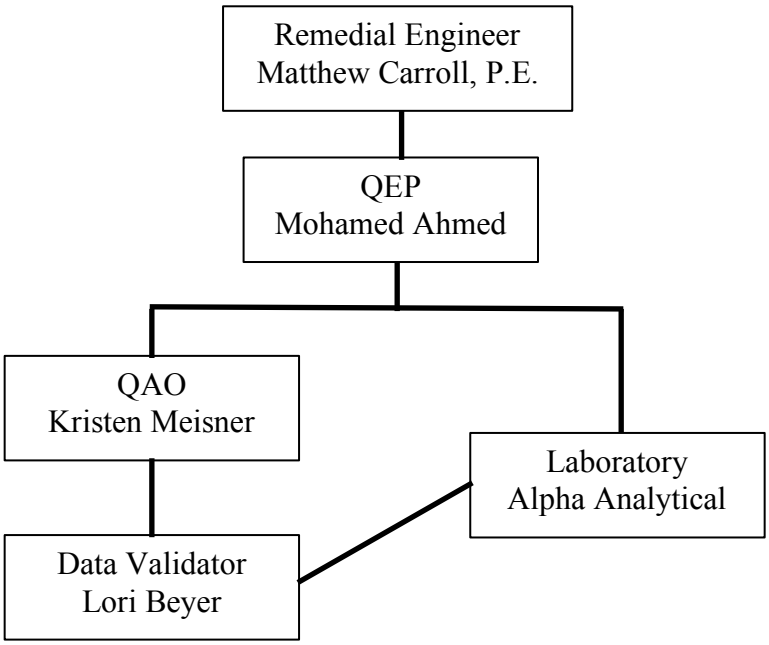
The Project Manager and Qualified Environmental Professional (QEP) will be Mohamed Ahmed, Ph.D., CPG, principal at Tenen. Dr. Ahmed is a certified professional geologist with over 20 years of experience in the New York City metropolitan area. He has designed and implemented subsurface investigations and is proficient in groundwater modeling, design of groundwater treatment systems, and soil remediation. He has managed numerous projects focused on compliance with the requirements of the New York State Brownfield Cleanup Program and spills programs and the New York City E-designation program. Dr. Ahmed also has extensive experience in conducting regulatory negotiations with the New York State Department of Environmental Conservation, the New York City Department of Environmental Protection, the NYC Office of Housing Preservation and Development, and the Mayor's Office of Environmental Remediation. Dr. Ahmed holds advanced degrees in geology and Earth and Environmental Sciences from Brooklyn College and the Graduate Center of the City University of New York; his resume is included in Appendix A.

The Quality Assurance Officer will be Ms. Kristen Meisner, E.I.T. Ms. Meisner is an environmental engineer with experience in soil, groundwater and soil vapor sampling techniques and data analysis, remedial systems, and environmental permitting. While with a national consulting firm, Ms. Meisner designed and implemented environmental investigations, designed remedial systems and performed watershed analyses for the U.S. Army Corps of Engineers. Her prior experience has involved projects related to the Spill Prevention, Control, and Countermeasure (SPCC) and Petroleum Bulk Storage (PBS) plan requirements. She has also prepared environmental permits for air, stormwater and wastewater under the NPDES, RCRA, SARA Title II, Title V, OSHA and Discharge Monitoring programs. Ms. Meisner is an Engineer-in-Training in New York State and holds a Bachelor of Science in Environmental Engineering from the University of New Hampshire; her resume is included in Appendix A.

In addition, Tenen will utilize subcontractors for laboratory services (Alpha Analytical of Westborough, MA) and data validation (L.A.B. Validation Corp. of East Northport, NY). The

resume for the Data Usability Summary Report (DUSR) preparer, Ms. Lori Beyer, is included in Appendix A.

An organization chart for the implementation of the IRM Work Plan and QAPP is below.



3.0 SAMPLING AND DECONTAMINATION PROCEDURES

A detailed description of the procedures to be used during this program for collection of endpoint soil samples and post remedial groundwater and soil vapor samples is provided below. Proposed sample locations are shown on Figures 6, 8, 10 and 13 of the RAWP. An Analytical Methods/Quality Assurance Summary is provided in Table 1, included in Section 3.11.

3.1 Level of Effort for QC Samples

Field blank, trip blank, field duplicate and matrix spike (MS) / matrix spike duplicate (MSD) samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. Each type of QC sample is discussed below.

- Field and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Field (equipment) blank samples are analyzed to check for procedural chemical constituents that may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage.

- Duplicate samples are analyzed to check for sampling and analytical reproducibility.

- MS/MSD samples provide information about the effect of the sample matrix on the digestion and measurement methodology.

The general level of QC effort will be one field duplicate and one field blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. Additional sample volume will also be provided to the laboratory to allow one site-specific MS/MSD for every 20 or fewer investigative samples of a given matrix. One trip blank will be included along with each sample delivery group of volatile organic compound (VOC) samples.

The analytical laboratory, Alpha Analytical, is certified under the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) as Lab IDs 11148 and 11627. NYSDEC Analytical Services Protocol (ASP) Category B deliverables will be prepared by the laboratory.

3.2 Sample Handling

Samples will either be picked up by the laboratory, delivered to the laboratory in person by the sampler, or transported to the laboratory by overnight courier. All samples will be shipped to the laboratory to arrive within 48 hours after collection, and the laboratory will adhere to the analytical holding times for these analyses, as listed in the current version of the New York State Analytical Services Protocol (ASP).

3.3 Custody Procedures

Sample custody will be controlled and maintained through the chain-of-custody procedures. The chain of custody is the means by which the possession and handling of samples is tracked from the site to the laboratory. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site. The following sections (Sections 3.4 and 3.5) describe procedures for maintaining sample custody from the time samples are collected to the time they are received by the analytical laboratory.

3.4 Sample Storage

Samples will be stored in secure limited-access areas. Walk-in coolers or refrigerators will be maintained at 4°C, +/- 2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location, if necessary.

3.5 Sample Custody

Sample custody is defined by this QAPP as the following:

- The sample is in someone's actual possession;
- The sample is in someone's view after being in his or her physical possession;
- The sample was in someone's possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering; or,
- The sample is placed in a designated and secured area.

Samples will be removed from storage areas by the sample custodian or laboratory personnel and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure.

Laboratory documentation used to establish chain of custody and sample identification may include the following:

- Field chains of custody or other paperwork that arrives with the sample;
- Laboratory chain of custody;
- Sample labels or tags attached to each sample container;
- Sample custody seals;
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books, filled out in legible handwriting, and signed and dated by the chemist;
- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist;
- Sample storage log (same as the laboratory chain of custody); and,

- Sample disposition log, which documents sample disposal by a contracted waste disposal company.

3.6 Sample Tracking

All samples will be maintained in the appropriate coolers prior to and after analysis. Laboratory analysts will remove and return their samples, as needed. Samples that require internal chain of custody procedures will be relinquished to the analysts by the sample custodians. The analyst and sample custodian will sign the original chain of custody relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original chain of custody returning sample custody to the sample custodian. Sample extracts will be relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department will track internal chain of custody through their logbooks/spreadsheets.

Any change in the sample during the time of custody will be noted on the chain of custody (e.g., sample breakage or depletion).

3.7 Soil Sampling

Pre-remedial delineation samples will be conducted in the small landscaped area along Astor Avenue. Samples will be collected every 30 linear feet (LF) at a depth of approximately 1 foot below grade. The samples will be analyzed for PAHs; Figure 6 of the RAWP depicts the pre-delineation sample locations.

End-point samples will be collected from the base of the hot spot excavation every 900 square feet (SF) at a depth of approximately six feet below grade and from the sidewalls of the excavation every 30 LF, in accordance with DER-10. The end-point samples will be analyzed for TCL VOCs and SVOCs. Figure 8 of the RAWP presents a generalized post-excavation sampling location map.

At each location samples will be biased toward the location of highest-suspected contamination based on PID readings, field observations and historic data.

Soil samples will be collected using dedicated sample scoops. Soil samples to be analyzed will be collected directly the scoop. All collected soil samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4 deg-C in the field, and transported under chain-of-custody command to the designated laboratory for analysis.

Soil samples will be analyzed for volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, Target Analyte List (TAL) metals by EPA Method 6010, and pesticides/polychlorinated biphenyls (PCBs) by EPA Methods 8081/8082 with a Category B data package.

3.8 Post Remedial Groundwater Sampling

Prior to sample collection, static water levels will be measured and recorded from all monitoring wells to be sampled. Tenen will purge and sample monitoring wells using low-flow/minimal drawdown purge and sample collection procedures (peristaltic pump system). Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min). Field measurements for pH, temperature, turbidity, dissolved oxygen, specific conductance, oxidation-reduction potential and water level, as well as visual and olfactory field observations, will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity, dissolved oxygen and temperature stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU) or become stable above 50 NTU.

Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed as discussed below.

Wells will be purged and sampled using dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures, as described above. The pump will be decontaminated between samples and a dedicated bladder will be used.

Groundwater samples will be collected through dedicated tubing. Prior to, and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, dissolved oxygen, turbidity and depth-to-water, as well as visual and olfactory field observations will be recorded. All collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4C in the field, and transported under chain-of-custody command to the designated laboratory for analysis.

Post-remedial groundwater sampling will be completed in accordance with a Site Management Plan (SMP). It is anticipated that groundwater samples will be collected from three previously installed wells six months after the groundwater remedy described in Section 5.1.3 of the RAWP is implemented. Proposed post-remedial groundwater sample locations are shown on Figure 13 of the RAWP.

Groundwater samples will be analyzed for CVOCs.

3.9 Post Remedial Soil Vapor and Indoor Air Sampling

All samples will be collected in general accordance with the *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, October 2006).

Interior sub-slab soil vapor points will be installed using a hand held rotary hammer. Access to the sub-slab soil will be gained by drilling through the top surface material (concrete and flooring material) using a drill bit. Upon penetration through the surface material, a disposable Vapor Pin® will be set no more than two inches below the slab.

The soil vapor sampling probe will be connected to 3/8-inch diameter tubing to the surface. The borehole above the sampling probe to grade will be sealed using a sand pack and an inert sealant to prevent ambient air mixing with the soil vapor. Ambient air will be purged from the bore hole by attaching the surface end of the 3/8-inch diameter tubing to an air valve and then to a vacuum pump. One to three volumes of air (volume of the sample probe and tube) will be removed prior to all soil vapor sample collection.

Post-remedial soil vapor samples will be screened for organic vapors using a PID. Samples will be collected in 2.7-liter Summa canisters using an eight-hour regulator. The flow rate of both purging and sampling will not exceed 0.2 liters per minute (L/min). A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples were collected, apparent moisture content of the sampling zone, and chain of custody protocols.

A helium tracer gas will be used as a quality assurance/quality control (QA/QC) measure to verify the integrity of the soil vapor probe seal. And a portable monitoring device will be used to analyze a sample of soil vapor for the tracer gas prior to sampling. If this analysis shows a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling, tracer monitoring will be performed a second time to confirm the integrity of the probe seals.

Paired indoor air and ambient air samples will be collected from breathing height (four to six feet above the slab). The sampling flow rate will not exceed 0.2 liters per minute (L/min).

Post-remedial soil vapor and indoor air sampling will be completed in accordance with a Site Management Plan (SMP). It is anticipated that two rounds of soil vapor and indoor air sampling will be collected upon completion of the soil vapor remedy described in Section 5.1.2 of the RAWP. Proposed post-remedial soil vapor and indoor air sample locations are shown on Figure 10 of the RAWP.

Summa canisters will be transported to Alpha Analytical Laboratories, a New York State ELAP-certified laboratory, under chain of custody procedures and the samples analyzed for CVOCs using EPA method TO-15.

3.10 Analytical Methods/Quality Assurance Summary Table

A summary of the analytical methods and quality assurance methods are included in Table 1, below.

Table 1

Analytical Methods/Quality Assurance Summary

Matrix	Proposed Samples	QA/QC Samples				Total # Samples	Analytical Parameter	Method	Preservative	Holding Time	Container
		TB	FB	DUP	MS/MSD						
Soil	5	1	1	1	1	10	VOCs	8260	Cool to 4°C	14 days to analysis	(3) 5-gram En Core
	5	0	1	1	1	9	SVOCs	8270	Cool to 4°C		(2) 250 mL clear glass bottle
	5	0	1	1	1	9	PAHs	8270	Cool to 4°C		(2) 250 mL clear glass bottle
Groundwater	6	2	0	2	0	10	CVOCs	8260	Cool to 4°C, pH<2 with HCl		(3) 40 mL clear glass vials
Soil Vapor, Indoor and Ambient Air	10	0	0	2	0	12	CVOCs	TO-15	Cool to 4°C, pH<2 with HCl		(1) 6-L Summa canister

TB – Trip Blank
FB – Field Blank
DUP – Duplicate
°C – degrees Celsius
mL – milliliter
L – liter

3.11 Decontamination

Where possible, samples will be collected using new, dedicated sampling equipment so that decontamination is not required. All non-dedicated equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g., Alconox) and/or a steam cleaner. All non-dedicated sampling equipment will also have a final rinse with deionized water. Decontamination water will be collected and disposed as investigation-derived waste (IDW).

3.12 Data Review and Reporting

The NYSDEC ASP Category B data package will be validated by an independent data validation subconsultant and a DUSR summarizing the results of the data validation process will be prepared. All reported analytical results will be qualified as necessary by the data validation and will be reviewed and compared against background concentrations and/or applicable New York State criteria:

Soil – Commercial Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs as listed in 6NYCRR Part 375 NYSDEC Commissioner's Policy CP-51;
Groundwater – Class GA groundwater standards and guidance values for groundwater as listed in NYSDEC Technical and Operations Guidance Series (TOGS) 1.1.1.; and
Soil Vapor - NYSDOH Guidance for Evaluating Soil Vapor Intrusions in the State of New York (2006) Indoor Air Guidance Values and Matrices

A report documenting the remedial action implementation will be prepared, and will describe Site conditions and document applicable observations made during the sample collection. In addition, the report will include a description of the sampling procedures, tabulated sample results and an assessment of the data and conclusions. The laboratory data packages, DUSR, geologic logs, well construction diagrams, and field notes will be included in the report as appendices. All data will also be submitted electronically to NYSDEC via the Environmental Information Management System (EIMS) in EqUIS format.

Appendix A

Resumes

Matthew Carroll, P.E.
Environmental Engineer/Principal

Experience Summary

Matthew Carroll is an environmental engineer experienced in all aspects of site assessment and development and implementation of remedial strategies. He has managed projects from inception through investigation, remediation and closure. His expertise includes soil, soil gas, and groundwater remediation, preparation of cost estimates, remedial alternative selection and design, soil characterization for disposal, field safety oversight, and preparation of work plans and reports to satisfy New York and New Jersey state requirements, and New York City "e" designation and restrictive declarations. Mr. Carroll's project management experience includes past management of a New York City School Construction Authority hazardous materials contract. He is responsible for all engineering work performed by Tenen and is currently the project manager and remedial engineer for several New York State Brownfield Cleanup Program sites.

Selected Project Experience

470 Kent Avenue, Brooklyn
As project manager, supported the client in due diligence and transactional activities, including a Phase I ESA, preliminary site investigation, and remedial cost estimate; preparation of BCP application and remedial investigation work plan. The former manufactured gas plant, sugar refinery and lumberyard will be developed as a mixed-use project with market rate and affordable housing and public waterfront access. As remedial engineer, will be responsible for development of remedial alternatives and oversight and certification of all remedial activities.

500 Exterior Street, Bronx
Designed and implemented the investigation of this former lumberyard and auto repair shop that will be redeveloped as mixed use development with an affordable housing component; prepared BCP application and subsequent work plans and reports. Designed a remedial strategy incorporating both interim remedial measures (IRMs) and remediation during the development phase.

Gateway Elton I and II, Brooklyn
Conducted soil disposal characterization, prepared Remedial Action Work Plans and designed methane mitigation systems for two phases of a nine-building residential development and commercial space; prepared and oversaw implementation of a Stormwater Pollution Prevention Plan during construction and prepared and certified the remedial closure reports for the project.

Affordable Housing Development, Rye, NY
Consultant to the City of Rye on environmental issues pertaining to a county-owned development site slated for an afford senior housing; reviewed environmental documentation for the project and prepared summary memorandum for City Council review; recommended engineering controls to address potential exposure to petroleum constituents, presented report findings at public meetings and currently providing ongoing environmental support during project implementation.

Queens West Development BCP Site, Long Island City, New York
Assistant Project Manager for two developers involved in the site.

- Responsible for oversight of remediation under the New York State Brownfield Cleanup Program
- Technical review of work plans and reports and coordination of the Applicant's investigation and oversight efforts
- Provided input for mass calculations and well placement for an in-situ oxidation remedy implemented on a proposed development parcel and within a City street
- Conducted technical review of work pertaining to a former refinery. Documents reviewed included work plans for characterization and contaminant delineation; pilot test (chemical oxidation); remediation (excavation and groundwater treatment). Managed field personnel conducting full time oversight and prepared progress summaries for distribution to project team
- Following implementation of remedial action, implemented the Site Management Plan and installation/design of engineering controls (SSDS, vapor barrier/concrete slab, NAPL recovery). Also responsible for coordination with NYSDEC

Brownfield Cleanup Program Redevelopment Sites – West Side, New York City
Managed remediation of a development consisting of four parcels being addressed under one or more State and city regulatory programs (NYS Brownfield Cleanup Program, NYS Spills, and NYC "e" designation program). Remediation includes soil removal, screening and disposal; treatment of groundwater during construction dewatering and implementation of a worker health and safety plan and community air monitoring plan (HASP/CAMP)

Managed an additional BCP site, supported the Applicant in coordination with MTA to create station access for the planned No. 7 subway extension; also provided support the client in coordination with Amtrak to obtain access for remedial activities on the portion of the site that is within an Amtrak easement. The site will eventually be used for construction of a mixed-use high-rise building.

BCP Site, Downtown Brooklyn, New York
Performed investigation on off-site properties and designed an SSDS for an adjacent building, retrofitting the system within the constraints of the existing structure; coordinated the installation of the indoor HVAC controls and vapor barrier; provided input to the design of a SVE system to address soil vapor issues on the site.

West Chelsea Brownfield Cleanup Program Site
Designed an in-situ remediation program and sub-slab depressurization system to address contamination remaining under the High Line Viaduct; SSDS design included specification of sub-grade components, fan modeling and selection, identifying exhaust location within building constraints and performance modeling; prepared the Operations Maintenance and Monitoring Plan and Site Management Plan sections pertaining to the SSDS.

Historic Creosote Spill Remediation – Queens, New York – New York State Voluntary Cleanup Program
Modeled contamination volume and extent and prepared mass estimates of historic fill constituents and creosote-related contamination; designed a soil vapor extraction (SVE) and dewatering system to address historic creosote release both above and below static

water table; coordinated with the Metropolitan Transit Authority and prepared drawings to secure approval to drill in the area of MTA subway tunnels.

NYSDEC Spill Site– Far West Side, Manhattan
Provided support to client during negotiations with a major oil company regarding allocation of remedial costs. Worked with client's attorney to develop a regulatory strategy to address the client's obligations under the NYSDEC Spills Program and the New York City "e" designation requirements.

Affordable Housing Site, Brooklyn, New York
Modified prior work plans for soil, soil vapor and groundwater investigation to address requirements for site entry into the New York City Brownfield Cleanup Program. Prepared technical basis for use of prior data previously disallowed by OER. Currently conducting site investigation.

New York City School Construction Authority Hazardous Materials Contract
Provided work scopes and cost estimates, managed and implemented concurrent projects, including Phase I site assessments, Phase II soil, groundwater and soil gas investigations, review of contractor bid documents, preparation of SEQR documents, specifications and field oversight for above- and underground storage tank removal, and emergency response and spill control.

Former Manufacturing Facility, Hoboken, New Jersey
Evaluated site investigation data to support a revision of the current property use to unrestricted; modified the John & Ettinger vapor intrusion model to apply the model to a site-specific, mixed use commercial/residential development; implemented a Remedial Action Work Plan that included the characterization, removal and separation of 9,500 cubic yards of historic fill; designed and implemented a groundwater characterization/delineation program using a real-time Triad approach; designed and implemented an innovative chemical oxidation technology for the property.

F**ormer Varnish Manufacturer – Newark, New Jersey**
Prepared a Phase I environmental site assessment; implemented soil and groundwater sampling to assess presence of petroleum and chlorinated compounds; prepared alternate cost remediation scenarios for settlement purposes and implemented a groundwater investigation plan, including pump tests and piezometer installation to assess the effect of subsurface utilities and unique drainage pathways upon contaminant transport.

Education and Certifications

Professional Engineer, New York
Bachelor of Engineering, Environmental; Stevens Institute of Technology, 2002
Bachelor of Science, Chemistry, New York University, 2002
Technical and Regulatory Training in Underground Storage Tanks, Cook College, Rutgers University, 2006

Mohamed Ahmed, Ph.D., C.P.G.
Sr. Geologist/Principal

Experience Summary

Mohamed Ahmed is a certified professional geologist with nearly 23 years of experience in the New York City metropolitan area. He has designed and implemented subsurface investigations and is proficient in groundwater modeling, design of groundwater treatment systems and soil remediation. He has managed numerous projects focused on compliance with the New York State Brownfield Cleanup and Spills programs and the New York City "e" designation program. Dr. Ahmed also has extensive experience in conducting regulatory negotiations with the New York State Department of Environmental Conservation, the NYC Office of Housing Preservation and Development, and the Mayor's Office of Environmental Remediation.

Selected Project Experience

Willoughby Square, Downtown Brooklyn
As Project Manager, directs all regulatory interaction and investigation on this joint public-private sector redevelopment that will include a public park and four-level underground parking garage. Prepared the remedial investigation work plan and remedial action work plan, conducted investigation activities and waste characterization, and negotiated with the NYC Department of Environmental Protection and the Mayor's Office of Environmental Remediation to transition the site into the NYC Voluntary Cleanup Program.

School Facility, Borough Park, Brooklyn
Managed all regulatory agency coordination, work plan and report preparation and remedial oversight; worked with OER to determine measures to retroactively address the hazardous materials and air quality E-designations on a previously constructed school building and prepared supporting documentation to justify the use of electrical units rather than natural gas.

LGA Hotel Site, East Elmhurst, Queens
Project manager for all work conducted at this former gasoline service station which is being remediated under the NYS Brownfield Cleanup Program; technical oversight of work plans, reports, and design and implementation of field and soil disposal characterization.

436 10th Avenue, Manhattan
As project manager and technical lead, assisted client in developing remedial cost estimates used for property transaction, developed regulatory strategy to address NYS Spills and NYC E-designation requirements, and currently overseeing remedial activities which include removal and disposal of petroleum-contaminated bedrock and dewatering and disposal of impacted groundwater.

Brownfield Cleanup Program Site, Downtown Brooklyn
Managed investigation and remediation under the BCP program for a proposed mixed-use development; designed the remedial investigation and prepared the remedial action work plan which includes an SVE system monitored natural attenuation. Prepared remedial cost

estimates for several scenarios. The project will include a 53-story mixed-use structure and parking garage.

Queens West Development, Long Island City
Directed project team and subcontractors for soil investigation/remediation studies on multiple properties; provided technical support for negotiations with NYSDEC during investigation and remediation.

Former Creosote Site, Long Island City
Designed and implemented a complex investigation to assess the nature and extent of historic creosote contamination at this former industrial site; conducted studies to optimize recovery of LNAPL and DNAPL and developed strategies using bioremediation and natural attenuation in conjunction with conventional remedial approaches. Performed pilot tests for soil vapor extraction system design and coordinated with NYSDEC and NYSDOH to implement sub-slab soil vapor sampling.

NYSDEC Spill Site – Far West Side, Manhattan
Developed a detailed remedial cost estimate for to support client negotiations with a major oil company. The estimate included costs pertaining to: chipping, removal and disposal of petroleum-impacted bedrock; removal/disposal of recycled concrete; costs for dewatering and disposal of impacted groundwater during construction; and design and installation of a vapor barrier below the redevelopment.

Active Industrial Facility, Newburgh, New York
Designed remedial investigation of soil and groundwater contaminated with trichloroethane; performed soil vapor pilot test and pump test to aid in design of soil and groundwater remediation alternatives; conducted sub-slab vapor sampling in accordance with NYSDOH guidance.

Former Dry Cleaning Facility, New York City
Conducted soil and groundwater investigations, designed and installed a soil vapor extraction system and performed extensive testing of indoor air. Negotiated the scope of the RI and IRM with NYSDEC.

Waterfront Redevelopment, Yonkers, NY
Designed and performed geophysics survey of six parcels to determine locations of subsurface features; supervised test pit excavation to confirm geophysics results and evaluate and classify soil conditions prior to development activities.

Prince's Point, Staten Island, New York
Performed soil, groundwater and sediment sampling to delineate the extent of contamination; used field-screening techniques to control analytical costs and supervised soil excavation and disposal.

Apartment Complex, New York City, New York
Coordinated with Con Edison, the owner of the adjacent property and NYSDEC to determine oil recovery protocol; assessed hydrogeological conditions and conducted pilot tests to design cost-effective recovery system; designed and supervised installation of recovery system.

Publications

"Impact of Toxic Waste Dumping on the Submarine Environment: A Case Study from the New York Bight". Northeastern Geology and Environmental Sciences, V. 21, No. 12, p. 102-120. (With G. Friedman)

Metals Fluxes Across the Water/Sediment Interface and the Influence of pH. Northeastern Geology and Environmental Sciences, in press. (With G. Friedman)

"Water and Organic Waste Near Dumping Ground in the New York Bight". International Journal of Coal Geology, volume 43. (With G. Friedman)

Education and Certifications

Ph.D., Earth and Environmental Sciences, Graduate Center of the City of New York (2001)
M.Ph., Earth and Environmental Sciences, City University of New York (1998)
M.A. Geology, Brooklyn College (1993)
B.S. Geology, Alexandria University, Egypt (1982)

American Institute of Professional Geologists, Certified Professional Geologist, 1997-2015

Kristen Meisner, E.I.T
Project Engineer

Experience Summary

Kristen Meisner is an environmental engineer with experience in soil, groundwater and soil vapor sampling techniques and data analysis, remedial systems, environmental permitting, watershed planning and management, environmental restoration, spill prevention, control, and countermeasure as well as field safety oversight, and preparation of work plans and reports to satisfy various state regulatory requirements. Her experience includes field oversight and preparation of work plans to satisfy New York City and New York State program requirements.

Ms. Meisner's project management experience includes management of a New York City Transit Authority hazardous materials contract. While with a national consulting firm, Ms. Meisner designed and implemented environmental investigations, designed remedial systems and performed watershed analyses for the U.S. Army Corps of Engineers. Her prior experience has also involved projects related to the Spill Prevention, Control, and Countermeasure (SPCC) and Petroleum Bulk Storage (PBS) plan requirements. She has also prepared environmental permits for air, stormwater and wastewater under the NPDES, RCRA, SARA Title II, Title V, OSHA and Discharge Monitoring programs.

Selected Project Experience

Redevelopment Sites, Manhattan, NY
Project Engineer

- Managed remedial oversight including Community Air Monitoring Program in accordance with OER requirements including daily correspondence with OER project manager.
- Remediation includes soil removal, dewatering and end-point sampling.
- Tracked soil loading and advancement of hot-spot excavations

Orangeburg Commons, Orangeburg, NY
Project Engineer

- Performed sampling and reporting for a 15.8-acre property in the site-management phase of the NYS Brownfield Cleanup Program.
- Sampling included groundwater and soil gas field investigations. Reporting included mapping and graphing groundwater concentration trends at the Site
- Visual inspections of several engineering controls in place at the Site including: soil cover system, sub-slab depressurization system, vapor barrier.

Fountain Creek Watershed Study, U.S. Army Corps of Engineers
Project Manager

- Technical design to address flood control, erosion, sedimentation and environmental restoration
- Incorporated public input into watershed plans utilizing geographic information system technology for finalized reports

- Provided final project implementation report assembly including environmental impact assessment and investigation
- Responsibilities include the management, evaluation and improvement of the Storm Water Management Program for compliance with the MS4 Permit

Hydrogeologic Study, Garfield County, Colorado
Project Engineer

- Performed hydrogeological investigations with analysis of water quality data and delineation of petroleum impacts
- Evaluation of temporal groundwater trends concurrent with impacts of increased gas well drilling and gas production in domestic water wells and surface water bodies.
- Performed extensive Phase II Environmental Site Assessment including sampling of groundwater monitoring wells, ponds, gas wells, irrigation ditches, domestic wells and springs.
- Identified impacts to water resources from petroleum activity culminating in a public outreach forum

Willoughby Square Redevelopment Project, Brooklyn, NY
Completed remedial investigations, reporting and mapping of the Site. The remedial investigation completed included field sampling, soil characterization for waste disposal and regulatory coordination with the New York City Department of Environmental Protection (NYCDEP). Based on detections of hazardous levels of lead, the Site was entered into the Office of Environmental Remediation (OER) Voluntary Cleanup Program (VCP).

Automotive Repair Shop, Brooklyn, NY
Completed in-field soil and groundwater monitoring, remediation and design services for a redevelopment project. Provided input for mass calculations and well placement for in-situ oxidation remedy implemented on the proposed development parcel. Following implementation of remedial action, designed engineering controls (SSDS, vapor barrier/concrete slab, NAPL recovery) in coordination with NYSDEC.

New York City Transit Authority Hazardous Materials Contract
Managed and implemented projects including Phase I site assessments, Phase II soil and groundwater investigations as well as lead and asbestos abatement, inspection and removal projects. Provided support to client during all phases of hazardous waste management, chemical removal, enclosure and legal disposal of waste.

Education and Certifications

Engineer in Training, New York
Bachelor of Science, Environmental Engineering - Industrial Processes; University of New Hampshire, 2009

Professional Memberships

American Society of Civil Engineers
Environmental and Water Resources Institute

- Provided final project implementation report assembly including environmental impact assessment and investigation
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Education and Certifications

Engineer in Training, New York
Bachelor of Science, Environmental Engineering - Industrial Processes; University of New Hampshire, 2009

Professional Memberships

American Society of Civil Engineers
Environmental and Water Resources Institute

L.A.B. Validation Corp., 14 West Point Drive, East Northport, New York 11731

Lori A. Beyer

SUMMARY: General Manager/Laboratory Director with a solid technical background combined with Management experience in environmental testing industry. Outstanding organizational, leadership, communication and technical skills. Customer focused, quality oriented professional with consistently high marks in customer/employee satisfaction.

EXPERIENCE:

1998-Present L.A.B. Validation Corporation, 14 West Point Drive, East Northport, NY
President
- Perform Data Validation activities relating to laboratory generated Organic and Inorganic Environmental Data.

1998-Present American Analytical Laboratories, LLC. 56 Toledo Street, Farmingdale, NY
Laboratory Director/Technical Director
- Plan, direct and control the operation, development and implementation of programs for the entire laboratory in order to meet AAL's financial and operational performance standards.
- Ensures that all operations are in compliance with AAL's QA manual and other appropriate regulatory requirements.
- Actively maintains a safe and healthy working environmental that is demanded by local laws/regulations.
- Monitors and manages group's performance with respect to data quality, on time delivery, safety, analyst development/goal achievement and any other key performance indices.
- Reviews work for accuracy and completeness prior to release of results to customers.

1996-1998 Nytest Environmental, Inc. (NEI) Port Washington, New York
General Manager
- Responsible for controlling the operation of an 18,000 square foot facility to meet NEI's financial and operational performance standards.
- Management of 65 FTEs including Sales and Operations
- Ensure that all operations are in compliance with NEI's QA procedures
- Ensures that productivity indicators, staffing levels and other cost factors are held within established guidelines
- Maintains a quantified model of laboratory's capacity and uses this model as the basis for controlling the flow of work into and through the lab so as to ensure that customer requirements and lab's revenue and contribution targets are achieved.

1994-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Technical Project Manager
- Responsible for the coordination and implementation of environmental testing programs requirements between NEI and their customers
- Supervise Customer Service Department
- Assist in the development of major proposals
- Complete management of all Federal and State Contracts and assigned commercial contracts
- Provide technical assistance to the customer, including data validation and interpretation
- Review and Implement Project specific QAPP's.

1995-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Corporate QA/QC Officer
- Responsible for the implementation of QA practices as required in the NJDEP and EPA Contracts
- Primary contact for NJDEP QA/QC issues including SOP preparation, review and approval
- Responsible for review, verification and adherence to the Contract requirements and NEI QA Plan

1992-1994 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Manager
- Responsible for the accurate compilation, review and delivery of analytical data to the company's customers. Directly and effectively supervised a department of 22 personnel.
- Managed activities of the data processing software including method development, form creation, and production
- Implement new protocol requirements for report and data management formats
- Maintained control of data storage/archival areas as EPA/CLP document control officer

1987-1991 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Specialist
- Responsible for the review of GC, GC/MS, Metals and Wet Chemistry data in accordance with regulatory requirements
- Proficient with USEPA, NYSDEC, NJDEP and NEESA requirements
- Review data generated in accordance with SW846, NYSDEC ASP, EPA/CLP and 40 CFR Methodologies

1986-1987 Nytest Environmental, Inc (NEI) Port Washington, New York
GC/MS VOA Analyst

EDUCATION:

1982-1985 State University of New York at Stony Brook, New York; BS Biology/Biochemistry
1981-1982 University of Delaware; Biology/Chemistry
5/91 Rutgers University; Mass Spectral Data Interpretation Course, GC/MS Training
8/92 Westchester Community College; Organic Data Validation Course
9/93 Westchester Community College; Inorganic Data Validation Course

Westchester Community College

Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

ORGANIC DATA VALIDATION COURSE (35 HOURS)

Dr. John Samuelian

Date AUGUST 1992

Assistant Dean
Professional Development Center

President

The Professional Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Westchester Community College
Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

INORGANIC DATA VALIDATION

Instructor: Dale Boshart

Date MARCH 1993

Assistant Dean
Professional Development Center

President

The Professional Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

July 8, 1992

Ms. Elaine Sall
Program Coordinator
Westchester Community College
Valhalla, NY 10595-1698

Dear Elaine,

Thank you for your letter of June 29, 1992. I have reviewed the course outline for organic data validation, qualifications for teachers and qualifications for students. The course that you propose to offer would be deemed equivalent to that which is offered by EPA. The individuals who successfully complete the course and pass the final written exam would be acceptable to perform the task of organic data validation for the Department of Environmental Conservation, Division of Hazardous Waste Remediation.

As we have discussed in our conversation of July 7, 1992, you will forward to me prior to the August course deadline, the differences between the EPA SOW/90 and the NYSDEC ASP 12/91. You stated these differences will be compiled by Mr. John Samulian.

I strongly encourage you to offer an inorganic data validation course. I anticipate the same list of candidates would be interested in an inorganic validation course as well, since most of the data to be validated consists of both organic and inorganic data.

Thank you for you efforts and please contact me if I can be of any further assistance.

Sincerely,

Maureen P. Serafini

Maureen P. Serafini
Environmental Chemist II
Division of Hazardous Waste
Remediation

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

October 2, 1992

Ms. Lori Beyer
3 sparkill Drive
East Northport, NY 11731

Dear Ms. Beyer:

Congratulations upon successful completion of the Organic Data Validation course held August 17 - 21, 1992, through Westchester Community College, Professional Development Center. This course has been deemed by New York State Department of Environmental Conservation as equivalent to EPA's Organic Data Validation Course.

Enclosed is your Certificate. Holders of this Certificate are deemed competent to perform organic data validation for the New York State DEC Division of Hazardous Waste Remediation.

The Professional Development Center at Westchester Community College plans to continue to offer courses and seminars which will be valuable to environmental engineers, chemists and related personnel. Current plans include a TCLP seminar on November 17th and a conference on Environmental Monitoring Regulations on November 18th.

We look forward to seeing you again soon at another environmental program or event. Again, congratulations.

Very truly yours,

Passing Grade is 70%
Your Grade is 99%

Elaine Sall
Program Coordinator

ES/bf

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

June 21, 1993

Dear Ms. Beyer:

Enclosed is your graded final examination in the Inorganic Data Validation course you completed this past March. A score of 70% was required in order to receive a certificate of satisfactory completion. Persons holding this certificate are deemed acceptable to perform Inorganic Data Validation for the New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation.

I am also enclosing a course evaluation for you to complete if you have not already done so. The information you provide will greatly aid us in structuring further courses. We wish to make these course offerings as relevant, targeted and comprehensive as possible. Your evaluation is vital to that end.

Congratulations on your achievement. I look forward to seeing you again at another professional conference or course. We will be co-sponsoring an environmental monitoring conference on October 21, 1993 with the New York Water Pollution Control Association, Lower Hudson Chapter, at IBM's Yorktown Heights, NY site. Information regarding this event will be going out in August.

Very truly yours,

Elaine Sall

Elaine Sall
Program Coordinator

ES/bf

Enclosures

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

APPENDIX E

Groundwater Treatment Specifications

Potassium and Sodium Permanganate

Hepure Technologies provides sodium and potassium permanganate for environmental remediation projects. Permanganate is a powerful oxidant which chemically reduces chlorinated ethene compounds quickly and effectively without forming daughter products such as dichloroethene and vinyl chloride. Permanganate is pH neutral and does not release gas or create heat during reaction, an excellent option for sites with underground utilities and equipment and is easy to detect in soil and monitoring wells due to the dark purple color it maintains while unreacted.

Permanganate effectively treats a fairly broad variety of contaminants, such as chlorinated ethenes (e.g., PCE, TCE, dichloroethene [DCE], and vinyl chloride [VC]), certain polycyclic aromatic hydrocarbons (e.g., napthalene, phenathrene, and pyrene), and energetic compounds such as trinitrotoluene (TNT). Permanganate does not effectively treat chlorinated ethanes/methanes (e.g., trichloroethane [TCA], carbon tetrachloride [CT], and chloroform), benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, methyl tert-butyl ether (MTBE), or polychlorinated biphenyls (PCBs).

When permanganate reacts with organic contaminants, the contaminant is oxidized to carbon dioxide and the permanganate is reduced to a manganese dioxide salt and a potassium salt. The equations below depict the reaction of permanganate in the subsurface.

Sodium and Potassium permanganate dissociates in aqueous solution:

$KMnO_4 \rightarrow K^+ + MnO_4^-$

$NaMnO_4 \rightarrow Na^+ + MnO_4^-$

Permanganate ions oxidize the organic contaminant PCE and TCE:

PCE: $C_2Cl_4 + 2MnO_4^- \rightarrow 2CO_2 + 2MnO_2(s) + Cl_2 + 2Cl^-$

TCE: $C_2Cl_3H + 2MnO_4^- \rightarrow 2CO_2 + 2MnO_2(s) + 3Cl^- + H^+$

From these equations, it can be seen that it takes two moles of the permanganate to oxidize one mole of the contaminants PCE and TCE. The reaction of permanganate is described by second order reaction kinetics. The rate of reaction is dependent upon the concentrations of both the permanganate and the COC as well as the concentrations of other competing species such as, reduced metals and natural organic matter. Hence, increasing the concentration of permanganate will increase the rate of reaction with the COCs and other competing species.

Laboratory Analysis

Permanganate is a natural mineral and may contain unwanted metals. Hepure's Permangate is produced exclusively for environmental remediation and consistently tested to insure the highest quality with the lowest mineral content possible.

Type	Sodium	Potassium
Metal	Test Results (mg/kg) June 24, 2016	Test Results (mg/kg) February 6, 2016
Silver (Ag)	<0.19	<0.4
Arsenic (As)	<0.098	1.13
Berylium (Be)	<0.47	<0.6
Cadmium (Cd)	<0.1	<0.12
Chromium (Cr)	<1.0	4.43
Copper (Cu)	<1.0	<1.0
Mercury (Hg)	<0.029	<0.03
Nickel (Ni)	<1.0	<1.0
Lead (Pb)	<0.1	0.172
Antimony (Sb)	<0.19	<1.0
Selinium (Se)	<0.94	<1.2
Thalium (Ti)	<1.0	<1.0
Zinc (Zn)	<1.0	<1.0

Corporate Office: 63 Main Street, Suite 203B Flemington, NJ 08822, 866.727.4776
Western US Sales Representative, Patrick Randall, 866.727.4766 Ext. 1,
pat.randall@hepure.com

Application Methods

Permanganate is easily applied to most sites. The application method is determine by the geological characteristics of the site, type and concentration of contaminates, and potential physical limitations of the working space. A brief synopsis on application methods is discussed below. Permanganate is only effective with dissolved phase contaminates in the saturated zone. Successful applications are dependent on achieving contact of the oxidant with the contaminated in the time period where the oxidant is active. Permanganate is typically active for a few hours to a few weeks depending on site conditions.

Ambient Pressure Injection: Many times referred to as a gravity flow or drip application. Shallow or deep injection points are installed and a low flow of a permanganate solution is applied. Typical applications utilize sodium permanganate to prevent potential clogging of the injection points with crystalline permanganate. Sodium also allows for a greater concentration to be applied at a lower flow rate. A gallery of injection points can be constructed of driven or drilled points which need not be fully constructed as a well. The radius of influence is very limited, distribution of permanganate is dependent on aquifer flow. This method has the advantage in non-homogenous soils and fractured bedrock which allows the permanganate to penetrate the formation in a similar manner as the contaminate.

Pressure Injection: The application is through a driven rod under adequate pressure to distribute the permanganate into the formation. High volumes of low permanganate concentration are typically applied to increase the radius of influence. Potassium Permanganate has the advantage of being able to be placed as a slurry, allowing release over a longer period of time. The method is limited by geological features which may limit the depth of the driven rod and limit the radius of influence. Applications may also be non-uniform with more permanganate being distributed to more permeable zones. Pressure injection allows for more permanganate to be applied over a shorter time period with a greater radius of influence than Ambient Pressure Injection.

Pneumatic and Hydraulic Fracturing: Fracturing involves the placement of high volumes at very high pressures under controlled conditions. Very large radius of influences may be achieved in heavy clays and fractured bedrock. Potassium permanganate can be applied as a slurry allowing the release of permanganate over a longer period of time.

Soil Mixing: Permanganate may be directly mixed into the soil of contaminated zones by placement and mixing in the bottom with an excavation, auger, or rotating mixing head. All applications require the treatment area to be in the saturated zone. High rates of removal are typically achieved due to the contact of the permanganate with the contaminate.

Logistics: Hepure has relationships with product distributors positioned throughout the United States, allowing us to provide competitive shipping rates. In addition to the standard packaging, our relationships with chemical blenders provide our clients with the opportunity to receive chemicals made to order and ready to inject at the desired concentration. Typical packaging and concentration by product are provided below.

Typical Packaging and Concentration of Remediation Grade Permanganates

	NaMnO4	KMnO4
Standard Packaging at 40%	55-gallon Drums and 275-gallon Totes	55-lb Pails or 330-lb Drums, dry crystals
<3,000 gallons at 5% or less	275-gallon Totes and 55-gallon Drums	275-gallon Totes and 55-gallon Drums
>3,000 gallons at 5% or less	Tankers and/or 275-gallon Totes	Tankers and/or 275 gallon Totes
<3,000 gallons at 10% or greater	275-gallon Totes and 55-gallon Drums	Not Available
>3,000 gallons at 10% or greater	Tankers and/or 275-gallon Totes	Not Available

In addition to the variable packaging and delivery options, Hepure can assist with preparation and maintenance of CSAT paperwork for potassium permanganate projects. Our clients not only enjoy the benefits of product reliability and cost effectiveness, but also the support to complete their projects successfully in a timely manner.

FLOWSORB®

Liquid Phase Adsorption Canister

Description

Designed for low-flow water treatment applications, prefabricated 55-gallon FLOWSORB canisters contain all the operating elements found in a full-scale adsorption system. These small, economical treatment systems hold 180 pounds of granular activated carbon for applications including:

- Small wastewater streams
- Groundwater remediation
- Underground storage tank leaks
- Well pump tests
- Product purification or de-colorization
- Tank cleaning water treatment
- Batch water or product treatment
- Carbon adsorption pilot testing
- Emergency spill treatment
- Monitoring well water treatment

Features / Benefits

FLOWSORB offers several features and benefits to industrial, commercial, and municipal users including:

- Low cost per unit makes carbon treatment economical
- Simple installation and operation
- Space above carbon bed facilitates flow distribution or back-flushing
- Flexibility to be used in series or parallel operation
- Supplied with virgin or reactivated carbon
- Practical disposal option: pre-approved spent carbon canisters may be returned to Calgon Carbon Corporation for safe carbon reactivation
- Continuous treatment at various flow rates and concentrations

System Specifications	FLOWSORB
Vessel	Open head steel canister
Cover	Removable steel cover, 12 gauge bolt ring
Internal Coating	Heat-cured phenolic epoxy
External Coating	Baked enamel (white)
Temperature Limit	120°F (max)
Inlet	2" FNPT
Outlet	2" FNPT
Carbon	180 lbs. granular activated carbon: Specify FILTRASORB 300 or reactivated grade
Ship Weight	219 lbs. (99.4 kg)
Identification	Sequentially numbered for traceability

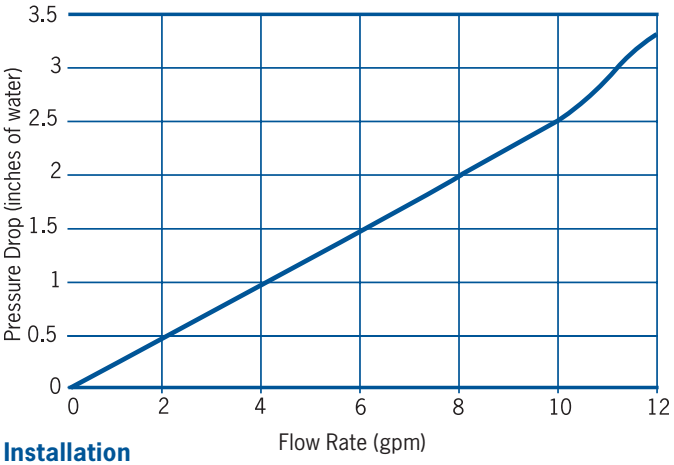
Typical Operating Parameters	FLOWSORB
Flow Rate	10 gpm (37.8 l/m)
Contact Time	4.5 minutes
Pressure Drop	< 1 psi (clean water and carbon)
Operating Pressures	3 psig maximum no vacuum

Pressure Drop

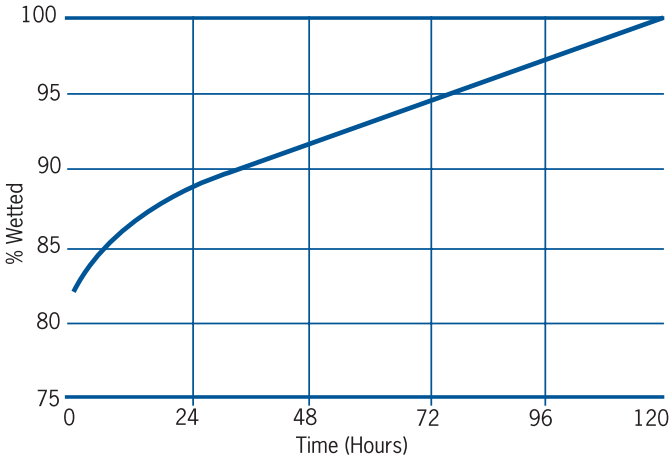
Safety Message

Wet activated carbon can deplete oxygen from air in enclosed spaces. If use in an enclosed space is required, procedures for work in an oxygen deficient environment should be followed.

1.800.4CARBON calgoncarbon.com



Typical Installation



Installation

FLOWSORB canisters should be set on a flat, level surface and piped as recommended in the installation illustration. The influent pipe connection should be attached to the unit by using a flexible connection. Some minor deflection of the lid may occur if pressure builds due to filtration or other flow blockage downstream.

FLOWSORB discharge piping should include a piping loop elevated above the top of the canister to ensure that the canister remains flooded with water at all times. In addition to the piping loop, a drain connection is recommended on the discharge piping; this allows drainage of the unit prior to disconnection or temporary shutdown.

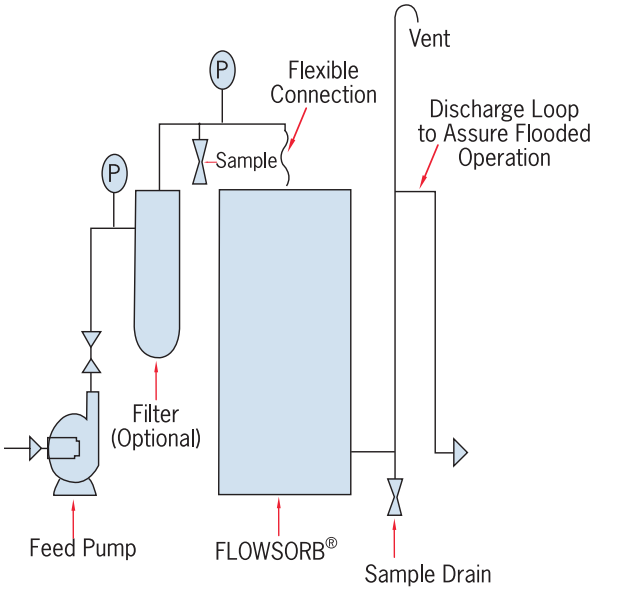
Pipe connections to the canister are the responsibility of the customer. It is recommended that influent and discharge pipe connections be made using fittings that are of good quality and have un-damaged threads. Application of sealant tape to the pipe thread ensures better contact with the limited depth of the fittings on the canister. Over tightening of the pipe fitting will damage the canister fittings and cause leaks.

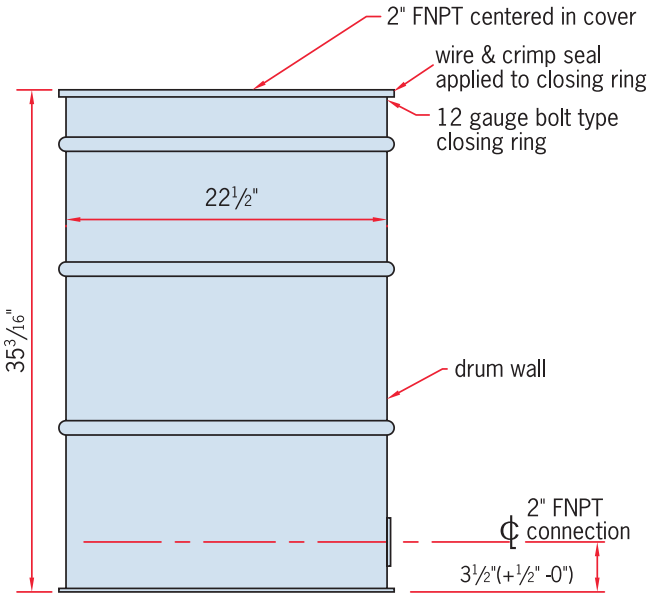
FLOWSORB canisters are shipped with dry activated carbon; the carbon must be wetted and de-aerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation each canister must be filled with clean water; the water should be introduced into the bottom outlet connection. The unit should sit for approximately 48 hours to allow most of the carbon's internal surface to become wetted as shown on the wetting curve. After wetting, the carbon bed can be de-aerated by draining the canister and refilling the canister upflow with clean water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The FLOWSORB is now ready for operation. A filter should be installed if the liquid to be treated contains substantial amounts of suspended solids. A simple cartridge or screen filter helps prevent pressure buildup in the carbon bed.

Wetting Curve for GAC (77°F/25°C)

Operation





Safety Message

Wet activated carbon can deplete oxygen from air in enclosed spaces. If use in an enclosed space is required, procedures for work in an oxygen deficient environment should be followed.

1.800.4CARBON calgoncarbon.com

DS-FLOWSORB15-EIN-E1

FLOWSORB canisters should be full of clean water before treatment begins. Flow rate to the canister should be determined based on required contact time between the liquid and the carbon media. In groundwater treatment applications, the recommended contact time is typically 8-10 minutes with a resultant flow of approximately 5 gpm. Consult your Calgon Carbon Corporation Technical Sales Representative for advice about proper contact time for your application.

FLOWSORBS can be manifolded in parallel operation for higher flow rates. For series operation, two FLOWSORBS can be piped together sequentially, as normal pressure drop will not exceed the recommended operating pressure.

These canisters have space for bed expansion and can be back flushed by introducing clean water or liquid at approximately 20-25 gpm to the outlet and taking backflush water from the inlet.

How to Estimate FLOWSORB Life

The treatment table on this page lists the volume of water that can be purified by the FLOWSORB for typical contamination situations. Most applications, however, involve a unique mixture of organic chemical contaminants including some chemicals that adsorb at different capacities or strengths. Please consult with your Calgon Carbon Technical Sales Representative for more information about carbon usage rates.

Calgon Carbon Liquid Purification System

FLOWSORB is a unit specifically designed for a variety of small flow applications. Calgon Carbon Corporation offers a wide range of carbon adsorption systems and services for a greater range of flow rates and carbon usages to meet specific applications.

Return of FLOWSORB

Arrangements should be made at the time of purchase to return canisters containing spent carbon. Calgon Carbon will provide instructions on how to sample the spent carbon and arrange for carbon acceptance testing. The spent carbon is reactivated by Calgon Carbon and all of the contaminants are thermally destroyed. The company will not accept FLOWSORB for landfill, incineration, or other means of disposal.

FLOWSORB cannot be returned to Calgon Carbon unless the carbon acceptance procedure has been completed, an acceptance number provided, and the return labels (included with the unit at the time of purchase) are attached. FLOWSORB must be drained and inlet/outlet connections must be plugged prior to return to Calgon Carbon.

Theoretical Treatment Capacity for Typical Cases

	Case 1 1,600,000 gal	**Case 2 400,000 gal**	**Case 3 85,000 gal**
Benzene	20 ppb	200 ppb	2 ppm
Toluene	40 ppb	400 ppb	4 ppm
Xylene	40 ppb	400 ppb	4 ppm
	Case 4 1,900,000 gal	**Case 5 550,000 gal**	**Case 6 125,000 gal**
TCE	50 ppb	500 ppb	5 ppm
PCE	50 ppb	500 ppb	4 ppm
	Case 7 230,000 gal	**Case 8 50,000 gal**	**Case 9 10,000 gal**
Phenol	1 ppm	10 ppm	100 ppm
Total SOC	10 ppm	100 ppm	1,000 ppm

Each case represents a groundwater or wastewater stream that contains the combination of contaminants listed. The treatment capacity indicates the total gallons of that particular water that may be treated before any of the specific contaminants are present in the treated water as noted. Theoretical capacity based on 5 gpm water at 70°F or less and 180 lbs. of FILTRASORB 300. Background TOC is < 1 ppm except phenol cases as noted. Contaminants reduced to < 5 ppb except phenol case which is for 95% phenol reduction.

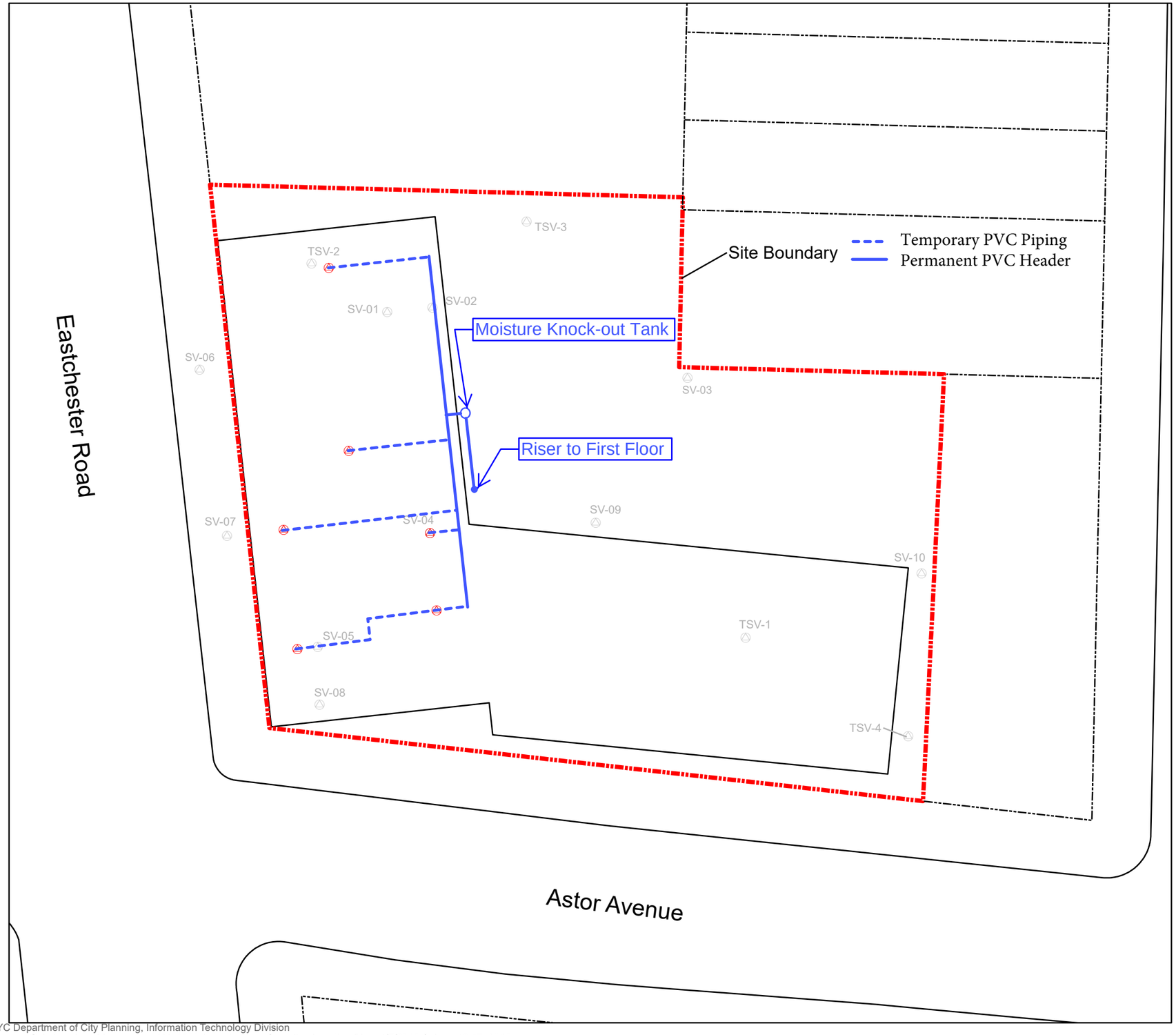
Safety Message

It is unlikely that a worker would be able to physically enter a FLOWSORB canister; however, the following information and precautions apply to partially closed canisters or situations where carbon is to be removed from the canister and stored elsewhere. Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed including all applicable federal and state requirements. Please refer to the SDS for all up to date product safety information.

Should the canister need to be opened, first vent the drum by slowly opening the inlet or outlet connection before removing the drum ring.

APPENDIX F

Soil Venting Layout



N
W
E
S

Legend

- Proposed Soil Vapor Venting Location
- Previous Soil Vapor Sample Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Site

Remedial Action Work Plan
1500 Astor Avenue
Bronx, New York
Block 4393, Lot 1

TENEN ENVIRONMENTAL
Tenen Environmental, LLC
121 West 27th Street
Suite 702
New York, NY 10001
O: (646) 606-2332
F: (646) 606-2379

Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Soil Vapor Venting Layout, Cellar**

Drawing No: **Figure X-000.0**

Legend

- Proposed Soil Vapor Venting Location
- Previous Soil Vapor Sample Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Remedial Action Work Plan
1500 Astor Avenue
Bronx, New York
Block 4393, Lot 1

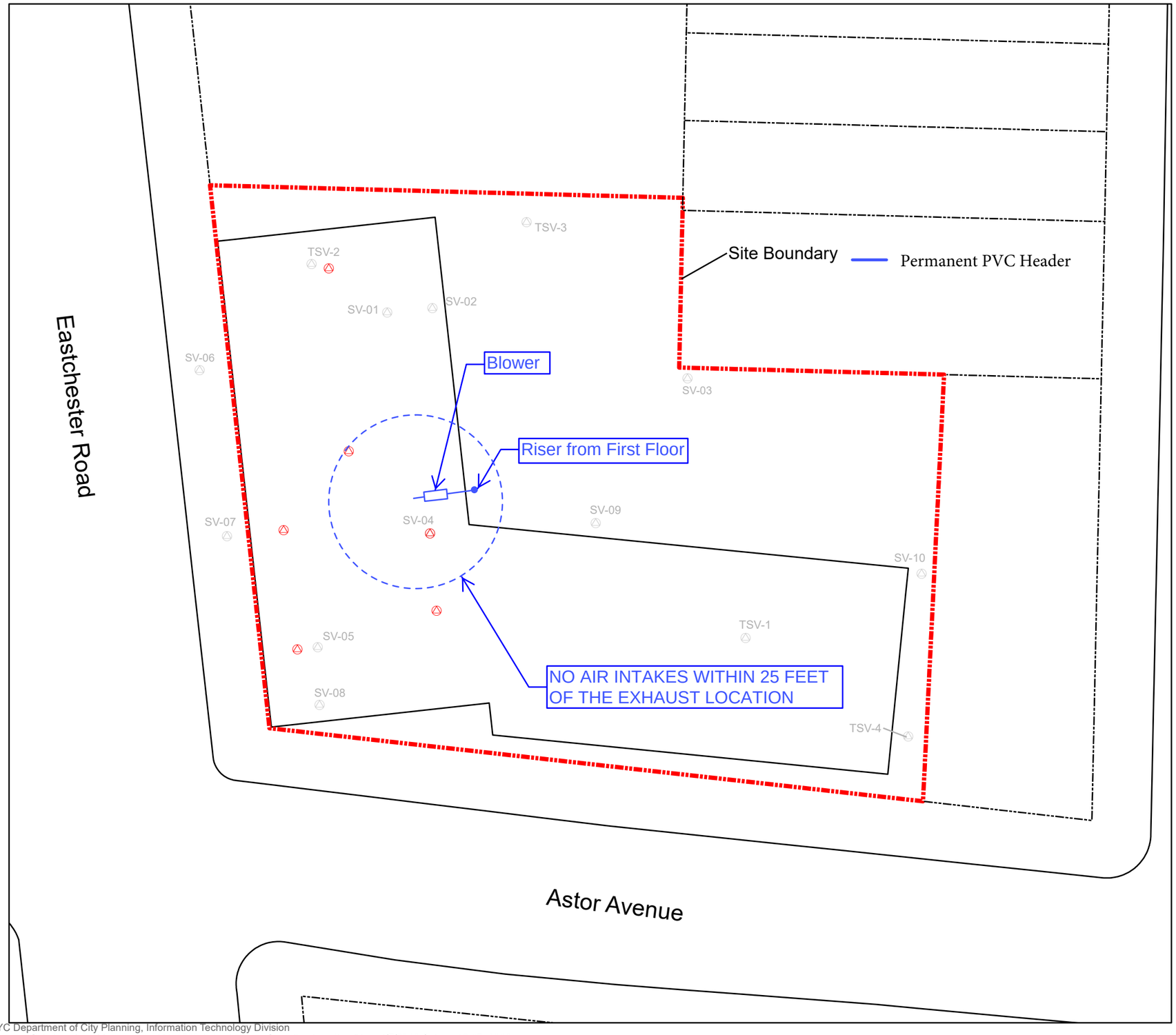
Site

TENEN ENVIRONMENTAL
Tenen Environmental, LLC
121 West 27th Street
Suite 702
New York, NY 10001
O: (646) 606-2332
F: (646) 606-2379

Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Soil Vapor Venting Layout, First Floor**

Drawing No: **Figure X-001.0**



Legend

- Proposed Soil Vapor Venting Location
- Previous Soil Vapor Sample Location

0 15 30 60 Feet

NYC Department of City Planning, Information Technology Division
Property Solutions Inc., Moorestown, NJ, 1500 Astor Avenue, Sampling Location Plan, 4/7/2016 & June 16-17, 2016

Remedial Action Work Plan
1500 Astor Avenue
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Tenen Environmental, LLC
121 West 27th Street
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New York, NY 10001
O: (646) 606-2332
F: (646) 606-2379

Drawn By	Checked By	Date	Scale
LM	MC	July 2018	As Noted

Drawing Title: **Proposed Soil Vapor Venting Layout, Roof**

Drawing No: **Figure X-002.0**

Submittal Data / Specifications
PLASTEC® Series Polypropylene Blowers

PHONE: (941) 751-7596 FAX: (941) 751-7598

APPLICATION:
The PLASTEC® Series blower is designed to work in highly corrosive air applications such as laboratory exhaust or the chemical industry.

MANUFACTURER:
PLASTEC® Series blowers shall be manufactured under the authority of Plastec® Ventilation, Inc., Bradenton, Florida.

MATERIALS OF CONSTRUCTION TEMPERATURE LIMITATION:
Polypropylene casing and wheel recommended 140° F constant and up to 190° F for short periods of time.

HOUSINGS: POLYPROPYLENE
Housing shall be constructed of strong high-density UV treated polypropylene for maximum corrosion resistance. Housing shall be made of one single piece to completely avoid leaks. Split molded housings are not acceptable. Screws holding housing to back plate shall be stainless steel. Housing shall be reversible (except PLASTEC® 35) and rotatable to any of the 8 standard discharge positions. Metal in the air stream will not be tolerated. *Optional carbon impregnated housing available when specified. See Submittal Data/Specifications for Explosion-Proof Series.*

IMPELLER/WHEEL: POLYPROPYLENE
Impeller/Wheels shall be of forward-curved type and constructed of uniformly molded polypropylene blades. Impeller/Wheels shall be both electronically and dynamically balanced. Blower impeller/wheel shall be supplied with a motor shaft bushing and hubcap made of polypropylene to protect shaft end. Blower impeller/wheel shall be suitable for RPM of up to 3450 on models PLASTEC® 15, 20 and 25, and up to 1725 on models PLASTEC® 30 and 35. **Optional** 304 stainless steel wheel is available for models PLASTEC® 20, 25, 30 & 35 when specified.

MOTOR SUPPORT:
Standard stand to be manufactured in galvanized steel with enamel coating. Optional polypropylene motor support or grey powder coated cast aluminum motor support for complete motor protection shall be provided as specified.

MOTORS:
Motors shall be direct drive and of heavy-duty ball bearing type for continuous duty with voltage as specified. Motors shall be totally enclosed fan cooled (TEFC). Optional explosion-proof motors available (see Submittal/Specifications Data for PLASTEC® Explosion-Proof Series). Motor shall be UL and CSA approved for safety.

PERFORMANCE:
Fan performance shall be based on tests conducted in accordance with AMCA 210-85 and ISO 5801.

WARRANTY:
Plastec Ventilation, Inc. warrants its equipment, products and parts, to be free from defects in workmanship and material under normal use and service for **two years** after delivery to the first user. **Motors** carry a **one year** warranty. (See full warranty on page 6 of the Installation, Operation & Maintenance Manual)

PROJECT			ARCHITECT
CONTRACTOR	DATE	SUBMITTED BY	ENGINEER

SPECIFICATION

Fan Position	Model #	CFM	In. WG	RPM	HP	Voltage/Phase	Qty	Accessories

WARNING! DO NOT use in HAZARDOUS ENVIRONMENTS where fan's electrical system could provide ignition to combustible or flammable materials unless it is specifically built for hazardous environments. Plastec Ventilation, Inc.® reserves the right to substitute material or change product specifications.

NATIONAL ENVIRONMENTAL SYSTEMS
508.226.1100 | info@nes-inc.biz

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System Start-up
System Operation & Maintenance

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HELPFUL INDUSTRY LINKS

SVE Moisture Separators

Moisture Separators remove liquids from the process stream in soil venting applications to help protect the blower from corrosion and mineral deposits caused by entrained water in the vapor stream.

DESIGN INFORMATION

NES manufactures drum and tank style moisture separators. These separators operate on the principles of cyclonic section aided by velocity reduction. The moisture separator inlet pipe is set tangential to the tank wall, a stringer pipe extends down past the separator inlet is placed in the center of the tank. The moisture laden air stream is forced into a cyclonic rotation. The centrifugal force produced throws the water droplets to the outer wall of the separator where they fall and collect at the bottom. Additional efficiency is produced when the velocity is reduced to values between 1500 fpm and 6000 fpm. For a separator of this type, moisture separation efficiency is typically 95% or greater for moisture droplets greater than 10 micron.

CONSTRUCTION

All NES moisture separators are constructed of carbon steel with bronze drain valves. All separators are primed and coated with a rust inhibitor to prevent corrosion.

- Drum style separators are equipped with removable lids, EPDM gaskets, mechanical ball and float assemblies. Sight glass, emergency high-level switch and pump out switches are available options.
- Tank style separators are equipped with a flanged clean-out port, a sight glass, and an emergency high level switch. Pump-out switches and mist eliminators are optional.

Drum Style Moisture Separator - 55 Gallon Capacity


Tank Style Moisture Separator - 120 Gallon Capacity

Tank Style Moisture Separators - 80 Gallon Capacity & 60 Gallon Capacity

Click on image to see larger view.