

2135 Westchester Avenue Remedial Action Work Plan

2135 Westchester Avenue, Bronx, New York
Block 3934, Lot 1
BCP Site #C203093

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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January 2019

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).



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NYS Professional Engineer #

01/02/2020
Date

Matthew M. Carroll, P.E.
Signature

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LIST OF ACRONYMS

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	<i>in-situ</i> 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 October 16, 2017, C Plus Realty, LLC (the “Participant”) 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 2135 Westchester Avenue in the Parkchester neighborhood of the Bronx, New York (the “Site”). The New York State Brownfield Cleanup Agreement Index Number is C203093-08-17 and the Site Number is C203093.

The Site is comprised of a one-story building with a basement. The property lot is an irregularly-shaped 0.33-acre parcel located in Bronx Community Board 9 and is identified as Block 3934, Lot 1 on the New York City Tax Maps. A location map for the Site is provided as Figure 1. A map of the current Site layout is included as Figure 2.

A portion of the one-story building is being operated as a self-service laundromat. The eastern portion of the building, a former dry cleaner, is currently vacant. The remainder of the property is capped with asphalt and utilized for parking.

The Participant is proposing to redevelop the Site with a new mixed commercial/residential structure. The Participant is currently working with architects to develop a design for the new structure. Until that time, the existing laundromat will continue to operate.

The Site was utilized as a funeral establishment for approximately 45 years and as a dry cleaner for approximately 16 years. The Site is currently occupied by a self-service laundromat. The Site is located in an R6 zoning district; a designation that typically denotes residential buildings with height factor regulations.

SUMMARY OF THE REMEDIAL INVESTIGATION

A Remedial Investigation Report (RIR) dated February 2019 was prepared by Tenen Environmental LLC (Tenen).

The investigation consisted of a geophysical survey, installation of soil borings and collection of soil samples, installation and sampling of groundwater monitoring wells, and sampling of soil vapor. Based on the results of the RI and previous investigations, the following summary has been prepared:

Site History

- Previous Site uses include a funeral establishment and dry cleaner. The most recent use of the Site is as a self-service laundromat.
- Previous reports identified chlorinated solvent impacts in soil, groundwater, and soil vapor.

Geology/Hydrogeology

- Bedrock was noted at depths of 14 to 21 feet below grade (ft-bg). Bedrock dips down to the east-northeast.
- The overburden is composed predominantly of silt with some sand.
- Perched groundwater was encountered at depths ranging from approximately 12 to 13 ft-bg in shallow wells.
- Groundwater in bedrock wells was encountered at approximately 12 ft-bg.
- Shallow groundwater flow has been measured to be toward the east, consistent with the bedrock dip. Groundwater is not present in the unconsolidated interval to the south, along Westchester Avenue, or to the west, along Unionport Road.

Chlorinated Solvents

- Tetrachloroethene (PCE) impacts were detected in soil, groundwater, and soil vapor.
- The results of historic sampling and the RI indicate that there is a PCE source area in soil located beneath the cellar of the historic dry cleaner. PCE was vertically delineated in soil as part of this RI and is estimated to be limited to a 200 square foot area having a depth of one foot.
- Chlorinated solvents were detected above the NYSDEC TOGS 1.1.1 Ambient Water Quality Standards (AWQS) in groundwater collected near the source area (shallow and deep wells) and immediately downgradient of the source area in shallow wells. The farthest downgradient shallow and deep wells, across Purdy Street, did not contain chlorinated volatile organic compounds (cVOCs) above the AWQS.
- The source of the VOCs in groundwater is assumed to be the soil impacts located beneath the basement. Infiltrated water from along Westchester Avenue flows on top of the bedrock interface, which eventually concentrates in the area of the perched water in the eastern portion of the parking lot.
- CVOCs were detected in exterior soil vapor at generally low concentrations but above those detected in ambient air.
- Historic sub-slab soil vapor sampling indicated that mitigation was required at the Site. Offsite sub-slab soil vapor and indoor air sampling during the RI indicated that migration was not required at the tested offsite locations.
- The concentration of trichloroethene (TCE) in one onsite indoor air sample, at 3.76 micrograms per cubic meter (ug/m^3), was above the NYSDOH long-term exposure air guidance value of 2 ug/m^3 .

Petroleum Impacts

- Petroleum-related VOCs were detected in soil vapor above the ambient air concentrations.

Emerging Contaminants

- Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above the USEPA drinking water health advisory; the groundwater at the Site is not potable and drinking water is provided by NYCDEP from upstate reservoirs.

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);
- direct contact with groundwater;
- inhalation of volatile groundwater constituents; and,
- inhalation of vapors.

The potential exposure pathways associated with the remediation/construction phase of the redevelopment are temporary and of limited duration. Worker exposure to impacted groundwater and soil vapor and particulates will be addressed by adherence to health and safety protocols. Based upon the measured soil vapor concentrations, no off-site impacts are present due to the contaminant concentrations on-site. 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 Remedial Action Work Plan (RAWP). Potential for exposure of building occupants to contaminants in indoor air will be minimized by removal of soil to a depth of approximately 12 ft-bg, treatment of dissolved, chlorinated solvent-related VOC groundwater constituents, installation of a vapor barrier, and implementation of institutional controls in the form of an environmental easement and Site Management Plan (SMP). Prior to the start of redevelopment, a temporary sub-slab depressurization system (SSDS) will be installed within the basement of the former dry cleaner to mitigate the potential for vapor intrusion while the existing building continues to operate for commercial purposes.

SUMMARY OF THE REMEDIAL ACTIONS

The preferred Track 4 remedy, intended to address all environmental issues associated with the Site, consists of the following:

- Installation of a temporary, active SSDS within the existing onsite building prior to the start of redevelopment. The SSDS will be decommissioned once the commercial use of the building ceases;
- Demolition of the existing onsite building and parking lot;
- Excavation and off-site disposal of an approximately 10 cubic yard PCE hotspot below the basement of the former dry cleaner;
- Excavation and off-site disposal of all on-site soils which exceed the Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for cVOCs, 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 4 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 a combination of in-situ activated carbon and in-situ chemical reduction (ISCR) treatment via injection. A pilot study will be completed to determine design considerations including the chemical to be used, and final number and locations of the injection points. A groundwater remedy Design Document will be submitted under separate cover to NYSDEC for approval;
- Installation of a waterproofing membrane/vapor barrier beneath the new building slab;
- Post-remedial indoor air sampling within the new building to evaluate if a soil vapor intrusion condition exists;
- Post-remedial sampling of groundwater;
- Preparation of a Final Engineering Report (FER) to document the implemented remedial actions; and,
- Development of a Site Management Plan (SMP) for long term management of residual contamination as required by an Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, and (3) reporting.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

C Plus Realty, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on October 16, 2017, to investigate and remediate an approximately 14,400 square feet (SF) (0.33 acres) property located at 2135 Westchester Avenue (Block 3934, Lot 1) in the Parkchester neighborhood of the Bronx, New York (the “Site”). C Plus Realty, LLC is a Participant in the Brownfield Cleanup Program.

The Site is currently improved with a one-story building with a basement, a portion of which is operating as a self-service laundromat. The eastern portion of the building, a former dry cleaner, is vacant. The remainder of the Site is capped with asphalt and utilized for parking.

The Participant has proposed the Site use to remain as a commercial unit in the near term with a future residential/commercial building.

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 July 2018.

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, in conjunction with the New York State Department of Health (NYSDOH) have determined that the Site does not pose 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 2135 Westchester Avenue in the Parkchester neighborhood of the Bronx, New York. The Site is an irregularly-shaped parcel, consisting of 14,400 SF (0.33 acres) on Westchester Avenue between Purdy and Unionport Streets. The Site is located in Bronx Community Board 9. 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. The Participant is proposing to redevelop the Site with a new mixed commercial/residential structure. The Participant is currently working with architects to develop a design for the new structure. Until that time, the existing laundromat will continue to operate.

1.3 Description of Surrounding Property

The surrounding area is predominantly residential and commercial. The adjacent properties consist of mixed-use residential and commercial buildings to the north and east, commercial buildings to the south and a funeral home to the west.

The Site is located in an R6 zoning district; a designation that typically denotes residential buildings with height factor regulations.

Based on a review of the New York City Office of Environmental Remediation (OER) Searchable Property Environmental E-Database (SPEED) and a Google maps search, no public schools or hospitals are present within 500 feet of the Site. One day care, Mrs. Ana's Day Care, is listed at 1315 Purdy Street, approximately 45 feet north of the Site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work described in the March 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.

2.1 Site History

A review of the Site history, completed as part of the 2014 Phase I Environmental Site Assessment (ESA) by Cider Environmental, found that the Site was utilized as a funeral establishment for approximately 45 years and as a dry cleaner for approximately 16 years. The Site is currently occupied by a self-service laundromat.

2.2 Site Geology / Hydrogeology

Site Topography

Based on the U.S. Geological Survey (Brooklyn-NY USGS 7.5 Minute Topographic Quadrangle) topographic map, the Site is located at an elevation of approximately 35 feet above mean sea level (msl). The Site is located in a relatively flat area, and the general downward slope of the surrounding region is to the east.

Site Geology and Hydrogeology

Bedrock was noted at depths of 14 to 21 feet below grade (ft-bg). Bedrock dips down to the east-northeast.

The overburden is composed predominantly of silt with some sand. Perched groundwater was encountered at depths ranging from approximately twelve to 13 ft-bg in shallow wells. Groundwater in two bedrock wells was encountered at approximately twelve ft-bg. Based on a well survey, the shallow groundwater flow has been measured to be toward the east, consistent with the bedrock dip, as shown in Figure 3. Groundwater is not present in the unconsolidated interval to the south, along Westchester Avenue, or to the west, along Unionport Road.

Previous investigations at the Site documented groundwater concentrations of contaminants above the NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values (AWQS). There are no known wellhead protection areas or specifically designated groundwater recharge areas in the vicinity of the Site. Groundwater in this area is not used as a source of potable water.

2.3 Summary of Remedial Investigation

This section presents the findings of the previous investigations conducted onsite and offsite by others as well as the findings of the 2018 Remedial Investigation performed by Tenen.

2.3.1 Summary of Data

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

- *Phase I Environmental Site Assessment, 2135 Westchester Avenue, Bronx, New York.* Cider Environmental, November 13, 2014.
- *Limited Phase II Subsurface Investigation Report, 2135 Westchester Avenue, Bronx, New York.* Odelphi Environmental (Odelphi), May 1, 2015.
- *Limited Phase II Subsurface Investigation Report, 2135 Westchester Avenue, Bronx, New York.* Odelphi Environmental, May 28, 2015.
- *2135 Westchester Avenue, Bronx, New York Spill #1503069.* Volumetric Technologies LTD, Letter dated April 21, 2016.
- *Remedial Investigation Report, 2135 Westchester Avenue, Bronx, New York.* Tenen Environmental, February 2019.

The 2014 Phase I ESA by Cider Environmental identified the historic uses of the Site as a funeral parlor and a dry cleaner, operations that may have used chlorinated solvents and other chemicals, as Recognized Environmental Conditions (RECs). Site reconnaissance noted the presence of improperly labeled drums/containers and significant staining on the concrete slab within the Site building.

The findings of the 2015 Limited Phase II Subsurface Investigations by Odelphi indicated the presence of tetrachloroethene (PCE) above Protection of Groundwater Soil Cleanup Objectives (SCOs) in two soil samples. The chlorinated solvents PCE, trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) were also detected above AWQS in groundwater at the Site. The results of soil vapor and indoor air analysis indicated that mitigation is required for TCE, cis-1,2-DCE, and 1,1-DCE based upon the New York State Department of Health (NYSDOH) Decision Matrices (updated May 2017) and for PCE, the Matrices indicated that the concentrations should be monitored.

A summary of the findings of the 2015 Phase II Investigations and the 2019 Remedial Investigation are as follows;

Chlorinated Solvents

- Tetrachloroethene (PCE) impacts were detected in soil, groundwater, and soil vapor.
- The results of historic sampling and the RI indicate that there is a PCE source area in soil located beneath the cellar of the historic dry cleaner. PCE was vertically delineated in soil as part of this RI and is estimated to be limited to a 200 square foot area having a depth of one foot.
- Chlorinated solvents were detected above the NYSDEC TOGS 1.1.1 Ambient Water Quality Standards (AWQS) in groundwater collected near the source area (shallow and deep wells) and immediately downgradient of the source area in shallow wells. The farthest downgradient shallow and deep wells, across Purdy Street, did not contain chlorinated volatile organic compounds (cVOCs) above the AWQS.
- The source of the VOCs in groundwater is assumed to be the soil impacts located beneath the basement. Infiltrated water from along Westchester Avenue flows on top of the bedrock interface, which eventually concentrates in the area of the perched water in the eastern portion of the parking lot.

- CVOCs were detected in exterior soil vapor at generally low concentrations but above those detected in ambient air.
- Historic sub-slab soil vapor sampling indicated that mitigation was required at the Site. Offsite sub-slab soil vapor and indoor air sampling during the RI indicated that migration was not required at the tested offsite locations.
- The concentration of trichloroethene (TCE) in one onsite indoor air sample, at 3.76 micrograms per cubic meter (ug/m^3), was above the NYSDOH long-term exposure air guidance value of $2 \text{ ug}/\text{m}^3$.

Petroleum Impacts

- Petroleum-related VOCs were detected in soil vapor above the ambient air concentrations.

Emerging Contaminants

- Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above the USEPA drinking water health advisory; the groundwater at the Site is not potable and drinking water is provided by NYCDEP from upstate reservoirs.

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 foundation, asphalt parking lot) and through Site remediation performed under an approved remedial action work plan.

2.4 Significant Threat

The NYSDEC, in conjunction with NYSDOH have determined that the Site does not pose a significant threat to human health and the environment. 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 as a self-service laundromat. The eastern portion of the building is currently vacant and was previously utilized as a dry cleaner for approximately 16 years. Other prior uses include a funeral establishment.

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 and TCE.

PCE was detected in soil vapor, soil and groundwater. PCE was detected in two soil samples in exceedance of its Part 375 Protection of Groundwater SCO in the basement of the former dry cleaner during the Limited Phase II Investigation. The RI further delineated PCE impacts in soil and detected PCE at concentrations below its Restricted-Residential Use and Protection of Groundwater SCOs in shallow soil at five locations in the basement of the former dry cleaning facility. 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 or soil vapor; TCE and cis-1,2-dichloroethylene (cis-1,2-DCE) were detected above the Class GA Standards in groundwater.

A cVOC source area was identified onsite during the RI and previous investigations and is present beneath the former dry cleaner. Analytical results from soil samples collected as part of the RI indicate that PCE in soil is limited to a 200 square foot area having a depth of one foot. The distribution of groundwater impacts supports a relationship between the soil source area and chlorinated solvent concentrations in shallow groundwater downgradient of the source area. Infiltrated water from along Westchester Avenue flows on top of the bedrock interface, which eventually concentrates in the area of the perched water in the eastern portion of the parking lot. Based upon the distribution of chlorinated solvent impacts, the presence of chlorinated solvents 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-Residential 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 and Figures 4, 5, 6, and 7 present soil, groundwater, soil vapor and indoor analytical results, respectively, for sampling conducted as part of the 2018 RI.

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
- Future building occupants and commercial workers
- 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 as part of Site redevelopment will include excavation of a hot spot of PCE in soil and treatment of PCE in groundwater. Following remediation of the soil and groundwater, a vapor barrier will be installed beneath the new building slab to mitigate vapor intrusion into the building.

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 demolition, 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 demolition, 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 and Users of the Laundromat

A sub-slab depressurization system (SSDS) will be installed in the basement of the former dry cleaner and laundromat areas until Site redevelopment.

During Site redevelopment, work during slab demolition 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 address potential soil vapor conditions in the existing Site building until redevelopment and then to remove the on-Site sources of chlorinated solvent impacts so as to allow for the Site's redevelopment for residential and 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 a concentration above the Part 375 Protection of Groundwater SCO below the Restricted-Residential Use SCO in one location below the basement of the former dry cleaner in the Odelphi Phase II Subsurface Investigation. This location was delineated

horizontally as part of the RI and PCE was not detected in exceedance of the Protection of Groundwater or Restricted-Residential Use SCOs in any delineation samples. Various metals were detected above Protection of Groundwater SCOs at one location, and one metal, lead, was also detected above its Restricted-Residential Use SCO at the same location.

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 cVOCs PCE, TCE, and cis-1,2-DCE were 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 or surface water contamination.

4.2.3 *Soil Vapor*

Chlorinated solvents, specifically PCE and TCE, 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 and groundwater are discussed below.

5.1.1 Soil

Two remedial alternatives were considered to address cVOC- and fill-related impacts in the soil.

Alternative 1 – Track 4 Excavation with PCE Hot Spot Excavation. Excavation as part of the Site redevelopment would allow for the removal of the bulk of the contaminant mass at the Site. The excavation would extend to approximately twelve ft-bg in the parking lot footprint and below the existing at-grade slab in the existing building footprint, as well as approximately two feet below the existing basement slab in the existing building footprint to remove the bulk of the overburden. The existing Site structure and asphalt surface cover will be demolished to facilitate excavation. The shallow cVOC hotspot in the southeast corner of the property will be excavated to bedrock or two feet below basement grade, whichever is encountered first, around boring S1-C (per Tenen's RI) as part of development. Barium and nickel impacts above the Unrestricted Use SCOs but below Restricted-Residential Use SCOs may remain in place at several locations (including SB-1, SB-3 and SB-5).

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 twelve feet below sidewalk grade. At this depth, end-point samples will be collected from the base of the excavation every 900 square feet (SF), where bedrock is not encountered, and from the sidewalls of the excavation every 30 linear feet (LF) and will be analyzed for VOCs, SVOCs, TAL metals, pesticides, and PCBs. Within the former dry cleaner basement, endpoint samples will also be collected from the base of excavation on a 15-foot grid, where bedrock is not encountered, and analyzed for VOCs only. If the end-point sample concentrations do not meet Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for all cVOCs, excavation and additional end-point sampling will continue until the appropriate SCOs are met.

Based on the existing sampling data, attainment of a Track 2 remedy may be achieved if endpoint samples meet the applicable Restricted-Residential SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for all cVOCs. Track 2 requires remediation to the applicable SCOs to depths of 15 ft-bg. In the event a Track 2 remedy is achieved, the cap would be installed but would not be considered an engineering control.

The extent of the hot spot excavation is depicted on Figure 8. The extent of the remedial excavation is depicted on Figure 9. Post excavation endpoint sample locations are depicted on Figures 10a and 10b.

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

Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for cVOCs.

This alternative is the preferred remedy as it is appropriate for source removal and the future proposed mixed commercial/residential use of the Site.

Alternative 2 – Track 1 Excavation. Excavation of all soil with concentrations above the Unrestricted Use SCOs would be completed. Based on previous investigations completed at the Site, this alternative would include an additional (compared to Soil Alternative 1) excavation in the northeast corner of the parking area, at depths up to 16 feet below grade to address a detections of nickel. Redevelopment of the Site would be implemented in accordance with *Alternative 1*.

5.1.2 Soil Vapor

One remedial alternatives was considered to address the levels of cVOCs present in the soil vapor at the Site and the potential for future vapor intrusion at the Site.

Alternative 1 – Temporary SSDS and Waterproofing Membrane/Vapor Barrier. Prior to the start of redevelopment, a temporary active sub-slab depressurization system (SSDS) would be installed in the portion of the existing building that was previously operating as a dry cleaner and the current laundromat area. The SSDS will create a negative pressure gradient beneath the building slab, resulting in the collection of any VOCs that might otherwise migrate into the interior of the building. The system will connect to an exterior blower that will release trapped VOCs into the atmosphere above the building roofline to be diluted in ambient air.

Confirmation testing will be performed following the installation of the system to verify that the system is achieving the depressurization goal set by the Remedial Engineer. If the test shows a sub-slab vacuum below the depressurization goal, attempts will be made to correct the issue. Possible corrective measures include adjusting flow rates of individual soil vapor suction points, increasing the size of the suction point, adding additional suction points, and adding an additional blower.

As part of redevelopment, a waterproofing membrane/vapor barrier will be installed beneath the new building slab to minimize the potential for vapor intrusion into the building. A W.R. Grace & Company (Grace) Preprufe 300R and Preprufe 160R waterproofing membrane/vapor barrier system or equivalent would be installed. The waterproofing membrane/vapor barrier will be applied to the bottom (Preprufe 300R) of the building slab and all sub-grade vertical walls (Preprufe 160R).

Post-remedial indoor air testing will be completed within the new building to evaluate soil vapor intrusion conditions prior to building occupancy. If a soil vapor intrusion condition exists, additional measures, such as an SSDS, will be required to mitigate the condition.

In this alternative, the SSDS would act as a short-term institutional and engineering control that will be decommissioned once the commercial use of the existing building ceases, leaving the building vacant prior to redevelopment. The waterproofing membrane/vapor barrier beneath the new building slab would act as a long-term institutional and engineering control.

5.1.3 Groundwater

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

Alternative 1 – In-Situ Activated Carbon and ISCR Treatment. Implementation of a combination of in-situ activated carbon and in-situ chemical reduction (ISCR) involves introducing activated carbon and a reductant into the subsurface via injection in order to break down contaminants into less toxic compounds. The type and dosing of the activated carbon and reductant will be determined through a pilot test. Based on information from Regenesis, it is anticipated that a combination of PlumeStop® liquid activated carbon and Sulfidated Micro Zero-Valent Iron (S-MZVI) will be utilized for the injections. In-situ activated carbon and ISCR is a viable alternative for remediation of cVOCs in groundwater. Long term engineering controls would include groundwater monitoring.

Post-remedial groundwater sampling will be performed in accordance with an SMP. Post-remedial groundwater samples will be collected from two new monitoring wells, MW-5 and MW-6, immediately off-site in the sidewalk of Purdy Street and upgradient of the Site in the sidewalk of Unionport Road, respectively, in order to evaluate the efficacy of the groundwater treatment. Two existing downgradient monitoring wells, MW-2 and MW-4B, will also be sampled to confirm PCE contamination has not migrated downgradient. The first round of post-remedial groundwater sampling will occur six months after the start of the groundwater remedy. 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, one confirmatory round of samples will be collected and the groundwater remedy will be considered complete. If they have not decreased below applicable standards, additional treatment and post-treatment samples will be collected.

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 the detected concentrations and lithology of the Site.

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 and hot spots removed to meet Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCO for all cVOCs, consistent with the proposed future commercial/residential use of the Site and cVOC concentrations detected in groundwater. Groundwater in this area is not used as a source of drinking water. Short-term soil vapor impacts would be mitigated prior to redevelopment by the installation of an active SSDS. As part of redevelopment, the source of potential soil vapor impacts would be removed and a vapor barrier would be installed beneath the new building slab to mitigate any potential vapor intrusion from offsite sources.

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 SSDS would address potential short-term soil vapor intrusion conditions while the existing building is in use. 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 (Track 4 SCOs) 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 two soil alternatives, the groundwater alternative and the soil vapor alternative would be consistent with the proposed use with long-term engineering controls. Groundwater in this area is not used as a source of drinking water and the source of potential impacts to soil vapor would be removed. A vapor barrier would

be installed beneath the new building slab to mitigate potential soil vapor intrusion from residual or off-site sources.

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 (Track 4 SCOs) and 2 (Track 1 SCOs), the Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (temporary SSDS and 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 (Track 4 SCOs) and 2 (Track 1 SCOs), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternatives 1 (temporary SSDS and 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 (Track 4 SCOs), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (temporary SSDS and long-term vapor barrier) is estimated at approximately \$_____, as shown in Table 7. Additional reporting and long-term monitoring costs, approximately \$_____, would also be incurred. The costs to implement Soil Alternative 2 (Track 1 SCOs) would be slightly higher due to the additional excavation both by area and depth in the parking lot.

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 proposed commercial/residential 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 R6 zoning district with a C2-2 commercial overlay; a designation that typically denotes residential buildings with height factor regulations 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 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 3604970103F) 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 4 remedy, intended to address all environmental issues associated with the Site, consists of the following: Soil Alternative 1 (Track 4 SCOs), Groundwater Alternative 1 (in-situ chemical treatments) and Soil Vapor Alternative 1 (temporary SSDS and vapor barrier). The preferred remedy is further described below:

- Installation of a temporary, active SSDS within the existing onsite building prior to the start of redevelopment. The SSDS will be decommissioned once the commercial use of the building ceases;
- Demolition of the existing onsite building and parking lot;
- Excavation and off-site disposal of an approximately 10 cubic yard PCE hotspot below the basement of the former dry cleaner;
- Excavation and off-site disposal of all on-site soils which exceed the Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for all cVOCs, 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 a combination of in-situ activated carbon and in-situ chemical reduction (ISCR) treatment via injection. A pilot study will be completed to determine design considerations including the chemical to be used, and final number and locations of the injection points. A groundwater remedy Design Document will be submitted under separate cover to NYSDEC for approval;
- Installation of a waterproofing membrane/vapor barrier beneath the new building slab;
- Post-remedial indoor air sampling within the new building to evaluate if a soil vapor intrusion condition exists;
- Post-remedial sampling of groundwater;
- Preparation of a Final Engineering Report (FER) to document the implemented remedial actions; and,
- Development of a Site Management Plan (SMP) for long term management of residual contamination as required by an Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, and (3) reporting.

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 southeast portion of the Site building where the former dry cleaner was located) will be removed. Site soils will meet the Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for all cVOCs, and end-point sampling will confirm targeted SCOs are met. Potential soil vapor impacts will be mitigated by removing the source of chlorinated solvents in soil and groundwater and installing a vapor barrier beneath the new building slab to mitigate potential soil vapor intrusion from offsite sources.

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

The following land-use factors were considered in selecting these remedial measures. Land Use Factor	Remedy Evaluation Result
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
1085 Sackett Avenue
Bronx, NY 10461
(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.
- Ashley Platt, Project Geologist: 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 Geologist 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:

C Plus Realty, LLC
2135 Westchester Avenue, Bronx, NY 10462
Attn: Seon Park
516-801-0355

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 2135 Westchester Avenue site (NYSDEC BCA Index No. C203093-08-17; Site No. C203093). 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 Participant 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

The SMMP, as included in Appendix C, includes provisions for sediment and erosion control and stormwater management, which will be in conformance with requirements presented in the New

York State Guidelines for Urban Erosion and Sediment Control. This includes silt fencing along Westchester Avenue and Purdy and Unionport Streets, as well as protection of nearby catch basins.

6.2.7 Stabilized Construction Entrances

Two stabilized construction entrances are proposed at gates along Purdy Street and Unionport Road.

6.2.8 Equipment and Material Staging

All equipment and materials will be stored at the Site in accordance with the requirements of this RAWP, manufacturer's recommendations, and in conformity to applicable statutes, ordinances, regulations, and rulings of the public authority having jurisdiction. The Contractor shall maintain accurate records documenting the measures taken to protect each equipment item. The Contractor shall not store materials or encroach upon private property without the written consent of the owners of such private property. No work shall commence until Notice to Commence work is provided by the Remedial Engineer.

6.2.9 Decontamination Area

Two truck and equipment decontamination pads will be constructed at the gates along Purdy Street and Unionport Road. These are the same as the construction entrance/exit pads, which limit the tracking of Site soils outside the Site.

The pads will be constructed using three- to six-inch crushed stone and shall be a minimum of eight-inches thick. The construction zone exit pad will be constructed in accordance with the New York Standards and Specifications for Erosion and Sediment Control.

All construction equipment exiting the contamination reduction zone must first be decontaminated regardless of whether the equipment has come in contact with contaminated materials.

During remediation, soil and liquids adhered to construction vehicles and equipment will be removed in the decontamination area prior to such vehicles and equipment leaving the Site.

After wetting with potable water, brooms or shovels will be utilized for the gross removal of soil from vehicles and equipment. The decontamination procedure for the removal of the remaining soil and liquids will consist of washing with potable water. Soil generated by the decontamination process will be stockpiled and tested in accordance with the SMMP included in Appendix C, and transported offsite for disposal.

Decontamination liquids will percolate through the truck wash pad and be treated along with the groundwater.

6.2.10 Demobilization

Disturbed areas resulting from remediation activities will be restored or addressed during construction activities. This includes removal of the construction fence and installation of a new

concrete sidewalk along Westchester Avenue, Purdy Street, and Unionport Road, as necessary. Restoration of disturbed access areas to pre-remediation conditions will include decommissioning any temporary curb supports for equipment access, if applicable.

Sediment and erosion control measures will be removed upon completion of the remediation activities.

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.

6.2.11 Sheet piling and Shoring

Appropriate management of structural stability of onsite or offsite structures during onsite activities including excavation is the sole responsibility of the Participant and its contractors. The Participant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Participant and its contractors must obey any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Participant and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

6.2.12 Utility Markout and Easement Layout

The Participant 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 Participant and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Participant 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.

6.2.13 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.

6.2.14 Site Security and Signage

A construction fence will be installed around the Site and will be maintained and expanded as required throughout the Remedial Action. A project sign has been erected at the entrance to the Site. Sidewalks adjacent to the Site will be maintained with barriers to protect the public.

6.2.15 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.

6.2.16 Estimated Remedial Action Costs

The estimated cost to implement the Remedial Action is approximately \$_____. Additional costs, approximately \$_____, 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.

6.2.17 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 soil excavation, air monitoring, soil segregation, off-Site disposal of material, endpoint sampling, waterproofing membrane/vapor barrier installation, and pouring of the concrete foundation slab.

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.

6.3.4 Complaint Management

All complaints received will be logged in by the Site Superintendent and reported in the daily report. Each complaint will be investigated as to its validity, the source determined, and a resolution adopted. Once a remedy has been put in place it will be recorded with the original complaint and reported in the daily report.

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 Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for all cVOCs. The applicable SCOs are presented in Table 2.

The Site will be excavated to approximately twelve ft-bg within the existing parking lot and the at-grade floor slab of the existing building, and approximately two feet below the cellar slab within the existing building. 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, 380 milligrams per kilogram (mg/kg), the material will be disposed as hazardous waste. A contained-in determination will be requested for the material outside of the hot spot.

Potential migration of offsite contamination onto the Site will not affect the future use of the building due to the installation and maintenance of a vapor barrier and composite cover system.

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 5,800 cubic yards (CY).

7.2 Soil Characterization

All soil will be disposed in accordance with NYSDEC requirements, which will require characterization sampling. Soil samples will be collected according to a grid system, as shown on Figure 11. Discrete and composite samples will be collected and analyzed in accordance with typical disposal facility requirements in order to characterize the soil. Samples will be field composited (as necessary), labeled and submitted for laboratory analysis. A field record, including PID readings, will be kept to document the materials encountered and support all sampling decisions. All samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals on the New York Part 375 SCOs and CP-51 lists and the New Jersey combined Soil Cleanup Criteria lists. In addition, samples will be analyzed for total petroleum hydrocarbons (TPH), toxicity characteristic leachate procedure (TCLP) metals, RCRA characteristics and paint filter test (PFT). These analytes are commonly required by regulated disposal facilities.

Approximately 5,800 CY of soil will be generated during excavation. At a rate of approximately one sample per 800 CY and based on the Site geometry, five samples will be collected in order to characterize the volume of the soil. This sample frequency reflects typical disposal facility requirements for soils generated in New York City. Please note that there is no standard number of samples or analytes required for all facilities and, therefore, additional samples or analytes may be required at a later date.

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

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.

Unionport Road is a two-way street, with traffic northwest to southeast. Purdy Street is a one-way street, with traffic south towards Westchester Avenue. Trucks leaving the Site from Unionport Road will turn left onto Unionport Road and turn right onto Westchester Avenue. Trucks leaving the Site from Purdy Street will turn right onto Purdy Street and turn right onto Westchester Avenue. Once on Westchester Avenue, trucks will continue west to the Hugh J. Grant Circle. Trucks will take the second exit on the Hugh J. Grant Circle for Virginia Avenue and keep left for the Cross Bronx Expressway, which is a truck through route. A map showing the truck route is included as Figure 12.

This is the most appropriate route and takes 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).

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Materials transported by trucks exiting the Site will be secured with covers. If loads contain wet material capable of producing free liquid, truck liners will be used.

7.6 UST Removal

No known USTs are present at the Site. 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”.

7.7 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.

7.8 Remedial Performance Evaluation

Post-Excavation End-Point Sampling

End-point samples will be collected from the base of the excavation every 900 square feet (SF) where bedrock is not encountered, and from the sidewalls of the excavation every 30 linear feet (LF). Sidewall and bottom end-point samples will be analyzed for VOCs, SVOCs, TAL metals, pesticides and PCBs. Figure 10a presents a generalized post-excavation sampling location map.

Within the former dry cleaner basement, additional end-point samples will be collected from the base of the excavation, where bedrock is not encountered, on a 15-foot grid and analyzed for VOCs. Figure 10b presents a generalized post-excavation sampling location map for the former dry cleaner basement.

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 Unrestricted Use, Protection of Groundwater, and Restricted-Residential Use SCOs. Any soils not meeting the Restricted-Residential Use SCOs for non-cVOC constituents or the Protection of Groundwater SCOs for cVOCs within the excavation will be removed and the area backfilled with clean fill meeting the criteria outlined in this RAWP. The Unrestricted Use, Protection of Groundwater Use, and Restricted-Residential Use SCOs are listed in Table 2.

7.8.1 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.

7.8.2 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.

7.8.3 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.

7.9 Import of Materials

Import of materials for backfill and cover is not anticipated at this time. However, in the event that import of materials is requested, it 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

As discussed in Section 5.1.2, the components of the remedial action to address groundwater impacts include in-situ chemical oxidation and continued groundwater monitoring.

8.1 Pilot Test

The in-situ chemical treatment pilot test will be conducted to evaluate the potential full scale use of the in-situ activated carbon and ISCR technology to treat cVOCs in groundwater at the Site. The pilot test will include one round of sampling at the Site. One groundwater sample will be collected from the previously installed permanent groundwater monitoring well MW-1 and analyzed for activated carbon and reductant demand. This location contained the highest PCE concentration during previous sampling events. Given the lithology, soil activated carbon and reductant demand will be estimated based on soil type.

The objective of the pilot test is to gain information sufficient to define the conditions needed to support an evaluation of the feasibility and long-term effectiveness of cVOC treatment using the in-situ activated carbon and ISCR remedial approach. The type and dosing of the activated carbon and reductant will be determined after the completion of the in-situ chemical treatment pilot test.

Site-specific data will be collected in order to determine the following:

- Lateral spacing for injection points;
- The volume and concentration of chemical oxidant to be injected; and,
- The potential for rebound of chemical concentrations following one injection of activated carbon and chemical reductant in order to evaluate the solution strength and frequency of additional injections (if needed) during the full-scale groundwater remedy implementation.

The in-situ chemical treatment pilot test design was developed based on Tenen's understanding of the contaminant mass in the groundwater at the Site. The proposed injection area will be selected to target the area of highest cVOC concentrations. Based on information from Regenesys, it is estimated that 30 injection points will be utilized in an approximate 1,300-SF treatment area in the eastern portion of the existing parking lot.

8.2 In-Situ Activated Carbon and ISCR Implementation

The goal of the in-situ chemical treatment for the Site is to break down contaminant cVOCs into less toxic compounds through the introduction of activated carbon and reductants into the subsurface via injection. A Design Document, to be provided following implementation of the in-situ chemical treatment pilot test, will describe the type of treatment chemicals and dosing of the proposed injection points. The Design Document will be submitted to NYSDEC for review and approval.

Based on pre-remedy groundwater concentrations, Regenesis confirmed that a combination of PlumeStop® liquid activated carbon and Sulfidated Micro Zero-Valent Iron (S-MZVI) would be appropriate for the detected compounds.

Based on information from Regenesis, the PlumeStop® liquid activated carbon binds to the aquifer matrix and rapidly removes contaminants from groundwater, expediting permanent contaminant biodegradation. S-MZVI is an ISCR reagent that promotes the destruction of many organic pollutants, including chlorinated hydrocarbons, such as PCE.

Based on pre-remedy groundwater concentrations, it is estimated that 30 injection points will be utilized in an approximate 1,300-SF treatment area in the eastern portion of the existing parking lot (surrounding MW-1), and approximately 300 gallons of a mixture of PlumeStop®, S-MZVI, and water will be injected at each location. The vertical depth of the injection screens will be from 12 to 22 ft-bg. Potential injection point locations are shown on Figure 16.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted as detailed in Section 8.1 to more clearly define design parameters and a Remedial Design Plan will be submitted to NYSDEC for review and approval.

The application of chemical injection, regardless of the method, is considered a Class V Well under the EPA Underground Injection Control (UIC) Program. Class V Wells are “used to inject non-hazardous fluids underground”. A UIC Permit will be obtained prior to application of either compound.

8.3 Remedial Performance Evaluation (Post-Remedial Groundwater Sampling)

Post-remedial groundwater sampling will be completed in accordance with a Site Management Plan (SMP). It is anticipated that groundwater samples will be collected quarterly for two years (i.e., eight quarters). Proposed post-remedial groundwater monitoring well locations are shown on Figure 13. Samples will be collected in accordance with the QAPP and results will be reported in the Annual Report required by the SMP, as detailed in Section 11.2.

All existing wells will be decommissioned in accordance with Section 7.7 and post-remedial monitoring wells will be installed in accordance with the SMP. Groundwater samples will be analyzed for VOCs.

9.0 REMEDIAL ACTION IMPLEMENTATION: TEMPORARY SUB-SLAB-DEPRESSURIZATION SYSTEM AND WATERPROOFING MEMBRANE/VAPOR BARRIER

To address soil vapor intrusion concerns prior to the start of redevelopment, a temporary, active sub-slab depressurization system (SSDS) will be installed in the existing building. The SSDS will remain active until the commercial use of the building has ceased and the building is vacant. As a part of redevelopment, a waterproofing membrane/vapor barrier will be installed below the building slab and on all sub-grade sidewalls to mitigate potential soil vapor intrusion from offsite sources.

9.1 Pressure Field Extension Test

Prior to the installation of the SSDS, a pressure field extension test will be performed to ensure that the system will create sufficient vacuum everywhere beneath the building slab. Test suction points will be installed through the floor slab in multiple locations within the onsite building. The static vacuum will first be measured by applying known quantities of vacuum to the test suction points. Smaller test points will be drilled at select distances from the test suction points and a manometer will be utilized to measure the pressure differential. The data from the pressure field extension test and the measured volume of the exhaust system will be used to determine the number of suction points and the types and capacities of suction blowers required for the SSDS. Based upon preliminary estimates, it is thought that approximately two suction points will need to be installed in the vicinity of the former dry cleaner.

9.2 Installation and Startup of Active SSDS

The SSDS will consist of newly installed vertical suction points through the existing floor slab. The suction points will be piped to an externally-mounted vacuum blower that will draw soil vapor from beneath the building to an exhaust point on the roof for treatment prior to discharge. Vapor influent concentrations will be periodically evaluated to determine the duration of treatment required for sub-slab vapors. Minor cracks and holes in the floor slab will also be sealed to minimize potential vapor intrusion pathways into the building and to increase the area of influence from each suction point beneath the building slab.

9.3 Decommissioning of Active SSDS

The SSDS will be decommissioned once the commercial use of the existing building has ceased and the building is vacant. Written approval from NYSDEC and NYSDOH will be acquired before the SSDS is decommissioned.

9.4 Waterproofing Membrane/Vapor Barrier

Excavation of the cVOC source and remediation of groundwater would minimize the potential for onsite soil vapor contamination. However, the potential for VOC impacted soil vapor intrusion into the Site building from offsite sources exists and will be mitigated by the vapor barrier. The vapor barrier will also act as a waterproofing membrane, as construction of the basement will extend to within one foot of the groundwater table. The waterproofing membrane/vapor barrier will be

installed beneath the building slab and along foundation sidewalls. The membrane system will be installed along the entire footprint of the Site beneath the foundation slab, and will extend along the sides of the foundation slab from the base of the excavation to surface grade level. The waterproofing membrane/vapor barrier will be a minimum of 20-mil thick and will be installed as a continuous membrane with overlapping seams, as per manufacturer instructions. The waterproofing membrane/vapor barrier will consist of Grace Preprufe 300R below the building slab and Grace Preprufe 160R along foundation sidewalls, or equivalent.

9.5 Remedial Performance Evaluation (Soil Vapor Intrusion Evaluation)

Prior to occupancy of the new building, indoor air samples will be collected in accordance with a SMP to evaluate if a soil vapor intrusion condition exists. Samples will be collected in accordance with the QAPP and results will be reported in the Annual Report required by the SMP, as detailed in Section 11.2.

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 Restricted-Residential Use SCOs for non-cVOC constituents and the Protection of Groundwater SCOs for cVOCs.
- 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 a combination of in-situ activated carbon and ISCR with a design goal of meeting the Class GA Standard for PCE.

Since residual contaminated groundwater and soil vapor may remain after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. These ECs and ICs are described below. Long-term management of ECs/ICs and of residual contamination will be executed under a Site-Specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have three primary long-term EC systems. They are:

- Waterproofing Membrane/Vapor Barrier,
- Composite Cover System; and,
- Post-Remedial Groundwater Monitoring.

The vapor barrier and composite cover system would be long-term ECs. While post-remedial groundwater monitoring is part of the selected remedy, it is presented as an EC because it will continue after the FER and SMP are submitted. The FER will report residual contamination on the Site in tabular and map form, including any exceedances of the Unrestricted Use or Protection of Groundwater SCOs.

11.0 ENGINEERING CONTROLS

11.1 Engineering Control Systems – Onsite

As discussed above, three long-term engineering controls (ECs) will be utilized at the Site: a vapor barrier, a composite cover system, and post-remedial groundwater monitoring. The ECs will be established in an Environmental Easement assigned to the property by the titleholder and will be implemented under a SMP. The post-remedial groundwater monitoring is considered an EC only because it will be implemented following submittal of the FER. The conceptual approach, general system design, maintenance and monitoring (OM&M) requirements and criteria for termination of each of these systems are described below.

11.1.1 Description of Engineering Controls

11.1.1.1 Waterproofing Membrane/Vapor Barrier and Composite Cover System

Exposure to soil, groundwater, and soil vapor associated with residual contaminated groundwater and/or soil would be prevented by a waterproofing membrane/vapor barrier and an engineered, composite cover system that will be constructed on the Site.

The composite cover system will be the concrete building slab. A waterproofing membrane/vapor barrier will be installed beneath the minimum four-inch thick slab to minimize the potential for vapor intrusion. A W.R. Grace & Company (Grace) Preprufe 160R (32-mil) and Grace Preprufe 300R (46-mil) waterproofing membrane/vapor barrier system, or equivalent, will be installed. The waterproofing membrane/vapor barrier will be applied to the bottom (Preprufe 300R) of the building slab and all sub-grade vertical walls (Preprufe 160R).

The waterproofing membrane/vapor barrier will be installed in accordance with the manufacturer's specifications. The Grace Preprufe 300R will be installed over a level and compacted base. The membrane will be placed with the smooth-side down and the plastic liner-side up. The plastic liner will be removed and discarded. Sheets will be overlapped by three inches and sealed using Grace Preprufe Tape LT. Penetrations will be sealed using Grace Bituthene Liquid Membrane. The Grace Preprufe 160R will be installed on the sub-grade vertical walls. All surfaces will be smooth with no gaps or voids greater than 0.5 inch. All penetrations will be grouted. The membrane will be attached to the wall and rolled to ensure a watertight seal. The sheets will be overlapped and sealed according to the manufacturer's specifications (minimum 3 inches for Preprufe 160R with seam taped using Preprufe Tape LT). Penetrations will be sealed using Grace Bituthene Liquid Membrane.

The extent of the waterproofing membrane/vapor barrier, a cross section showing typical details and the vapor barrier specifications are included in Appendix F.

The location of each potential remedial cover type used on the Site is shown on Figure 14. The SMP will outline the procedures required in the event the vapor barrier and composite cover system and underlying residual contamination are disturbed and planned inspections of the composite cover system.

11.1.1.2 Post-Remedial Groundwater Monitoring

Elevated levels of VOCs have been detected in groundwater at the Site. Groundwater will be treated with injections of chemicals during the remedial action to destroy the bulk of any remaining contaminants.

Groundwater will be monitored by sampling existing and newly-installed monitoring wells, as shown on Figure 13.

New wells will be installed using a hollow-stem auger. At each location, a ten-foot, 20-slot PVC screen will be installed in the top five feet of groundwater. The wells will be constructed by placing a filter pack of sand in the annular space around the screen that will extend two feet above the screen. The annular area around the well casing will be sealed with bentonite pellets and will extend to two feet below the cap. A grout, consisting of a cement and bentonite mixture or an anti-shrink mixture, will then extend from the bentonite pellet seal to two feet below the cap. The remaining annular space will be sealed with a concrete cap and well apron (expanding cement). A locking well cap will be installed upon completion of the well.

All monitoring wells will be developed on the day they are installed by pumping using dedicated tubing. Turbidity will be measured using a water quality meter, and the well developed until the reading is 50 Nephelometric Turbidity Units (NTU) or less, or until at least three well volumes have been evacuated.

The monitoring wells will be sampled at least ten days after development. All sampling equipment will be decontaminated prior to use. Prior to sampling, water levels will be measured using an electronic product-water level indicator. Samples will be collected using low-flow techniques in accordance with EPA Region 1 Low-Stress (Low-Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. (EQASOP-GW 001 Revision 3 dated July 30, 1996 Revised: January 19, 2010).

Long-term monitoring (eight quarterly events) of the groundwater will be conducted to determine the efficacy of the Remedial Action. All quarterly monitoring samples will be analyzed for VOCs.

11.1.2 Criteria for Termination of Remedial Systems

11.1.2.1 Waterproofing Membrane/Vapor Barrier and Composite Cover System

The waterproofing membrane/vapor barrier and composite cover system are long-term ECs and will be maintained throughout the life of the building. Any breaches of the waterproofing membrane/vapor barrier or composite cover will be repaired in accordance with the SMP.

11.1.2.2 Post-Remedial Groundwater Monitoring

Groundwater monitoring to assess the efficacy of the Remedial Action is planned for eight quarters after the completion of the Remedial Action.

Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the SMP.

12.0 INSTITUTIONAL CONTROLS

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.

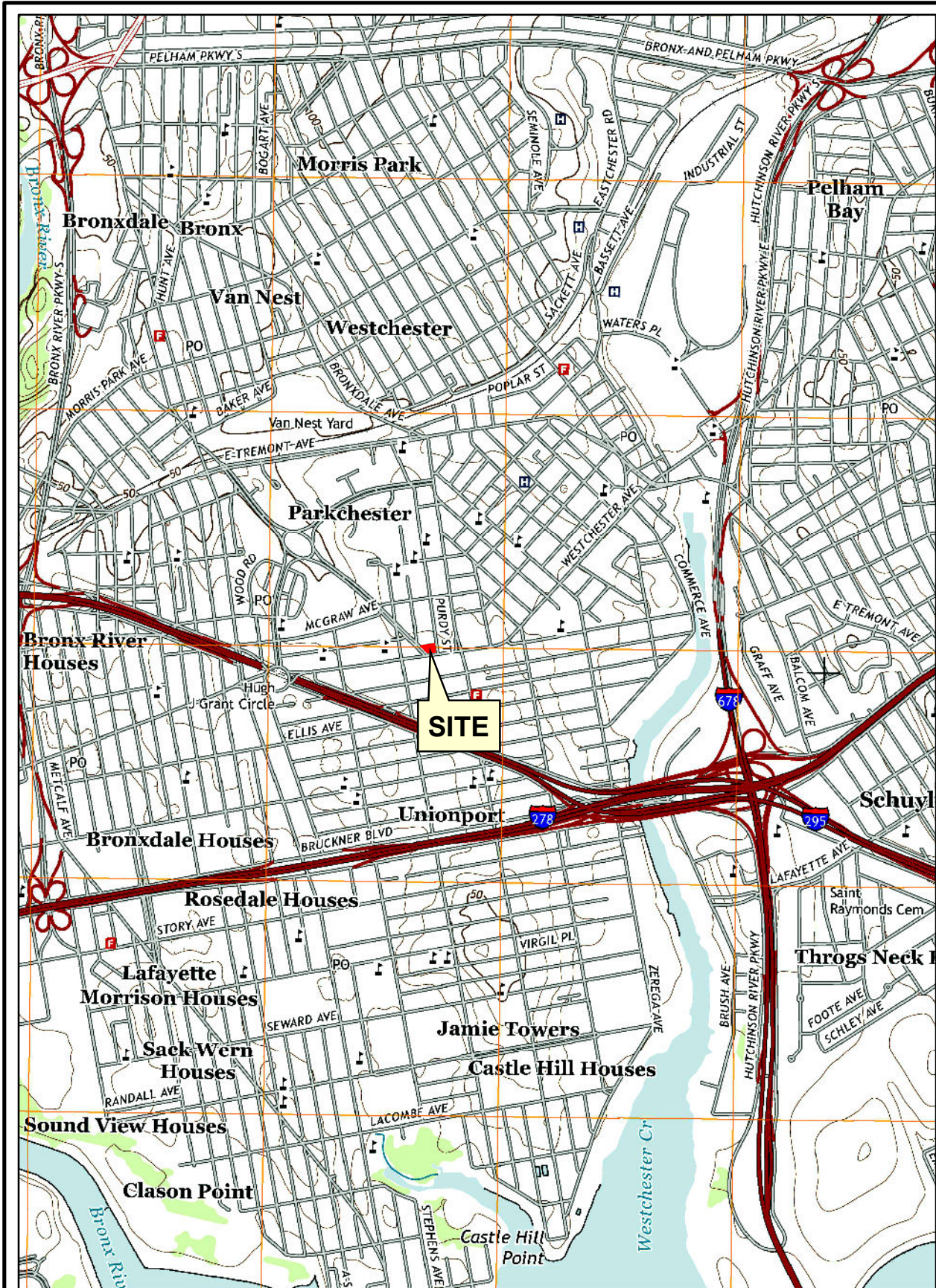
The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include 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.

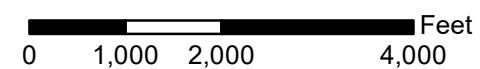
Before approval of a FER and issuance of a Certificate of Completion, all documents and reports will be submitted to the NYSDEC will be in both hard copy and in digital format on CD. These digital documents shall be in PDF form and, where appropriate, supplemented by photos and Microsoft Excel files.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

Figures



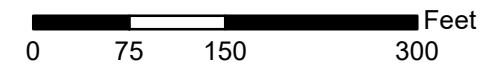
Basemap: Flushing, NY Quandrangle, 2013
<http://www.usgs.gov>

Site Location



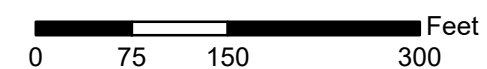
<http://gis.nyc.gov/taxmap/map.htm>

Department of Finance Digital Tax Map



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

Department of City Planning MapPLUTO - 2016 v2



Client
**2135 Westchester Avenue
Bronx, New York
Block 3934, 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 LM

Checked By MC

Date May 2017

Scale As Noted

Drawing Title
Site Location Map

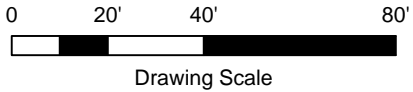
Drawing No
Figure 1




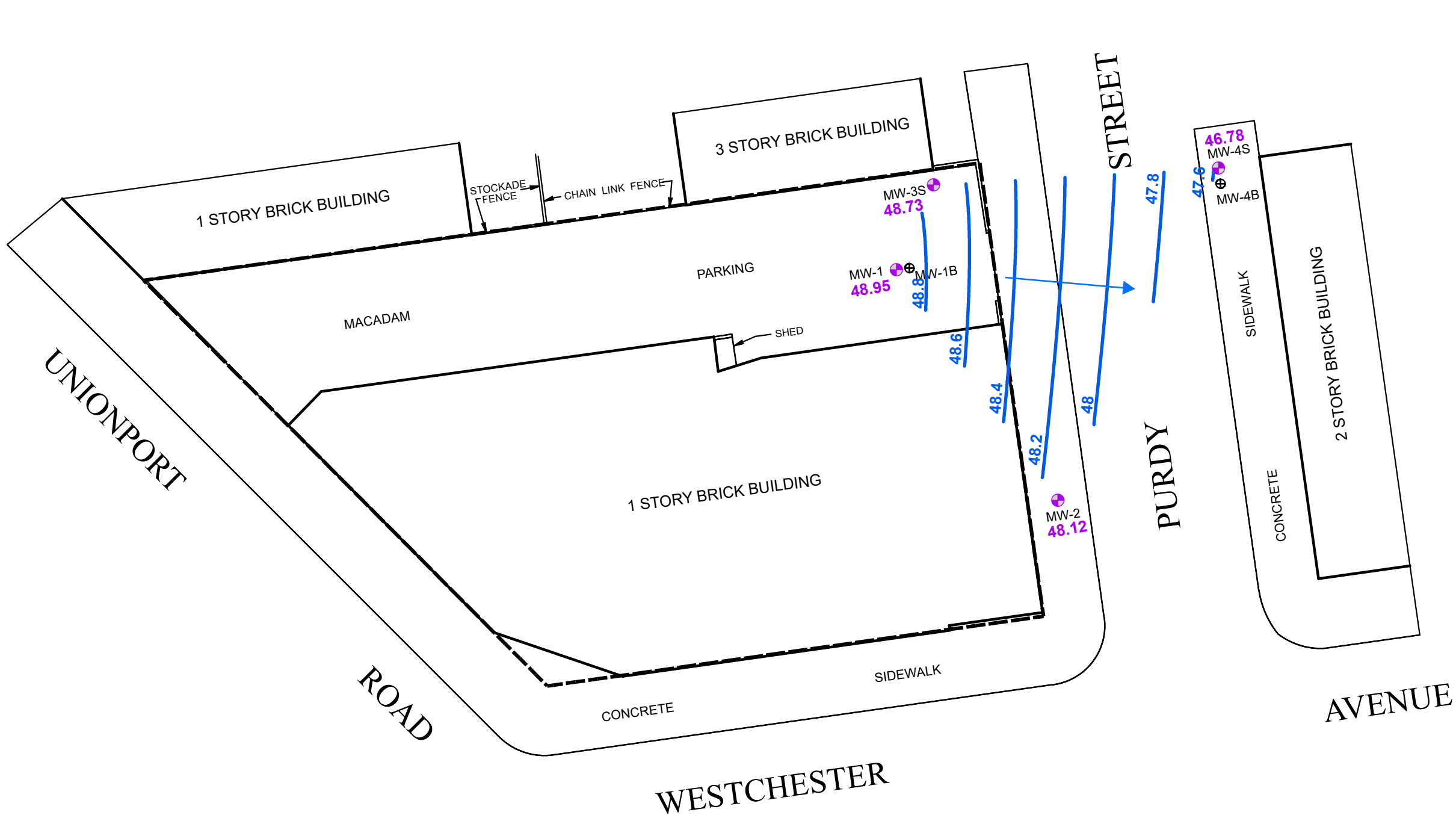
Legend

— Site Boundary

— Extent of Partial Basement

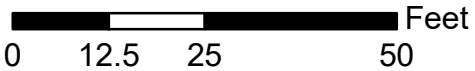


DRAWING TITLE.	Site Layout	DRAWN BY	LM	CONSULTANT	 TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379	SITE	2135 Westchester Avenue Bronx, New York Block 3934, Lot 1
		CHECKED BY	AP				
		DATE	November 2019				
		SCALE:	As Noted				
DRAWING NO.	Figure 2						

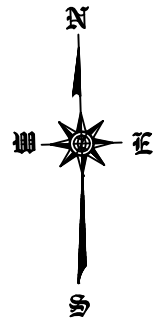


Legend

- Monitoring Well (Sample Collected)
- Groundwater Contour
- Groundwater Flow Direction



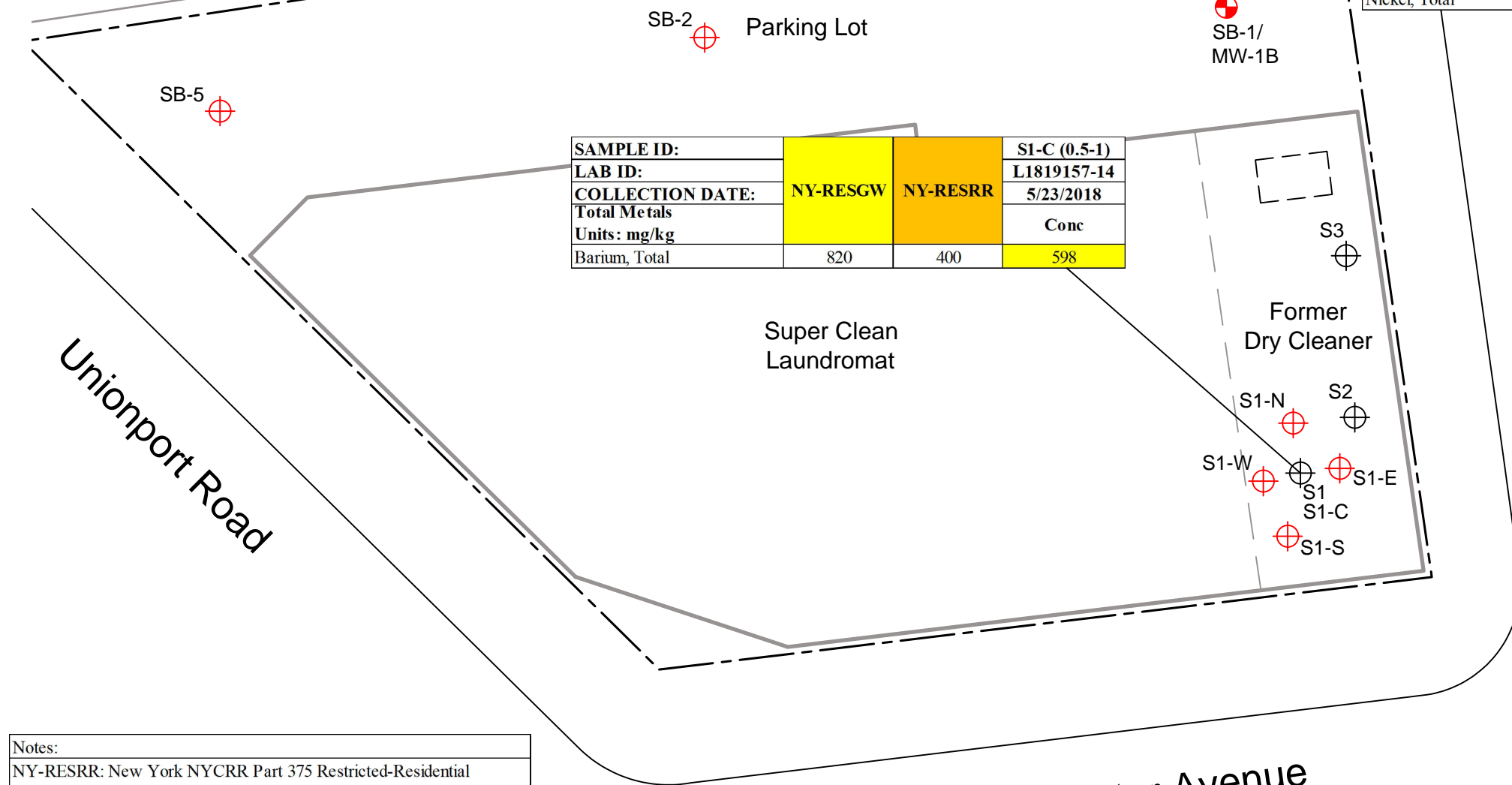
Drawing Title		Groundwater Flow Direction 7/12/2018	
Drawing No		Figure 3	
Client		2135 Westchester Avenue Bronx, New York Block 3934, Lot 1	
TENEN ENVIRONMENTAL		Tenen Environmental, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: (646) 606-2332 F: (646) 606-2379	
Drawn By	LM	Checked By	CZ
Date	December 2018		
Scale	As Noted		



SAMPLE ID:			SB-3 (1-5)
LAB ID:			L1819157-06
COLLECTION DATE:	NY-RESGW	NY-RESRR	5/23/2018
Total Metals			Conc
Units: mg/kg			
Cadmium, Total	7.5	4.3	7.56
Lead, Total	450	400	1110
Nickel, Total	130	310	276
Selenium, Total	4	180	13.9

SAMPLE ID:			SB-3 (15-16)
LAB ID:			L1819157-05
COLLECTION DATE:	NY-RESGW	NY-RESRR	5/23/2018
Total Metals			Conc
Units: mg/kg			
Nickel, Total	130	310	214

SAMPLE ID:			S1-C (0.5-1)
LAB ID:			L1819157-14
COLLECTION DATE:	NY-RESGW	NY-RESRR	5/23/2018
Total Metals			Conc
Units: mg/kg			
Barium, Total	820	400	598



Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Conc = Concentration

Cells highlighted in yellow indicate a concentration above NYRESGW

Cells highlighted in orange indicate a concentration above NY-RESRR and NY-UNRES

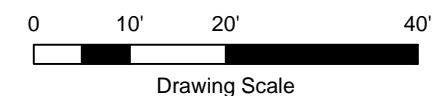
Westchester Avenue

Purdy Street

Legend

- ⊕ Soil Boring Location
- Permanent Groundwater/ Soil Boring Location

- - - Property Boundary
- Building



Sample Designation Notes:

- Previous investigations were completed by Odelphi Environmental, Inc. in 2015 or 2016 Subsurface Investigation Reports
- Previous sample locations shown in black

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1



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CONSULTANT

DRAWN BY LM

CHECKED BY CZ

DATE January 2019

SCALE: As Noted

Previous Soil Analytical Results

Figure 4

DRAWING NO.



SAMPLE ID:		MW-4B	MW-4B DUP
LAB ID:		L1826668-03	L1826668-04
COLLECTION DATE:		7/12/2018	7/12/2018
Perfluorinated Alkyl Acids		Conc	Q
Units: ug/l		Conc	Q
Perfluorooctanoic Acid (PFOA)	0.07	0.0694	0.0704

SAMPLE ID:		MW-1B
LAB ID:		L1826668-07
COLLECTION DATE:		7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		Conc
Tetrachloroethene	5	800
Vinyl chloride	2	2.9
trans-1,2-Dichloroethene	5	76
Trichloroethene	5	1900
cis-1,2-Dichloroethene	5	420
Benzo(a)anthracene	0.002	0.06
Chrysene	0.002	0.05
Manganese, Dissolved	300	750.1
Sodium, Dissolved	20000	33100
Antimony, Total	3	5.26
Iron, Total	300	608
Manganese, Total	300	2373
Sodium, Total	20000	34200
Zinc, Total	2000	5352

SAMPLE ID:		MW-1
LAB ID:		L1826668-08
COLLECTION DATE:		7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		Conc
Tetrachloroethene	5	1300
Trichloroethene	5	170
cis-1,2-Dichloroethene	5	47
Dieldrin	0.004	0.021
Iron, Dissolved	300	1530
Magnesium, Dissolved	35000	69700
Manganese, Dissolved	300	1718
Sodium, Dissolved	20000	65100
Iron, Total	300	9650
Magnesium, Total	35000	72400
Manganese, Total	300	1686
Sodium, Total	20000	76400

SAMPLE ID:		MW-3S
LAB ID:		L1826668-01
COLLECTION DATE:		7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		Conc
Tetrachloroethene	5	5.6

SAMPLE ID:		MW-2
LAB ID:		L1826668-02
COLLECTION DATE:		7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		Conc
Tetrachloroethene	5	8
Benzene	1	1.1
Trichloroethene	5	27
cis-1,2-Dichloroethene	5	46
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	--	0.07

Unionport Road

Groundwater Flow Direction
Shallow, Unconsolidated Aquifer

Parking Lot

Super Clean
Laundromat

Former
Dry Cleaner

Purdy Street

Westchester Avenue

Legend

Permanent Monitoring Well Location

Property Boundary

Building

0 10' 20' 40'

Drawing Scale

Notes:

NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

Cells highlighted in yellow indicate concentrations above NY-AWQS

Cells highlighted in blue indicate a concentration above the USEPA Drinking Water Health Advisory

No exceedances above the Class GA Standards in MW-4S and MW-4B

-- = No standard

Tax Lot Source: New York City Dept. of Finance Digital Tax Map

Building Foot Print Source: NYC Open Data, Bing Imagery

Sample Designation Notes:

- Previous investigations were completed by Odelphi Environmental, Inc. in 2015 or 2016 Subsurface Investigation Reports
- Previously installed permanent groundwater wells are shown in black

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1

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CONSULTANT

DRAWN BY LM

CHECKED BY CZ

DATE February 2019

SCALE As Noted

Previous
Groundwater Results

Figure 5

DRAWING NO.

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	1311P-SS1		1311P-IA		Action
LAB ID:			L1811084-09		L1811084-10		
COLLECTION DATE:			3/29/2018		3/29/2018		
Volatile Organic Compounds Units: ug/m3			Conc	Q	Conc	Q	
Trichloroethene	5	A	2.01		0.425		No further action
Tetrachloroethene	30	B	15.6		5.36		No further action

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	1310P-SS1		1310P-IA		Action
LAB ID:			L1811084-04		L1811084-05		
COLLECTION DATE:			3/29/2018		3/29/2018		
Volatile Organic Compounds Units: ug/m3			Conc	Q	Conc	Q	
Trichloroethene	5	A	1.07	U	0.385	U	No further action
Tetrachloroethene	30	B	1.36	U	0.848		No further action

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	AA03282018-8HR	
LAB ID:			L1811084-03	
COLLECTION DATE:			3/28/2018	
Volatile Organic Compounds Units: ug/m3			Conc	Q
Trichloroethene	2	A	0.134	
Tetrachloroethene	30	B	0.841	

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	AA03282018-24HRAM	
LAB ID:			L1811084-08	
COLLECTION DATE:			3/29/2018	
Volatile Organic Compounds Units: ug/m3			Conc	Q
Trichloroethene	5	A	0.113	
Tetrachloroethene	30	B	0.698	

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	AA03282018-24HRPM	
LAB ID:			L1811084-11	
COLLECTION DATE:			3/29/2018	
Volatile Organic Compounds Units: ug/m3			Conc	Q
Trichloroethene	5	A	0.231	
Tetrachloroethene	30	B	3.24	

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	AMBIENT	
LAB ID:			L1826620-10	
COLLECTION DATE:			7/12/2018	
Volatile Organic Compounds Units: ug/m3			Conc	Q
Trichloroethene	2	A	3.42	
Tetrachloroethene	30	B	0.251	

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	SS-2		IA-2		Action
LAB ID:			L1826620-08		L1826620-09		
COLLECTION DATE:			7/12/2018		7/12/2018		
Volatile Organic Compounds in Air Units: ug/m3			Conc	Q	Conc	Q	
Trichloroethene	2	A	1.99		3.76		Identify Source*
Tetrachloroethene	30	B	1.97		1.6		No further action

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	2151W-SS1		2151W-IA		Action
LAB ID:			L1811084-06		L1811084-07		
COLLECTION DATE:			3/29/2018		3/29/2018		
Volatile Organic Compounds Units: ug/m3			Conc	Q	Conc	Q	
Trichloroethene	5	A	5.37	U	0.107	U	No further action
Tetrachloroethene	30	B	6.78	U	1.42		No further action

SAMPLE ID:	NYSDOH Air Guidance Value	Matrix	2135W-SS1		2135W-IA		Action
LAB ID:			L1811084-01		L1811084-02		
COLLECTION DATE:			3/28/2018		3/28/2018		
Volatile Organic Compounds Units: ug/m3			Conc	Q	Conc	Q	
Trichloroethene	2	A	1.28		0.107	U	No further action
Tetrachloroethene	30	B	43.3		1.5		No further action

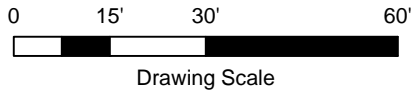
Westchester Avenue

Legend

- ▲ Sub-slab Soil Vapor and Indoor Air Sample
- ⊙ Ambient Air Sample Location

--- Property Boundary

— Building



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
Q = Laboratory Data Qualifier
For U qualified entries, the RL is shown
RL = Reporting Limit
Results and RL values are in micrograms per cubic meter (ug/m3)
*Identify Source - Identify Source(s) and Resample or Mitigate

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



TENEN ENVIRONMENTAL, LLC
121 West 27th Street
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New York, NY 10001
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CHECKED BY CZ

DATE February 2019

SCALE: As Noted

Previous Sub-slab Soil Vapor Results

Figure 6

DRAWING NO.

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1

SAMPLE ID:	SV-3
LAB ID:	L1826620-04
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Chloromethane	11.7
Ethanol	569
Acetone	1230
Isopropanol	22.4
Tertiary butyl Alcohol	91.9
Carbon disulfide	9.09
2-Butanone	106
Chloroform	8.4
Benzene	8.95
2-Hexanone	16.3
Tetrachloroethene	11.4

SAMPLE ID:	SV-2
LAB ID:	L1826620-02
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Ethanol	439
Acetone	347
Isopropanol	7.57
Tertiary butyl Alcohol	40
Carbon disulfide	4.73
2-Butanone	202
Benzene	9.71
Toluene	4.07
2-Hexanone	12.9

SAMPLE ID:	SV-1
LAB ID:	L1826620-01
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Dichlorodifluoromethane	2.05
Chloromethane	3.61
Ethanol	313
Acetone	784
Isopropanol	14.9
Tertiary butyl Alcohol	98.2
Carbon disulfide	11.6
2-Butanone	102
n-Hexane	2.29
Benzene	16.1
Heptane	2.52
4-Methyl-2-pentanone	4.18
Toluene	4.71
2-Hexanone	19.1

SAMPLE ID:	SV-4
LAB ID:	L1826620-03
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Ethanol	65.6
Acetone	238
Tertiary butyl Alcohol	24.7
2-Butanone	137
Benzene	6.49
2-Hexanone	12

SAMPLE ID:	SV-6
LAB ID:	L1826620-06
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Chloromethane	19
Ethanol	258
Acetone	3820
Isopropanol	20.8
Tertiary butyl Alcohol	55.8
Carbon disulfide	383
2-Butanone	137
n-Hexane	53.2
Benzene	14.6
Cyclohexane	24.9
2,2,4-Trimethylpentane	35.3
Heptane	15.8
2-Hexanone	20.4

SAMPLE ID:	SV-5
LAB ID:	L1826620-05
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Chloromethane	2.91
Ethanol	300
Acetone	791
Isopropanol	7.69
Tertiary butyl Alcohol	52.7
Carbon disulfide	138
2-Butanone	87.9
Chloroform	34.7
Benzene	51.8
2,2,4-Trimethylpentane	5.18
Heptane	4.34
Toluene	4.86
2-Hexanone	13.2
Tetrachloroethene	21.4

SAMPLE ID:	SV-7
LAB ID:	L1826620-07
COLLECTION DATE:	7/12/2018
Volatile Organic Compounds in Air Units: ug/m3	Conc
Chloromethane	2.11
Ethanol	251
Acetone	1380
Isopropanol	8.01
Tertiary butyl Alcohol	25.1
Carbon disulfide	92.8
2-Butanone	73.1
Chloroform	80.6
Benzene	7.28
Cyclohexane	6.13
2,2,4-Trimethylpentane	10.2
Toluene	4.67
2-Hexanone	11.6
Tetrachloroethene	33.6

SAMPLE ID:	AMBIENT	
LAB ID:	L1826620-10	
COLLECTION DATE:	7/12/2018	
Volatile Organic Compounds in Air Units: ug/m3	Conc	Q
Dichlorodifluoromethane	1.98	
Chloromethane	0.869	
Freon-114	1.4	U
Vinyl chloride	0.051	U
1,3-Butadiene	0.442	U
Bromomethane	0.777	U
Chloroethane	0.528	U
Ethanol	10.5	
Vinyl bromide	0.874	U
Acetone	9.05	
Trichlorofluoromethane	1.13	
Isopropanol	1.79	
1,1-Dichloroethene	0.079	U
Tertiary butyl Alcohol	1.52	U
Methylene chloride	1.74	U
3-Chloropropene	0.626	U
Carbon disulfide	0.623	U
Freon-113	1.53	U
trans-1,2-Dichloroethene	0.793	U
1,1-Dichloroethane	0.809	U
Methyl tert butyl ether	0.721	U
2-Butanone	1.47	U
cis-1,2-Dichloroethene	0.079	U
Ethyl Acetate	1.8	U
Chloroform	0.977	U
Tetrahydrofuran	1.47	U
1,2-Dichloroethane	0.809	U
n-Hexane	0.705	U
1,1,1-Trichloroethane	0.109	U
Benzene	0.639	U
Carbon tetrachloride	0.465	
Cyclohexane	0.688	U
1,2-Dichloropropane	0.924	U
Bromodichloromethane	1.34	U
1,4-Dioxane	0.721	U
Trichloroethene	3.42	
2,2,4-Trimethylpentane	0.934	U
Heptane	0.82	U
cis-1,3-Dichloropropene	0.908	U
4-Methyl-2-pentanone	2.05	U
trans-1,3-Dichloropropene	0.908	U
1,1,2-Trichloroethane	1.09	U
Toluene	0.829	
2-Hexanone	0.82	U
Dibromochloromethane	1.7	U
1,2-Dibromoethane	1.54	U
Tetrachloroethene	0.251	
Chlorobenzene	0.921	U
Ethylbenzene	0.869	U
p/m-Xylene	1.74	U
Bromoform	2.07	U
Styrene	0.852	U
1,1,2,2-Tetrachloroethane	1.37	U
o-Xylene	0.869	U
4-Ethyltoluene	0.983	U
1,3,5-Trimethylbenzene	0.983	U
1,2,4-Trimethylbenzene	0.983	U
Benzyl chloride	1.04	U
1,3-Dichlorobenzene	1.2	U
1,4-Dichlorobenzene	1.2	U
1,2-Dichlorobenzene	1.2	U
1,2,4-Trichlorobenzene	1.48	U
Hexachlorobutadiene	2.13	U



Notes:
Results shown were detected at higher concentrations than Ambient Air results
Q = Laboratory Data Qualifier
For U qualified entries, the RL is shown
RL = Reporting Limit
Results and RL values are in micrograms per cubic meter (ug/m3)

Legend

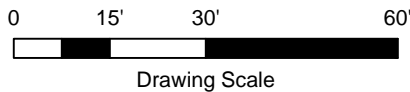
△ Exterior Soil Vapor Sample Location

⊙ Ambient Air Sample Location

⊕ Indoor Air Sample Location

--- Property Boundary

— Building



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1

TENEN ENVIRONMENTAL

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CONSULTANT

LM

CZ

December 2018

As Noted

DRAWN BY

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DATE

SCALE


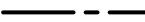


Previous Exterior Soil
Vapor Results

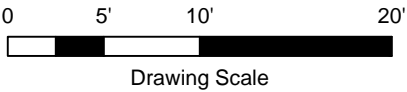
Figure 7

DRAWING TITLE

DRAWING NO.



- Legend
-  Previous Soil Boring Location
 -  Property Boundary
 -  Building
 -  Proposed Extent of PCE Hotspot Excavation



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



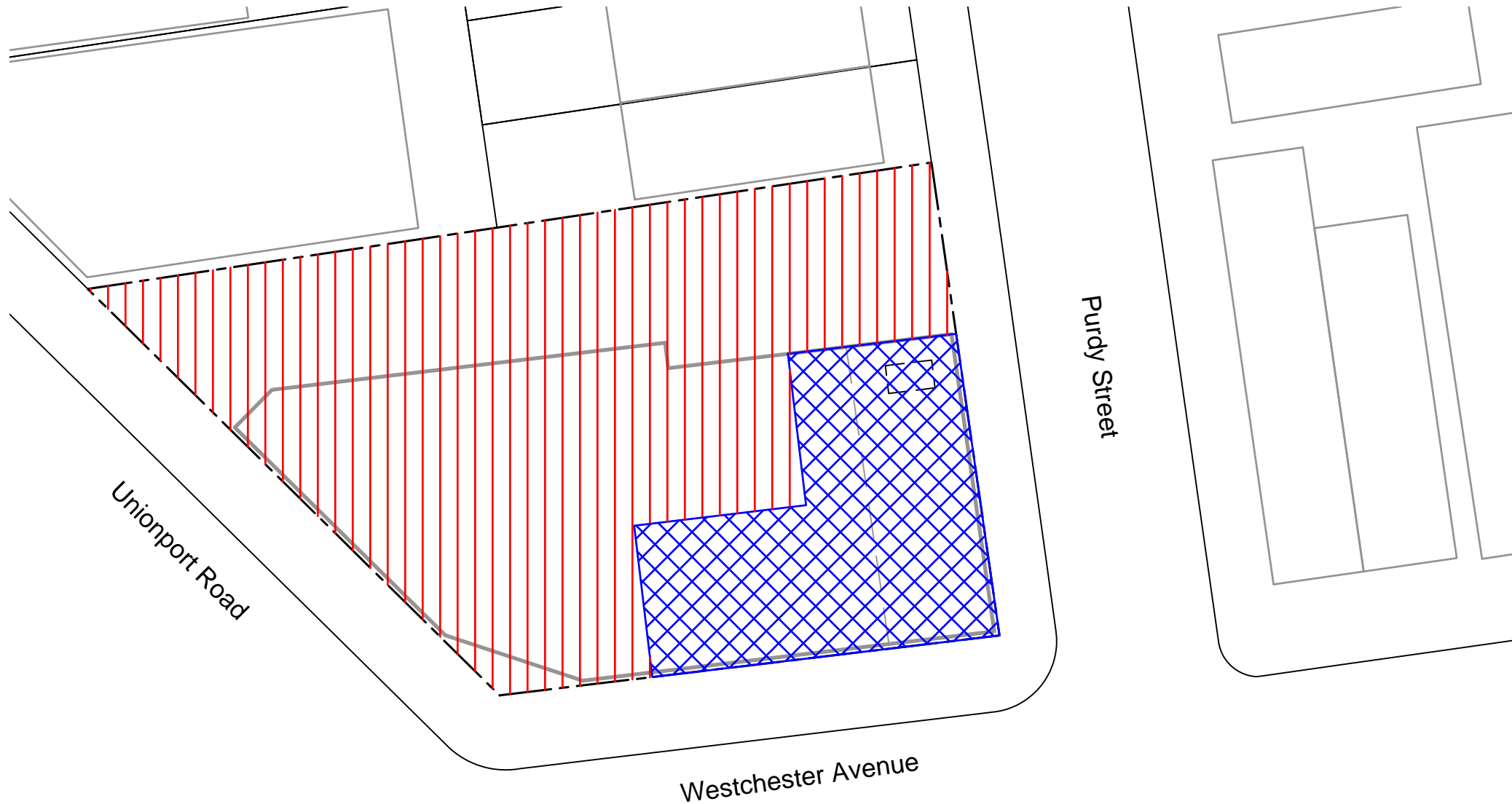
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SITE

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Bronx, New York
Block 3934, Lot 1


DRAWING TITLE. Extent of Hotspot Excavation	DRAWN BY LM
	CHECKED BY AP
DRAWING NO. Figure 8	DATE June 2019
	SCALE As Noted




Legend

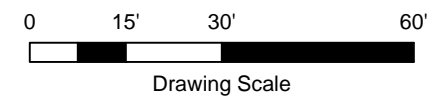
--- Property Boundary

— Building

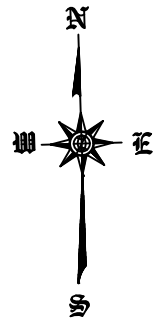
 Excavation to 2-feet below cellar slab

 Excavation to 12-ft bg (parking area plus at-grade area of existing building)

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



DRAWING TITLE.	Site Excavation Plan			
	DRAWN BY	LM		
DRAWING NO.	CHECKED BY	AP		
	DATE	June 2019		
	SCALE	As Noted		
CONSULTANT			TENEN ENVIRONMENTAL TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379	
SITE			2135 Westchester Avenue Bronx, New York Block 3934, Lot 1	

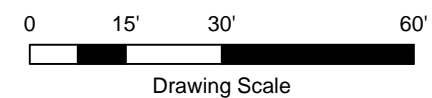


Groundwater Flow Direction
Shallow, Unconsolidated Aquifer

Legend





- Sidewall Samples
- Bottom of Excavation Samples
- Property Boundary
- Building
- Excavation to 2-feet below cellar slab
- Excavation to 12-ft bg (parking area plus at-grade area of existing building)

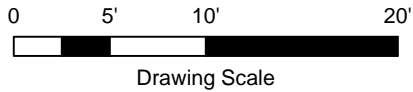
Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



DRAWING TITLE: Proposed Endpoint Sampling Locations		DRAWN BY: LM	CONSULTANT: TENEN ENVIRONMENTAL TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379		SITE: 2135 Westchester Avenue Bronx, New York Block 3934, Lot 1
DRAWING NO.: Figure 10a		CHECKED BY: AP	DATE: June 2019	SCALE: As Noted	



- Legend
-  Bottom Endpoint Sample Location
 -  Property Boundary
 -  Building
 -  Proposed Extent of PCE Hotspot Excavation



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



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CHECKED BY AP

DATE November 2019

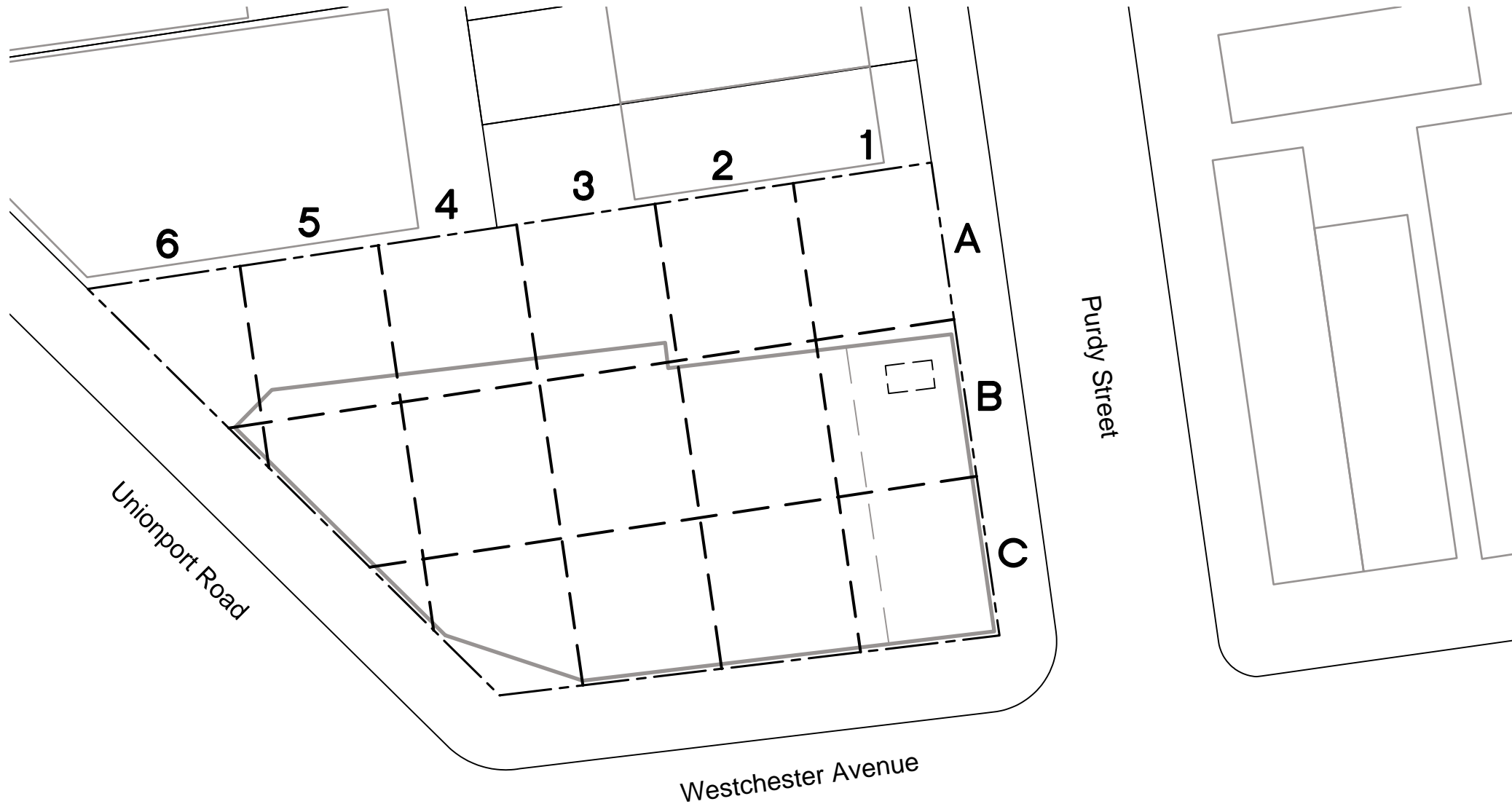
SCALE As Noted

DRAWING TITLE. Proposed VOC Endpoint Sampling Locations

DRAWING NO. Figure 10b

SITE

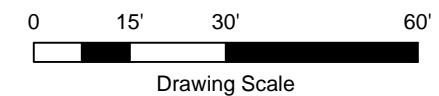
2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1



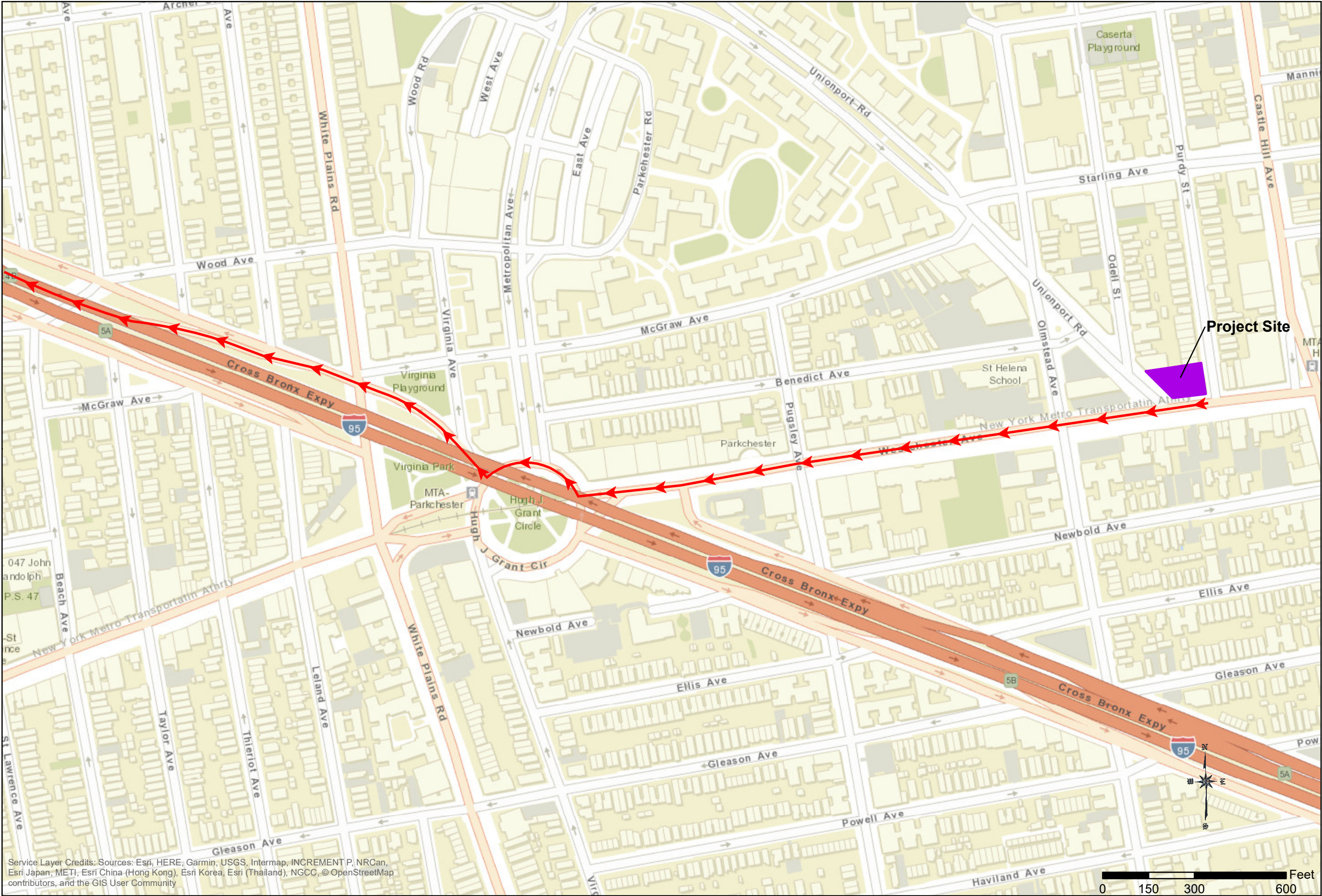
Legend

- Alphanumeric Grid
- - - Property Boundary
- Building

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



DRAWING TITLE.		DRAWN BY		CONSULTANT		SITE	
Grid System		LM		TENEN ENVIRONMENTAL		2135 Westchester Avenue Bronx, New York Block 3934, Lot 1	
CHECKED BY		AP		TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379			
DATE		June 2019					
SCALE		As Noted					
DRAWING NO.		Figure 11					



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2135 Westchester Avenue Bronx, New York Block 3934, Lot 1

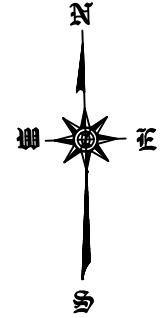
TENEN ENVIRONMENTAL

Tenen Environmental, LLC
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F: (646) 606-2379

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

Truck Route Map

Figure 12



MW-6

MW-5

MW-4B

MW-2

Parking Lot

Super Clean
Laundromat

Former
Dry Cleaner

Purdy Street

Unionport Road

Groundwater Flow Direction
Shallow, Unconsolidated Aquifer

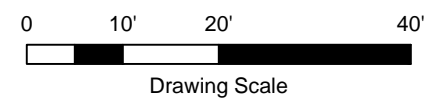
Westchester Avenue

Legend

Permanent Monitoring Well Location

Property Boundary

Building



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, Lot 1



CONSULTANT

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DATE

November 2019

SCALE

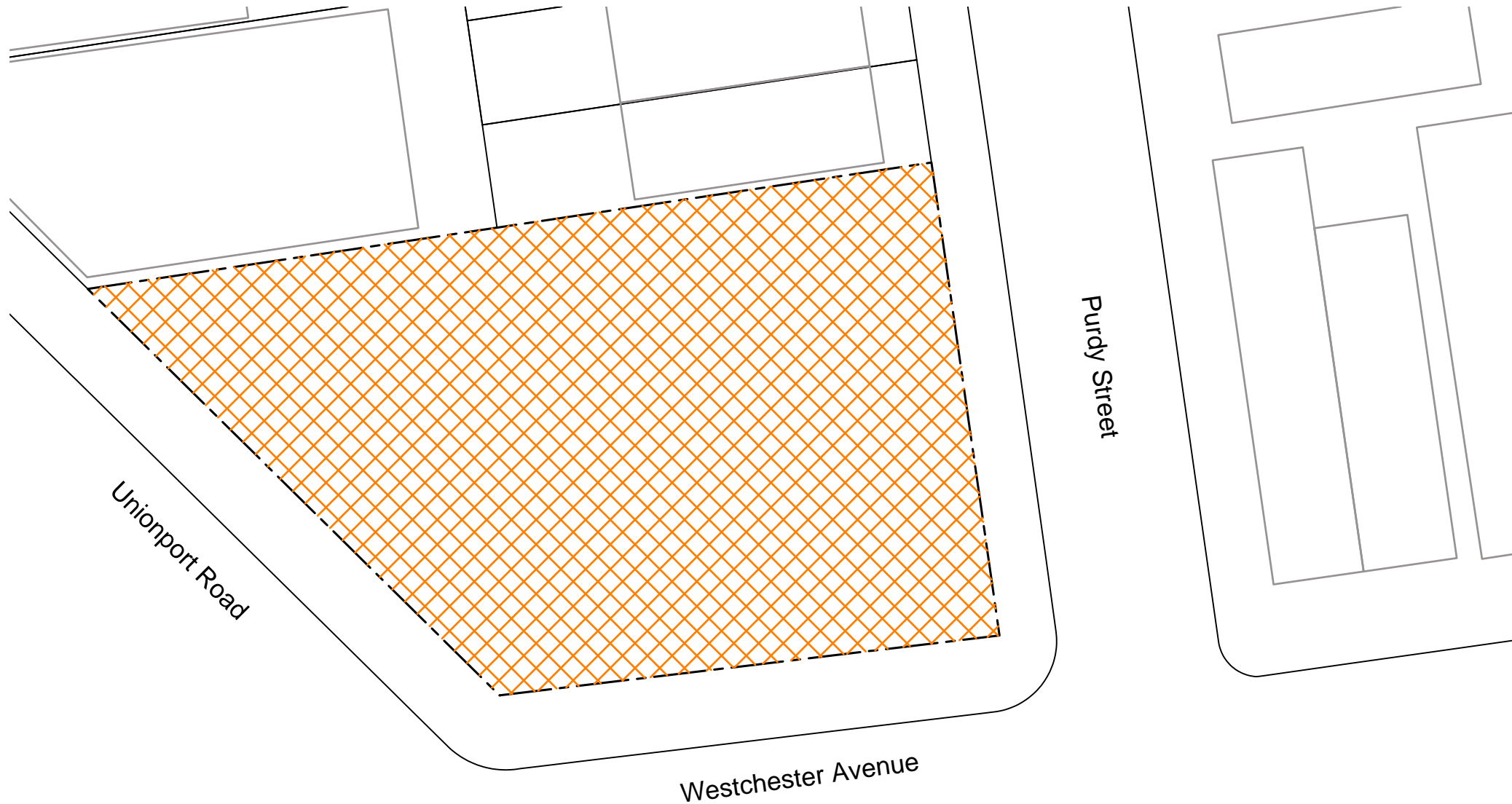
As Noted

DRAWING TITLE



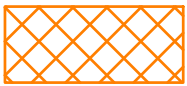
Proposed Post-Remedial
Groundwater Sampling Locations

DRAWING NO.

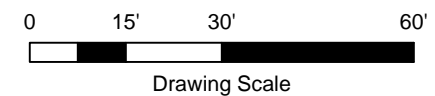
Figure 13



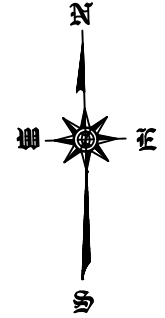
Legend

-  Property Boundary
-  Building
-  Waterproofing membrane/vapor barrier system and concrete building slab

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery



DRAWING TITLE.	Remedial Cover System			
	Figure 14			
DRAWING NO.	DRAWN BY	LM	SITE	
	CHECKED BY	AP	<div>TENEN ENVIRONMENTAL</div> <div>TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379</div> <div>2135 Westchester Avenue Bronx, New York Block 3934, Lot 1</div>	
	DATE	June 2019		
	SCALE	As Noted		



Unionport Road

Parking Lot

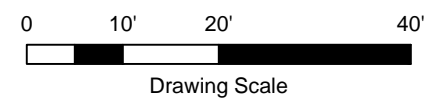
Super Clean
Laundromat

Former
Dry Cleaner

Purdy Street

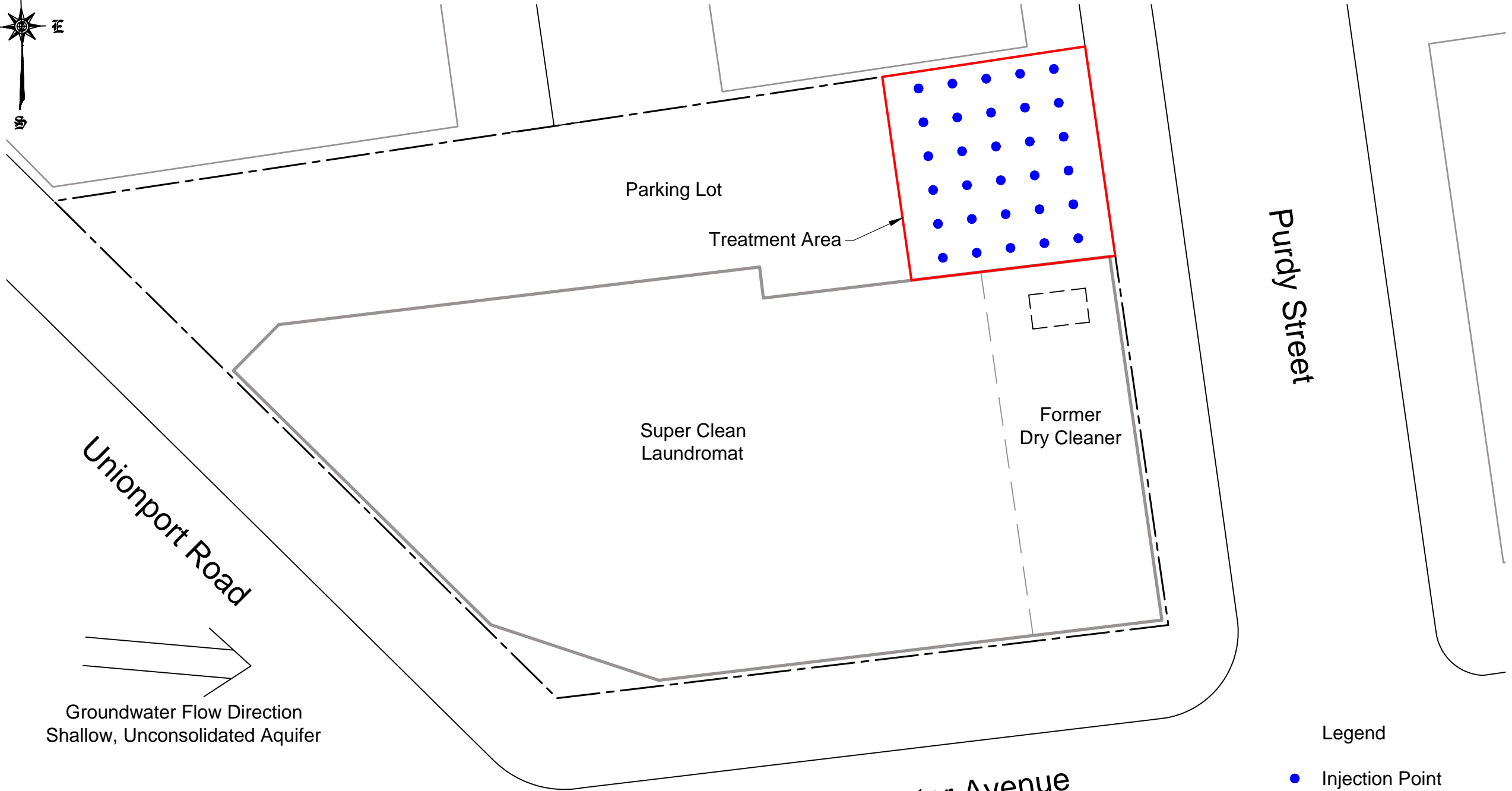
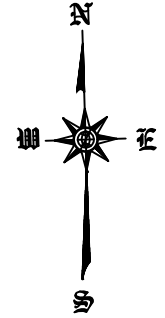
Westchester Avenue

- Legend
- Pressure Monitoring Point
 - Suction Pit
 - - - Property Boundary
 - Building



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

DRAWING TITLE.	SSDS Layout Plan		DRAWING NO.	Figure 15	CONSULTANT	<div>TENEN ENVIRONMENTAL</div> <div>TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379</div>	SITE	2135 Westchester Avenue Bronx, New York Block 3934, Lot 1			
DRAWN BY		LM	CHECKED BY		AP	DATE		November 2019	SCALE:		As Noted



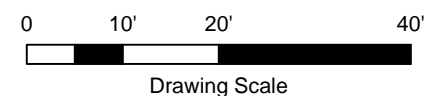
Groundwater Flow Direction
Shallow, Unconsolidated Aquifer

Westchester Avenue

Purdy Street

Legend

- Injection Point
- Treatment Area
- - - Property Boundary
- Building



Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

DRAWING TITLE: Potential Injection Point Locations		DRAWN BY LM	CONSULTANT TENEN ENVIRONMENTAL		SITE 2135 Westchester Avenue Bronx, New York Block 3934, Lot 1
DRAWING NO. Figure 16		CHECKED BY AP	TENEN ENVIRONMENTAL, LLC 121 West 27th Street Suite 702 New York, NY 10001 O: 646-606-2332 F: 646-606-2379		
		DATE November 2019			
		SCALE As Noted			

Tables

**2135 Westchester Avenue - Bronx, NY
BCP Site C203093**

**Table 1
Unrestricted Use Soil Cleanup Objectives (SCOs)**

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

Contaminant	CAS Number	SCO
<i>Metals</i>		
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 ^c	18540-29-9	1 ^b
Chromium, trivalent ^c	16065-83-1	30 ^c
Copper	7440-50-8	50
Total Cyanide ^{c,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
<i>PCBs/Pesticides</i>		
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 ^c
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
<i>Semivolatiles</i>		
Acenaphthene	83-32-9	20
Acenaphthylene ^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
<i>Volatiles</i>		
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.

**2135 Westchester Avenue - Bronx, NY
BCP Site C203093**

**Table 2
Restricted-Residential Use Soil Cleanup Objectives (SCOs)**

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

Contaminant	CAS Number	Restricted Residential	Protection of GW
<i>Metals</i>			
Arsenic	7440-38-2	16 ^d	16 ^d
Barium	7440-39-3	400	820
Beryllium	7440-41-7	72	47
Cadmium	7440-43-9	4.3	7.5
Chromium, hexavalent ^b	18540-29-9	110	19
Chromium, trivalent ^c	16065-83-1	180	36
Copper	7440-50-8	270	1720
Total Cyanide ^b		27	40
Lead	7439-92-1	400	450
Manganese	7439-96-5	2,000 ^j	2,000 ^j
Total Mercury		0.81 ⁱ	0.73
Nickel	7440-02-0	310	130
Selenium	7782-49-2	180	4 ⁱ
Silver	7440-22-4	180	8
Zinc	7440-66-6	10,000 ^d	2,480
<i>PCBs/Pesticides</i>			
2,4,5-TP Acid (Silvex)	93-72-1	100 ^a	3.8
4,4'-DDE	72-55-9	8.9	17
4,4'-DDT	50-29-3	7.9	136
4,4'-DDD	72-54-8	13	14
Aldrin	309-00-2	0.097	0.19
alpha-BHC	319-84-6	0.48	0.02
beta-BHC	319-85-7	0.36	0.009
Chlordane (alpha)	5103-71-9	4.2	2.9
delta-BHC	319-86-8	100 ^a	0.25
Dibenzofuran	132-64-9	59	6.2
Dieldrin	60-57-1	0.2	0.1
Endosulfan I	959-98-8	24 ⁱ	102
Endosulfan II	33213-65-9	24 ⁱ	102
Endosulfan sulfate	1031-07-8	24 ⁱ	1000 ⁱ
Endrin	72-20-8	11	0.06
Heptachlor	76-44-8	2.1	0.38
Lindane	58-89-9	1.3	0.1
Polychlorinated biphenyls	1336-36-3	1	3.2

Contaminant	CAS Number	Restricted Residential	Protection of GW
<i>Semivolatiles</i>			
Acenaphthene	83-32-9	100 ^a	98
Acenaphthylene	208-96-8	100 ^a	107
Anthracene	120-12-7	100 ^a	1000 ⁱ
Benz(a)anthracene	56-55-3	1 ⁱ	1 ⁱ
Benzo(a)pyrene	50-32-8	1 ⁱ	22
Benzo(b)fluoranthene	205-99-2	1 ⁱ	2
Benzo(g,h,i)perylene	191-24-2	100 ^a	1000 ⁱ
Benzo(k)fluoranthene	207-08-9	3.9	2
Chrysene	218-01-9	3.9	1 ⁱ
Dibenzo(a,h)anthracene	53-70-3	0.33 ⁱ	1000 ⁱ
Fluoranthene	206-44-0	100 ^a	1000 ⁱ
Fluorene	86-73-7	100 ^a	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5 ⁱ	8
m-Cresol	108-39-4	100 ^a	0.33 ⁱ
Naphthalene	91-20-3	100 ^a	12
o-Cresol	95-48-7	100 ^a	0.33 ⁱ
p-Cresol	106-44-5	100 ^a	0.33 ⁱ
Pentachlorophenol	87-86-5	6.7	0.8 ^e
Phenanthrene	85-01-8	100 ^a	1000 ⁱ
Phenol	108-95-2	100 ^a	0.33 ⁱ
Pyrene	129-00-0	100 ^a	1000 ⁱ

Contaminant	CAS Number	Restricted Residential	Protection of GW
<i>Volatiles</i>			
1,1,1-Trichloroethane	71-55-6	100 ^a	0.68
1,1-Dichloroethane	75-34-3	26	0.27
1,1-Dichloroethene	75-35-4	100 ^a	0.33
1,2-Dichlorobenzene	95-50-1	100 ^a	1.1
1,2-Dichloroethane	107-06-2	3.1	0.02 ⁱ
cis-1,2-Dichloroethene	156-59-2	100 ^a	0.25
trans-1,2-Dichloroethene	156-60-5	100 ^a	0.19
1,3-Dichlorobenzene	541-73-1	49	2.4
1,4-Dichlorobenzene	106-46-7	13	1.8
1,4-Dioxane	123-91-1	13	0.1 ⁱ
Acetone	67-64-1	100 ^a	0.05
Benzene	71-43-2	4.8	0.06
n-Butylbenzene	104-51-8	100 ^a	12
Carbon tetrachloride	56-23-5	2.4	0.76
Chlorobenzene	108-90-7	100 ^a	1.1
Chloroform	67-66-3	49	0.37
Ethylbenzene	100-41-4	41	1
Hexachlorobenzene	118-74-1	1.2	3
Methyl ethyl ketone	78-93-3	100 ^a	0.12
Methyl tert-butyl ether	1634-04-4	100 ^a	0.93
Methylene chloride	75-09-2	100 ^a	0.05
n-Propylbenzene	103-65-1	100 ^a	3.9
sec-Butylbenzene	135-98-8	100 ^a	11
tert-Butylbenzene	98-06-6	100 ^a	5.9
Tetrachloroethene	127-18-4	19	1.3
Toluene	108-88-3	100 ^a	0.7
Trichloroethene	79-01-6	21	
1,2,4-Trimethylbenzene	95-63-6	52	3.6
1,3,5- Trimethylbenzene	108-67-8	52	8.4
Vinyl chloride	75-01-4	0.9	0.02
Xylene (mixed)	1330-20-7	100 ^a	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-residential use were capped at a maximum value of 250 ppm.

b the SCOs for restricted-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.

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
<i>Volatiles</i>		
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-Trichloropropene	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
<i>Volatiles</i>		
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

<i>Semivolatiles</i>		
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)	186-30-6	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)

Table 4a - Volatile Organic Compounds in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-1 (1-5)		SB-1 (20-21)		SB-1 (20-21) DU		SB-2 (1-5)		SB-2 (13-14)		SB-3 (1-5)		SB-3 (15-16)	
LAB ID:			L1819157-07		L1819157-08		L1819157-09		L1819157-03		L1819157-04		L1819157-06		L1819157-05	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Volatile Organic Compounds Units: mg/kg			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Methylene chloride	0.05	100	0.0018	U	0.0022	J	0.0027	J	0.0017	J	0.0034	J	0.0018	J	0.0023	J
1,1-Dichloroethane	0.27	26	0.00029	U	0.00029	U	0.00029	U	0.00027	U	0.00037	U	0.00025	U	0.00026	U
Chloroform	0.37	49	0.00039	U	0.0004	U	0.0004	U	0.00037	U	0.00051	U	0.00034	U	0.00035	U
Carbon tetrachloride	0.76	2.4	0.00037	U	0.00037	U	0.00037	U	0.00035	U	0.00048	U	0.00032	U	0.00033	U
1,2-Dichloropropane	--	--	0.00024	U	0.00024	U	0.00025	U	0.00023	U	0.00031	U	0.00021	U	0.00022	U
Dibromochloromethane	--	--	0.00019	U	0.00019	U	0.00019	U	0.00018	U	0.00024	U	0.00016	U	0.00017	U
1,1,2-Trichloroethane	--	--	0.00033	U	0.00034	U	0.00034	U	0.00032	U	0.00043	U	0.00028	U	0.0003	U
Tetrachloroethene	1.3	19	0.00032	U	0.045		0.028		0.0003	U	0.00042	U	0.00028	U	0.00057	
Chlorobenzene	1.1	100	0.00037	U	0.00037	U	0.00038	U	0.00035	U	0.00048	U	0.00032	U	0.00033	U
Trichlorofluoromethane	--	--	0.00044	U	0.00045	U	0.00045	U	0.00042	U	0.00058	U	0.00038	U	0.0004	U
1,2-Dichloroethane	0.02	3.1	0.00026	U	0.00026	U	0.00027	U	0.00025	U	0.00034	U	0.00022	U	0.00023	U
1,1,1-Trichloroethane	0.68	100	0.00037	U	0.00037	U	0.00038	U	0.00035	U	0.00048	U	0.00032	U	0.00033	U
Bromodichloromethane	--	--	0.00033	U	0.00033	U	0.00033	U	0.00031	U	0.00042	U	0.00028	U	0.00029	U
trans-1,3-Dichloropropene	--	--	0.00022	U	0.00022	U	0.00022	U	0.00021	U	0.00029	U	0.00019	U	0.0002	U
cis-1,3-Dichloropropene	--	--	0.00025	U	0.00025	U	0.00025	U	0.00023	U	0.00032	U	0.00021	U	0.00022	U
1,3-Dichloropropene, Total	--	--	0.00022	U	0.00022	U	0.00022	U	0.00021	U	0.00029	U	0.00019	U	0.0002	U
1,1-Dichloropropene	--	--	0.00035	U	0.00035	U	0.00036	U	0.00033	U	0.00045	U	0.0003	U	0.00031	U
Bromoform	--	--	0.00025	U	0.00025	U	0.00026	U	0.00024	U	0.00033	U	0.00022	U	0.00022	U
1,1,2,2-Tetrachloroethane	--	--	0.00032	U	0.00032	U	0.00032	U	0.0003	U	0.00041	U	0.00027	U	0.00028	U
Benzene	0.06	4.8	0.0002	U	0.00021	U	0.00021	U	0.0002	U	0.00027	U	0.00018	U	0.00018	U
Toluene	0.7	100	0.00021	U	0.00021	U	0.00021	U	0.0002	U	0.00027	U	0.00018	U	0.00018	U
Ethylbenzene	1	41	0.00018	U	0.00018	U	0.00018	U	0.00017	U	0.00023	U	0.00016	U	0.00016	U
Chloromethane	--	--	0.00046	U	0.00047	U	0.00047	U	0.00044	U	0.0006	U	0.0004	U	0.00041	U
Bromomethane	--	--	0.00036	U	0.00036	U	0.00037	U	0.00034	U	0.00047	U	0.00031	U	0.00032	U
Vinyl chloride	0.02	0.9	0.00034	U	0.00034	U	0.00034	U	0.00032	U	0.00043	U	0.00029	U	0.0003	U
Chloroethane	--	--	0.00034	U	0.00034	U	0.00034	U	0.00032	U	0.00044	U	0.00029	U	0.0003	U
1,1-Dichloroethene	0.33	100	0.0004	U	0.0004	U	0.0004	U	0.00038	U	0.00051	U	0.00034	U	0.00035	U
trans-1,2-Dichloroethene	0.19	100	0.00026	U	0.00026	U	0.00026	U	0.00024	U	0.00033	U	0.00022	U	0.00023	U
Trichloroethene	0.47	21	0.00032	U	0.0022		0.00086	J	0.0003	U	0.00042	U	0.00028	U	0.00029	U
1,2-Dichlorobenzene	1.1	100	0.00019	U	0.00019	U	0.0002	U	0.00018	U	0.00025	U	0.00017	U	0.00017	U
1,3-Dichlorobenzene	2.4	49	0.00023	U	0.00023	U	0.00024	U	0.00022	U	0.0003	U	0.0002	U	0.00021	U
1,4-Dichlorobenzene	1.8	13	0.00019	U	0.00019	U	0.0002	U	0.00018	U	0.00025	U	0.00017	U	0.00017	U
Methyl tert butyl ether	0.93	100	0.00016	U	0.00016	U	0.00017	U	0.00015	U	0.00021	U	0.00014	U	0.00014	U
p-m-Xylene	--	--	0.00037	U	0.00038	U	0.00038	U	0.00035	U	0.00048	U	0.00032	U	0.00033	U
o-Xylene	--	--	0.00036	U	0.00036	U	0.00037	U	0.00034	U	0.00047	U	0.00031	U	0.00032	U
Xylenes, Total	1.6	100	0.00036	U	0.00036	U	0.00037	U	0.00034	U	0.00047	U	0.00031	U	0.00032	U
cis-1,2-Dichloroethene	0.25	100	0.00036	U	0.0009	J	0.00037	U	0.00034	U	0.00047	U	0.00031	U	0.00032	U
1,2-Dichloroethene, Total	--	--	0.00026	U	0.0009	J	0.00026	U	0.00024	U	0.00033	U	0.00022	U	0.00023	U
Dibromomethane	--	--	0.00025	U	0.00026	U	0.00026	U	0.00024	U	0.00033	U	0.00022	U	0.00023	U
Styrene	--	--	0.00043	U	0.00043	U	0.00044	U	0.0004	U	0.00055	U	0.00037	U	0.00038	U
Dichlorodifluoromethane	--	--	0.00053	U	0.00054	U	0.00054	U	0.0005	U	0.00069	U	0.00046	U	0.00047	U
Acetone	0.05	100	0.0024	U	0.0024	U	0.0025	U	0.0023	U	0.0032	U	0.0021	U	0.0022	U
Carbon disulfide	--	--	0.0012	U	0.0012	U	0.0012	U	0.0011	U	0.0015	U	0.001	U	0.001	U
2-Butanone	0.12	100	0.00074	U	0.00074	U	0.00075	U	0.0007	U	0.00095	U	0.00063	U	0.00066	U
Vinyl acetate	--	--	0.00016	U	0.00016	U	0.00017	U	0.00015	U	0.00021	U	0.00014	U	0.00014	U
4-Methyl-2-pentanone	--	--	0.00026	U	0.00026	U	0.00026	U	0.00025	U	0.00034	U	0.00022	U	0.00023	U
1,2,3-Trichloropropane	--	--	0.00019	U	0.00019	U	0.00019	U	0.00018	U	0.00024	U	0.00016	U	0.00017	U
2-Hexanone	--	--	0.00071	U	0.00071	U	0.00072	U	0.00067	U	0.00092	U	0.00061	U	0.00063	U
Bromochloromethane	--	--	0.00038	U	0.00038	U	0.00039	U	0.00036	U	0.00049	U	0.00033	U	0.00034	U
2,2-Dichloropropane	--	--	0.00048	U	0.00048	U	0.00049	U	0.00045	U	0.00062	U	0.00041	U	0.00043	U
1,2-Dibromoethane	--	--	0.00021	U	0.00021	U	0.00022	U	0.0002	U	0.00027	U	0.00018	U	0.00019	U
1,3-Dichloropropane	--	--	0.0002	U	0.0002	U	0.0002	U	0.00018	U	0.00025	U	0.00017	U	0.00017	U
1,1,1,2-Tetrachloroethane	--	--	0.00034	U	0.00034	U	0.00034	U	0.00032	U	0.00044	U	0.00029	U	0.0003	U
Bromobenzene	--	--	0.00023	U	0.00023	U	0.00024	U	0.00022	U	0.0003	U	0.0002	U	0.00021	U
n-Butylbenzene	12	100	0.00024	U	0.00024	U	0.00025	U	0.00023	U	0.00031	U	0.00021	U	0.00022	U
sec-Butylbenzene	11	100	0.00023	U	0.00023	U	0.00024	U	0.00022	U	0.0003	U	0.0002	U	0.00021	U
tert-Butylbenzene	5.9	100	0.00026	U	0.00026	U	0.00027	U	0.00025	U	0.00034	U	0.00022	U	0.00023	U
o-Chlorotoluene	--	--	0.00024	U	0.00024	U	0.00024	U	0.00022	U	0.0003	U	0.0002	U	0.00021	U
p-Chlorotoluene	--	--	0.0002	U	0.0002	U	0.0002	U	0.00018	U	0.00025	U	0.00017	U	0.00017	U
1,2-Dibromo-3-chloropropane	--	--	0.00042	U	0.00042	U	0.00043	U	0.0004	U	0.00055	U	0.00036	U	0.00038	U
Hexachlorobutadiene	--	--	0.00037	U	0.00037	U	0.00038	U	0.00035	U	0.00048	U	0.00032	U	0.00033	U
Isopropylbenzene	--	--	0.00021	U	0.00021	U	0.00021	U	0.0002	U	0.00027	U	0.00018	U	0.00018	U
p-Isopropyltoluene	--	--	0.00022	U	0.00022	U	0.00022	U	0.0002	U	0.00028	U	0.00018	U	0.00019	U
Naphthalene	12	100	0.00015	U	0.00015	U	0.00015	U	0.00014	U	0.00019	U	0.00013	U	0.00013	U
Acrylonitrile	--	--	0.00055	U	0.00055	U	0.00056	U	0.00052	U	0.00071	U	0.00047	U	0.00049	U
n-Propylbenzene	3.9	100	0.00023	U	0.00023	U	0.00023	U	0.00022	U	0.0003	U	0.0002	U	0.0002	U
1,2,3-Trichlorobenzene	--	--	0.00027	U	0.00027	U	0.00027	U	0.00025	U	0.00035	U	0.00023	U	0.00024	

Table 4a - Volatile Organic Compounds in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-4 (0-5)		SB-4 (18-20)		SB-5 (1-2)		SB-5 (15-17)		S1-S (0-0.5)		S1-E (0-0.5)		S1-C (0.5-1)		S1-N (0.5-1.5)		S1-W (0-1)	
LAB ID:			L1819157-10		L1819157-11		L1819157-01		L1819157-02		L1819157-12		L1819157-13		L1819157-14		L1819157-15		L1819157-18	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Volatile Organic Compounds			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Units: mg/kg																				
Methylene chloride	0.05	100	0.0018	J	0.002	U	0.0018	J	0.0033	J	0.0026	J	0.0047	J	0.0018	U	0.002	U	0.0025	U
1,1-Dichloroethane	0.27	26	0.00026	U	0.00032	U	0.00026	U	0.00032	U	0.00041	U	0.0005	U	0.00029	U	0.00033	U	0.0004	U
Chloroform	0.37	49	0.00036	U	0.00044	U	0.00036	U	0.00044	U	0.00056	U	0.00068	U	0.0004	U	0.00045	U	0.00055	U
Carbon tetrachloride	0.76	2.4	0.00034	U	0.00041	U	0.00033	U	0.00041	U	0.00052	U	0.00064	U	0.00037	U	0.00042	U	0.00052	U
1,2-Dichloropropane	--	--	0.00022	U	0.00027	U	0.00022	U	0.00027	U	0.00034	U	0.00042	U	0.00024	U	0.00028	U	0.00034	U
Dibromochloromethane	--	--	0.00017	U	0.00021	U	0.00017	U	0.00021	U	0.00027	U	0.00032	U	0.00019	U	0.00021	U	0.00026	U
1,1,2-Trichloroethane	--	--	0.0003	U	0.00037	U	0.0003	U	0.00037	U	0.00047	U	0.00058	U	0.00034	U	0.00038	U	0.00047	U
Tetrachloroethene	1.3	19	0.00029	U	0.00036	U	0.00029	U	0.00036	U	0.028		0.0077		0.0015		0.007		0.067	
Chlorobenzene	1.1	100	0.00034	U	0.00041	U	0.00033	U	0.00041	U	0.00053	U	0.00064	U	0.00037	U	0.00042	U	0.00052	U
Trichlorofluoromethane	--	--	0.00041	U	0.00049	U	0.0004	U	0.0005	U	0.00063	U	0.00077	U	0.00045	U	0.0005	U	0.00062	U
1,2-Dichloroethane	0.02	3.1	0.00024	U	0.00029	U	0.00024	U	0.00029	U	0.00037	U	0.00045	U	0.00026	U	0.0003	U	0.00037	U
1,1,1-Trichloroethane	0.68	100	0.00034	U	0.00041	U	0.00034	U	0.00042	U	0.00053	U	0.00064	U	0.00038	U	0.00042	U	0.00052	U
Bromodichloromethane	--	--	0.0003	U	0.00036	U	0.0003	U	0.00037	U	0.00047	U	0.00057	U	0.00033	U	0.00037	U	0.00046	U
trans-1,3-Dichloropropene	--	--	0.0002	U	0.00024	U	0.0002	U	0.00025	U	0.00031	U	0.00038	U	0.00022	U	0.00025	U	0.00031	U
cis-1,3-Dichloropropene	--	--	0.00022	U	0.00027	U	0.00022	U	0.00027	U	0.00035	U	0.00043	U	0.00025	U	0.00028	U	0.00035	U
1,3-Dichloropropene, Total	--	--	0.0002	U	0.00024	U	0.0002	U	0.00025	U	0.00031	U	0.00038	U	0.00022	U	0.00025	U	0.00031	U
1,1-Dichloropropene	--	--	0.00032	U	0.00039	U	0.00032	U	0.00039	U	0.0005	U	0.0006	U	0.00035	U	0.0004	U	0.00049	U
Bromoform	--	--	0.00023	U	0.00028	U	0.00023	U	0.00028	U	0.00036	U	0.00044	U	0.00025	U	0.00029	U	0.00036	U
1,1,2,2-Tetrachloroethane	--	--	0.00029	U	0.00035	U	0.00029	U	0.00035	U	0.00045	U	0.00055	U	0.00032	U	0.00036	U	0.00045	U
Benzene	0.06	4.8	0.00019	U	0.00023	U	0.00018	U	0.00023	U	0.00029	U	0.00036	U	0.00021	U	0.00023	U	0.00029	U
Toluene	0.7	100	0.00019	U	0.00023	U	0.00019	U	0.00023	U	0.0003	U	0.00036	U	0.00021	U	0.00024	U	0.00029	U
Ethylbenzene	1	41	0.00016	U	0.0002	U	0.00016	U	0.0002	U	0.00026	U	0.00031	U	0.00018	U	0.00021	U	0.00025	U
Chloromethane	--	--	0.00042	U	0.00052	U	0.00042	U	0.00052	U	0.00066	U	0.0008	U	0.00047	U	0.00053	U	0.00065	U
Bromomethane	--	--	0.00033	U	0.0004	U	0.00032	U	0.0004	U	0.00051	U	0.00062	U	0.00036	U	0.00041	U	0.00051	U
Vinyl chloride	0.02	0.9	0.00031	U	0.00037	U	0.0003	U	0.00037	U	0.00048	U	0.00058	U	0.00034	U	0.00038	U	0.00047	U
Chloroethane	--	--	0.00031	U	0.00037	U	0.0003	U	0.00038	U	0.00048	U	0.00058	U	0.00034	U	0.00038	U	0.00047	U
1,1-Dichloroethene	0.33	100	0.00036	U	0.00044	U	0.00036	U	0.00044	U	0.00056	U	0.00069	U	0.0004	U	0.00045	U	0.00056	U
trans-1,2-Dichloroethene	0.19	100	0.00024	U	0.00028	U	0.00023	U	0.00029	U	0.00036	U	0.00044	U	0.00026	U	0.00029	U	0.00036	U
Trichloroethene	0.47	21	0.00029	U	0.00036	U	0.00029	U	0.00036	U	0.00046	U	0.00056	U	0.00032	U	0.00037	U	0.00072	J
1,2-Dichlorobenzene	1.1	100	0.00018	U	0.00022	U	0.00017	U	0.00022	U	0.00028	U	0.00034	U	0.0002	U	0.00022	U	0.00027	U
1,3-Dichlorobenzene	2.4	49	0.00021	U	0.00026	U	0.00021	U	0.00026	U	0.00033	U	0.0004	U	0.00023	U	0.00026	U	0.00033	U
1,4-Dichlorobenzene	1.8	13	0.00018	U	0.00022	U	0.00017	U	0.00022	U	0.00028	U	0.00034	U	0.0002	U	0.00022	U	0.00027	U
Methyl tert butyl ether	0.93	100	0.00015	U	0.00018	U	0.00015	U	0.00018	U	0.00023	U	0.00028	U	0.00016	U	0.00018	U	0.00023	U
p/m-Xylene	--	--	0.00034	U	0.00041	U	0.00034	U	0.00042	U	0.00053	U	0.00065	U	0.00038	U	0.00042	U	0.00053	U
o-Xylene	--	--	0.00033	U	0.0004	U	0.00032	U	0.0004	U	0.00051	U	0.00062	U	0.00036	U	0.00041	U	0.00051	U
Xylenes, Total	1.6	100	0.00033	U	0.0004	U	0.00032	U	0.0004	U	0.00051	U	0.00062	U	0.00036	U	0.00041	U	0.00051	U
cis-1,2-Dichloroethene	0.25	100	0.00033	U	0.0004	U	0.00033	U	0.00041	U	0.00052	U	0.00063	U	0.00037	U	0.00041	U	0.00051	U
1,2-Dichloroethene, Total	--	--	0.00024	U	0.00028	U	0.00023	U	0.00029	U	0.00036	U	0.00044	U	0.00026	U	0.00029	U	0.00036	U
Dibromomethane	--	--	0.00023	U	0.00028	U	0.00023	U	0.00028	U	0.00036	U	0.00044	U	0.00026	U	0.00029	U	0.00036	U
Styrene	--	--	0.00039	U	0.00047	U	0.00038	U	0.00048	U	0.00061	U	0.00074	U	0.00043	U	0.00049	U	0.0006	U
Dichlorodifluoromethane	--	--	0.00049	U	0.00059	U	0.00048	U	0.00059	U	0.00076	U	0.00092	U	0.00054	U	0.00061	U	0.00075	U
Acetone	0.05	100	0.0022	U	0.0027	U	0.0022	U	0.0027	U	0.0035	U	0.0064	U	0.0024	U	0.0028	U	0.0034	U
Carbon disulfide	--	--	0.0011	U	0.0013	U	0.001	U	0.0013	U	0.0017	U	0.002	U	0.0012	U	0.0013	U	0.0016	U
2-Butanone	0.12	100	0.00067	U	0.00082	U	0.00066	U	0.00082	U	0.001	U	0.0013	U	0.00074	U	0.00084	U	0.001	U
Vinyl acetate	--	--	0.00015	U	0.00018	U	0.00015	U	0.00018	U	0.00023	U	0.00028	U	0.00016	U	0.00018	U	0.00023	U
4-Methyl-2-pentanone	--	--	0.00024	U	0.00029	U	0.00023	U	0.00029	U	0.00037	U	0.00045	U	0.00026	U	0.0003	U	0.00036	U
1,2,3-Trichloropropane	--	--	0.00017	U	0.00021	U	0.00017	U	0.00021	U	0.00027	U	0.00033	U	0.00019	U	0.00021	U	0.00026	U
2-Hexanone	--	--	0.00065	U	0.00079	U	0.00064	U	0.00079	U	0.001	U	0.0012	U	0.00071	U	0.00081	U	0.001	U
Bromochloromethane	--	--	0.00035	U	0.00042	U	0.00034	U	0.00042	U	0.00054	U	0.00066	U	0.00038	U	0.00043	U	0.00054	U
2,2-Dichloropropane	--	--	0.00044	U	0.00053	U	0.00043	U	0.00053	U	0.00068	U	0.00083	U	0.00048	U	0.00054	U	0.00067	U
1,2-Dibromoethane	--	--	0.00019	U	0.00024	U	0.00019	U	0.00024	U	0.0003	U	0.00037	U	0.00021	U	0.00024	U	0.0003	U
1,3-Dichloropropane	--	--	0.00018	U	0.00022	U	0.00018	U	0.00022	U	0.00028	U	0.00034	U	0.0002	U	0.00022	U	0.00027	U
1,1,1,2-Tetrachloroethane	--	--	0.00031																	

Table 4b - Semivolatile Organic Compounds in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:			SB-1 (1-5)		SB-1 (20-21)		SB-1 (20-21) DU#		SB-2 (1-5)		SB-2 (13-14)		SB-3 (15-16)		SB-3 (1-5)	
LAB ID:			L1819157-07		L1819157-08		L1819157-09		L1819157-03		L1819157-04		L1819157-05		L1819157-06	
COLLECTION DATE:	NY-RESGW	NY-RESRR	5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Semivolatile Organic Compounds			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Acenaphthene	98	100	0.019	U	0.021	U	0.021	U	0.02	U	0.022	U	0.02	U	0.02	U
1,2,4-Trichlorobenzene	--	--	0.021	U	0.023	U	0.024	U	0.022	U	0.024	U	0.022	U	0.022	U
Hexachlorobenzene	3.2	1.2	0.021	U	0.022	U	0.023	U	0.021	U	0.024	U	0.021	U	0.022	U
Bis(2-chloroethyl)ether	--	--	0.025	U	0.027	U	0.028	U	0.026	U	0.028	U	0.026	U	0.026	U
2-Chloronaphthalene	--	--	0.019	U	0.02	U	0.02	U	0.019	U	0.021	U	0.019	U	0.019	U
1,2-Dichlorobenzene	1.1	100	0.034	U	0.036	U	0.037	U	0.034	U	0.038	U	0.034	U	0.035	U
1,3-Dichlorobenzene	2.4	49	0.032	U	0.034	U	0.035	U	0.033	U	0.036	U	0.033	U	0.033	U
1,4-Dichlorobenzene	1.8	13	0.033	U	0.035	U	0.036	U	0.033	U	0.037	U	0.033	U	0.034	U
3,3'-Dichlorobenzidine	--	--	0.05	U	0.053	U	0.055	U	0.051	U	0.056	U	0.051	U	0.052	U
2,4-Dinitrotoluene	--	--	0.038	U	0.04	U	0.041	U	0.038	U	0.042	U	0.038	U	0.039	U
2,6-Dinitrotoluene	--	--	0.032	U	0.034	U	0.035	U	0.033	U	0.036	U	0.033	U	0.033	U
Fluoranthene	1000	100	0.13	U	0.023	U	0.024	U	0.08	J	0.024	U	0.022	U	0.085	J
4-Chlorophenyl phenyl ether	--	--	0.02	U	0.021	U	0.022	U	0.02	U	0.022	U	0.02	U	0.021	U
4-Bromophenyl phenyl ether	--	--	0.029	U	0.03	U	0.031	U	0.029	U	0.032	U	0.029	U	0.03	U
Bis(2-chloroisopropyl)ether	--	--	0.032	U	0.034	U	0.035	U	0.033	U	0.036	U	0.033	U	0.033	U
Bis(2-chloroethoxy)methane	--	--	0.019	U	0.02	U	0.021	U	0.019	U	0.021	U	0.019	U	0.019	U
Hexachlorobutadiene	--	--	0.027	U	0.029	U	0.03	U	0.028	U	0.031	U	0.028	U	0.028	U
Hexachlorocyclopentadiene	--	--	0.17	U	0.18	U	0.19	U	0.17	U	0.19	U	0.17	U	0.18	U
Hexachloroethane	--	--	0.03	U	0.032	U	0.033	U	0.031	U	0.034	U	0.031	U	0.031	U
Isophorone	--	--	0.024	U	0.026	U	0.027	U	0.025	U	0.027	U	0.025	U	0.025	U
Naphthalene	12	100	0.023	U	0.024	U	0.025	U	0.023	U	0.026	U	0.023	U	0.024	U
Nitrobenzene	--	--	0.028	U	0.029	U	0.03	U	0.028	U	0.031	U	0.028	U	0.029	U
NDPA/DPA	--	--	0.021	U	0.023	U	0.023	U	0.022	U	0.024	U	0.022	U	0.022	U
n-Nitrosodi-n-propylamine	--	--	0.029	U	0.031	U	0.032	U	0.03	U	0.032	U	0.03	U	0.03	U
Bis(2-ethylhexyl)phthalate	--	--	0.065	U	0.069	U	0.071	U	0.066	U	0.073	U	0.066	U	0.067	U
Butyl benzyl phthalate	--	--	0.047	U	0.05	U	0.052	U	0.048	U	0.053	U	0.048	U	0.049	U
Di-n-butylphthalate	--	--	0.055	J	0.038	U	0.039	U	0.036	U	0.04	U	0.036	U	0.037	U
Di-n-octylphthalate	--	--	0.064	U	0.068	U	0.07	U	0.065	U	0.071	U	0.065	U	0.066	U
Diethyl phthalate	--	--	0.017	U	0.018	U	0.019	U	0.018	U	0.019	U	0.018	U	0.018	U
Dimethyl phthalate	--	--	0.039	U	0.042	U	0.043	U	0.04	U	0.044	U	0.04	U	0.041	U
Benzo(a)anthracene	1	1	0.078	J	0.022	U	0.023	U	0.055	J	0.024	U	0.022	U	0.055	J
Benzo(a)pyrene	22	1	0.079	J	0.048	U	0.05	U	0.053	J	0.051	U	0.047	U	0.055	J
Benzo(b)fluoranthene	1.7	1	0.11	U	0.034	U	0.035	U	0.074	J	0.035	U	0.032	U	0.082	J
Benzo(k)fluoranthene	1.7	3.9	0.039	J	0.032	U	0.033	U	0.031	U	0.034	U	0.031	U	0.031	U
Chrysene	1	3.9	0.083	J	0.021	U	0.021	U	0.06	J	0.022	U	0.02	U	0.063	J
Acenaphthylene	107	100	0.029	U	0.031	U	0.032	U	0.03	U	0.032	U	0.03	U	0.03	U
Anthracene	1000	100	0.036	U	0.039	U	0.04	U	0.037	U	0.041	U	0.037	U	0.038	U
Benzo(ghi)perylene	1000	100	0.058	J	0.023	U	0.024	U	0.039	J	0.025	U	0.022	U	0.04	J
Fluorene	386	100	0.018	U	0.019	U	0.02	U	0.019	U	0.02	U	0.019	U	0.019	U
Phenanthrene	1000	100	0.052	J	0.024	U	0.025	U	0.028	J	0.026	U	0.023	U	0.03	J
Dibenzo(a,h)anthracene	1000	0.33	0.022	U	0.023	U	0.024	U	0.022	U	0.024	U	0.022	U	0.022	U
Indenol(1,2,3-cd)pyrene	8.2	0.5	0.057	J	0.028	U	0.029	U	0.042	J	0.029	U	0.027	U	0.041	J
Pyrene	1000	100	0.11	U	0.02	U	0.02	U	0.076	J	0.021	U	0.019	U	0.082	J
Biphenyl	--	--	0.044	U	0.046	U	0.048	U	0.044	U	0.049	U	0.044	U	0.045	U
4-Chloroaniline	--	--	0.034	U	0.036	U	0.038	U	0.035	U	0.038	U	0.035	U	0.035	U
2-Nitroaniline	--	--	0.036	U	0.038	U	0.04	U	0.037	U	0.04	U	0.037	U	0.038	U
3-Nitroaniline	--	--	0.035	U	0.038	U	0.039	U	0.036	U	0.04	U	0.036	U	0.037	U
4-Nitroaniline	--	--	0.078	U	0.082	U	0.085	U	0.079	U	0.087	U	0.079	U	0.08	U
Dibenzofuran	210	59	0.018	U	0.019	U	0.02	U	0.018	U	0.02	U	0.018	U	0.018	U
2-Methylnaphthalene	--	--	0.023	U	0.024	U	0.025	U	0.023	U	0.025	U	0.023	U	0.024	U
1,2,4,5-Tetrachlorobenzene	--	--	0.02	U	0.021	U	0.022	U	0.02	U	0.022	U	0.02	U	0.02	U
Acetophenone	--	--	0.023	U	0.025	U	0.026	U	0.024	U	0.026	U	0.024	U	0.024	U
2,4,6-Trichlorophenol	--	--	0.036	U	0.038	U	0.039	U	0.036	U	0.04	U	0.036	U	0.037	U
p-Chloro-m-cresol	--	--	0.028	U	0.03	U	0.031	U	0.028	U	0.031	U	0.028	U	0.029	U
2-Chlorophenol	--	--	0.022	U	0.024	U	0.024	U	0.023	U	0.025	U	0.023	U	0.023	U
2,4-Dichlorophenol	--	--	0.03	U	0.032	U	0.033	U	0.031	U	0.034	U	0.031	U	0.031	U
2,4-Dimethylphenol	--	--	0.062	U	0.066	U	0.068	U	0.063	U	0.069	U	0.063	U	0.064	U
2-Nitrophenol	--	--	0.07	U	0.075	U	0.078	U	0.072	U	0.079	U	0.072	U	0.073	U
4-Nitrophenol	--	--	0.076	U	0.081	U	0.084	U	0.078	U	0.086	U	0.078	U	0.079	U
2,4-Dinitrophenol	--	--	0.087	U	0.093	U	0.096	U	0.089	U	0.098	U	0.089	U	0.091	U
4,6-Dinitro-o-cresol	--	--	0.09	U	0.096	U	0.099	U	0.092	U	0.1	U	0.092	U	0.093	U
Pentachlorophenol	0.8	6.7	0.041	U	0.044	U	0.045	U	0.042	U	0.046	U	0.042	U	0.043	U
Phenol	0.33	100	0.028	U	0.03	U	0.031	U	0.029	U	0.032	U	0.029	U	0.029	U
2-Methylphenol	0.33	100	0.029	U	0.031	U	0.032	U	0.03	U	0.032	U	0.03	U	0.03	U
3-Methylphenol/4-Methylphenol	0.33	100	0.029	U	0.031	U	0.032	U	0.03	U	0.033	U	0.03	U	0.03	U
2,4,5-Trichlorophenol	--	--	0.036	U	0.038	U	0.039	U	0.037	U	0.04	U	0.037	U	0.037	U
Benzoic Acid	--	--	0.19	U	0.2	U	0.21	U	0.19	U	0.21	U	0.19	U	0.2	U
Benzyl Alcohol	--	--	0.057	U	0.061	U	0.063	U	0.059	U	0.064	U	0.058	U	0.06	U
Carbazole	--	--	0.018	U	0.019	U	0.02	U	0.019	U	0.02	U	0.019	U	0.019	U
Total SVOCs	--	--	0.851	-	-	-	-	-	0.507	-	-	-	-	-	0.533	-

Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental
 NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

- = Not Analyzed

Cells highlighted in yellow indicate a concentration above NY-UNRES

Cells highlighted in orange indicate a concentration above NY-RESRR and NY-UNRES

Cells shaded in grey indicate MDL values above NY-UNRES or NY-RESRR

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

P = The RPD between the results for the two columns exceeds the method-specified criteria.

-- = No standard

Table 4b - Semivolatile Organic Compounds in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-4 (0-5)		SB-4 (18-20)		SB-5 (1-2)		SB-5 (15-17)		SI-S (0-0.5)		SI-E (0-0.5)		SI-C (0.5-1)		SI-N (0.5-1.5)		SI-W (0-1)	
LAB ID:			L1819157-10		L1819157-11		L1819157-01		L1819157-02		L1819157-12		L1819157-13		L1819157-14		L1819157-15		L1819157-18	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Semivolatile Organic Compounds			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Acenaphthene	98	100	0.019	U	0.019	U	0.02	U	0.019	U	0.019	U	0.019	U	0.018	U	0.018	U	0.02	U
1,2,4-Trichlorobenzene	--	--	0.021	U	0.021	U	0.022	U	0.021	U	0.022	U	0.021	U	0.02	U	0.02	U	0.022	U
Hexachlorobenzene	3.2	1.2	0.021	U	0.02	U	0.021	U	0.02	U	0.021	U	0.021	U	0.02	U	0.02	U	0.022	U
Bis(2-chloroethyl)ether	--	--	0.025	U	0.025	U	0.026	U	0.025	U	0.026	U	0.025	U	0.024	U	0.024	U	0.026	U
2-Chloronaphthalene	--	--	0.018	U	0.018	U	0.019	U	0.018	U	0.019	U	0.018	U	0.017	U	0.018	U	0.019	U
1,2-Dichlorobenzene	1.1	100	0.033	U	0.033	U	0.034	U	0.033	U	0.034	U	0.033	U	0.032	U	0.032	U	0.035	U
1,3-Dichlorobenzene	2.4	49	0.032	U	0.031	U	0.032	U	0.031	U	0.032	U	0.032	U	0.03	U	0.031	U	0.033	U
1,4-Dichlorobenzene	1.8	13	0.032	U	0.032	U	0.033	U	0.032	U	0.033	U	0.032	U	0.031	U	0.031	U	0.034	U
3,3'-Dichlorobenzidine	--	--	0.049	U	0.048	U	0.05	U	0.048	U	0.05	U	0.05	U	0.047	U	0.048	U	0.051	U
2,4-Dinitrotoluene	--	--	0.037	U	0.036	U	0.038	U	0.036	U	0.038	U	0.037	U	0.035	U	0.036	U	0.038	U
2,6-Dinitrotoluene	--	--	0.032	U	0.031	U	0.032	U	0.031	U	0.032	U	0.032	U	0.03	U	0.031	U	0.033	U
Fluoranthene	1000	100	0.021	U	0.021	U	0.36		0.021	U	0.024	J	0.063	J	0.02	U	0.021	U	0.042	J
4-Chlorophenyl phenyl ether	--	--	0.02	U	0.019	U	0.02	U	0.019	U	0.02	U	0.02	U	0.019	U	0.019	U	0.021	U
4-Bromophenyl phenyl ether	--	--	0.028	U	0.028	U	0.029	U	0.028	U	0.029	U	0.028	U	0.027	U	0.027	U	0.029	U
Bis(2-chloroisopropyl)ether	--	--	0.032	U	0.031	U	0.032	U	0.031	U	0.032	U	0.032	U	0.03	U	0.031	U	0.033	U
Bis(2-chloroethoxy)methane	--	--	0.019	U	0.018	U	0.019	U	0.018	U	0.019	U	0.019	U	0.018	U	0.018	U	0.019	U
Hexachlorobutadiene	--	--	0.027	U	0.026	U	0.028	U	0.027	U	0.028	U	0.027	U	0.026	U	0.026	U	0.028	U
Hexachlorocyclopentadiene	--	--	0.17	U	0.16	U	0.17	U	0.16	U	0.17	U	0.17	U	0.16	U	0.16	U	0.17	U
Hexachloroethane	--	--	0.03	U	0.029	U	0.03	U	0.029	U	0.03	U	0.03	U	0.028	U	0.029	U	0.031	U
Isophorone	--	--	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.023	U	0.023	U	0.025	U
Naphthalene	12	100	0.023	U	0.022	U	0.023	U	0.022	U	0.023	U	0.023	U	0.021	U	0.022	U	0.045	J
Nitrobenzene	--	--	0.027	U	0.027	U	0.028	U	0.027	U	0.028	U	0.028	U	0.026	U	0.026	U	0.028	U
NDPA/DPA	--	--	0.021	U	0.021	U	0.022	U	0.021	U	0.021	U	0.021	U	0.02	U	0.02	U	0.022	U
n-Nitrosodi-n-propylamine	--	--	0.029	U	0.028	U	0.029	U	0.028	U	0.029	U	0.029	U	0.027	U	0.028	U	0.03	U
Bis(2-ethylhexyl)phthalate	--	--	0.064	U	0.063	U	0.065	U	0.063	U	0.065	U	0.064	U	0.061	U	0.062	U	0.067	U
Butyl benzyl phthalate	--	--	0.047	U	0.046	U	0.048	U	0.046	U	0.047	U	0.047	U	0.044	U	0.045	U	0.049	U
Di-n-butylphthalate	--	--	0.035	U	0.034	U	0.036	U	0.034	U	0.036	U	0.035	U	0.033	U	0.034	U	0.036	U
Di-n-octylphthalate	--	--	0.063	U	0.062	U	0.064	U	0.062	U	0.064	U	0.063	U	0.06	U	0.061	U	0.066	U
Diethyl phthalate	--	--	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.016	U	0.017	U	0.018	U
Dimethyl phthalate	--	--	0.039	U	0.038	U	0.04	U	0.038	U	0.04	U	0.039	U	0.037	U	0.038	U	0.04	U
Benzo(a)anthracene	1	1	0.021	U	0.02	U	0.22		0.02	U	0.021	J	0.037	J	0.02	U	0.02	U	0.03	J
Benzo(a)pyrene	22	1	0.045	U	0.044	U	0.2		0.044	U	0.046	U	0.045	U	0.043	U	0.044	U	0.047	U
Benzo(b)fluoranthene	1.7	1	0.031	U	0.03	U	0.3		0.031	U	0.041	J	0.053	J	0.03	U	0.03	U	0.039	J
Benzo(k)fluoranthene	1.7	3.9	0.03	U	0.029	U	0.099	J	0.029	U	0.03	U	0.03	U	0.028	U	0.029	U	0.031	U
Chrysene	1	3.9	0.019	U	0.019	U	0.23		0.019	U	0.023	J	0.039	J	0.018	U	0.019	U	0.057	J
Acenaphthylene	107	100	0.029	U	0.028	U	0.038	J	0.028	U	0.029	U	0.029	U	0.027	U	0.028	U	0.03	U
Anthracene	1000	100	0.036	U	0.035	U	0.037	U	0.035	U	0.037	U	0.036	U	0.034	U	0.035	U	0.038	U
Benzo(ghi)perylene	1000	100	0.022	U	0.021	U	0.14	J	0.021	U	0.038	J	0.028	J	0.021	U	0.021	U	0.023	U
Fluorene	386	100	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.017	U	0.017	U	0.019	U
Phenanthrene	1000	100	0.022	U	0.022	U	0.12		0.022	U	0.023	U	0.057	J	0.021	U	0.022	U	0.12	
Dibenzo(a,h)anthracene	1000	0.33	0.021	U	0.021	U	0.034	J	0.021	U	0.022	U	0.022	U	0.02	U	0.021	U	0.022	U
Indeno(1,2,3-cd)pyrene	8.2	0.5	0.026	U	0.025	U	0.15		0.025	U	0.031	J	0.028	J	0.024	U	0.025	U	0.027	U
Pyrene	1000	100	0.018	U	0.018	U	0.32		0.018	U	0.024	J	0.052	J	0.017	U	0.018	U	0.043	J
Biphenyl	--	--	0.043	U	0.042	U	0.044	U	0.042	U	0.044	U	0.043	U	0.041	U	0.042	U	0.045	U
4-Chloroaniline	--	--	0.034	U	0.033	U	0.034	U	0.033	U	0.034	U	0.034	U	0.032	U	0.033	U	0.035	U
2-Nitroaniline	--	--	0.036	U	0.035	U	0.036	U	0.035	U	0.036	U	0.036	U	0.034	U	0.035	U	0.037	U
3-Nitroaniline	--	--	0.035	U	0.034	U	0.036	U	0.034	U	0.035	U	0.035	U	0.033	U	0.034	U	0.036	U
4-Nitroaniline	--	--	0.077	U	0.075	U	0.078	U	0.075	U	0.078	U	0.077	U	0.073	U	0.074	U	0.08	U
Dibenzofuran	210	59	0.018	U	0.017	U	0.018	U	0.017	U	0.018	U	0.018	U	0.017	U	0.017	U	0.018	U
2-Methylnaphthalene	--	--	0.022	U	0.022	U	0.023	U	0.022	U	0.023	U	0.022	U	0.021	U	0.022	U	0.074	J
1,2,4,5-Tetrachlorobenzene	--	--	0.019	U	0.019	U	0.02	U	0.019	U	0.02	U	0.019	U	0.018	U	0.019	U	0.02	U
Acetophenone	--	--	0.023	U	0.022	U	0.023	U	0.022	U	0.023	U	0.023	U	0.022	U	0.022	U	0.024	U
2,4,6-Trichlorophenol	--	--	0.035	U	0.034	U	0.036	U	0.034	U	0.036	U	0.035	U	0.033	U	0.034	U	0.036	U
p-Chloro-m-cresol	--	--	0.028	U	0.027	U	0.028	U	0.027	U	0.028	U	0.028	U	0.026	U	0.027	U	0.029	U
2-Chlorophenol	--	--	0.022	U	0.021	U	0.022	U	0.021	U	0.022	U	0.022	U	0.021	U	0.021	U	0.023	U
2,4-Dichlorophenol	--	--	0.03	U	0.029	U	0.03	U	0.029	U	0.03	U	0.03	U	0.028	U	0.029	U	0.031	U
2,4-Dimethylphenol	--	--	0.061	U	0.06	U	0.062	U	0.06	U	0.062	U	0.061	U	0.058	U	0.059	U	0.064	U
2-Nitrophenol	--	--	0.07	U	0.068	U	0.071	U	0.068	U	0.071	U	0.07	U	0.066	U	0.067	U	0.072	U
4-Nitrophenol	--	--	0.076	U	0.074	U	0.077													

Table 4c - Herbicides, Pesticides and PCBs in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-1 (1-5)		SB-1 (20-21)		SB-1 (20-21) DUH		SB-2 (1-5)		SB-2 (13-14)		SB-3 (15-16)	
LAB ID:			L1819157-07		L1819157-08		L1819157-09		L1819157-03		L1819157-04		L1819157-05	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Herbicides Units: mg/kg			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
2,4-D	--	--	0.012	U	0.0127	U	0.0129	U	0.0121	U	0.0131	U	0.0119	U
2,4,5-T	--	--	0.00589	U	0.00627	U	0.00633	U	0.00593	U	0.00643	U	0.00585	U
2,4,5-TP (Silvex)	3.8	100	0.00506	U	0.00538	U	0.00543	U	0.00509	U	0.00552	U	0.00502	U
Pesticides														
Delta-BHC	0.25	100	0.000357	U	0.000368	U	0.000386	U	0.000361	U	0.000392	U	0.00036	U
Lindane	0.1	1.3	0.00034	U	0.00035	U	0.000367	U	0.000343	U	0.000373	U	0.000342	U
Alpha-BHC	0.02	0.48	0.000216	U	0.000222	U	0.000233	U	0.000218	U	0.000237	U	0.000218	U
Beta-BHC	0.09	0.36	0.000692	U	0.000712	U	0.000748	U	0.000699	U	0.000759	U	0.000697	U
Heptachlor	0.38	2.1	0.000409	U	0.000421	U	0.000442	U	0.000413	U	0.000449	U	0.000412	U
Aldrin	0.19	0.097	0.000642	U	0.000661	U	0.000694	U	0.000649	U	0.000705	U	0.000647	U
Heptachlor epoxide	--	--	0.00102	U	0.00106	U	0.00111	U	0.00104	U	0.00113	U	0.00103	U
Endrin	0.06	11	0.000312	U	0.000321	U	0.000337	U	0.000315	U	0.000342	U	0.000314	U
Endrin aldehyde	--	--	0.000798	U	0.000821	U	0.000863	U	0.000806	U	0.000876	U	0.000804	U
Endrin ketone	--	--	0.00047	U	0.000483	U	0.000508	U	0.000474	U	0.000516	U	0.000473	U
Dieldrin	0.1	0.2	0.00057	U	0.000587	U	0.000616	U	0.000576	U	0.000626	U	0.000574	U
4,4'-DDE	17	8.9	0.000594	J	0.000434	U	0.000456	U	0.000951	J	0.000463	U	0.000425	U
4,4'-DDD	14	13	0.00065	U	0.00067	U	0.000703	U	0.000657	U	0.000714	U	0.000656	U
4,4'-DDT	136	7.9	0.00164	J	0.00151	U	0.00159	U	0.0026	J	0.00161	U	0.00148	U
Endosulfan I	102	24	0.000431	U	0.000444	U	0.000466	U	0.000435	U	0.000473	U	0.000434	U
Endosulfan II	102	24	0.000609	U	0.000627	U	0.000659	U	0.000616	U	0.000669	U	0.000614	U
Endosulfan sulfate	1000	24	0.000362	U	0.000372	U	0.000391	U	0.000365	U	0.000397	U	0.000364	U
Methoxychlor	--	--	0.00106	U	0.0011	U	0.00115	U	0.00107	U	0.00117	U	0.00107	U
Toxaphene	--	--	0.00958	U	0.00986	U	0.0104	U	0.00967	U	0.0105	U	0.00965	U
cis-Chlordane	2.9	4.2	0.000635	U	0.000654	U	0.000687	U	0.000642	U	0.000698	U	0.00064	U
trans-Chlordane	--	--	0.000602	U	0.000619	U	0.000651	U	0.000608	U	0.000661	U	0.000606	U
Chlordane	--	--	0.00604	U	0.00622	U	0.00653	U	0.0061	U	0.00663	U	0.00609	U
Polychlorinated Biphenyls														
Aroclor 1016	3.2	1	0.00422	U	0.00444	U	0.0046	U	0.00425	U	0.00476	U	0.00434	U
Aroclor 1221	3.2	1	0.00567	U	0.00595	U	0.00618	U	0.0057	U	0.00639	U	0.00582	U
Aroclor 1232	3.2	1	0.00367	U	0.00385	U	0.004	U	0.00369	U	0.00413	U	0.00376	U
Aroclor 1242	3.2	1	0.00456	U	0.00479	U	0.00497	U	0.00459	U	0.00514	U	0.00468	U
Aroclor 1248	3.2	1	0.00418	U	0.00439	U	0.00456	U	0.0042	U	0.00471	U	0.00429	U
Aroclor 1254	3.2	1	0.00304	U	0.00319	U	0.00331	U	0.00306	U	0.00343	U	0.00312	U
Aroclor 1260	3.2	1	0.00389	U	0.00408	U	0.00424	U	0.00391	U	0.00438	U	0.00399	U
Aroclor 1262	3.2	1	0.00306	U	0.00321	U	0.00334	U	0.00308	U	0.00345	U	0.00314	U
Aroclor 1268	3.2	1	0.00264	U	0.00277	U	0.00287	U	0.00265	U	0.00297	U	0.00271	U
PCBs, Total	3.2	1	0.00264	U	0.00277	U	0.00287	U	0.00265	U	0.00297	U	0.00271	U

Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

-- = Not Analyzed

Cells highlighted in yellow indicate a concentration above NY-RESGW

Cells highlighted in purple indicate a concentration above NY-RESRR

Cells highlighted in orange indicate a concentration above NY-RESGW and NY-UNRES

Cells shaded in grey indicate MDL values above NY-RESGW or NY-RESRR

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

P = The RPD between the results for the two columns exceeds the method-specified criteria.

-- = No standard

Table 4c - Herbicides, Pesticides and PCBs in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-3 (I-5)		SB-4 (0-5)		SB-4 (18-20)		SB-5 (I-2)		SB-5 (15-17)		S1-S (0-0.5)		S1-E (0-0.5)		S1-C (0.5-1)		S1-N (0.5-1.5)		S1-W (0-1)	
LAB ID:			L1819157-06		L1819157-10		L1819157-11		L1819157-01		L1819157-02		L1819157-12		L1819157-13		L1819157-14		L1819157-15		L1819157-18	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Herbicides Units: mg/kg			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
2,4-D	--	--	0.0122	U	0.0115	U	0.0114	U	0.0118	U	0.0116	U	0.0119	U	0.0117	U	0.0111	U	0.0113	U	0.012	U
2,4,5-T	--	--	0.006	U	0.00568	U	0.00563	U	0.00578	U	0.00571	U	0.00586	U	0.00575	U	0.00548	U	0.00555	U	0.0059	U
2,4,5-TP (Silvex)	3.8	100	0.00514	U	0.00487	U	0.00483	U	0.00496	U	0.0049	U	0.00502	U	0.00494	U	0.0047	U	0.00476	U	0.00506	U
Pesticides																						
Delta-BHC	0.25	100	0.000357	U	0.000353	U	0.000338	U	0.000352	U	0.000344	U	0.000349	U	0.00352	U	0.00033	U	0.000328	U	0.000755	J
Lindane	0.1	1.3	0.000339	U	0.000336	U	0.000321	U	0.000335	U	0.000327	U	0.000332	U	0.00335	U	0.000314	U	0.000312	U	0.000332	U
Alpha-BHC	0.02	0.48	0.000216	U	0.000213	U	0.000204	U	0.000213	U	0.000208	U	0.000211	U	0.00213	U	0.000199	U	0.000198	U	0.000211	U
Beta-BHC	0.09	0.36	0.000691	U	0.000683	U	0.000654	U	0.000682	U	0.000665	U	0.000675	U	0.00682	U	0.000639	U	0.000634	U	0.000675	U
Heptachlor	0.38	2.1	0.000408	U	0.000404	U	0.000387	U	0.000403	U	0.000393	U	0.000399	U	0.00403	U	0.000378	U	0.000375	U	0.000399	U
Aldrin	0.19	0.097	0.000642	U	0.000634	U	0.000608	U	0.000633	U	0.000618	U	0.000627	U	0.00634	U	0.000593	U	0.000589	U	0.000627	U
Heptachlor epoxide	--	--	0.00102	U	0.00101	U	0.000971	U	0.00101	U	0.000987	U	0.001	U	0.0101	U	0.000948	U	0.000941	U	0.001	U
Endrin	0.06	11	0.000311	U	0.000308	U	0.000295	U	0.000307	U	0.0003	U	0.000304	U	0.00307	U	0.000288	U	0.000286	U	0.000304	U
Endrin aldehyde	--	--	0.000797	U	0.000788	U	0.000755	U	0.000787	U	0.000768	U	0.000779	U	0.00787	U	0.000737	U	0.000732	U	0.000779	U
Endrin ketone	--	--	0.000469	U	0.000464	U	0.000444	U	0.000463	U	0.000452	U	0.000458	U	0.00463	U	0.000434	U	0.000431	U	0.000459	U
Dieldrin	0.1	0.2	0.00057	U	0.000563	U	0.000539	U	0.000672	J	0.000548	U	0.000556	U	0.00562	U	0.000527	U	0.000523	U	0.000556	U
4,4'-DDE	17	8.9	0.000755	J	0.000417	U	0.000399	U	0.00123	J	0.000406	U	0.00172	J	0.00416	U	0.00039	U	0.000493	J	0.0016	J
4,4'-DDD	14	13	0.00065	U	0.000642	U	0.000616	U	0.000642	U	0.000626	U	0.000635	U	0.00642	U	0.000601	U	0.000597	U	0.000635	U
4,4'-DDT	136	7.9	0.0025	J	0.00145	U	0.00139	U	0.0024	J	0.00141	U	0.00151	J	0.0145	U	0.00136	U	0.00134	U	0.00174	J
Endosulfan I	102	24	0.00043	U	0.000426	U	0.000408	U	0.000425	U	0.000415	U	0.000421	U	0.00425	U	0.000398	U	0.000395	U	0.000421	U
Endosulfan II	102	24	0.000609	U	0.000602	U	0.000577	U	0.000601	U	0.000586	U	0.000595	U	0.00601	U	0.000563	U	0.000559	U	0.000595	U
Endosulfan sulfate	1000	24	0.000361	U	0.000357	U	0.000342	U	0.000357	U	0.000348	U	0.000353	U	0.00357	U	0.000334	U	0.000332	U	0.000353	U
Methoxychlor	--	--	0.00106	U	0.00105	U	0.00101	U	0.00105	U	0.00102	U	0.00104	U	0.0105	U	0.000983	U	0.000976	U	0.00104	U
Toxaphene	--	--	0.00957	U	0.00946	U	0.00906	U	0.00944	U	0.00921	U	0.00935	U	0.0945	U	0.00885	U	0.00878	U	0.00935	U
cis-Chlordane	2.9	4.2	0.000635	U	0.000628	U	0.000601	U	0.000626	U	0.000611	U	0.00062	U	0.00627	U	0.000587	U	0.000583	U	0.00062	U
trans-Chlordane	--	--	0.000601	U	0.000594	U	0.00057	U	0.000594	U	0.000579	U	0.000588	U	0.00594	U	0.000556	U	0.000552	U	0.000588	U
Chlordane	--	--	0.00604	U	0.00597	U	0.00572	U	0.00596	U	0.00581	U	0.0059	U	0.0596	U	0.00558	U	0.00554	U	0.0059	U
Polychlorinated Biphenyls																						
Aroclor 1016	3.2	1	0.00426	U	0.0042	U	0.00411	U	0.00432	U	0.00421	U	0.00427	U	0.00428	U	0.00404	U	0.00402	U	0.00435	U
Aroclor 1221	3.2	1	0.00572	U	0.00563	U	0.00552	U	0.0058	U	0.00565	U	0.00573	U	0.00574	U	0.00542	U	0.00539	U	0.00584	U
Aroclor 1232	3.2	1	0.0037	U	0.00364	U	0.00356	U	0.00375	U	0.00365	U	0.0037	U	0.00371	U	0.0035	U	0.00348	U	0.00377	U
Aroclor 1242	3.2	1	0.0046	U	0.00453	U	0.00444	U	0.00467	U	0.00454	U	0.00461	U	0.00462	U	0.00436	U	0.00434	U	0.00469	U
Aroclor 1248	3.2	1	0.00422	U	0.00415	U	0.00407	U	0.00428	U	0.00416	U	0.00422	U	0.00423	U	0.00399	U	0.00397	U	0.0043	U
Aroclor 1254	3.2	1	0.00307	U	0.00302	U	0.00296	U	0.00311	U	0.00303	U	0.00307	U	0.00308	U	0.0029	U	0.00289	U	0.00313	U
Aroclor 1260	3.2	1	0.00392	U	0.00386	U	0.00378	U	0.00398	U	0.00388	U	0.00393	U	0.00394	U	0.00372	U	0.0037	U	0.004	U
Aroclor 1262	3.2	1	0.00309	U	0.00304	U	0.00298	U	0.00314	U	0.00305	U	0.0031	U	0.0031	U	0.00292	U	0.00291	U	0.00315	U
Aroclor 1268	3.2	1	0.00266	U	0.00262	U	0.00256	U	0.0027	U	0.00263	U	0.00356	J	0.00267	U	0.00252	U	0.00251	U	0.00271	U
PCBs, Total	3.2	1	0.00266	U	0.00262	U	0.00256	U	0.0027	U	0.00263	U	0.00356	J	0.00267	U	0.00252	U	0.00251	U	0.00271	U

Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

-- = Not Analyzed

Cells highlighted in yellow indicate a concentration above NY-RESGW

Cells highlighted in purple indicate a concentration above NY-RESRR

Cells highlighted in orange indicate a concentration above NY-RESGW and NY-UNRES

Cells shaded in grey indicate MDL values above NY-RESGW or NY-RESRR

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

P = The RPD between the results for the two columns exceeds the method-specified criteria.

-- = No standard

Table 4d - Total Metals in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-5 (1-2)		SB-5 (15-17)		SB-2 (1-5)		SB-2 (13-14)		SB-3 (15-16)		SB-3 (1-5)	
LAB ID:			L1819157-01		L1819157-02		L1819157-03		L1819157-04		L1819157-05		L1819157-06	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Total Metals														
Units: mg/kg			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Aluminum, Total	--	--	13500		20400		11700		8200		31500		12900	
Antimony, Total	--	--	0.344	U	0.377	J	0.353	U	0.367	U	0.47	J	34.1	
Arsenic, Total	16	16	3.44		1.74	U	1.62		0.201	U	0.184	U	2.54	J
Barium, Total	820	400	53.7		352		26.6		55.2		388		153	
Beryllium, Total	47	72	0.353	J	0.612		0.306	J	0.27	J	0.709		0.363	J
Cadmium, Total	7.5	4.3	0.434	J	0.906		0.39	J	0.212	J	0.168	J	7.56	
Calcium, Total	--	--	1250		1620		765		1500		1730		2370	
Chromium, Total	--	--	24.6		57.9		26.8		10.4		15.1		30.8	
Cobalt, Total	--	--	8.74		25.1		7.74		13.8		6.45		161	
Copper, Total	1720	270	16.7		42.2		14.2		0.249	U	0.228	U	37.5	
Cyanide, Total	40	27	0.23	U	0.23	U	0.24	U	0.25	U	0.24	U	0.25	U
Chromium, Hexavalent	19	110	0.184	U	0.179	U	0.188	U	0.203	U	0.185	U	0.19	U
Iron, Total	--	--	21200		41900		19800		11000		9780		24900	
Lead, Total	450	400	32.5		18.8		10.4		10.3		1.12	J	1110	
Magnesium, Total	--	--	2200		11600		2440		3590		1020		4650	
Manganese, Total	2000	2000	239		981		232		636		320		585	
Mercury, Total	0.73	0.81	0.036	J	0.015	U	0.279		0.017	U	0.015	U	0.297	
Nickel, Total	130	310	11.2		41.9		12.9		11.8		214		276	
Potassium, Total	--	--	722		14800		908		4030		491		4730	
Selenium, Total	4	180	1.43	J	1.84		1.11	J	0.483	J	0.868	J	13.9	
Silver, Total	8.3	180	0.256	U	0.237	U	0.263	U	0.273	U	0.251	U	0.257	U
Sodium, Total	--	--	657		275		300		62	J	224		256	
Thallium, Total	--	--	0.398	J	0.264	U	0.292	U	0.541	J	0.549	J	0.286	U
Vanadium, Total	--	--	30.9		75.9		35.8		10.9		14.1		46.2	
Zinc, Total	2480	10000	37.6		82.6		28.2		33.4		16.1		1290	

Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

- = Not Analyzed

Cells highlighted in yellow indicate a concentration above NY-RESGW

Cells highlighted in purple indicate a concentration above NY-RESRR

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For U qualified entries, the MDL is shown

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J = estimated value, indicating the detected value is below the RL, but above the MDL

P = The RPD between the results for the two columns exceeds the method-specified criteria.

-- = No standard

Table 4d - Total Metals in Soil
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-RESGW	NY-RESRR	SB-1 (1-5)		SB-1 (20-21)		SB-1 (20-21) DU		SB-4 (0-5)		SB-4 (18-20)		S1-S (0-0.5)		S1-E (0-0.5)		S1-C (0.5-1)		S1-N (0.5-1.5)		S1-W (0-1)	
LAB ID:			L1819157-07		L1819157-08		L1819157-09		L1819157-10		L1819157-11		L1819157-12		L1819157-13		L1819157-14		L1819157-15		L1819157-18	
COLLECTION DATE:			5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Total Metals Units: mg/kg			Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Aluminum, Total	--	--	16700		18100		22900		11700		14800		13500		7150		28700		17000		4890	
Antimony, Total	--	--	0.343	U	0.349	U	0.366	U	0.341	U	0.322	U	0.705	J	0.771	J	0.347	J	0.364	J	0.573	J
Arsenic, Total	16	16	0.442	J	0.191	U	0.2	U	0.681	J	0.176	U	6.39		8.66		0.176	U	0.18	U	5.44	
Barium, Total	820	400	192		257		348		63.3		208		292		349		598		273		190	
Beryllium, Total	47	72	0.406	J	0.533		0.655		0.412	J	0.322	J	0.54		0.29	J	0.516		0.268	J	0.37	J
Cadmium, Total	7.5	4.3	0.686	J	0.68	J	0.761	J	0.358	J	0.593	J	0.558	J	0.581	J	0.888		0.476	J	0.472	J
Calcium, Total	--	--	1760		1990		2320		1190		1210		9180		16400		3130		4800		8120	
Chromium, Total	--	--	41.1		109		109		20.7		24.2		34.2		25.8		127		65.1		11.1	
Cobalt, Total	--	--	19.5		25.1		31.5		8.59		18.9		13.4		9.87		39.5		17.8		6.85	
Copper, Total	1720	270	103		6.08		4.84		25.8		4.42		39.6		51.7		13.5		42.6		41.3	
Cyanide, Total	40	27	0.23	U	0.25	U	0.26	U	0.23	U	0.22	U	0.23	U	0.22	U	0.22	U	0.21	U	0.23	U
Chromium, Hexavalent	19	110	0.184	U	0.195	U	0.198	U	0.181	U	0.178	U	0.184	U	0.183	U	0.171	U	0.175	U	0.187	U
Iron, Total	--	--	31200		35500		39000		17900		28900		19400		11400		44600		23600		13000	
Lead, Total	450	400	64		2.06	J	2.24	J	7.4		6.47		53.8		111		22.1		8.92		56.6	
Magnesium, Total	--	--	6860		13300		16500		2730		7710		7560		7130		21100		10800		3390	
Manganese, Total	2000	2000	630		1130		1140		254		374		281		185		1050		427		149	
Mercury, Total	0.73	0.81	0.174		0.016	U	0.017	U	0.042	J	0.015	U	0.047	J	0.045	J	0.014	U	0.015	U	0.064	J
Nickel, Total	130	310	34.2		78		92.9		13.2		21.5		32.7		30.4		101		57.1		15.7	
Potassium, Total	--	--	7720		9690		12400		1850		11000		5080		3020		17200		6980		1570	
Selenium, Total	4	180	1.63	J	1.36	J	1.65	J	1.11	J	0.949	J	1.99		2.01		1.53	J	1.08	J	1.28	J
Silver, Total	8.3	180	0.256	U	0.26	U	0.273	U	0.254	U	0.24	U	0.259	U	0.257	U	0.239	U	0.245	U	0.262	U
Sodium, Total	--	--	302		173	J	217		196		121	J	232		256		358		283		206	
Thallium, Total	--	--	0.284	U	0.289	U	0.304	U	0.282	U	0.267	U	0.288	U	0.327	J	0.266	U	0.273	U	0.324	J
Vanadium, Total	--	--	81.1		57.8		69		28.7		37.9		84.8		85.9		87.4		45.1		36.8	
Zinc, Total	2480	10000	88.4		51.9		61.6		29		78		108		146		78.2		42.9		90	

Notes:

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

- = Not Analyzed

Cells highlighted in yellow indicate a concentration above NY-RESGW

Cells highlighted in purple indicate a concentration above NY-RESRR

Cells highlighted in orange indicate a concentration above NY-RESGW and NY-UNRES

Cells shaded in grey indicate MDL values above NY-RESGW or NY-RESRR

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

P = The RPD between the results for the two columns exceeds the method-specified criteria.

-- = No standard

Table Sa - Volatile Organic Compounds in Groundwater
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-AWQS	MW-3S		MW-2		MW-4B		MW-4B DUP		MW-4S		MW-1B		MW-1		TRIP BLANK	
LAB ID:		L1826668-01		L1826668-02		L1826668-03		L1826668-04		L1826668-05		L1826668-07		L1826668-08		L1826668-09	
COLLECTION DATE:		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018	
Volatile Organic Compounds Units: ug/l		Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Methylene chloride	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,1-Dichloroethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Chloroform	7	0.71	J	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Carbon tetrachloride	5	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	2.7	U	2.7	U	0.13	U
1,2-Dichloropropane	1	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	2.7	U	2.7	U	0.14	U
Dibromochloromethane	50	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	3	U	3	U	0.15	U
1,1,2-Trichloroethane	1	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	10	U	10	U	0.5	U
Tetrachloroethene	5	5.6		8		0.18	U	0.18	U	0.18	U	800		1300		0.18	U
Chlorobenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Trichlorofluoromethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2-Dichloroethane	0.6	0.13	U	0.47	J	0.13	U	0.13	U	0.13	U	2.6	U	2.6	U	0.13	U
1,1,1-Trichloroethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Bromodichloromethane	50	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	3.8	U	3.8	U	0.19	U
trans-1,3-Dichloropropene	0.4	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	3.3	U	3.3	U	0.16	U
cis-1,3-Dichloropropene	0.4	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	2.9	U	2.9	U	0.14	U
1,3-Dichloropropene, Total		0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	2.9	U	2.9	U	0.14	U
1,1-Dichloropropene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Bromoform	50	0.65	U	0.65	U	0.65	U	0.65	U	0.65	U	13	U	13	U	0.65	U
1,1,2,2-Tetrachloroethane	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	3.3	U	3.3	U	0.17	U
Benzene	1	0.16	U	1.1		0.16	U	0.16	U	0.16	U	3.2	U	3.2	U	0.16	U
Toluene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Ethylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Chloromethane		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Bromomethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Vinyl chloride	2	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	2.9	J	1.4	U	0.07	U
Chloroethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,1-Dichloroethene	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	3.4	U	3.4	U	0.17	U
trans-1,2-Dichloroethene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	76		14	U	0.7	U
Trichloroethene	5	0.48	J	27		0.2	J	0.18	U	0.18	U	1900		170		0.18	U
1,2-Dichlorobenzene	3	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,3-Dichlorobenzene	3	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,4-Dichlorobenzene	3	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Methyl tert butyl ether	10	0.7	U	5		0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
p/m-Xylene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
o-Xylene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Xylenes, Total		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
cis-1,2-Dichloroethene	5	0.7	U	46		0.7	U	0.7	U	0.7	U	420		47	J	0.7	U
1,2-Dichloroethene, Total		0.7	U	46		0.7	U	0.7	U	0.7	U	500		47	J	0.7	U
Dibromomethane	5	1	U	1	U	1	U	1	U	1	U	20	U	20	U	1	U
1,2,3-Trichloropropane	0.04	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Acrylonitrile	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	30	U	30	U	1.5	U
Styrene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Dichlorodifluoromethane	5	1	U	1	U	1	U	1	U	1	U	20	U	20	U	1	U
Acetone	50	7.8		2.3	J	1.9	J	3	J	3.3	J	29	U	29	U	3	J
Carbon disulfide	60	1	U	1	U	1	U	1	U	1.1	J	20	U	20	U	1	U
2-Butanone	50	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U	39	U	39	U	1.9	U
Vinyl acetate		1	U	1	U	1	U	1	U	1	U	20	U	20	U	1	U
4-Methyl-2-pentanone		1	U	1	U	1	U	1	U	1	U	20	U	20	U	1	U
2-Hexanone	50	1	U	1	U	1	U	1	U	1	U	20	U	20	U	1	U
Bromochloromethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
2,2-Dichloropropane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2-Dibromoethane	0.0006	0.65	U	0.65	U	0.65	U	0.65	U	0.65	U	13	U	13	U	0.65	U
1,3-Dichloropropane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,1,1,2-Tetrachloroethane	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Bromobenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
n-Butylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
sec-Butylbenzene	5	0.7	U	0.7	U	0.82	J	0.85	J	0.7	U	14	U	14	U	0.7	U
tert-Butylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
o-Chlorotoluene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
p-Chlorotoluene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2-Dibromo-3-chloropropane	0.04	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Hexachlorobutadiene	0.5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Isopropylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
p-Isopropyltoluene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Naphthalene	10	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
n-Propylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2,3-Trichlorobenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2,4-Trichlorobenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,3,5-Trimethylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2,4-Trimethylbenzene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,4-Dioxane		61	U	61	U	61	U	61	U	61	U	1200	U	1200	U	61	U
p-Diethylbenzene		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
p-Ethyltoluene		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
1,2,4,5-Tetramethylbenzene	5	0.54	U	0.54	U	0.54	U	0.54	U	0.54	U	11	U	11	U	0.54	U
Ethyl ether		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
trans-1,4-Dichloro-2-butene	5	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	14	U	14	U	0.7	U
Total VOCs		14.59	-	89.87	-	2.92	-	3.85	-	4.4	-	3198.9	-	1517	-	3	-

Notes:

NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 200:

MDL = Maximum Detection Limit

Conc = Concentration

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- = Not Analyzed

Cells highlighted in yellow indicate concentrations above NY-AWQS

Cells shaded in grey indicate MDL values above NY-AWQS

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

-- = No standard

Table 5b - Semivolatile Organic Compounds in Groundwater
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-AWQS	MW-1B		MW-1	
LAB ID:		L1826668-07		L1826668-08	
COLLECTION DATE:		7/12/2018		7/12/2018	
Semivolatile Organic Compounds		Conc	Q	Conc	Q
Units: ug/l					
1,2,4-Trichlorobenzene	5	0.5	U	0.5	U
Bis(2-chloroethyl)ether	1	0.5	U	0.5	U
1,2-Dichlorobenzene	3	0.45	U	0.45	U
1,3-Dichlorobenzene	3	0.4	U	0.4	U
1,4-Dichlorobenzene	3	0.43	U	0.43	U
3,3'-Dichlorobenzidine	5	1.6	U	1.6	U
2,4-Dinitrotoluene	5	1.2	U	1.2	U
2,6-Dinitrotoluene	5	0.93	U	0.93	U
4-Chlorophenyl phenyl ether		0.49	U	0.49	U
4-Bromophenyl phenyl ether		0.38	U	0.38	U
Bis(2-chloroisopropyl)ether	5	0.53	U	0.53	U
Bis(2-chloroethoxy)methane	5	0.5	U	0.5	U
Hexachlorocyclopentadiene	5	0.69	U	0.69	U
Isophorone	50	1.2	U	1.2	U
Nitrobenzene	0.4	0.77	U	0.77	U
NDPA/DPA	50	0.42	U	0.42	U
n-Nitrosodi-n-propylamine		0.64	U	0.64	U
Bis(2-ethylhexyl)phthalate	5	1.5	U	1.5	U
Butyl benzyl phthalate	50	1.2	U	1.2	U
Di-n-butylphthalate	50	0.39	U	0.39	U
Di-n-octylphthalate	50	1.3	U	1.3	U
Diethyl phthalate	50	0.38	U	0.38	U
Dimethyl phthalate	50	1.8	U	1.8	U
Biphenyl		0.46	U	0.46	U
4-Chloroaniline	5	1.1	U	1.1	U
2-Nitroaniline	5	0.5	U	0.5	U
3-Nitroaniline	5	0.81	U	0.81	U
4-Nitroaniline	5	0.8	U	0.8	U
Dibenzofuran		0.5	U	0.5	U
1,2,4,5-Tetrachlorobenzene	5	0.44	U	0.44	U
Acetophenone		0.53	U	0.53	U
2,4,6-Trichlorophenol		0.61	U	0.61	U
p-Chloro-m-cresol		0.35	U	0.35	U
2-Chlorophenol		0.48	U	0.48	U
2,4-Dichlorophenol	1	0.41	U	0.41	U
2,4-Dimethylphenol	50	1.8	U	1.8	U
2-Nitrophenol		0.85	U	0.85	U
4-Nitrophenol		0.67	U	0.67	U
2,4-Dinitrophenol	10	6.6	U	6.6	U
4,6-Dinitro-o-cresol		1.8	U	1.8	U
Phenol	1	0.57	U	0.57	U
2-Methylphenol		0.49	U	0.49	U
3-Methylphenol/4-Methylphenol		0.48	U	0.48	U
2,4,5-Trichlorophenol		0.77	U	0.77	U
Benzoic Acid		21	J	2.6	U
Benzyl Alcohol		0.59	U	0.59	U
Carbazole		0.49	U	0.49	U
Acenaphthene	20	0.01	U	0.01	U
2-Chloronaphthalene	10	0.02	U	0.02	U
Fluoranthene	50	0.22		0.02	U
Hexachlorobutadiene	0.5	0.05	U	0.05	U
Naphthalene	10	0.24		0.05	U
Benzo(a)anthracene	0.002	0.06	J	0.02	U
Benzo(a)pyrene	0	0.02	U	0.02	U
Benzo(b)fluoranthene	0.002	0.01	U	0.01	U
Benzo(k)fluoranthene	0.002	0.01	U	0.01	U
Chrysene	0.002	0.05	J	0.01	U
Acenaphthylene		0.01	U	0.01	U
Anthracene	50	0.03	J	0.01	U
Benzo(ghi)perylene		0.01	U	0.01	U
Fluorene	50	0.04	J	0.18	
Phenanthrene	50	0.14		0.02	U
Dibenzo(a,h)anthracene		0.01	U	0.01	U
Indeno(1,2,3-cd)pyrene	0.002	0.01	U	0.01	U
Pyrene	50	0.24		0.02	U
2-Methylnaphthalene		0.07	J	0.02	U
Pentachlorophenol	1	0.01	U	0.01	U
Hexachlorobenzene	0.04	0.01	U	0.01	U
Hexachloroethane	5	0.06	U	0.06	U

Notes:

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MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

- = Not Analyzed

Cells highlighted in yellow indicate concentrations above NY-AWQS

Cells shaded in grey indicate MDL values above NY-AWQS

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

-- = No standard

Table 5c - Pesticides and PCBs in Groundwater
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-AWQS	MW-1B		MW-1	
LAB ID:		L1826668-07		L1826668-08	
COLLECTION DATE:		7/12/2018		7/12/2018	
Chlorinated Herbicides Units: ug/l		Conc	Q	Conc	Q
2,4-D	50	0.524	U	0.524	U
2,4,5-T	35	0.559	U	0.559	U
2,4,5-TP (Silvex)		0.567	U	0.567	U
Pesticides					
Delta-BHC	0.04	0.003	U	0.003	U
Lindane	0.05	0.003	U	0.003	U
Alpha-BHC	0.01	0.003	U	0.003	U
Beta-BHC	0.04	0.004	U	0.004	U
Heptachlor	0.04	0.002	U	0.002	U
Aldrin	0	0.002	U	0.002	U
Heptachlor epoxide	0.03	0.003	U	0.003	U
Endrin	0	0.003	U	0.003	U
Endrin aldehyde	5	0.006	U	0.006	U
Endrin ketone	5	0.003	U	0.003	U
Dieldrin	0.004	0.003	U	0.021	J
4,4'-DDE	0.2	0.003	U	0.003	U
4,4'-DDD	0.3	0.003	U	0.003	U
4,4'-DDT	0.2	0.003	U	0.003	U
Endosulfan I		0.002	U	0.002	U
Endosulfan II		0.004	U	0.004	U
Endosulfan sulfate		0.003	U	0.003	U
Methoxychlor	35	0.005	U	0.005	U
Toxaphene	0.06	0.045	U	0.045	U
cis-Chlordane		0.005	U	0.005	U
trans-Chlordane		0.004	U	0.004	U
Chlordane	0.05	0.033	U	0.033	U
Polychlorinated Biphenyls					
Aroclor 1016	0.09	0.034	U	0.034	U
Aroclor 1221	0.09	0.067	U	0.067	U
Aroclor 1232	0.09	0.046	U	0.046	U
Aroclor 1242	0.09	0.039	U	0.039	U
Aroclor 1248	0.09	0.049	U	0.049	U
Aroclor 1254	0.09	0.039	U	0.039	U
Aroclor 1260	0.09	0.032	U	0.032	U
Aroclor 1262	0.09	0.035	U	0.035	U
Aroclor 1268	0.09	0.034	U	0.034	U
PCBs, Total		0.032	U	0.032	U

Notes:

NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004

MDL = Maximum Detection Limit

Conc = Concentration

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Cells highlighted in yellow indicate concentrations above NY-AWQS

Cells shaded in grey indicate MDL values above NY-AWQS

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

-- = No standard

Table 5d - Total and Dissolved Metals in Groundwater
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	NY-AWQS	MW-1B		MW-1	
LAB ID:		L1826668-07		L1826668-08	
COLLECTION DATE:		7/12/2018		7/12/2018	
Dissolved Metals Units: ug/l		Conc	Q	Conc	Q
Aluminum, Dissolved		3.27	U	3.27	U
Antimony, Dissolved	3	2.56	J	0.42	U
Arsenic, Dissolved	25	0.16	U	0.16	U
Barium, Dissolved	1000	54.16		90.48	
Beryllium, Dissolved	3	0.1	U	0.1	U
Cadmium, Dissolved	5	0.05	U	0.05	U
Calcium, Dissolved		53500		116000	
Chromium, Dissolved	50	0.17	U	0.17	U
Cobalt, Dissolved		0.2	J	5.38	
Copper, Dissolved	200	0.38	U	0.38	U
Iron, Dissolved	300	19.1	U	1530	
Lead, Dissolved	25	0.34	U	0.34	U
Magnesium, Dissolved	35000	23300		69700	
Manganese, Dissolved	300	750.1		1718	
Mercury, Dissolved	0.7	0.06	U	0.06	U
Nickel, Dissolved	100	0.78	J	13.88	
Potassium, Dissolved		17600		10400	
Selenium, Dissolved	10	1.73	U	2.37	J
Silver, Dissolved	50	0.16	U	0.16	U
Sodium, Dissolved	20000	33100		65100	
Thallium, Dissolved	0.5	0.14	U	0.14	U
Vanadium, Dissolved		1.57	U	1.57	U
Zinc, Dissolved	2000	830.2		3.41	U
Total Metals					
Aluminum, Total		165		208	
Antimony, Total	3	5.26		0.46	J
Arsenic, Total	25	0.16	U	0.16	U
Barium, Total	1000	69.77		99.22	
Beryllium, Total	3	0.1	U	0.1	U
Cadmium, Total	5	0.07	J	0.05	U
Calcium, Total		71400		110000	
Chromium, Total	50	0.17	U	0.17	U
Cobalt, Total		1.11		5.74	
Copper, Total	200	4.42		0.7	J
Iron, Total	300	608		9650	
Lead, Total	25	0.45	J	0.34	U
Magnesium, Total	35000	28500		72400	
Manganese, Total	300	2373		1686	
Mercury, Total	0.7	0.06	U	0.06	U
Nickel, Total	100	4.85		13.54	
Potassium, Total		12200		10100	
Selenium, Total	10	1.73	U	2.28	J
Silver, Total	50	0.38	J	0.16	U
Sodium, Total	20000	34200		76400	
Thallium, Total	0.5	0.14	U	0.14	U
Vanadium, Total		1.57	U	1.57	U
Zinc, Total	2000	5352		11.5	

Notes:

NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June

MDL = Maximum Detection Limit

Conc = Concentration

Q = Laboratory Data Qualifier

- = Not Analyzed

Cells highlighted in yellow indicate concentrations above NY-AWQS

Cells shaded in grey indicate MDL values above NY-AWQS

For U qualified entries, the MDL is shown

U = not detected at or above the MDL

For J qualified entries, the estimated concentration is shown

J = estimated value, indicating the detected value is below the RL, but above the MDL

-- = No standard

Table 6 – On-Site Exterior Soil Vapor and Ambient Air Results
2135 Westchester Avenue - Bronx, NY
BCP Site No. C203093

SAMPLE ID:	AMBIENT		SV-1		SV-2		SV-4		SV-3		SV-5		SV-6		SV-7	
LAB ID:	L1826620-10		L1826620-01		L1826620-02		L1826620-03		L1826620-04		L1826620-05		L1826620-06		L1826620-07	
COLLECTION DATE:	7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018		7/12/2018	
Volatile Organic Compounds in Air Units: ug/m3	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q	Conc	Q
Dichlorodifluoromethane	1.98		2.05		4.94	U	4.94	U	4.94	U	4.94	U	9.89	U	4.94	U
Chloromethane	0.869		3.61		2.07	U	2.07	U	11.7		2.91		19		2.11	
Freon-114	1.4	U	2.8	U	6.99	U	6.99	U	6.99	U	6.99	U	14	U	6.99	U
Vinyl chloride	0.051	U	1.02	U	2.56	U	2.56	U	2.56	U	2.56	U	5.11	U	2.56	U
1,3-Butadiene	0.442	U	0.885	U	2.21	U	2.21	U	2.21	U	2.21	U	4.42	U	2.21	U
Bromomethane	0.777	U	1.55	U	3.88	U	3.88	U	3.88	U	3.88	U	7.77	U	3.88	U
Chloroethane	0.528	U	1.06	U	2.64	U	2.64	U	2.64	U	2.64	U	5.28	U	2.64	U
Ethanol	10.5		313		439		65.6		569		300		258		251	
Vinyl bromide	0.874	U	1.75	U	4.37	U	4.37	U	4.37	U	4.37	U	8.74	U	4.37	U
Acetone	9.05		784		347		238		1230		791		3820		1380	
Trichlorofluoromethane	1.13		2.25	U	5.62	U	5.62	U	5.62	U	5.62	U	11.2	U	5.62	U
Isopropanol	1.79		14.9		7.57		6.15	U	22.4		7.69		20.8		8.01	
1,1-Dichloroethene	0.079	U	1.59	U	3.96	U	3.96	U	3.96	U	3.96	U	7.93	U	3.96	U
Tertiary butyl Alcohol	1.52	U	98.2		40		24.7		91.9		52.7		55.8		25.1	
Methylene chloride	1.74	U	3.47	U	8.69	U	8.69	U	8.69	U	8.69	U	17.4	U	8.69	U
3-Chloropropene	0.626	U	1.25	U	3.13	U	3.13	U	3.13	U	3.13	U	6.26	U	3.13	U
Carbon disulfide	0.623	U	11.6		4.73		3.11	U	9.09		138		383		92.8	
Freon-113	1.53	U	3.07	U	7.66	U	7.66	U	7.66	U	7.66	U	15.3	U	7.66	U
trans-1,2-Dichloroethene	0.793	U	1.59	U	3.96	U	3.96	U	3.96	U	3.96	U	7.93	U	3.96	U
1,1-Dichloroethane	0.809	U	1.62	U	4.05	U	4.05	U	4.05	U	4.05	U	8.09	U	4.05	U
Methyl tert butyl ether	0.721	U	1.44	U	3.61	U	3.61	U	3.61	U	3.61	U	7.21	U	3.61	U
2-Butanone	1.47	U	102		202		137		106		87.9		137		73.1	
cis-1,2-Dichloroethene	0.079	U	1.59	U	3.96	U	3.96	U	3.96	U	3.96	U	7.93	U	3.96	U
Ethyl Acetate	1.8	U	3.6	U	9.01	U	9.01	U	9.01	U	9.01	U	18	U	9.01	U
Chloroform	0.977	U	1.95	U	4.88	U	4.88	U	8.4		34.7		9.77	U	80.6	
Tetrahydrofuran	1.47	U	2.95	U	7.37	U	7.37	U	7.37	U	7.37	U	14.7	U	7.37	U
1,2-Dichloroethane	0.809	U	1.62	U	4.05	U	4.05	U	4.05	U	4.05	U	8.09	U	4.05	U
n-Hexane	0.705	U	2.29		3.52	U	3.52	U	3.52	U	3.52	U	53.2		3.52	U
1,1,1-Trichloroethane	0.109	U	2.18	U	5.46	U	5.46	U	5.46	U	5.46	U	10.9	U	5.46	U
Benzene	0.639	U	16.1		9.71		6.49		8.95		51.8		14.6		7.28	
Carbon tetrachloride	0.465		2.52	U	6.29	U	6.29	U	6.29	U	6.29	U	12.6	U	6.29	U
Cyclohexane	0.688	U	1.38	U	3.44	U	3.44	U	3.44	U	3.44	U	24.9		6.13	
1,2-Dichloropropane	0.924	U	1.85	U	4.62	U	4.62	U	4.62	U	4.62	U	9.24	U	4.62	U
Bromodichloromethane	1.34	U	2.68	U	6.7	U	6.7	U	6.7	U	6.7	U	13.4	U	6.7	U
1,4-Dioxane	0.721	U	1.44	U	3.6	U	3.6	U	3.6	U	3.6	U	7.21	U	3.6	U
Trichloroethene	3.42		3.04		5.37	U	5.37	U	5.37	U	5.37	U	10.7	U	5.37	U
2,2,4-Trimethylpentane	0.934	U	1.87	U	4.67	U	4.67	U	4.67	U	5.18		35.3		10.2	
Heptane	0.82	U	2.52		4.1	U	4.1	U	4.1	U	4.34		15.8		4.1	U
cis-1,3-Dichloropropene	0.908	U	1.82	U	4.54	U	4.54	U	4.54	U	4.54	U	9.08	U	4.54	U
4-Methyl-2-pentanone	2.05	U	4.18		10.2	U	10.2	U	10.2	U	10.2	U	20.5	U	10.2	U
trans-1,3-Dichloropropene	0.908	U	1.82	U	4.54	U	4.54	U	4.54	U	4.54	U	9.08	U	4.54	U
1,1,2-Trichloroethane	1.09	U	2.18	U	5.46	U	5.46	U	5.46	U	5.46	U	10.9	U	5.46	U
Toluene	0.829		4.71		4.07		3.77	U	3.77	U	4.86		7.54	U	4.67	
2-Hexanone	0.82	U	19.1		12.9		12		16.3		13.2		20.4		11.6	
Dibromochloromethane	1.7	U	3.41	U	8.52	U	8.52	U	8.52	U	8.52	U	17	U	8.52	U
1,2-Dibromoethane	1.54	U	3.07	U	7.69	U	7.69	U	7.69	U	7.69	U	15.4	U	7.69	U
Tetrachloroethene	0.251		2.71	U	6.78	U	6.78	U	11.4		21.4		13.6	U	33.6	
Chlorobenzene	0.921	U	1.84	U	4.61	U	4.61	U	4.61	U	4.61	U	9.21	U	4.61	U
Ethylbenzene	0.869	U	1.74	U	4.34	U	4.34	U	4.34	U	4.34	U	8.69	U	4.34	U
p/m-Xylene	1.74	U	3.47	U	8.69	U	8.69	U	8.69	U	8.69	U	17.4	U	8.69	U
Bromoform	2.07	U	4.14	U	10.3	U	10.3	U	10.3	U	10.3	U	20.7	U	10.3	U
Styrene	0.852	U	1.7	U	4.26	U	4.26	U	4.26	U	4.26	U	8.52	U	4.26	U
1,1,2,2-Tetrachloroethane	1.37	U	2.75	U	6.87	U	6.87	U	6.87	U	6.87	U	13.7	U	6.87	U
o-Xylene	0.869	U	1.74	U	4.34	U	4.34	U	4.34	U	4.34	U	8.69	U	4.34	U
4-Ethyltoluene	0.983	U	1.97	U	4.92	U	4.92	U	4.92	U	4.92	U	9.83	U	4.92	U
1,3,5-Trimethylbenzene	0.983	U	1.97	U	4.92	U	4.92	U	4.92	U	4.92	U	9.83	U	4.92	U
1,2,4-Trimethylbenzene	0.983	U	1.97	U	4.92	U	4.92	U	4.92	U	4.92	U	9.83	U	4.92	U
Benzyl chloride	1.04	U	2.07	U	5.18	U	5.18	U	5.18	U	5.18	U	10.4	U	5.18	U
1,3-Dichlorobenzene	1.2	U	2.4	U	6.01	U	6.01	U	6.01	U	6.01	U	12	U	6.01	U
1,4-Dichlorobenzene	1.2	U	2.4	U	6.01	U	6.01	U	6.01	U	6.01	U	12	U	6.01	U
1,2-Dichlorobenzene	1.2	U	2.4	U	6.01	U	6.01	U	6.01	U	6.01	U	12	U	6.01	U
1,2,4-Trichlorobenzene	1.48	U	2.97	U	7.42	U	7.42	U	7.42	U	7.42	U	14.8	U	7.42	U
Hexachlorobutadiene	2.13	U	4.27	U	10.7	U	10.7	U	10.7	U	10.7	U	21.3	U	10.7	U

Notes:

Cells highlighted in yellow indicate concentrations above the Ambient Air Concentration

Q = Laboratory Data Qualifier

For U qualified entries, the RL is shown

RL = Reporting Limit

Results and RL values are in micrograms per cubic meter (ug/m3)

2135 Westchester Avenue - Bronx, NY

BCP Site #C203093

Table 7

Estimated Remedial Costs

Alternative 1: Track 2 Soil Cleanup Objectives (SCOs) with Hot-Spot Excavation for PCE, groundwater remediation and temporary soil vapor remediation		
<i>Remedial Tasks</i>		
Pilot Test and Installation of SSDS	\$55,000	Pilot test and installation of temporary SSDS prior to the start of the Remedial Action
Remedial Oversight and Design	\$140,000	Remedial oversight of excavation and CAMP equipment rental (24 weeks)
Soil Disposal	\$250,000	Soil characterization sampling; off-site disposal of 7,166 SF by 12 ft deep and 7,234 SF by 2 ft deep (3,750 CY, 5,250 tons) @ \$40/ton
Labor and Equipment	\$800,000	Excavate and install foundation, install waterproofing membrane/vapor barrier and concrete cap with HAZWOPER-trained laborers; estimated 24 weeks
End-point Sampling	\$25,000	34 full-scan samples, 8 samples for VOC analysis, QA/QC samples, DUSR
Groundwater Remediation	\$80,000	In-situ liquid activated carbon and ISCR
Groundwater Sampling	\$8,000	Labor, equipment and laboratory analysis to confirm dosing
Monitoring Well Installation	\$3,000	Install two post-remedial groundwater monitoring wells on sidewalks adjacent to the Site
<i>Post-Remedial Reporting and Long-term Groundwater Monitoring</i>		
Reporting (FER, SMP)	\$60,000	Reporting
Long-term Groundwater Monitoring	\$40,000	Eight quarters of groundwater sampling for VOCs from four wells; annual reporting

Estimated Remedial Costs \$1,361,000

Estimated Reporting and Long-Term Monitoring Costs \$100,000

Total Estimated Remedial Costs \$1,461,000

2135 Westchester Avenue - Bronx, NY
BCP Site #C203093
Table 8
Remedial Action Construction Schedule

Milestone	Weeks from Remedial Action Start	Duration (weeks)	Estimated Date
Approval of RAWP	--	0	1/1/2020
Fact Sheet Announcing Start of Remedial Action	0	1	1/8/2020
Temporary SSDS Installation	2	1	1/15/2020
Groundwater Remedy Pilot Test	3	1	1/22/2020
Mobilization	15	12	4/15/2020
Remedial Action (Excavation, Vapor Barrier and Foundation Installation, Groundwater Treatment)	39	24	9/30/2020
Submittal of Draft Site Management Plan (SMP)	45	--	11/11/2020
Submittal of Draft Final Engineering Report (FER)	45	--	11/11/2020
Initial Groundwater Sampling	51	--	12/23/2020
Second Round of Groundwater Sampling	63	--	3/17/2021
Submit Final Engineering Report (FER)	65	--	3/31/2021
Obtain Certificate of Completion (COC)	67	--	4/14/2021

2135 Westchester Avenue - Bronx, NY

BCP Site #C203093

Table 9

Required Permits

Permit	Law, Statute or Code	Contact
Underground Injection Control (UIC) Permit	40 CFR 144-147	USEPA Region 2, Nicole Kraft, (212) 637-3093

Appendix A

NYSDOH Generic Community Air Monitoring Plan

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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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

Construction Health and Safety Plan

Health and Safety Plan
for
2135 Westchester Avenue
Remedial Action Work Plan

2135 Westchester Avenue
Bronx, NY 10462
Bronx County
Block 3934, Lot 1
Site No. C203093

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B
1 Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101

Prepared for:
C Plus Realty, LLC
2135 Westchester Avenue
Bronx, NY 10462

Prepared by:



121 West 27th Street, Suite 702
New York, NY 10001

June 2019

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Appendices

Appendix A – Acknowledgement of HASP

Appendix B – Injury Reporting Form (OSHA Form 300)

Appendix C – Material Safety Data Sheets

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 Investigation Work Plan (RIWP).

The Site is located at 2135 Westchester Avenue in the Parkchester neighborhood of the Bronx, New York. The Site is an irregularly-shaped parcel, identified by the New York City Department of Finance Office as Block 3934, Lot 1 with an area of approximately 0.33 acres. The Site is located at the corner of Westchester Avenue and Purdy Street in Bronx Community Board 9.

The Site is currently improved with a one-story building with a basement, a portion of which is operating as a self-service laundromat. The eastern portion of the building, a former dry cleaner, is vacant.

1.1 Scope of HASP

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

- Implementation of remedial oversight and air monitoring activities;
- Collection of soil samples from grab samples; and
- Collection of post-remedial groundwater samples from permanent monitoring wells.

Contractors performing remedial construction work will ensure that performance of the work is in compliance with this CHASP and applicable laws and regulations. The CHASP pertains to remedial and invasive work performed at the Site.

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) – Claire Zaccheo

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 uses of the Site include a funeral parlor and dry cleaner. The findings of the Limited Phase II Subsurface Investigations conducted in 2015 and the Remedial Investigation (RI) conducted in 2018 indicate the following:

Geology/Hydrogeology

- The Site is underlain by silt and sand to bedrock, which is encountered between 14 and 21 feet below grade (ft-bg). Bedrock is dipping to the east-northeast based on Site observations and USGS bedrock contours.
- Perched groundwater was encountered between approximately twelve and 13 ft-bg and flows in an easterly direction. Groundwater was not encountered along Westchester Avenue or in the western portion of the parking lot.
- Groundwater was encountered in two bedrock wells at approximately 12 ft-bg.

Chlorinated Solvents

- PCE impacts were detected in soil, groundwater, and soil vapor.
- The results of historic sampling and the RI indicate that there is a PCE source area in soil located beneath the cellar of the historic dry cleaner. PCE was vertically and horizontally delineated in soil as part of the RI and is estimated to be limited to a 200 square foot area having a depth of one foot.
- Chlorinated solvents were detected above the NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards (AWQS) in groundwater collected near the source area (shallow and deep wells) and immediately downgradient of the source area in shallow wells. The farthest downgradient shallow and deep wells, across Purdy Street, did not contain chlorinated volatile organic compounds (cVOCs) above the AWQS.
- The source of the VOCs in groundwater is assumed to be the soil impacts located beneath the basement. Infiltrated water from along Westchester Avenue flows on top of the bedrock interface, which eventually concentrates in the area of the perched water in the eastern portion of the parking lot.
- CVOCs were detected in exterior soil vapor at generally low concentrations but above those detected in the ambient air.
- Historic sub-slab soil vapor and indoor air sampling during the RI indicated that mitigation was required at the Site. Offsite sub-slab soil vapor and indoor air sampling during the RI indicated that migration was not required at the tested offsite locations.
- The concentration of TCE in one onsite indoor air sample, at 3.76 ug/m³, was above the NYSDOH long-term exposure air guidance value of 2 ug/m³.

Petroleum Impacts

- Petroleum-related VOCs were detected in soil vapor above the ambient air concentrations.

Emerging Contaminants

- Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above the USEPA drinking water health advisory; the groundwater at the Site is not

potable and drinking water is provided by NYCDEP from upstate reservoirs.

Qualitative Exposure 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 HASP and CAMP during ground-intrusive activities, current Site caps (building foundation, asphalt parking lot) and through Site remediation performed under an approved remedial action work plan.

No wetlands or surface water bodies are present at the Site. The nearest surface water body is the Westchester Creek approximately 0.6 miles to the southwest.

3.1 Human Exposure Pathways

The media of concern at the Site include potentially-impacted soil, groundwater, indoor air 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

- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- cis-1,2-dichloroethene
- 1,1-dichloroethene

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 sampling and remedial activities. Continuous monitoring will be implemented during all soil handling activities, boring installation

(soil boring, monitoring wells, and soil vapor points) and periodic monitoring will be implemented during sampling (groundwater and soil vapor samples).

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 the 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 without continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persists 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/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 reevaluation 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 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

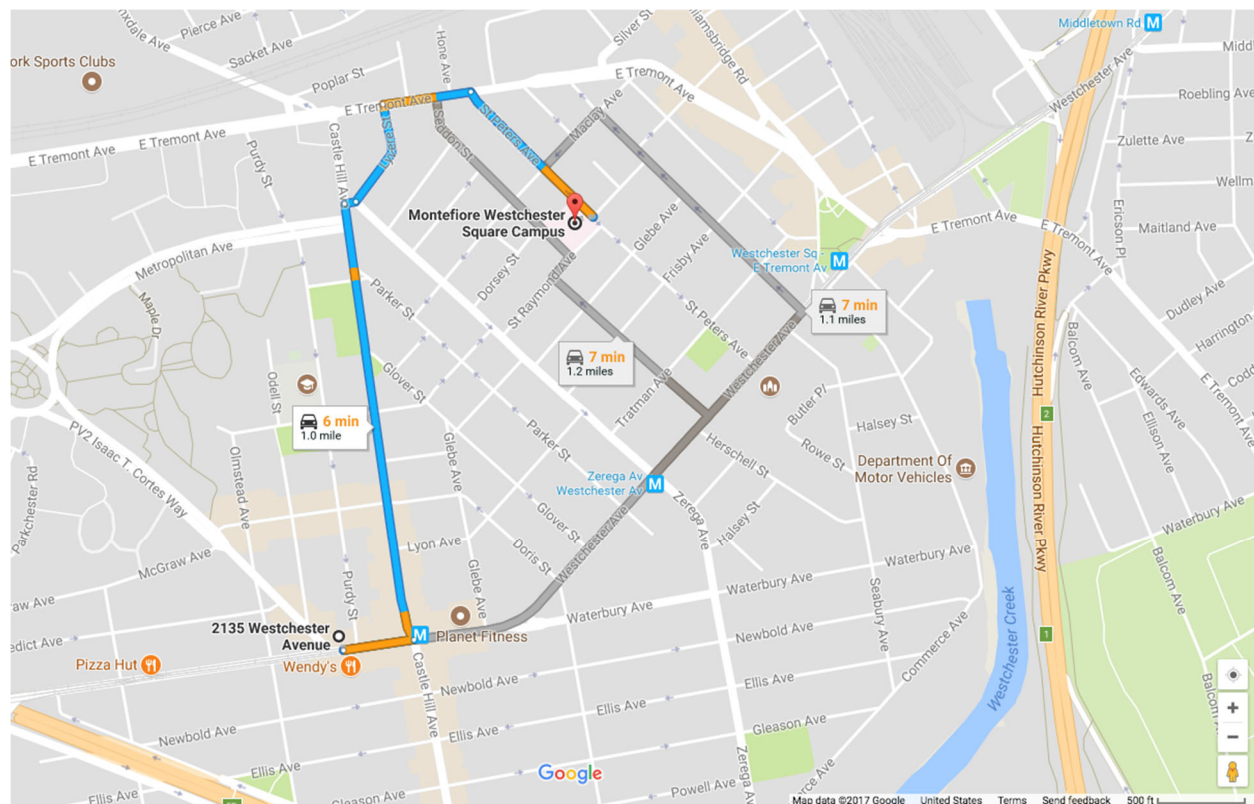
To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance.

- 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 him to a hospital. **The nearest emergency room is at Jamaica Hospital Medical Center located at 2475 St Raymond Avenue, Bronx, NY 10461. The phone number is (718) 430-7300.** The route to the hospital is shown and detailed on the next page.

11.1 Route to Hospital



Driving directions to **Jamaica Hospital Medical Center** from **2135 Westchester Avenue**.

Driving Directions

1. Head east on Westchester Ave towards Purdy Street
2. Turn left onto Castle Hill Ave
3. Turn right onto Zerega Ave
4. Turn left onto Lyver Street
5. Turn right onto E Tremont Ave
6. Turn right onto St. Peters Ave
7. Arrive at Westchester Square Medical Center

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) 963-8000
NYSDEC Spill Hotline	(800) 457-7362
NYSDEC Manager, Ruth Curley	(518) 402-9767

Tenen Environmental, LLC

**2135 Westchester Avenue
BCP Site # C203093**

Tenen QEP, Mohamed Ahmed
On-site Field Phone, Claire Zaccheo
Client representative

(917) 612-6018
(917) 744-5421
(516)-801-0355

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 2135 Westchester Avenue site in the 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: _____
Signature: _____
Signature: _____
Signature: _____
Signature: _____

Date: _____
Date: _____
Date: _____
Date: _____
Date: _____

Tenen Environmental, LLC

**2135 Westchester Avenue
BCP Site # C203093**

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.

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												
(A) Case no.	(B) Employee’s name	(C) Job title <i>(e.g., Welder)</i>	(D) Date of injury or onset of illness	(E) Where the event occurred <i>(e.g., Loading dock north end)</i>	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill <i>(e.g., Second degree burns on right forearm from acetylene torch)</i>	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:							
						Remained at Work				Away from work	On job transfer or restriction	(M)						
						Death	Days away from work	Job transfer or restriction	Other record-able cases	(K)	(L)	Injury	Skin disorder	Respiratory condition	Poisoning	Hearing loss	All other illnesses	
						(G)	(H)	(I)	(J)			(1)	(2)	(3)	(4)	(5)	(6)	
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Appendix C

Material Safety Data Sheets (MSDS)



Tel: 514-956-7503
Fax: 514-956-7504
Internet: www.megs.ca
E-mail:
support@megs.ca

Montreal
Ottawa
Quebec

St-Laurent
Nepean
Quebec

Tel : 514-956-7503
Tel : 613-226-4228
Tel : 418-834-7447

Fax : 514-956-7504
Fax : 613-226-4229
Fax : 418-834-3774

1,1,-DICHLORETHYLENE- MATERIAL SAFETY DATA SHEET

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1. [Chemical Product and Company Identification](#)
2. [Composition, Information on Ingredients](#)
3. [Hazards Identification](#)
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6. [Accidental Release Measures](#)
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9. [Physical and Chemical Properties](#)
10. [Stability and Reactivity](#)
11. [Toxicological Information](#)
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15. [Regulatory Information](#)
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24 Hour EMERGENCY CONTACT

**U.S- CHEMTREC 1-800-
424-9300**

**CANADA- CANUTEC 613-
996-6666**

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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of Contents](#)

Matheson Tri-Gas, Inc.

*The telephone numbers listed below are
emergency numbers, please contact your local
branch for routine inquiries.*

USA

959 Route 46 East
Parsippany, New Jersey
07054-0624 USA
Phone: 973-257-1100

CANADA

530 Watson Street
Whitby, Ontario
L1N 5R9 Canada
Phone: 905-668-3570

SUBSTANCE: 1,1-DICHLOROETHYLENE

SYMBOL: C₂H₂Cl₂

TRADE NAMES/SYNONYMS:

1,1-DICHLOROETHENE; 1,1-DICHLOROETHYLENE; VDC; VINYLIDENE CHLORIDE MONOMER; VINYLIDENE DICHLORIDE; VINYLIDENE CHLORIDE, INHIBITED; RCRA U078; UN 1303; C₂H₂CL₂; MAT25070; RTECS KV9275000

CHEMICAL FAMILY: halogens

CREATION DATE: Jan 24 1989

REVISION DATE: Mar 16 1999

2. COMPOSITION, INFORMATION ON INGREDIENTS

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[Contents](#)

COMPONENT: 1,1-DICHLOROETHYLENE

CAS NUMBER: 75-35-4

EC NUMBER (EINECS): 200-864-0

PERCENTAGE: >99.9

COMPONENT: 4-METHOXYPHENOL

CAS NUMBER: 150-76-5

EC NUMBER (EINECS): 205-769-8

PERCENTAGE: 0.02000

3. HAZARDS IDENTIFICATION

[Up to Table of Contents](#)

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=2

WHMIS CLASSIFICATION: BD2

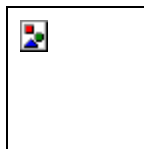
EC CLASSIFICATION (ASSIGNED):

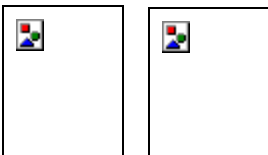
F+ Extremely Flammable

Xn Harmful

R 12-20-40

EC Classification may be inconsistent with independently-researched data.



**EMERGENCY OVERVIEW:**

Color: colorless

Physical Form: volatile liquid

Odor: faint odor, sweet odor

Major Health Hazards: harmful if swallowed, respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

Physical Hazards: Flammable liquid and vapor. Vapor may cause flash fire. May polymerize. Containers may rupture or explode. May form peroxides during prolonged storage.

POTENTIAL HEALTH EFFECTS:**INHALATION:**

Short Term Exposure: irritation, symptoms of drunkenness, lung congestion, liver damage, convulsions

Long Term Exposure: kidney damage, tumors

SKIN CONTACT:

Short Term Exposure: irritation (possibly severe)

Long Term Exposure: same as effects reported in short term exposure

EYE CONTACT:

Short Term Exposure: irritation (possibly severe), eye damage

Long Term Exposure: same as effects reported in short term exposure

INGESTION:

Short Term Exposure: same as effects reported in short term exposure

Long Term Exposure: same as effects reported in short term exposure

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

4. FIRST AID MEASURES

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INHALATION:

Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT:

Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT:

Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION:

If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention, if needed.

5. FIRE FIGHTING MEASURES

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FIRE AND EXPLOSION HAZARDS:

Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point. Containers may rupture or explode if exposed to heat.

EXTINGUISHING MEDIA:

alcohol resistant foam, carbon dioxide, regular dry chemical, water

Large fires: Use alcohol-resistant foam or flood with fine water spray.

FIRE FIGHTING:

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT:

14 F (-10 C)

LOWER FLAMMABLE LIMIT:

5.6%

UPPER FLAMMABLE LIMIT:

11.4%

AUTOIGNITION:

855 F (457 C)

FLAMMABILITY CLASS (OSHA):

IA

6. ACCIDENTAL RELEASE MEASURES

[Up to Table of Contents](#)

AIR RELEASE:

Reduce vapors with water spray. Stay upwind and keep out of low areas.

SOIL RELEASE:

Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:

Collect with absorbent into suitable container. Collect spilled material using mechanical equipment.

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Remove sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Reportable Quantity (RQ): Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

[Up to Table of Contents](#)

Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Store in a cool, dry place. Store in a well-ventilated area. Keep in the dark. Keep separated from incompatible substances. Store outside or in a detached building. Store with flammable liquids. Store in a tightly closed container. Containers must have overpressure release device. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances. Monitor inhibitor content. Avoid exposure to low temperatures or freezing. May form explosive peroxides. Store in a tightly closed container. Avoid contact with light. Store in a cool, dry place. Monitor inhibitor content. Do not evaporate or distill to dryness. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

[Up to Table of Contents](#)

EXPOSURE LIMITS:**1,1-DICHLOROETHYLENE:**

1 ppm (4 mg/m³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)

5 ppm (20 mg/m³) ACGIH TWA

20 ppm (80 mg/m³) ACGIH STEL

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from

NIOSH and/or OSHA.

At any detectable concentration -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Escape -

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

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PHYSICAL STATE: liquid

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: faint odor, sweet odor

MOLECULAR WEIGHT: 96.64

MOLECULAR FORMULA: C₂H₂CL₂

BOILING POINT: 86-90 F (30-32 C)

FREEZING POINT: -188 F (-122 C)

VAPOR PRESSURE: 400 mmHg @ 14.8 C

VAPOR DENSITY (air=1): 3.4

SPECIFIC GRAVITY (water=1): 1.213

WATER SOLUBILITY: 0.04% @ 20 C

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: 500 ppm

EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: organic solvents

10. STABILITY AND REACTIVITY

[Up to Table of Contents](#)

REACTIVITY:

May form explosive peroxides. Avoid contact with temperatures above -40 C. Avoid contact with heat, air, light or moisture and monitor inhibitor content. May polymerize. Closed containers may rupture violently.

CONDITIONS TO AVOID:

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES:

metals, acids, oxidizing materials

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION:

May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

[Up to Table of Contents](#)

VINYLDENE CHLORIDE:

TOXICITY DATA:

6350 ppm/4 hour(s) inhalation-rat LC50; 200 mg/kg oral-rat LD50

CARCINOGEN STATUS:

IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A3 -Animal Carcinogen

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:

Toxic: ingestion

Slightly Toxic: inhalation

TARGET ORGANS:

central nervous system, liver

TUMORIGENIC DATA:

Available.

MUTAGENIC DATA:

Available.

REPRODUCTIVE EFFECTS DATA:

Available.

12. ECOLOGICAL INFORMATION

[Up to Table of Contents](#)

ECOTOXICITY DATA:

FISH TOXICITY:

74000 ug/L 96 hour(s) LC50 (Mortality) Bluegill (*Lepomis macrochirus*)

INVERTEBRATE TOXICITY:

224000 ug/L 96 hour(s) LC50 (Mortality) Opossum shrimp (*Mysidopsis bahia*)

ALGAL TOXICITY:

>712000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (*Skeletonema costatum*)

ENVIRONMENTAL SUMMARY:

Moderately toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

[Up to Table of Contents](#)

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U078. Hazardous Waste Number(s): D029. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.7 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

[Up to Table of Contents](#)

U.S. DOT 49 CFR 172.101. SHIPPING NAME-UN NUMBER; HAZARD CLASS; PACKING GROUP; LABEL:

Vinylidene chloride, inhibited-UN1303; 3; I; Flammable liquid



15. REGULATORY INFORMATION

[Up to Table of Contents](#)

U.S. REGULATIONS:

TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): Y

1,1-Dichloroethylene: 100 LBS RQ

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): Y

1,1-Dichloroethylene

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: Y

CHRONIC: Y

FIRE: Y

REACTIVE: Y

SUDDEN RELEASE: Y

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: N

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 200-864-0

EC RISK AND SAFETY PHRASES:

R 12	Extremely flammable.
R 20	Harmful by inhalation.
R 40	Possible risks of irreversible effects.
S 2	Keep out of reach of children.
S 7	Keep container tightly closed.
S 16	Keep away from sources of ignition - No smoking.
S 29	Do not empty into drains.

CONCENTRATION LIMITS:

C_≥12.5% Xn R 20-40

1%_≤C<12.5% Xn R 40

16. OTHER INFORMATION

[Up to Table of Contents](#)

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Material Safety Data Sheet

Version 4.0

Revision Date 12/24/2012

Print Date 05/19/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : cis-Dichloroethylene

Product Number : 48597

Brand : Supelco

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable liquid

Target Organs

Central nervous system, Liver, Kidney

GHS Classification

Flammable liquids (Category 2)

Acute toxicity, Inhalation (Category 4)

Acute aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H332

Harmful if inhaled.

H402

Harmful to aquatic life.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

HMIS Classification

Health hazard: 1

Chronic Health Hazard: *

Flammability: 3

Physical hazards: 1

NFPA Rating

Health hazard: 2

Fire: 3

Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₂H₂Cl₂
Molecular Weight : 96.94 g/mol

Component		Concentration
cis-Dichloroethylene		
CAS-No.	156-59-2	-
EC-No.	205-859-7	
Index-No.	602-026-00-3	

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: 2 - 8 °C

Handle and store under inert gas. Air and moisture sensitive. Light sensitive.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
cis-Dichloroethylene	156-59-2	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Eye irritation			

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	light yellow

Safety data

pH	no data available
----	-------------------

Melting point/freezing point	-80.0 °C (-112.0 °F)
Boiling point	60.0 - 61.0 °C (140.0 - 141.8 °F)
Flash point	6.0 °C (42.8 °F) - closed cup
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.28 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapor density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid

Oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

Inhalation LC50

LC50 Inhalation - rat - 13700 ppm

Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: KV9420000

12. ECOLOGICAL INFORMATION**Toxicity**

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS**Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1150 Class: 3 Packing group: II

Proper shipping name: 1,2-Dichloroethylene

Marine Pollutant: No

Poison Inhalation Hazard: No

IMDG

UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D

Proper shipping name: 1,2-DICHLOROETHYLENE

Marine Pollutant: No

IATA

UN number: 1150 Class: 3 Packing group: II

Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION**OSHA Hazards**

Flammable liquid

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

cis-Dichloroethylene

CAS-No.
156-59-2

Revision Date
1993-04-24

Pennsylvania Right To Know Components

cis-Dichloroethylene

CAS-No.
156-59-2

Revision Date
1993-04-24

New Jersey Right To Know Components

cis-Dichloroethylene

CAS-No.
156-59-2

Revision Date
1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

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Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet

Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolve; Tetrachloroethene; Tetraleno; Tetralen; Tetralex; Tetravec; Tetraguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂-Cl₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema. Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver (hepatitis, fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

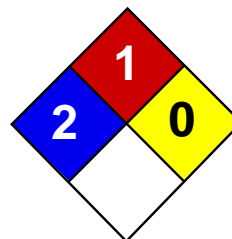
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):**Health Hazard:** 2**Fire Hazard:** 0**Reactivity:** 0**Personal Protection:** g**National Fire Protection Association (U.S.A.):****Health:** 2**Flammability:** 0**Reactivity:** 0**Specific hazard:****Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information**References:** Not available.**Other Special Considerations:** Not available.**Created:** 10/10/2005 08:29 PM**Last Updated:** 05/21/2013 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C₂HCl₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse].
DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.

MUTAGENIC EFFECTS: Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not

available. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO₂), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/

spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 50 STEL: 200 (ppm) from ACGIH (TLV) TWA: 269 STEL: 1070 (mg/m³) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:

Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:

Extremely corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 2402 mg/kg [Mouse]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Trichloroethylene Pennsylvania RTK: Trichloroethylene Florida: Trichloroethylene Minnesota: Trichloroethylene Massachusetts RTK: Trichloroethylene New Jersey: Trichloroethylene TSCA 8(b) inventory: Trichloroethylene CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R36/38- Irritating to eyes and skin. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:54 PM

Last Updated: 11/01/2010 12:00 PM

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Appendix C

Soils/Materials Management Plan

SOIL/MATERIALS MANAGEMENT PLAN

for 2135 Westchester Avenue Remedial Action Work Plan

2135 Westchester Avenue, Bronx, New York
Block 3934, Lot 1
BCP Site #C203093

Submitted to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B
1 Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101

Prepared for:

C Plus Realty, LLC
2135 Westchester Avenue
Bronx, NY 10462

Prepared by:



121 West 27th Street, Suite 702
New York, NY 10001

June 2019

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FIGURES

Figure 1 – Site Location

Figure 2 – Site Layout

1.0 INTRODUCTION

This Soil/Materials Management Plan (SMMP) has been developed for the Remedial Action Work Plan (RAWP) prepared for 2135 Westchester Avenue (the Site).

The Site is located at 2135 Westchester Avenue in the Parkchester neighborhood of the Bronx, New York. The Site is an irregularly-shaped 0.33-acre parcel located in the Bronx Community Board 9 and is identified as Block 3934, Lot 1 on New York City Tax Maps. The Site is located at the corner of Westchester Avenue and Purdy Street.

The Site is currently improved with a one-story building with a basement, a portion of which is operating as a self-service laundromat. The eastern portion of the building, a former dry cleaner, is vacant. 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 suspected areas of contamination will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiled will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook, maintained at the Site and available for inspection by the New York State Department of Environmental Conservation (NYSDEC). Excavated soils will be stockpiled on double layers of 8-mil minimum-thickness sheeting, at a minimum. Stockpiles will be kept covered when not in use with appropriately anchored plastic tarps and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile management will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

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. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on the Site, when possible in order to minimize offsite disturbance. Offsite queuing will be minimized.

Trucks removing soil from the Site will be loaded on-site and exit the Site turning right onto Purdy Street or left onto Unionport Road. Trucks will then make a right on Westchester Avenue and will continue towards the Cross Bronx Expressway (Interstate-95).

This is the most appropriate route 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).

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. If loads contain wet material capable of producing free liquid, truck liners will be used.

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 5,800 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 On-Site

“Reuse on-Site” means material that is excavated during the remedy or development does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to Engineering Controls. The RE will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in the RAWP are followed. Soil reuse is not proposed. Reused soil must be non-hazardous and meet the Use-based SCOs and Protection of Groundwater SCOs in accordance with the predetermined beneficial use determination listed in 6 NYCRR Part 360-1.15(b). If any of the waste materials are used for an end use specified in 6 NYCRR Part 360-1.15(b), it will not be considered a solid waste. Reuse of soil will be coordinated in advance with the NYSDEC project manager.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing the Site will not be buried onsite. Soil and fill excavated from the Site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods:

- (1) Placement of a demarcation layer. The demarcation layer will consist of geo-synthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the FER;
- (2) A land survey of the top elevation of residual soil/fill before placement of cover soils, pavement, and associated sub-soils, or other materials or structures; and,
- (3) All materials beneath the approved cover will be considered impacted and subject to Site management after the remedy is complete.

Demarcation may be established by one or any combination of the above three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the FER. The demarcation will constitute the top of the Site management horizon, if necessary.

1.9 Import of Backfill Soil from Off-Site Sources

Import of soil is not anticipated on this project. However, if materials are imported, they 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.

1.10 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. Liquids discharged into the New York City sewer system will receive prior approval by the New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an offsite treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e., a stream or river) is prohibited without a SPDES permits issued by NYSDEC.

1.11 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.

1.12 Erosion and Sediment Control Measures

Erosion and sediment control measures identified in this Soil/Materials Management Plan will be installed around the entire perimeter of the remedial construction area and inspected one a week and after every storm event to ensure that they are operating appropriately. Discharge locations

will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook, maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion off the silt fence anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.13 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.

1.14 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.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the Remedial Engineer (RE), who is responsible for certifying the FER.

Dust Control

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

- Use of a dedicated water spray method for roads, excavation areas, and stockpiles;
- Use of properly anchored tarps to cover stockpiles;
- Exercise of extra care during dry and high-wind periods; and

- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

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.

Rodent control will be provided during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

1.15 Import of Clean Cover and Fill Material

Soil is not anticipated to be imported to the Site for use as clean cover. If applicable, any imported soil will be uncontaminated soil that meets the lower of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use soil cleanup objectives (SCOs) and the NYSDEC 6 NYCRR Part 375-6.8(b) Protection of Groundwater SCOs.

Any imported uncontaminated soil cover will be from an approved source/facility and will be evaluated by the RE to ensure the following:

- (1) That a segregated stockpile for less than 750 tons (500 cubic yards) is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;
- (2) That the material does not include any solid waste, including construction and demolition material, as prohibited;
- (3) That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source, as well as upon importing to the Site for grading, is completed; and
- (4) That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 250 cubic yards and analyzed for the following Full List parameters:
 - VOCs by EPA Method 8260C
 - SVOCs by EPA Method 8270D
 - Pesticides by EPA Method 8081B
 - PCBs by EPA Method 8082A
 - TAL Metals by EPA Method 6010C/7471B

Upon receipt of the segregated stockpile analytical results collected at the source, a Clean Soil Sampling Report will be submitted to NYSDEC for review/approval prior to importing. The report will include the following:

- (1) A summary of the sample quantities collected and analyzed, tabulated data and comparison to the Unrestricted Use SCOs;
- (2) Analytical data sheets and chain-of-custody (COC) documentation;
- (3) Estimate of the amount of soil/material stockpiled in tons and cubic yards;
- (4) Photographs from the segregated stockpile at the source with sample point locations identified;
- (5) An affidavit from the source/facility on company letterhead stating that the segregated stockpile has been properly maintained at the source and complies with the requirements listed above; and
- (6) A copy of the source/facility NYSDEC permit(s).

If fill material is imported, a highly visible demarcation barrier (i.e. orange geo-synthetic material or equivalent) will be installed beneath the clean soil/fill surface cover. Upon importing and grading any NYSDEC-approved clean soil cover on top of a highly visible demarcation barrier, the following documentation will be presented in the FER:

- (1) Copies of purchase invoices;
- (2) Truck transportation slips from the source to the Site;
- (3) Confirmation of the number of tons and cubic yards of NYSDEC-approved clean soil cover material imported and graded at the Site on top of a highly visible demarcation barrier;
- (4) A Site plan depicting all areas where the NYSDEC-approved clean soil cover has been placed; and
- (5) Photographs documenting the importing and grading of the NYSDEC-approved clean soil cover across the Site with the underlying highly visible demarcation barrier (i.e., orange geo-synthetic material or equivalent).

Appendix D

Quality Assurance Project Plan

**Quality Assurance Project Plan
for
2135 Westchester Avenue
Remedial Action Work Plan**

2135 Westchester Avenue, Bronx, New York
Block 3934, Lot 1
BCP Site #C203093

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:
C Plus Realty, LLC
2135 Westchester Avenue
Bronx, NY 10462

Prepared by:



121 West 27th Street, Suite 702
New York, NY 10001

November 2019

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Appendices

Appendix A – Resumes

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed for the Remedial Action Work Plan (RAWP) prepared for 2135 Westchester Avenue (the Site).

The Site is located at 2135 Westchester Avenue in the Parkchester neighborhood of the Bronx, New York. The Site is an irregularly-shaped 0.33-acre parcel located in the Bronx Community Board 9 and is identified as Block 3934, Lot 1 on New York City Tax Maps. The Site is located on the northwest corner of Westchester Avenue and Purdy Street. 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 Site is currently improved with a one-story building with a basement, a portion of which is operating as a self-service laundromat. The eastern portion of the building, a former dry cleaner, is currently vacant. The remainder of the Site is capped with asphalt and utilized for parking.

1.1 Project Scope and QAPP Objective

The proposed scope of work includes the following:

- Installation of a temporary, active SSDS within the existing onsite building prior to the start of redevelopment. The SSDS will be decommissioned once the commercial use of the building ceases;
- Demolition of the existing onsite building and parking lot;
- Excavation and offsite disposal of an approximately 10 cubic yard tetrachloroethene (PCE) hotspot below the basement of the former dry cleaner;
- Excavation and offsite disposal of all onsite soils which exceed the Restricted-Residential Use Soil Cleanup Objectives (SCOs) for non-cVOC constituents and the Protection of Groundwater SCOs for cVOCs, 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 4 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 in-situ chemical oxidation (ISCO) treatment via injection. A pilot study will be completed to determine design considerations including the chemical to be used, and final number and locations of the injection points. An ISCO Design Document will be submitted under separate cover to NYSDEC for approval;
- Installation of a waterproofing membrane/vapor barrier beneath the new building slab;
- Post-remedial indoor air sampling within the new building to evaluate if a soil vapor intrusion condition exists; and

- Post-remedial sampling of groundwater.

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 C Plus Realty, LLC (the Participant) 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.

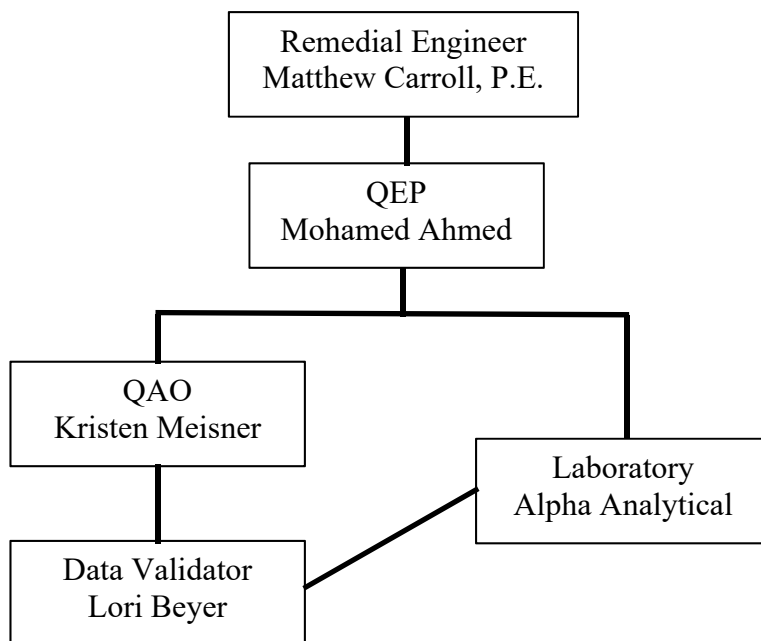
The Project Manager and Qualified Environmental Professional (QEP) will be Mohamed Ahmed, Ph.D., CPG, principal at Tenen. Dr. Ahmed is a certified professional geologist with over 20 years of experience in the New York City metropolitan area. He has designed and implemented subsurface investigations 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 samples is provided below. Proposed sample locations are shown on Figures 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

End-point samples will be collected from the base of the excavation every 900 square feet (SF) at a depth of approximately twelve 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 Part 375 volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), target analyte list (TAL) metals, pesticides, and polychlorinated biphenyls (PCBs). In addition, end-point samples will be collected on a 15-foot grid within the footprint of the former dry cleaner basement and analyzed for Part 375 VOCs. Figures 10a and 10b 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 disposable sampling equipment. Soil samples to be analyzed will be collected directly and placed in pre-cleaned, pre-preserved laboratory provided sample bottles or En Core samplers (En Novative Technologies, Inc.), cooled to 4°C in the field, and transported under chain-of-custody command to the designated laboratory for analysis.

Soil samples collected from the base of excavation every 900 SF and excavation sidewalls every 30 LF will be analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, TAL metals by EPA Method 6010, and pesticides/PCBs by EPA Methods 8081/8082 with a Category B data package. Soil samples collected from the footprint of the former dry cleaner basement on a 15-foot grid will be analyzed for VOCs by EPA Method 8260 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 4°C 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 one newly installed well and one previously installed well 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 VOCs.

3.9 Post Remedial 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).

Post-remedial indoor air samples will be collected within the new building from breathing height (three to five feet above the slab). The sampling flow rate will not exceed 0.2 liters per minute (L/min). Sampling will occur for eight-hours in commercial structures and 24-hours in residential structures. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, identity of samplers, sampling methods and devices, vacuum of

canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

Post-remedial indoor air sampling will be completed in accordance with a Site Management Plan (SMP). It is anticipated that one round of indoor air samples will be collected prior to occupancy of the new building. Proposed post-remedial indoor air sample locations will be determined when building plans are received.

Indoor air samples will be collected in laboratory-supplied 6-liter Summa canisters using eight-hour regulators in commercial structures or 24-hr regulators in residential structures. 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 VOCs 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	42	3	3	3	3/3	57	VOCs	8260C	Cool to 4°C, No Headspace	14 days	(3) 5-gram Encore; (1) 2-oz plastic bottle
	34	0	2	2	2/2	42	SVOCs	8270D	Cool to 4°C		(2) 250 mL amber glass bottle
	34	0	2	2	2/2	42	Pesticides	8081B	Cool to 4°C		
	34	0	2	2	2/2	42	PCBs	8082A	Cool to 4°C		
	34	0	2	2	2/2	42	TAL Metals	6010C / 7471B	Cool to 4°C	28 days for mercury; 6 months for all others	
Groundwater	4	1	1	1	1/1	9	VOCs	8260	Cool to 4°C, pH<2 with HCl	14 days	(3) 40 mL amber glass vials
Indoor Air	4	No QA/QC Samples					VOCs	TO-15	None	30 days	(1) 6-L Summa canister

TB – Trip Blank
FB – Field Blank
DUP – Duplicate

**Tenen Environmental, LLC
Quality Assurance Project Plan**

**2135 Westchester Avenue – Bronx, NY
BCP Site # C203093**

°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 sampling 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 – Restricted-Residential Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs as listed in 6NYCRR Part 375 and NYSDEC Commissioner’s Policy CP-51; and
Groundwater – Class GA groundwater standards and guidance values for groundwater as listed in NYSDEC Technical and Operations Guidance Series (TOGS) 1.1.1.*

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

Matthew Carroll, Environmental Engineer/Principal
Tenen Environmental

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.

Former 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

Kristen Meisner, E.I.T./Project Engineer
Tenen Environmental

- 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

Kristen Meisner, E.I.T./Project Engineer
Tenen Environmental

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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 environment 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

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

Arch O'Neil

Assistant Dean

Professional Development Center

J. Boshart

President



The Professional Development Center

New York State Department of Environmental Conservation
60 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 your 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

②



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
Program Coordinator

ES/bf

Enclosures



SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Appendix E

Groundwater Treatment Specifications



Remedial Cost Proposal

To: Ashley Platt (Tenen Environmental)
From: Andy Lowy - Design Specialist
alowy@regenesiS.com (610) 655-5259

6/28/2019

Subject: *Design and Cost Estimate*

Site: 2135 Westchester Avenue
Bronx, NY

Applicable Products

PlumeStop® Liquid Activated Carbon™
Sulfidated MicroZVI™

Links to View/Download Product Infor

[PlumeStop](#)
[S-MZVI](#)

REGENESIS is pleased to present you with this design and cost estimate for the proposed treatment at your site utilizing the remediation technologies presented above. Included within this document you will find the following attachments supporting the proposed approach:

- Map Depicting Treatment Area
- Remedial Design and Cost Estimate
- Product Technical Sheets
- Standard Assumptions
- Terms and Conditions

Remedial Approach

RegenesiS is proposing one co-application of PlumeStop and S-MicroZVI to address the residual dissolved phase cVOC mass in the overburden. The PlumeStop will sorb the dissolved phase mass and drop it out of the groundwater rapidly while the S-MicroZVI will provide a degradation pathway. The PlumeStop and S-MicroZVI would be applied via RegenesiS Remediation Services (RRS). A preliminary turnkey cost range has been included with the proposal.

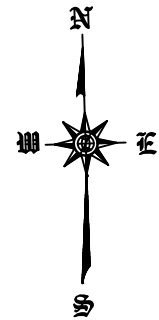
**Assumptions**

In generating this design proposal REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site. The attached design summary tables specify the assumptions used in preparation of this technical design. We request that these modeling input assumptions be verified by your firm.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

Closing

Please feel free to contact me if you need additional information or have any questions regarding our evaluation and/or this correspondence (contact info listed above). Thank you for considering REGENESIS as part of your remedial solution for this project.



SAMPLE ID:		MW-4B	MW-4B DUP
LAB ID:		L1826668-03	L1826668-04
COLLECTION DATE:		7/12/2018	7/12/2018
Perfluorinated Alkyl Acids		Conc	Q
Units: ug/l			
Perfluorooctanoic Acid (PFOA)	0.07	0.0694	0.0704

SAMPLE ID:		MW-1B
LAB ID:		L1826668-07
COLLECTION DATE:	NY-AWQS	7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		
Tetrachloroethene	5	800
Vinyl chloride	2	2.9
trans-1,2-Dichloroethene	5	76
Trichloroethene	5	1900
cis-1,2-Dichloroethene	5	420
Benzo(a)anthracene	0.002	0.06
Chrysene	0.002	0.05
Manganese, Dissolved	300	750.1
Sodium, Dissolved	20000	33100
Antimony, Total	3	5.26
Iron, Total	300	608
Manganese, Total	300	2373
Sodium, Total	20000	34200
Zinc, Total	2000	5352

SAMPLE ID:		MW-1
LAB ID:		L1826668-08
COLLECTION DATE:	NY-AWQS	7/12/2018
Volatile Organic Compounds		Conc
Units: ug/l		
Tetrachloroethene	5	1300
Trichloroethene	5	170
cis-1,2-Dichloroethene	5	47
Dieldrin	0.004	0.021
Iron, Dissolved	300	1530
Magnesium, Dissolved	35000	69700
Manganese, Dissolved	300	1718
Sodium, Dissolved	20000	65100
Iron, Total	300	9650
Magnesium, Total	35000	72400
Manganese, Total	300	1686
Sodium, Total	20000	76400

SAMPLE ID:			MW-2
LAB ID:			L1826668-02
COLLECTION DATE:			7/12/2018
Volatile Organic Compounds			Conc
Units: ug/l			
Tetrachloroethene	5	--	8
Benzene	1	--	1.1
Trichloroethene	5	--	27
cis-1,2-Dichloroethene	5	--	46
Perfluorinated Alkyl Acids			
Perfluorooctanesulfonic Acid (PFOS)	--	0.07	0.0959

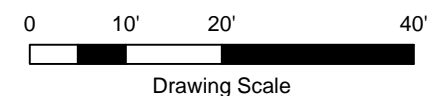
Treatment Area

Legend

Permanent Monitoring Well Location

Property Boundary

Building



Notes:
NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.
MDL = Maximum Detection Limit
Conc = Concentration
Q = Laboratory Data Qualifier
Cells highlighted in yellow indicate concentrations above NY-AWQS
Cells highlighted in blue indicate a concentration above the USEPA Drinking Water Health Advisory
No exceedances above the Class GA Standards in MW-4S and MW-4B
-- = No standard

Tax Lot Source: New York City Dept. of Finance Digital Tax Map
Building Foot Print Source: NYC Open Data, Bing Imagery

Sample Designation Notes:

- Previous investigations were completed by Odelphi Environmental, Inc. in 2015 or 2016 Subsurface Investigation Reports
- Previously installed permanent groundwater wells are shown in black

SITE

2135 Westchester Avenue
Bronx, New York
Block 3934, 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

CONSULTANT

DRAWN BY

Previous Groundwater Results

CHECKED BY

February 2019

DATE

As Noted

SCALE

Figure 5

DRAWING NO.



Project Info			PlumeStop® Application Design Summary		
2135 Westchester Avenue			Dissolved Plume		
Bronx, NY			PlumeStop + S-MZVI		
Dissolved Plume			Technical Notes		
Prepared For:			Treatment Type	Grid	Injection Radius for Soil Coverage (ft-est.avg.)
Ashley Platt (Tenen Environmental)			Treatment Areal Extent (sq ft)	1295	
			Spacing Within Rows (ft)	7	
			Spacing Between Rows (ft)	7	3.8
Target Treatment Zone (TTZ) Info	Unit	Value	DPT Injection Points	30	PlumeStop Injection Concentration (mg/L)
Grid Treatment Areal Extent	sq ft	1,295	Top Application Depth (ft bgs)	12	
Top Treat Depth	ft	12.0	Bottom Application Depth (ft bgs)	22	
Bot Treat Depth	ft	22.0	PlumeStop to be Applied (lbs)	8,000	4,250
Vertical Treatment Interval	ft	10.0	PlumeStop to be Applied (gals)	959	
Treatment Zone Volume	ft³	12,950	In Situ Chemical Reduction - S-MZVI		
Treatment Zone Volume	cy	480	S-MZVI to be added to PlumeStop (lbs)	1,300	Special Instructions:
Soil Type	---	silt	S-MZVI to be added to PlumeStop (gals)	97	
Porosity	cm³/cm³	0.40	PlumeStop + S-MZVI Volume Totals		
Effective Porosity	cm³/cm³	0.15	Mixing Water (gal)	8,064	
Treatment Zone Pore Volume	gals	38,749	Total Application Volume (gals)	9,120	
Treatment Zone Effective Pore Volume	gals	14,531	Injection Volume per Point (gals)	304	
Treatment Zone Pore Volume	liters	146,681			
Treatment Zone Effective Pore Volume	liters	55,005			
Fraction Organic Carbon (foc)	g/g	0.005			
Soil Density	g/cm³	1.5			
Soil Density	lb/ft³	94			
Soil Weight	lbs	1.2E+06			
Hydraulic Conductivity	ft/day	1.0			
Hydraulic Conductivity	cm/sec	3.53E-04			
Hydraulic Gradient	ft/ft	0.007			
GW Velocity	ft/day	0.05			
GW Velocity	ft/yr	17			
Sources of Hydrogen Demand	Unit	Value	Assumptions/Qualifications		
Dissolved Phase Contaminant Mass	lbs	0	In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.		
Sorbed Phase Contaminant Mass	lbs	3			
Competing Electron Acceptor Mass	lbs	29			
Total Mass Contributing to H2 Demand	lbs	33	REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.		
Mass Flux and HRC Demand	Unit	Value			
Groundwater Mass Flux through TTZ	L/day	73			
Stoichiometric HRC Demand	lbs	185	Prepared by: Andy Lowy - Design Specialist		
Mass Flux HRC Demand	lbs	32			
Toral HRC Demand	lbs	217			
Application Dosing	Unit	Value	Date: 6/28/2019		
PlumeStop to be Applied	lbs	8,000			
S-MZVI to be Applied	lbs	1,300			



Purchasing Information			Currently Available Packaging Options		
2135 Westchester Avenue		--	Dissolved Plume		
PlumeStop Required	lbs	8,000	<u>Package Type***</u>	<u># of packages</u>	<u>lbs required</u>
			PlumeStop-2,000 lb reinf. plastic totes	4	8,000
S-MZVI to be Applied	lbs	1,300	PlumeStop-400 lb poly drums	20	8,000
			S-MZVI-50 lb HDPE Pails	26	1,300
Total Estimated Project Cost Range**	Min	\$79,000			
	Max	\$95,000			
Estimated RRS Days to Apply	--	5			
*Note that the combined tax and freight costs are preliminary estimates only. Please contact your local sales manager or Customer Service at 949-366-8000 to obtain a shipping quote. You will be asked to provide a ship-to address and estimated time of delivery.			**Total Project cost is only an estimate; actual project cost may change as the final scope and/or RRS proposal are developed.		
			***Available Package Types are subject to change.		

PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation at an accelerated rate.



Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the [Range of Treatable Contaminants Guide](#).

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage

Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling

Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: [PlumeStop SDS](#).



www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

S-MicroZVI Specification Sheet

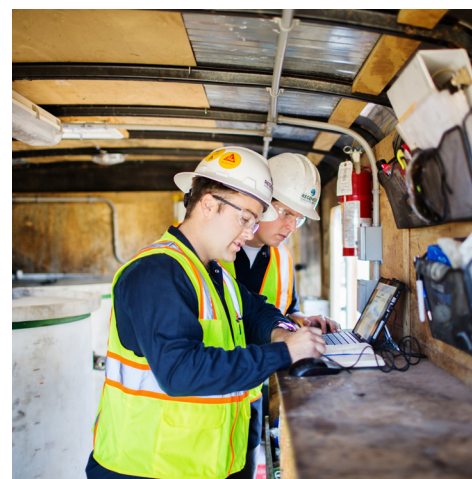
S-MicroZVI Technical Description

S-MicroZVI™ is an *In Situ* Chemical Reduction (ISCR) reagent that promotes the destruction of many organic pollutants and is most commonly used with chlorinated hydrocarbons. It is engineered to provide an optimal source of micro-scale zero valent iron (ZVI) that is both easy to use and delivers enhanced reactivity with the target contaminants via multiple pathways. S-MicroZVI can destroy many chlorinated contaminants through a direct chemical reaction (see Figure 1). S-MicroZVI will also stimulate anaerobic biological degradation by rapidly creating a reducing environment that is favorable for reductive dechlorination.

Sulfidated ZVI

S-MicroZVI is composed of colloidal, sulfidated zero-valent iron particles suspended in glycerol using proprietary environmentally acceptable dispersants. The passivation technique of sulfidation, completed using proprietary processing methods, provides unparalleled reactivity with chlorinated hydrocarbons like PCE and TCE and increases its stability and longevity by minimizing undesirable side reactions.

In addition to superior reactivity, S-MicroZVI is designed for easy handling that is unmatched by any ZVI product on the market. Shipped as a liquid suspension, S-MicroZVI requires no powder feeders, no thickening with guar, and pneumatic or hydraulic fracturing is not mandatory. When diluted with water prior to application, the resulting suspension is easy to inject using either direct push or permanent injection wells.



S-MicroZVI is Best in Class For

- ☒ Longevity
- ☒ Reactivity
- ☒ Transport

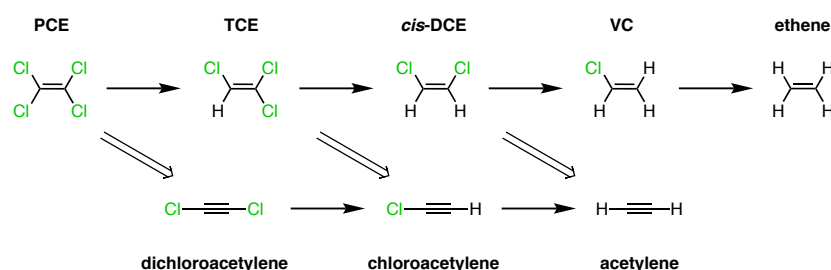


Figure 1: Chlorinated ethene degradation pathways and products. The top pathway with single line arrows represent the reductive dechlorination (hydrogenolysis) pathway. The lower pathway with downward facing double line arrows represent the beta-elimination pathway.

To see a list of treatable contaminants, view the S-MicroZVI treatable contaminants guide.

S-MicroZVI Specification Sheet

Chemical Composition

Iron, powders CAS 7439-89-6
Iron (II) sulfide CAS 1317-37-9
Glycerol CAS 56-81-8

Properties

Physical State: Liquid
Form: Viscous metallic suspension
Color: Dark gray
Odor: Slight
pH: Typically 7-9 as applied
Density: 15 lb/gal

Storage and Handling Guidelines

Storage:

- Use within four weeks of delivery
- Store in original containers
- Store at temperatures below 95F°
- Store away from incompatible materials

Handling:

- Never mix with oxidants or acids
- Wear appropriate personal protective equipment
- Do not taste or swallow
- Observe good industrial hygiene practices

Applications

S-MicroZVI is diluted with water on site and easily applied into the subsurface through low-pressure injections. S-MicroZVI can also be mixed with products like 3-D Microemulsion® or PlumeStop® prior to injection.

Health and Safety

The material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves and eye protection are recommended when handling this product. Please review the Safety Data Sheet for additional storage, and handling requirements here: S-MicroZVI SDS.



www.regenesiS.com

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RRS Assumptions and Qualifications

- Client personnel will take delivery of the remediation chemistry prior to RRS mobilization and arrange for secure storage where the material will not be affected by inclement weather. This may include the use of a pallet jack, forklift (or equivalent), and storage containers given the site circumstances. If material is stored off-site, Client personnel will coordinate the delivery of the material to the site.
- All quoted product rates and delivery dates are based on Standard Delivery Terms, which allow or provide only an estimated date and time of delivery of product to the site. Delivery times will vary per carrier. A guaranteed delivery can be arranged for an additional cost, and must be placed 7 days prior to shipment. Quoted shipping rates are valid for 25 days from date of proposal.
- Cost outlined will be valid for 60 days from date of proposal. If beyond 60 days, REGENESIS reserves the right to update cost.
- Client will locate the product within 10 feet of the RRS injection trailer during application activities.
- RRS will collect project related refuse and empty treatment chemistry containers on a daily basis to keep the site clean. This nonhazardous refuse will be placed in the Client-provided refuse container on-site for disposal. Client is responsible for disposal or recycling of totes, drums and pallets.
- A high volume water source (e.g. hydrant) capable of producing at least 30 gpm will be available to RRS for the duration of the project within 300' of the project staging area, at no cost to RRS. RRS will supply 300 linear feet of 1.5 inch National Standard Thread fire hose.
- RRS will have access to the site for equipment operation and secure storage of materials and equipment throughout the duration of the project.
- Client will provide field water quality meter similar to a YSI 556 with a down-hole sensor, a water level meter, bailers and a technician while on-site for injection activities to assist RRS in assessing groundwater from monitoring wells.
- Client is responsible for securing any permits prior to mobilizing to the site.
- Client is responsible for all soil, air and groundwater sampling and analysis.
- Client is responsible for transportation and disposal of any contaminated waste generated on-site, though we do not anticipate generating any such waste during direct push injection activities.
- For safety reasons, access to the treatment area will be limited to RRS and Client personnel.
- The proposed quantity of reagents can be delivered to the treatment area without significant surfacing/short-circuiting via the prescribed number of injection points. RRS will take precautions to prevent surfacing, but if surfacing occurs, RRS is not responsible for any treatment chemistry infiltration into undesired locations beyond their visual observations.



- RRS will call in a public utility locate for the injection zone area if responsible for providing Direct Push Technology subcontractor. Private utility locates will be the Client's responsibility. RRS is not responsible for damage to unmarked utilities and subsurface structures. If as-built drawings are available for any on-site subsurface features, RRS request the right to review to confirm clearance for the advancement of subsurface drilling and injection.
- RRS personnel will have access to the site for work up to 12 hours per day Sunday through Saturday. However, the standard workday does not exceed 10 hours with travel time Monday through Friday.
- Pricing and work schedule assume union labor and prevailing wages (Davis-Bacon) are not required.
- Proposal assumes standard probing and drilling will begin at ground surface. If hand augering, concrete coring or air knife services will be required, additional charges will apply.
- RRS assumes that Direct Push style drill rig can access all injection point locations and drive injection tooling to the required depth. If site conditions limit the use of the provided Direct Push rig for any injection points and other drilling methods are required to complete the task, additional charges will apply.
- All traffic control requirements will be provided by the client.
- All injection point will be closed/backfilled with bentonite chips to ground surface by RRS. Additional costs associated with restoration of the ground surface have not been included. If restoration of the ground surface is needed, additional charges will apply.
- In generating this estimate, REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.



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Terms and Conditions Products and Services

1. PAYMENT TERMS. Net 30 Days. Accounts outstanding after 30 days will be assessed 1.5% monthly interest. Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available for cash or check payments only. We accept Master Card, Visa and American Express.

2. RETURN POLICY. A 15% re-stocking fee will be charged for all returned goods. All requests to return product must be pre-approved by seller. Returned product must be in original condition and no product will be accepted for return after a period of 90 days.

3 FORCE MAJEURE. Seller shall not be liable for delays in delivery or services or failure to manufacture or deliver due to causes beyond its reasonable control, including but not limited to acts of God, acts of buyer, acts of military or civil authorities, fires, strikes, flood, epidemic, war, riot, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components or services through seller's usual and regular sources at usual and regular prices. In any such event Seller may, without notice to buyer, at any time and from time to time, postpone the delivery or service dates under this contract or make partial delivery or performance or cancel all or any portion of this and any other contract with buyer without further liability to buyer. Cancellation of any part of this order shall not affect Seller's right to payment for any product delivered or service performed hereunder.

4. LIMITED WARRANTY. Seller warrants the product(s) sold and services provided as specified on face of invoice, solely to buyer. Seller makes no other warranty of any kind respecting the product and services, and expressly DISCLAIMS ALL OTHER WARRANTIES OF WHATEVER KIND RESPECTING THE PRODUCT AND SERVICES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND NON-INFRINGEMENT.

5. DISCLAIMER. Where warranties to a person other than buyer may not be disclaimed under law, seller extends to such a person the same warranty seller makes to buyer as set forth herein, subject to all disclaimers, exclusions and limitations of warranties, all limitations of liability and all other provisions set forth in the Terms and Conditions herein. Buyer agrees to transmit a copy of the Terms and Conditions set forth herein to any and all persons to whom buyer sells, or otherwise furnishes the products and/or services provided buyer by seller and buyer agrees to indemnify seller for any liability, loss, costs and attorneys' fees which seller may incur by reason, in whole or in part, of failure by buyer to transmit the Terms and Conditions as provided herein.

6. LIMITATION OF SELLER'S LIABILITY AND LIMITATION OF BUYER'S REMEDY. Seller's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair or use of any goods or performance of any services covered by or furnished hereunder, shall in no case exceed the lesser of (1) the cost of repairing or replacing goods and repeating the services failing to conform to the forgoing warranty or the price of the goods and/or services or part thereof which gives rise to the claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, OR FOR DAMAGES IN THE NATURE OF PENALTIES.

7. INDEMNIFICATION. Buyer agrees to defend and indemnify seller of and from any and all claims or liabilities asserted against seller in connection with the manufacture, sale, delivery, resale or repair or use of any goods, and performance of any services, covered by or furnished hereunder arising in whole or in part out of or by reason of the failure of buyer, its agents, servants, employees or customers to follow instructions, warnings or recommendations furnished by seller in connection with such goods and services, by reason of the failure of buyer, its agents, servants, employees or customers to comply with all federal, state and local laws applicable to such goods and services, or the use thereof, including the Occupational Safety and Health Act of 1970, or by reason of the negligence or misconduct of buyer, its agents, servants, employees or customers.

8. EXPENSES OF ENFORCEMENT. In the event seller undertakes any action to collect amounts due from buyer, or otherwise enforce its rights hereunder, Buyer agrees to pay and reimburse Seller for all such expenses, including, without limitation, all attorneys and collection fees.

9. TAXES. Liability for all taxes and import or export duties, imposed by any city, state, federal or other governmental authority, shall be assumed and paid by buyer. Buyer further agrees to defend and indemnify seller against any and all liabilities for such taxes or duties and legal fees or costs incurred by seller in connection therewith.

10. ASSISTANCE AND ADVICE. Upon request, seller in its discretion will furnish as an accommodation to buyer such technical advice or assistance as is available in reference to the goods and services. Seller assumes no obligation or liability for the advice or assistance given or results obtained, all such advice or assistance being given and accepted at buyer's risk.

11. SITE SAFETY. Buyer shall provide a safe working environment at the site of services and shall comply with all applicable provisions of federal, state, provincial and municipal safety laws, building codes, and safety regulations to prevent accidents or injuries to persons on, about or adjacent to the site.

12. INDEPENDENT CONTRACTOR. Seller and Buyer are independent contractors and nothing shall be construed to place them in the relationship of partners, principal and agent, employer/employee or joint ventures. Neither party will have the power or right to bind or obligate the other party except as may be expressly agreed and delegated by other party, nor will it hold itself out as having such authority.

13. REIMBURSEMENT. Seller shall provide the products and services in reliance upon the data and professional judgments provided by or on behalf of buyer. The fees and charges associated with the products and services thus may not conform to billing guidelines, constraints or other limits on fees. Seller does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where seller may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by seller, it is the sole responsibility of the buyer or other entity seeking reimbursement to ensure the products and services and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, seller does not knowingly present or cause to be presented any claim for payment to the Government.

14. APPLICABLE LAW/JURISDICTION AND VENUE. The rights and duties of the parties shall be governed by, construed, and enforced in accordance with the laws of the State of California (excluding its conflict of laws rules which would refer to and apply the substantive laws of another jurisdiction). Any suit or proceeding hereunder shall be brought exclusively in state or federal courts located in Orange County, California. Each party consents to the personal jurisdiction of said state and federal courts and waives any objection that such courts are an inconvenient forum.

15. ENTIRE AGREEMENT. This agreement constitutes the entire contract between buyer and seller relating to the goods or services identified herein. No modifications hereof shall be binding upon the seller unless in writing and signed by seller's duly authorized representative, and no modification shall be effected by seller's acknowledgment or acceptance of buyer's purchase order forms containing different provisions. Trade usage shall neither be applicable nor relevant to this agreement, nor be used in any manner whatsoever to explain, qualify or supplement any of the provisions hereof. No waiver by either party of default shall be deemed a waiver of any subsequent default.



Remedial Design Assumptions and Qualifications

Cost Estimate Disclaimer: The cost listed assumes conditions set forth within the proposed scope of work and assumptions and qualifications. Changes to either could impact the final cost of the project. This may include final shipping arrangements, sales tax or application related tasks such as product storage and handling, access to water, etc. If items listed need to be modified, please contact RegenesiS for further evaluation.

Shipping Estimates: Shipping estimates are valid for 30 days. All shipping charges are estimates and actual freight charges are calculated at the time of invoice. Additional freight charges may be assessed for any accessorial requested at the time of delivery. The estimate included within assumes standard shipping.

Standard delivery is between 8am -5pm Monday –Friday. *accessorial – can include, but not limited to lift gate and pallet jack at delivery, inside delivery, time definite deliveries, and delivery appointments.

Please communicate any requirements for delivery with the customer service department at the time the order is placed.

Return Policy: To initiate a return please contact your local sales manager for an RMA. A 15% re-stocking fee will be charged for all returned goods. Return freight must be prepaid. All requests to return product must be in original condition and no product will be accepted for return after 90 days from date of delivery.

Professional Judgement: In generating this estimate, REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s), and in reliance upon REGENESIS' prior experience on similar project sites. The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the government.

Appendix F

Vapor Barrier Specification Sheets

PREPRUFE® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Product Description

Preprufe® 300R & 160R membranes are unique composite sheets comprised of a thick HDPE film, pressure sensitive adhesive and weather resistant protective coating. Designed with Advanced Bond Technology™, Preprufe 300R & 160R membranes form a unique, integral bond to poured concrete, preventing both the ingress and lateral migration of water while providing a robust barrier to water, moisture and gas.

The Preprufe R System includes:

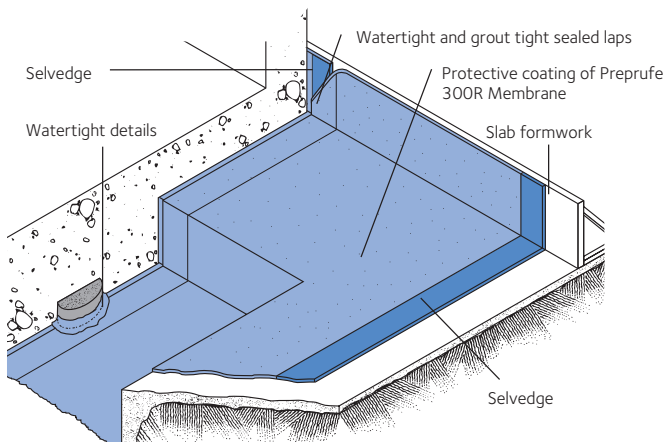
- **Preprufe 300R** – heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers
- **Preprufe 160R** – thinner grade for blindside, zero property line applications against soil retention systems. Vertical use only
- **Preprufe Tape LT** – for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C))
- **Preprufe Tape HC** – for covering cut edges, roll ends, penetrations and detailing (minimum 50°F (10°C))
- **Preprufe CJ Tape LT** – for construction joints and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C))
- **Preprufe CJ Tape HC** – for construction joints and detailing (minimum 50°F (10°C))
- **Bituthene® Liquid Membrane** – for sealing around penetrations, etc.
- **Adcor® ES** – waterstop for joints in concrete walls and floors
- **Preprufe Tieback Covers** – preformed cover for soil retention wall tieback heads
- **Preprufe Preformed Corners** – preformed inside and outside corners

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe products can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor fluid-applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

Advantages

- Forms a unique continuous adhesive bond to concrete poured against it – prevents water migration and makes it unaffected by ground settlement beneath slabs
- Fully-adhered watertight laps and detailing
- Provides a barrier to water, moisture and gas – physically isolates the structure from the surrounding ground
- BBA Certified for basement Grades 2, 3, & 4 to BS 8102:1990
- Zero permeance to moisture
- Solar reflective – reduced temperature gain
- Simple and quick to install – requiring no priming or fillets
- Can be applied to permanent formwork – allows maximum use of confined sites
- Self protecting – can be trafficked immediately after application and ready for immediate placing of reinforcement
- Unaffected by wet conditions – cannot activate prematurely
- Inherently waterproof, non-reactive system:
 1. not reliant on confining pressures or hydration
 2. unaffected by wet/dry cycling
- Chemical resistant – effective in most types of soils and waters, protects structure from salt or sulphate attack



Drawings are for illustration purposes only.
Please refer to gcpat.com for specific application details.

Installation

The most current application instructions, detail drawings and technical letters can be viewed at gcpat.com. For other technical information contact your local GCP representative.

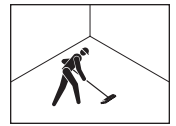
Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a seldge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

All surfaces – It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

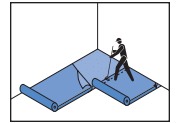
Horizontal – The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

Figure 1



Vertical – Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

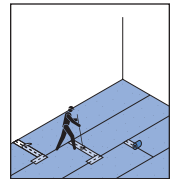
Figure 2



Membrane Installation

Preprufe membranes can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe product in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) membrane is available for low temperature condition applications. Refer to Preprufe LT data sheet and GCP tech letter 16 for more information.

Figure 3



Horizontal substrates – Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked seldge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to GCP tech letter 15 for information on suitable rebar chairs for Preprufe products.

Vertical substrates – Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the seldge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

Roll ends and cut edges – Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly (see Figure 3). Immediately remove printed plastic release liner from the tape.

Details

Detail drawings are available at gcpat.com.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape. Any areas of damaged adhesive should be covered with Preprufe Tape. Where exposed selvage has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape. All Preprufe Tape must be rolled firmly and the tinted release liner removed. Alternatively, use a hot air gun or similar to activate the adhesive using caution not to damage the membrane and firmly roll lap to achieve continuity.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

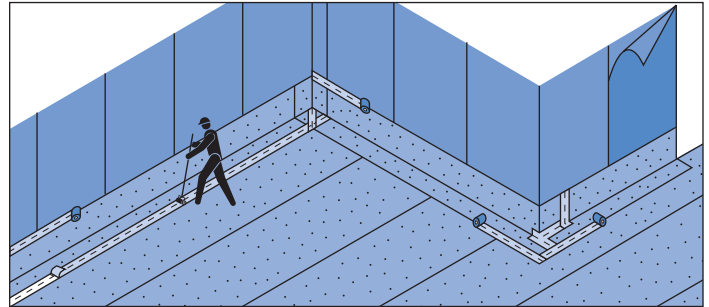
It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

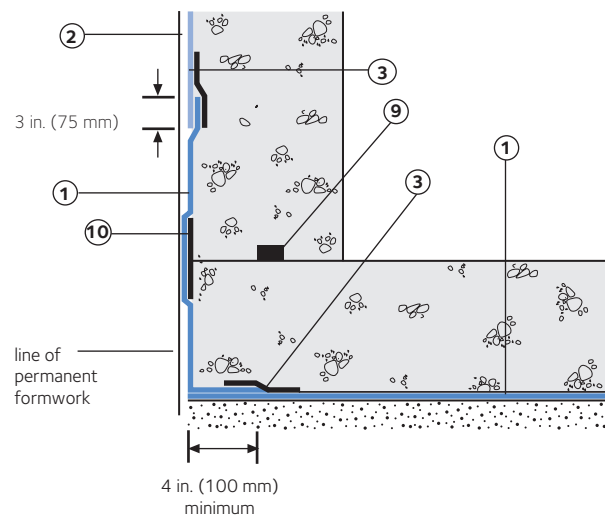
Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at gcpat.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

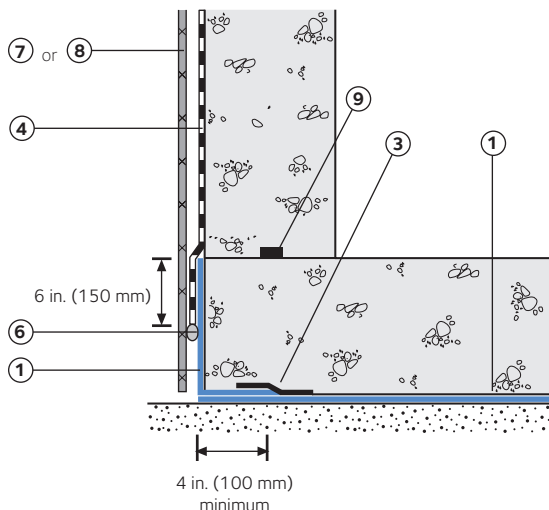
Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems, see GCP tech letter 13 for information on forming systems used with Preprufe products.



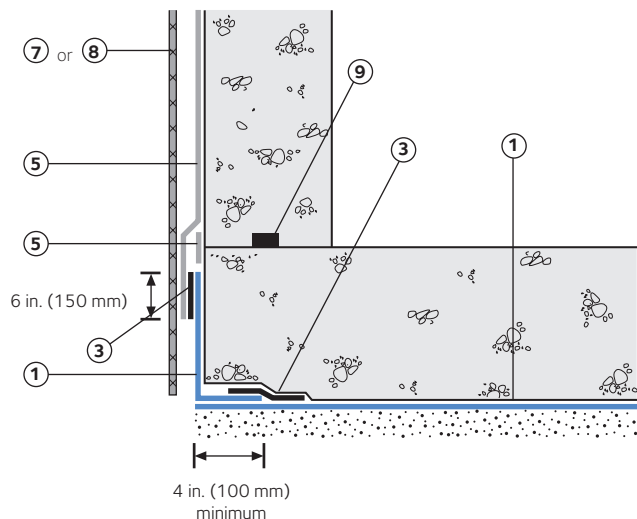
Wall base detail against permanent shutter



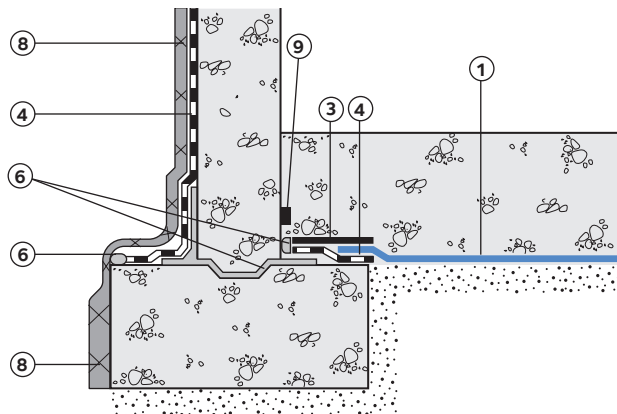
Bituthene® wall base detail (Option 1)



Procor® wall base detail (Option 1)



Bituthene® wall base detail (Option 2)

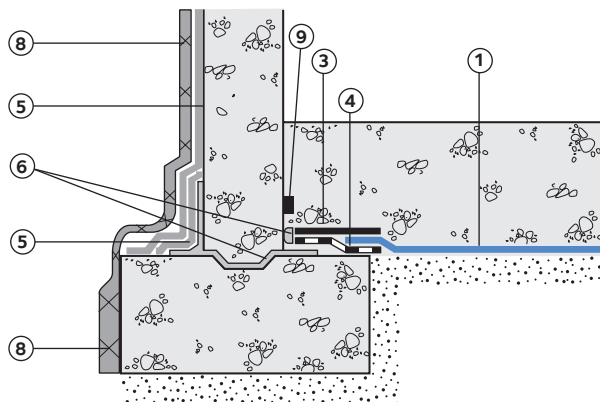


- 1 Preprufe® 300R
- 2 Preprufe® 160R
- 3 Preprufe® Tape
- 4 Bituthene®

- 5 Procor®
- 6 Bituthene® Liquid Membrane
- 7 Approved Protection Course

- 8 Hydroduct®
- 9 Adcor™ ES
- 10 Preprufe® CJ Tape

Procor® wall base detail (Option 2)



Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft ² (36 m ²)	460 ft ² (42 m ²)	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified ¹
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified ²
Elongation	500%	500%	ASTM D412, modified ³
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified ⁴
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified ⁵
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m ²))	0.01 perms (0.6 ng/(Pa x s x m ²))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

Footnotes:

- Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per GCP published recommendations) and run at a rate of 2 in. (50 mm) per minute.

Removal of Formwork (continued)

A minimum concrete compressive strength of 3000 psi (20 N/mm²) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to GCP Tech Letter 17 for information on removal of formwork for Preprufe products.

Specification Clauses

Preprufe 300R or 160R membrane shall be applied with its protective coating presented to receive fresh concrete to which it will integrally bond. Only GCP Applied Technologies approved membranes shall be bonded to Preprufe 300R/160R product. All Preprufe 300R/160R system materials shall be supplied by GCP Applied Technologies, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor® fluid-applied membrane with Preprufe products.

Health and Safety

Refer to relevant SDS (Safety Data Sheet). Complete rolls should be handled by a minimum of two persons.



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