2921 Westchester Avenue
Remedial Investigation Work Plan

2921 Westchester Avenue
Bronx, NY
Bronx County
Block 4164, Portion of Lot 5
BCP Site No. TBD

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B
625 Broadway, 12th Floor
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CERTIFICATION

I, Alana Carroll, certify that I am currently a Qualified Environmental Professional as defined in 6NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____DRAFT_____ _____

Alana Carroll, PG Date

1.0 INTRODUCTION

On behalf of Ralford Realty Corp. (the Participant), Tenen Environmental, LLC (Tenen) has prepared this Remedial Investigation Work Plan (RIWP) for the property located at 2921 Westchester Avenue (Block 4164, Portion of Lot 5) in the Pelham Bay neighborhood of the Bronx, New York (the Site). The Site location and layout are shown on Figures 1 and 2, respectively. The RIWP has been designed to further investigate and characterize the nature and extent of contamination previously identified on the Site. The scope of work includes investigation of subsurface soils, soil vapor and groundwater in areas where historic operations potentially impacted the Site or surrounding areas. The results of the investigation will be used to prepare a Remedial Investigation Report (RIR) and qualitative human health exposure assessment (QHHEA) and to support the development of a Remedial Action Work Plan (RAWP). This RIWP has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10, May 3, 2010).

1.1 Work Plan Organization

This RIWP includes an introduction (Section 1), background information (Section 2), scope of work (Section 3) and project schedule (Section 4). Quality assurance/quality control, health and safety (including community air monitoring), and project team information are addressed in separate appendices. Supporting tables and figures referenced throughout are included at the end of this RIWP.

1.2 Summary of Previous Investigations

A Phase II Environmental Site Assessment (Phase II ESA) was completed at the Site by Castleton Environmental (Castleton) in August 2019 to investigate the potential for contamination associated with historic Site operations. The Phase II ESA included soil, groundwater, and soil vapor sampling and revealed the presence of chlorinated solvents, specifically the chlorinated volatile organic compounds (cVOCs) tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) in soil, groundwater, and soil vapor beneath the Site. cVOCs were detected in exceedance of applicable standards in one of three soil samples collected and all three groundwater samples collected. cVOCs were also detected at elevated concentrations in two of three soil vapor samples collected.

Soil, groundwater, and indoor air sampling was completed by Tenen to further investigate the presence of chlorinated solvents in soil and groundwater at the Site and to determine if a potential soil vapor intrusion condition exists. Tenen's initial investigation was conducted between September and November 2019. On February 27, 2020, Tenen returned to the Site to delineate the extent of PCE contamination identified in soil boring SB-05 in Castleton's Phase II ESA. This investigation included the collection of twenty-two onsite and one offsite soil samples, one onsite and two offsite groundwater samples, and two onsite and three offsite indoor air samples. The investigation confirmed the presence of cVOCs in exceedance of applicable standards in nine of sixteen onsite soil samples analyzed and the one onsite groundwater sample analyzed. Chlorinated solvents were not detected in exceedance of applicable standards in any offsite soil or groundwater samples analyzed. Low concentrations of cVOCs were detected in all onsite and offsite indoor air samples analyzed, with the highest concentrations occurring in the sample collected from the basement of the Site. A PCE hotspot in soil was horizontally and vertically delineated to the extent possible within the Site basement. The hotspot comprises approximately seven cubic yards of chlorinated solvent impacted material. A map depicting previous sample locations is included as Figure 2.

1.3 Regulatory Interaction

A Brownfield Cleanup Program (BCP) application was submitted for the Site to NYSDEC DER in conjunction with this RIWP in June 2020. Following a 30-day public comment period, a Brownfield Cleanup Agreement (BCA) will be executed by the Participant and NYSDEC. The work to be performed under this RIWP, as well as, all future remedial work, will be performed in accordance with the requirements set forth in the BCA.

1.4 Work Plan Objectives

This RIWP has been developed to achieve the following BCP objectives:

- To define the nature and extent of contamination on-site and off-site;
- To identify if residual contaminant source areas are present on the Site;
- To determine whether remedial action is needed to protect human health and the environment; and
- To produce data of sufficient quantity and quality to prepare a Remedial Action Work Plan (including alternatives analysis) to support the remediation of the Site if it is determined that remedial action is needed.

2.0 BACKGROUND

This section includes a description of the Site and surrounding uses, a summary of the proposed Site development, Site characteristics, and information regarding historic operations and regulatory interactions. Summaries of previous Site investigations are also provided.

2.1 Site Description and Surrounding Uses

The Site is located at 2921 Westchester Avenue in the Pelham Bay neighborhood of the Bronx, New York. The Site is defined by an approximate 525 square foot (SF) portion of an irregularly shaped parcel, identified by the New York City Department of Finance as Block 4164 and Lot 5. The Site is located on the west side of Westchester Avenue, between Pilgrim Avenue and Buhre Avenue, in Bronx Community Board 10.

Lot 5 is improved with one two-story commercial building with a partial basement. The building contains multiple commercial tenant spaces currently occupied by a barber, a tutoring and after-school center, a cell phone store and a flooring store. The Site consists of one tenant space of the building and a portion of the partial basement. The Site is zoned R7-1, denoting a medium density apartment house district, with a C2-2 commercial overlay and is currently occupied by the tutoring/after-school center, but was historically utilized as a dry-cleaning facility. The area surrounding the Site is predominantly commercial and residential.

2.2 Proposed Development

There is currently no redevelopment plan for the Site. Redevelopment and/or possible remediation without redevelopment will be addressed in the Remedial Action Work Plan to be submitted to NYSDEC subsequent to the implementation of the Remedial Investigation and submission of the RIR.

2.3 Site Characteristics

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 45 feet above mean sea level (msl). The Site is located in a relatively flat area and gently slopes to the west.

Site Geology and Hydrogeology
The overburden at the Site is composed predominantly of native dense, fine silty sands extending to bedrock (approximately 3 to 4 feet below basement grade [ft-bbg]). Bedrock consists of schist and perched water is present above the bedrock. Perched water was detected at depths ranging from approximately 9 to 10 feet below sidewalk grade (ft-bsg) and 0.16 ft-bbg in permanent groundwater wells installed during the Due Diligence Investigation (DDI) performed by Tenen. Based upon the well survey conducted as part of the DDI investigation, groundwater generally flows south-southwest.

2.4 Historic Operations

Lot 5 was initially developed sometime prior to 1950 with the existing two-story building with a partial basement. The Site operated as a dry-cleaning facility from circa 1988 to circa 2000. Following the cessation of dry-cleaning operations, the Site was occupied for approximately five years by Tristate Interiors. As noted, the Site is currently operated as a tutoring and after-school facility.

2.5 Previous Investigations

Previous assessments and investigations include a 2019 Phase II ESA conducted by Castleton and a 2019/2020 Due Diligence Investigation conducted by Tenen.

Copies of available environmental records and reports are included in their entirety, as received, in Appendix A. A map depicting previous sample locations is included as Figure 2. The results of historical sampling are summarized on Figures 4-6 and included in their entirety in the Tables provided in Appendix A. Findings and conclusions from these reports are summarized in the following sections. Conclusions from the Castleton Phase II ESA and are not necessarily representative of Tenen's professional opinion.

2.5.1 Phase II Environmental Site Assessment, 2925 Westchester Avenue, Bronx, NY 10461, Castleton Environmental, August 2019.

A Phase II ESA was completed at the Site by Castleton Environmental in 2019 to investigate the potential for contamination associated with the historic use of the Site for dry cleaning. The Phase II ESA included the advancement of five soil borings, the collection of three soil samples, the installation of three temporary well points, the collection of three groundwater samples, the installation of three temporary soil vapor points, and the collection of three sub-slab soil vapor samples.

Soil Results
Results of the soil sampling indicated concentrations of several chlorinated VOCs (cVOCs), specifically tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE), in exceedance of their respective NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use (UU) Soil Cleanup Objectives (SCOs) and Part 375-6.8(b) Protection of Groundwater (PGW) SCOs in one of three samples collected.

Groundwater Results
Results of the groundwater sampling indicated concentrations of several cVOCs, specifically PCE, TCE, and cis-1,2-DCE, in exceedance of their NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (Class GA Standards) in all three samples collected.

Soil Vapor Results
Results of the sub-slab soil vapor sampling indicated elevated concentrations of several cVOCs, specifically PCE, TCE, and cis-1,2-DCE, in two of three samples collected.

2.5.2 Due Diligence Investigation Letter Report, 2921 Westchester Avenue, Bronx, NY 10461, Tenen Environmental, LLC, May 2020.

A Due Diligence Investigation was conducted on and off the Site by Tenen between September 2019 and February 2020. Soil, groundwater, and indoor air sampling was completed by Tenen to further investigate the presence of chlorinated solvents in soil and groundwater at the Site and to determine if a potential soil vapor intrusion condition exists. The DDI consisted of the advancement of ten soil borings, the collection of 22 onsite soil samples and one offsite soil sample, the installation of three permanent groundwater monitoring wells (one onsite and two offsite), the collection of three groundwater samples, and the collection of two onsite indoor air samples (first floor and basement) and three offsite indoor air samples

(separate tenant spaces within the building on Lot 5). A well survey was conducted at the Site as part of this investigation and groundwater was determined to flow to the south-southwest. A groundwater contour map is included as Figure 3.

Soil Results

Soil results were compared to NYSDEC PGW and RCU SCOs as listed in 6 NYCRR Part 375-6.8(b) and the October 21, 2010 NYSDEC DEC Policy CP-51. The PGW SCOs are used as a screening value for potential groundwater impacts and the RCU SCOs are consistent with the current and assumed future use of the Site.

All VOCs and metals were detected below the PGW and RCU SCOs in offsite soil sample MW-1 (16-18). All VOCs were detected below RCU SCOs in soil samples collected onsite.

PCE was detected in exceedance of its PGW SCO from 0-1 ft-bbg in soil delineation boring SB-5 (concentration 3.2 mg/kg), SB-5-N (concentration 34 mg/kg), SB-5-S (concentration 1.7 mg/kg), SB-5-W (concentration 20 mg/kg), and SB-5-W2 (concentration 8.1 mg/kg). PCE was detected at a low concentration below the PGW SCO from 0-1 ft-bbg in soil delineation boring SB-5-E. PCE was detected in exceedance of its PGW SCO from 1-2 ft-bbg in soil delineation borings SB-5-N (concentration 22 mg/kg) and SB-5-W (concentration 16 mg/kg). PCE was detected at low concentrations below the PGW SCO from 1-2 ft-bbg in soil delineation borings SB-5, SB-5-S, and SB-5-W2. PCE was detected in exceedance of its PGW SCO from 2-3 ft-bbg in soil delineation boring SB-5-W, only (concentration 7 mg/kg). PCE was detected at low concentrations below the PGW SCO from 2-3 ft-bbg in soil delineation borings SB-5, SB-5-N, and SB-5-S. PCE was also detected at a low concentration below the PGW SCO from 3-4 ft-bbg in soil delineation boring SB-5.

Concentrations of cis-1,2 DCE and TCE were detected in exceedance of their respective PGW SCO in five samples collected from three borings: SB-5(0-1ft); SB-5-N(0-1 ft, 1-2 ft and 2-3 ft); and SB-5-W(0-1ft)

Groundwater Results

Groundwater results were compared to NYSDEC TOGS Class GA Standards. Results of the groundwater sampling indicated concentrations of chlorinated solvents, specifically PCE, TCE, and cis-1,2-DCE in exceedance of Class GA Standards in the groundwater sample collected from the basement of the Site. PCE was detected at a concentration of 470 micrograms per liter (ug/l); TCE was detected at a concentration of 79 ug/l; and, cis-1,2-DCE was detected at a concentration of 210 ug/l. PCE, TCE and cis-1,2-DCE all have a Class GA Standard of 5 ug/l.

All cVOCs were detected below the Class GA Standards in the two offsite, permanent monitoring wells samples.

Indoor Air Results

Indoor air results were compared to the NYSDOH Air Guidance Values (AGVs) as presented in the NYSDOH Soil Vapor Guidance, October 2006 with May 2017 updates and the Environmental Protection Agency (EPA) Vapor Intrusion Screening Limits (VISL), Commercial Target Indoor Air Concentrations (TIAC). Results of the indoor air sampling indicated that concentrations of VOCs were not detected in exceedance of NYSDOH AGVs in any onsite or offsite indoor air samples collected. However, low concentrations of cVOCs were detected in all five indoor air samples collected, with the highest concentrations generally occurring in the sample collected from the basement of the Site.

2.6 Summary of Previous Investigations

Based on investigations conducted to date at the Site, the primary contaminants of concern for the Site are cVOCs[1].

Soil
Concentrations of cVOCs in soil were detected in ten of 20 samples collected and analyzed as part of the Castleton and Tenen investigations in exceedance of respective UU and PGW SCOs. All soil samples met RCU SCOs. During Tenen's investigation, a PCE hotspot in soil was horizontally and vertically delineated to the extent possible within the Site basement. The hotspot comprises approximately seven cubic yards of chlorinated solvent impacted material. The vertical extent of contamination ranges from 1 ft-bbg along the eastern and southern perimeters of the hotspot, to 2 ft-bbg along the northern perimeter of the hotspot, to bedrock (approximately 3 ft-bbg) along the western perimeter of the hotspot. Access to the northern tenant's basement space is necessary to fully delineate the hotspot to the north. Additional delineation is also needed to the west. A cross section of the hot spot is provided as Figure 7; a PCE isopleth for soil is provided as Figure 8. VOCs and metals were not detected in exceedance of PGW or RCUSCOs in soils collected offsite.

Groundwater
The results of the groundwater sampling indicated that concentrations of cVOCs are present in groundwater at concentrations above Class GA Standards in all four onsite groundwater samples collected as part of the Castleton and Tenen investigations. cVOCs were not detected in exceedance of Class GA Standards in offsite wells MW-1 or MW-2, located cross- and downgradient of the Site, respectively.

Indoor Air
Based upon comparison of the detected concentrations of chlorinated solvents and petroleum-related hydrocarbons in indoor air to applicable standards and guidance, there is no meaningful soil vapor intrusion condition at the Site that would require immediate action. Comparison of the indoor air concentrations (specifically cVOCs) collected from the Site with soil vapor concentrations collected during Castleton's Phase II ESA indicate that a cVOC vapor intrusion condition does not exist onsite and that no mitigation is required. Indoor air results are consistent with the commercial use of the Site.

1 A DUSR and EDDs will be provided for data collected during the Due Diligence Investigation and, insofar as available, the Castleton Phase II ESA.

3.0 REMEDIAL INVESTIGATION

The Remedial Investigation (RI) proposed for the Site includes sampling of soil, sub-slab soil vapor, exterior soil vapor and groundwater. The objectives of this RI are to define the nature and extent of contamination onsite; to determine if onsite contamination is migrating offsite; and to provide data of sufficient quantity and quality to support development of a Remedial Investigation Report (RIR), Qualitative Human Health Exposure Assessment (QHHEA) and Remedial Action Alternatives Analysis.

This RIWP was developed to meet the following Site-specific objectives:

- Confirm prior investigation results;
- Delineate the horizontal and vertical extent of cVOCs in soil and groundwater beneath the Site;
- Evaluate bedrock conditions beneath the Site;
- Identify the extent of onsite and offsite (if present) soil vapor impacts, specifically those related to chlorinated solvents;
- Evaluate potential sources of contamination, the migration pathways, and actual or potential receptors of contaminants on or through soil, groundwater and soil vapor;
- Evaluate potential offsite impacts to soil and groundwater;
- Assess potential upgradient sources of chlorinated solvent impacts in groundwater;
- Investigate potential indoor air impacts inside the basement of the Site building;
- Assess potential impacts to human health as a result of the release of contaminants at the Site.

3.1 Scope of Remedial Investigation

The scoping process, for the purpose of identifying and defining the RI tasks described below, included the following:

- Review of current and historic Site reports and data;
- Review of results from the 2019 Phase II ESA and 2019/2020 Due Diligence Investigation; and
- Evaluation of DER-10 requirements and relevant State and Federal guidance documents.

The RI will begin after NYSDEC approval of this RIWP and after the 30-day public comment period is satisfied. The RI will include the collection of 37 samples from ten soil borings, installation of four permanent groundwater monitoring wells (three shallow wells and one bedrock well), collection of seven groundwater samples from three previously installed and four newly installed groundwater monitoring wells and collection of soil vapor from five sub-slab soil vapor points and three exterior soil vapor points, within and surrounding the Site. The type, location, and rationale for each exploration are detailed in the sections below and in summary table included in Section 3.6.

Installation of soil borings, groundwater monitoring wells and soil vapor will be completed in accordance with the sections below and the standard procedures included in the Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP), included as Appendix B and C, respectively. Following the collection of this data, review and evaluation will be performed in order to determine if additional investigation is needed.

Proposed RI sample locations are shown on Figure 9.

3.2 Soil Sampling

A subsurface investigation will be performed to further characterize soil conditions onsite, to complete the horizontal and vertical delineation of documented chlorinated solvent impacts onsite and to assess soil conditions offsite.

The following scope of work will be implemented:

- Advance nine soil borings to bedrock (approximately 3 to 4 ft-bbg) within the Site basement and northern adjoining basement to complete the northern and western horizontal and vertical delineation of the cVOC hot spot identified in previous investigations and complete characterization of the Site to the east and south;
- Advance one soil boring offsite in the sidewalk along Pilgrim Avenue to 20 ft-bsg to assess offsite soil conditions;
- Collect 4 soil samples (two from each characterization boring) from the soil borings advanced east and south within the Site basement. Soil samples will be collected from the two-foot interval directly below the basement slab and the two-foot interval directly above bedrock;
- Collect 28 soil samples from soil delineation borings advanced within the Site basement (north and west) and northern adjoining basement. Soil delineation samples will be collected from each one-foot interval of the soil column, from directly below the basement slab to the top of bedrock (approximately 3 to 4 ft-bbg). Soil delineation samples will be analyzed on a stepwise basis: the one-foot interval directly below the slab will be analyzed first, if this interval contains concentrations of cVOCs in excess of applicable standards, then the next interval will be analyzed (VOCs, only) until a clean interval is reached;
- Collect one soil sample from the offsite soil boring advanced in the sidewalk from the zone of highest suspected contamination. If no visual contamination is observed, the sample will be collected from the two-foot interval above the groundwater interface;
- Analyze soil samples collected onsite for full scan Part 375 SCOs, 1,4-dioxane, and perfluoroalkyl acids (PFAS) (minimum of two per boring); and
- Analyze all samples collected offsite for Part 375 VOCs.

3.2.1 Soil Sampling Methodology

A total of ten soil borings will be advanced as part of this RI; proposed soil sample locations are shown in Figure 9. Based on field measurements and observations, boring locations may be moved or added. Prior to modifications being made with regard to the above-described placement, coordination with NYSDEC will take place.

The interior soil borings will be installed using a manual sampling hammer and the exterior soil boring will be installed using a direct-push track-mounted Geoprobe® unit. All borings will be advanced to bedrock (approximately 3-4 ft-bbg, 20 ft-bsg). Soil samples will be collected from three- or five-foot macrocores fitted with dedicated acetate liners.

At each location, the liners for each interval will be opened and the soil screened for VOCs using a 10.6 electron-volt (EV) photoionization detector (PID). The soil retrieved from each sampler will be described

by Tenen field staff on boring logs using the Unified Soil Classification System. All observations regarding potential contamination such as odors, staining, etc. will be documented. Soil will be screened from grade to the terminal depth of each boring. If evidence of contamination (e.g., elevated PID readings, odor) or staining is observed, the soil boring will be extended, to the extent possible based on the equipment, to delineate the vertical extent of contamination. All descriptions and observations will be documented in a field logbook.

For each soil delineation boring: SB-1, SB-4, and SB-5 through SB-9 samples be collected from each one-foot interval of the soil column, from directly below the basement slab to the top of bedrock (approximately 3 to 4 ft-bbg). Soil delineation samples will be analyzed on a stepwise basis: the one-foot interval directly below the slab will be analyzed first, if this interval contains concentrations of cVOCs in excess of applicable standards, then the next interval will be analyzed (VOCs, only) until a clean interval is reached. A minimum of two soil samples will be analyzed from borings located onsite. Analysis of soil samples collected from offsite soil delineation samples will terminate when a clean interval is present. For each characterization boring (SB-2 and SB-3), soil samples will be collected from the two-foot interval directly below the basement slab and the two-foot interval directly above bedrock. For the exterior offsite soil boring, one soil sample will be collected from the interval of highest suspected contamination based upon PID readings, visual and olfactory methods. If no contamination is observed, the sample will be collected from the two-foot interval directly above the groundwater interface.

Soil samples selected for laboratory analysis will be collected directly from the acetate liner, placed in pre-cleaned, pre-preserved laboratory-provided sample bottles or En Core samplers (En Novative Technologies), sealed and labeled, and placed in a cooler and chilled to 4◦C for transport under chain-of custody procedures. Soil samples will be submitted to a New York State Department of Health (NYSDOH) ELAP-certified laboratory via courier service and analyzed for the respective analyte lists included in 6 NYCRR Part 375 SCOs. Laboratory analytical parameters and methods are outlined below. QA/QC procedures to be followed are described in the QAPP included as Appendix B.

A minimum of two soil samples collected from each onsite boring will be analyzed for the following analytes on the Part 375 list with a Category B deliverable package:

- Target Compound List (TCL) VOCs by EPA Method 8260C;
- TCL SVOCs by EPA Method 8270D;
- Pesticides by EPA Method 8081B;
- Herbicides by EPA Method 8151A;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082A;
- Target Analyte List (TAL) Metals by EPA Method 6010C/7471B;
- Total Cyanide by EPA Method 9010C;
- Trivalent and Hexavalent Chromium by EPA Method 3060A;
- PFAS by USEPA Method 537 Modified; and
- 1,4-Dioxane by USEPA Method 8270.

All offsite samples will be analyzed for the following analytes on the Part 375 list with a Category B deliverable package:

- TCL VOCs by EPA Method 8260C.

A summary table of proposed soil samples and sampling rationale is included in Section 3.6 of this Work

Plan.

3.3 Sub-slab Vapor, Soil Vapor, Indoor Air Sampling

The following scope of work is proposed to investigate potential onsite impacts to soil vapor from known chlorinated solvent impacted soil and groundwater and to document offsite soil vapor conditions.

The following scope of work will be implemented:

- Install five sub-slab soil vapor sample points within the building on Lot 5. Two soil vapor sample probes will be installed within the Site basement, two will be installed within the northern adjoining basement, and one will be installed within the southern adjoining basement. The soil vapor sample probes will be installed within the lowest building level no more than two inches below the building slab. These locations will be co-located with indoor air samples collected from Tenen's DDI;
- Install three offsite exterior soil vapor points to approximately ten ft-bg (anticipated basement depth) to assess offsite soil vapor conditions. Two soil vapor points will be installed within the western sidewalk of Pilgrim Avenue and one soil vapor point will be installed within the eastern sidewalk of Westchester Avenue. All soil vapor points will be installed within sidewalks adjacent to residential housing;
- One ambient air sample will be collected for each sub-slab and soil vapor sampling event; and,
- Analyze sub-slab vapor and soil vapor samples for EPA Method TO-15 VOCs.

3.3.1 Sub-slab Vapor and Soil Vapor Sampling Methodology

A total of five sub-slab soil vapor samples, three exterior soil vapor samples and three ambient air samples will be collected as part of this RI. Samples will be collected in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (Soil Vapor Guidance, October 2006 with updates). Two sub-slab soil vapor samples will be collected from the Site basement, two sub-slab soil vapor samples will be collected from the northern adjoining basement, and one sub-slab soil vapor sample will be collected from the southern adjoining basement. Three exterior soil vapor samples will be collected sidewalks surrounding the Site where residential housing exists. Figure 9 depicts proposed sample locations.

Temporary sub-slab soil vapor points will be installed using a hand-held hammer drill with a concrete drill bit. The drill bit will be extended a maximum two inches below the floor slab for sub-slab soil vapor samples.

A Geoprobe® direct push machine will be used to install the exterior soil vapor sampling probes. At each soil vapor sampling location, access to the subsurface soil will be gained by drilling through the top surface material (concrete) using a drill bit. Upon penetration through the surface material, a disposable sampling probe consisting of a 1.5-inch long hardened point and a 6-inch long perforated vapor intake will be installed to a depth of ten ft-bg.

At the terminal depth of sub-slab and soil vapor locations, the sample probe will be attached to ¼-inch diameter Teflon® tubing and extended to the surface. The borehole above the sampling probe to grade will be sealed using an inert sealant to prevent ambient air mixing with the soil vapor. Ambient air will be purged from the boring hole by attaching the surface end of the ¼-inch diameter Teflon® tube to an air

valve and then to a vacuum pump. The vacuum pump will remove three volumes of air (volume of the sample probe and tube) prior to sample collection. The flow rate for both purging and sample collection will not exceed 0.2 liters per minute.

The sub-slab soil vapor and exterior soil vapor samples will be first screened for VOCs using a PID. A tracer gas (helium) will be used in accordance with the NYSDOH protocols to verify the integrity of the soil vapor probe seal. Helium will be used as the tracer gas and a bucket will serve to keep it in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results show a significant presence of the tracer gas, the probe seals will be adjusted to prevent infiltration.

A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone and chain of custody

Sub-slab soil vapor samples will be collected in laboratory-supplied 6-liter Summa canisters using eight-hour regulators and exterior soil vapor samples will be collected in laboratory-supplied 2.7-liter Summa canisters using two-hour regulators. All samples will be sealed, labeled, and placed in a secure container for delivery to a NYSDOH ELAP-certified analytical laboratory. All soil vapor samples will be analyzed for EPA Method TO-15 VOCs.

3.3.2 Ambient Air Sampling Methodology

All samples will be collected in accordance with the NYSDOH Soil Vapor Guidance. Sample locations may be adjusted based on field observations or conditions.

Ambient air samples will be collected from breathing height (three to five feet above the floor) in an upgradient direction. The sampling flow rate will not exceed 0.2 liters per minute (L/min). Sampling will occur for a duration of eight hours. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

Samples will be collected in laboratory-supplied 6-liter Summa canisters using eight-hour regulators and will be sealed, labeled, and placed in a secure container for delivery to a NYSDOH ELAP-certified analytical laboratory. All samples will be analyzed for EPA Method TO-15 VOCs.

A summary table of proposed soil vapor samples and sampling rationale is included in Section 3.6 of this Work Plan.

3.4 Groundwater Sampling

The following scope of work is proposed to further characterize groundwater on-and offsite:

- One permanent bedrock monitoring well will be installed within the onsite basement approximately five feet into bedrock to assess groundwater conditions within bedrock fractures;

- One permanent groundwater monitoring well will be installed within the onsite basement and will be seated above bedrock (approximately 3 to 4 ft-bbg) to further investigate onsite groundwater conditions and the potential for offsite migration of cVOC impacts;
- One permanent groundwater monitoring well will be installed within the northern adjoining basement and will be seated above bedrock (approximately 3 to 4 ft-bbg) to assess offsite and upgradient groundwater conditions;
- One permanent groundwater monitoring well will be installed offsite concurrent with an offsite soil boring to further evaluate offsite and downgradient groundwater conditions. The monitoring well will be installed in the sidewalk of Pilgrim Avenue and will be seated above bedrock (approximately 20 ft-bsg);
- Gauge and collect groundwater samples from four newly-installed and three existing groundwater wells;
- Groundwater samples will be analyzed for Part 375 VOCs, SVOCs, pesticides, herbicides, PCBs, total and dissolved metals, cyanide, trivalent and hexavalent chromium, 1,4-dioxane, and PFAS; and,
- Survey newly-installed monitoring wells; collect one round of depth-to-groundwater measurements from newly-installed and previously-installed wells; and evaluate groundwater elevations and present updated groundwater contours.

Proposed RI well and existing well locations are shown on Figure 9.

3.4.1 Groundwater Well Sampling

Three previously installed permanent monitoring wells (MW-1 through MW-3) and four newly-installed permanent monitoring wells (MW-4 through MW-7) will be sampled. All sampling equipment will be decontaminated prior to use. Prior to sampling, water levels will be measured using an electronic product-water level indicator. Sample collection will be accomplished by using low-flow procedures. Samples will not be collected until pH, temperature, and conductivity measurements stabilize and the turbidity reading is 50 Nephelometric Turbidity Units (NTU) or less, or stabilizes above 50 NTU.

All exterior monitoring wells will be installed using a Geoprobe® direct-push rig, all interior monitoring wells seated above bedrock will be installed using a manual sampling hammer, and the bedrock monitoring well will be installed using a hydraulic drill rig with coring capabilities. All non-bedrock monitoring wells will consist of a two-inch inner diameter (ID) PVC casing and riser. A ten-foot PVC screen (0.020-inch slot) will be installed and straddle the groundwater table (five ft above and five ft below) in the offsite and exterior well; a four-foot pre-packed PVC screen (0.020-inch slot) will be installed into the groundwater table in the interior non-bedrock wells; and a two-inch five-foot screen (0.020-inch slot) will be installed five feet into bedrock for the bedrock well. For the bedrock well, the overburden will be cased off from the underlying bedrock to prevent downward migration of cVOC impacts into bedrock fractures.

A filter pack of sand will be placed in the annular space around the screen of the monitoring wells (minimum 2-inches around the circumference of the screen) and will extend two feet above the screen. The annular area around the well casing above the sand pack will be sealed with bentonite pellets for an interval of two feet. The annular space above the bentonite pellets to one ft-bg will be backfilled with unimpacted drill cuttings. Upon completion of the well, a locking well cap will be installed atop the PVC riser and a steel flush-mount roadbox and concrete apron will be installed at grade.

Groundwater well construction logs will be completed for all of the newly constructed wells, including description of the lithology, top of casing, and screening interval. Boring and well construction logs will be included in the RIR.

The monitoring wells will be developed on the day of installation by pumping using dedicated high-density polyethylene (HDPE) tubing. The wells will be developed until at least three well volumes have been evacuated. All permanent monitoring wells will be surveyed to a common datum.

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). All groundwater samples will be analyzed for the following analytes on the Part 375 list and emerging contaminants with a Category B deliverable package:

- TCL VOCs by EPA Method 8260C;
- TCL SVOCs by EPA Method 8270D;
- Pesticides by EPA Method 8081B;
- Herbicides by EPA Method 8151A;
- PCBs by EPA Method 8082A;
- Total and Dissolved TAL Metals by EPA Method 6010C/7471B;
- Total and Dissolved Cyanide by EPA Method 9010C; and
- Total and Dissolved Trivalent and Hexavalent Chromium by EPA Method 3060A;
- 1,4-Dioxane by EPA Method 8270D-SIM Modified; and
- PFAS by EPA Method 537.

Emerging contaminants (e.g., PFAS and 1,4-Dioxane) will be sampled in accordance with the current NYSDEC guidance, *Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs* (January 2020).

3.5 Quality Assurance / Quality Control (QA/QC)

Samples will be collected in accordance with the Quality Assurance Project Plan (QAPP) included as Appendix B.

Sample analysis will be performed by a NYSDOH ELAP-certified laboratory. The laboratory will report sample results on a 5-day turn-around time. An independent sub-consultant will validate sample results and prepare a Data Usability Summary Report (DUSR).

3.6 Summary Table of Proposed Sampling Locations

As required by Section 3.3(b) 3 of DER-10, below is a table describing all proposed sampling locations and QA/QC samples.

Proposed Sampling Locations and Analysis

Soil

Sample Location	Media	Sampling Intervals	Analytical Parameters	Sampling Method / Minimum Reporting Levels	Rationale
SB-2	Soil	From the two-foot interval directly below the basement slab and the two-foot interval directly above bedrock	Part 375 Analytes, PFAAs, and 1,4-Dioxane (two samples from each boring) All additional samples: TCL VOCs only	EPA 537 Modified / MDL less than 1 ug/kg for PFAAs; EPA 8270 / MDL less than 0.1 mg/kg for 1,4-Dioxane; EPA 8260C, 8270D, 8081B, 8082A, 8151A, 7196A, 3050B, 7471B, 9010C/9012B/9014 and 3060A/7196 / MDL less than Unrestricted Use SCOs	Site Coverage
SB-3					
SB-1		From each one-foot interval directly below the basement slab to the top of bedrock (analysis of more than two samples will depend on preceding interval results)			Onsite vertical and horizontal delineation of known chlorinated solvent impacts
SB-4					
SB-5		From each one-foot interval directly below the basement slab to the top of bedrock (analysis of intervals below 0-1 will depend on the results of the 0-1 interval)	TCL VOCs	EPA 8260C	Offsite vertical and horizontal delineation of chlorinated solvent impacts (if any)
SB-6					
SB-7					
SB-8					
SB-9					
SB-10		From the zone of highest suspected contamination or, if no contamination is observed, the two-foot interval above the groundwater interface			Assess offsite soil conditions

Groundwater

Sample Location	Media	Sampling Intervals	Analytical Parameters	Sampling Method / Minimum Reporting Levels	Rationale
MW-1	Groundwater	10 ft screen across groundwater interface (4 to 19 ft-bsg)	Part 375 analytes including total and dissolved metals; 1,4-dioxane; PFAAs	EPA 8260C, 8270D, 8270D-SIM Modified, 8081B, 8151A, 7196A, 3050B, 7471B, 9010C/9012B/9014, 3060A/7196 and 537 / MDL less than Class GA Standards for Part 375 analytes; MDL less than 0.28 ug/L for 1,4-dioxane; MDL less than 2 nanograms per liter (ng/L) for PFAAs	Assess offsite groundwater conditions
MW-2					
MW-3		4 ft pre-packed screen (0 to 4 ft-bbg)			Confirm/investigate groundwater conditions in shallow aquifer
MW-4					
MW-5					Assess offsite groundwater conditions
MW-6		10 ft screen across groundwater interface (10 to 20 ft-bsg)			
MW-7		5 ft screen in bedrock (4 to 9 ft-bbg)			Investigate groundwater conditions in bedrock

Soil Vapor and Ambient Air

Sample Location	Media	Sampling Intervals	Analytical Parameters	Sampling Method / Minimum Reporting Levels	Rationale
SS-1	Sub-slab Soil Vapor	Max 2 inches below floor slab	TO-15 VOCs	EPA TO-15 / MDL less than 1.00 ug/m3	Assess sub-slab soil vapor conditions onsite
SS-2					
SS-3					Assess sub-slab soil vapor conditions offsite
SS-4					
SS-5					
SV-1	Exterior Soil Vapor	10 ft-bsg			Assess soil vapor conditions offsite adjacent to residential housing
SV-2					
SV-3					
AA-1	Ambient Air	Breathing height (3-5 feet above the ground)			Assess ambient air conditions onsite
AA-2					Assess ambient air conditions offsite
AA-3					

Quality Assurance / Quality Control

Sample Location	Media	Sampling Intervals	Analytical Parameters	Rationale
Trip Blanks	QA / QC	--	Part 375 analytes and/or 1,4-dioxane and PFAAs, as necessary	Quality assurance and quality control
Soil Duplicate				
Soil Blank				
Soil MS/MSD				
Groundwater Duplicate				
Groundwater Blank				
Groundwater MS/MSD				

MDL – Method Detection Limit
Reporting limits are laboratory- and sampling event-specific. The overall objective is to ensure that the minimum reporting levels are such that they can be used to evaluate potential sources, assess risk from detected compounds, and compare detected concentrations against applicable regulatory levels.

3.7 Qualitative Exposure Assessment

Following receipt of the sample results, a QHHEA will be completed in accordance with Section 3.3(c)4 and Appendix B (NYSDOH guidance for preparing a qualitative human health exposure assessment) of DER-10. The QHHEA will utilize the results of the RI to evaluate and document potential exposure routes and identify and characterize potential current and future receptors. The results of the RI will be used to identify potential human exposure scenarios associated with contaminants in sub-slab soil vapor, indoor air, soil, and groundwater. The results of the QHHEA will be included in the RIR.

3.8 Health and Safety Plan (HASP)

All work at the Site will be completed in accordance with the Health and Safety Plan (HASP) included in Appendix C.

3.9 Air Monitoring

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

Daily CAMP reports will be sent to the NYSDOH and NYSDEC Project Manager via email. Daily reports will include a Site figure depicting Work Zones; activities; wind direction, in addition to CAMP monitor readings and CAMP station locations. Any exceedances of CAMP readings and corrective actions taken will be communicated to the NYSDEC and the NYSDOH Project Managers on the day of occurrence.

3.10 Investigation-Derived Waste (IDW)

Following the completion of sampling, boreholes will be backfilled with clean cuttings or sand. If grossly contaminated soil cuttings are encountered or if excess soil cuttings are generated, they will be placed in 55-gallon drums. Purge water and other investigation-derived waste (IDW) will be containerized in 55-gallon drums. After the investigation is complete, the drum contents will be characterized for offsite disposal.

3.11 Reporting

A RIR will be prepared in accordance with the requirements of DER-10. The report will include details of the sampling, tabulated sample results and an assessment of the data and conclusions. If warranted, recommendations for additional actions will be included.

Soil sample results will be compared to the Protection of Groundwater and Commercial Use SCOs as included in Part 375-6.8 and PFAS results will be compared to NYSDEC's January 2020 PFAS Guidelines. Groundwater sample results will be compared to the Class GA Standards with the exception of PFAS, which will be compared to NYSDEC's January 2020 PFAS Guidelines. Sub-slab and indoor air sample results will be compared to NYSDOH Soil Vapor Guidance Matrices. The results of all media will be evaluated comprehensively to determine the need for additional investigation.

The report will also include the qualitative exposure assessment, CAMP results, laboratory data packages, DUSR, geologic logs, well construction diagrams and well purging/sampling logs. All data will also be submitted electronically to NYSDEC via the Environmental Information Management System (EIMS) in EqUIS format.

4.0 SCHEDULE

Project activities (Tasks 1-3) will be completed within approximately nine weeks after RIWP approval by NYSDEC, assuming there are no limitations on work in NYC and that social distancing can be maintained. The following project schedule has been developed:

Work Plan Implementation Schedule

Task Number	Task	Estimated Task Duration (business days)	Total Duration (business days)
0	Work Plan Approval	0	0
1	Mobilization	25	25
2	Soil Boring, Monitoring Well and Soil Vapor Point Installation / Soil Sampling	3	28
3	Groundwater and Soil Vapor Sampling	2	30
4	Laboratory Analysis	15	45
5	Draft Report and Data Validation	30	75

5.0 REFERENCES

New York State Department of Environmental Conservation, Division of Environmental Remediation. DER Technical Guidance for Site Investigation and Remediation (DER-10). NYSDEC 2010.

New York State Department of Environmental Conservation DEC Policy. Commissioner's Policy 51 – Soil Cleanup Guidance. October 21, 2010. NYSDEC 2010.

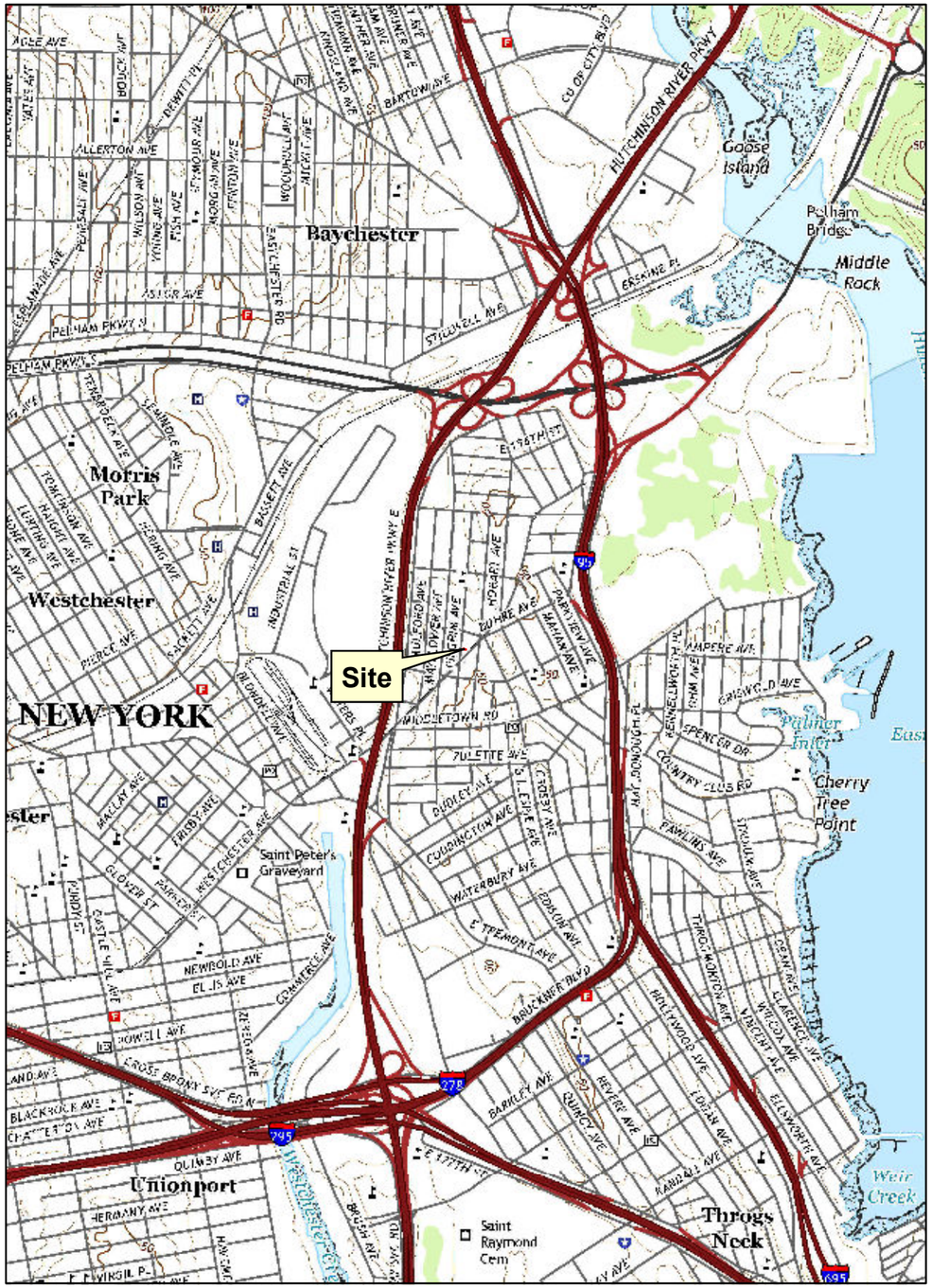
New York State Department of Environmental Conservation. Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs. January 2020. NYSDEC 2020.

New York State Department of Health. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, October 2006 with revisions).

Phase II Environmental Site Assessment, 2925 Westchester Avenue, Bronx, NY 10461, Castleton Environmental, August 2019.

Due Diligence Investigation Report , 2921 Westchester Avenue, Bronx, NY 10461, Tenen Environmental, LLC, May 2020.

Figures



Basemap: USGS Topographic Map, 7.5 Minute Quadrangle, Flushing, NY, 2016

Site Location

0 1,000 2,000 4,000 Feet

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

Department of Finance Digital Tax Map

0 150 300 600 Feet

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

Department of City Planning MapPLUTO - 2018 v2.1

0 150 300 600 Feet

Site

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

TENEN ENVIRONMENTAL

Tenen Environmental, LLC
121 West 27th Street
Suite 702
New York, NY 10001
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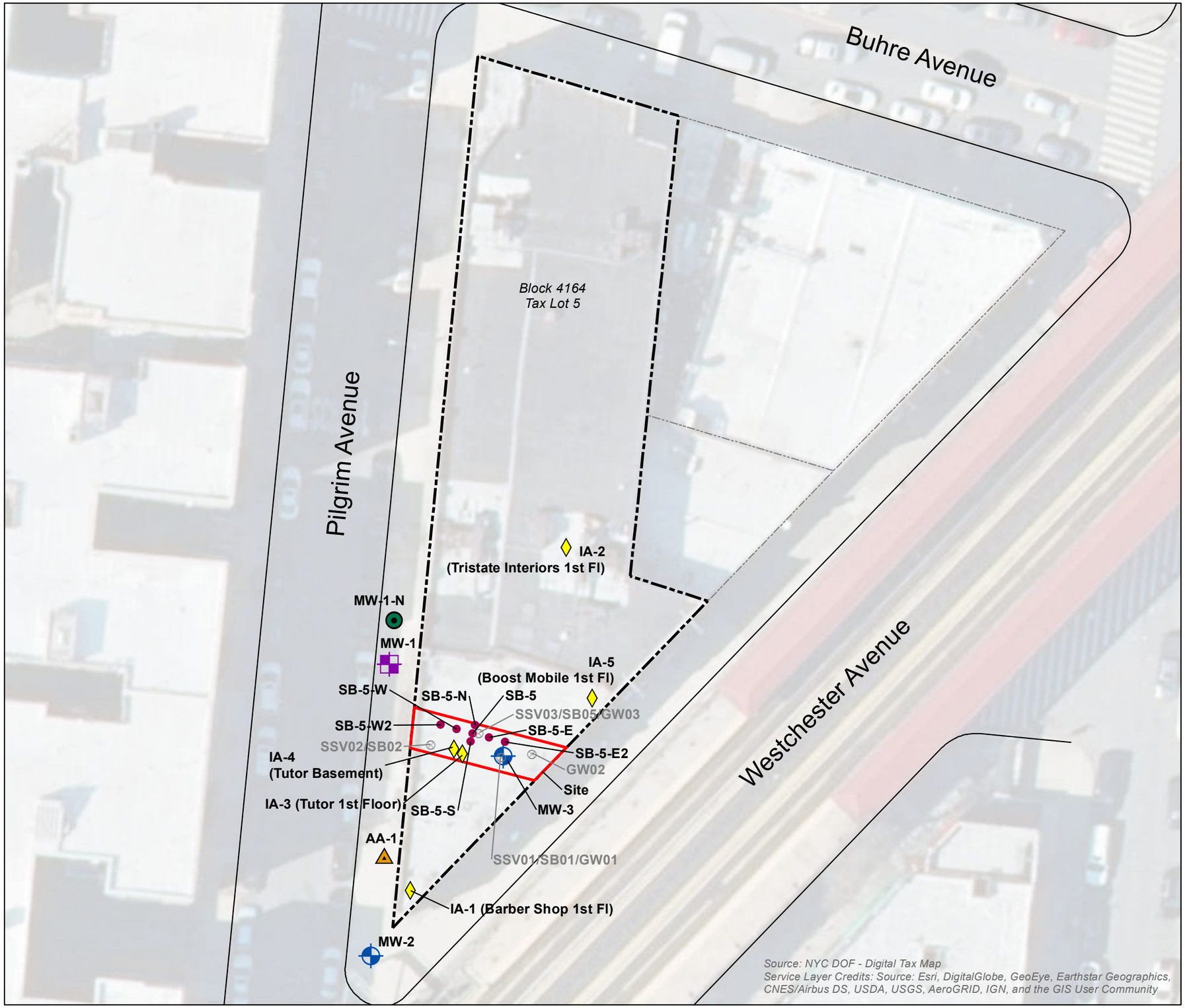
Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

Drawing Title: **Site Location Map**

Drawing No: **Figure 1**



Legend

- Soil Delineation Sample Location
- Soil Boring Location
- Groundwater Sampling Location
- Soil and Groundwater Sampling Location
- Indoor Air Sampling Location
- Ambient Air Sampling Location
- Castleton Environmental Soil, GW and SV Sampling Locations, 2019
- Neighboring Tax Lots
- Block 4164, Tax Lot 5
- Site Location 2921 Westchester Avenue

0 15 30 60 Feet

Site

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

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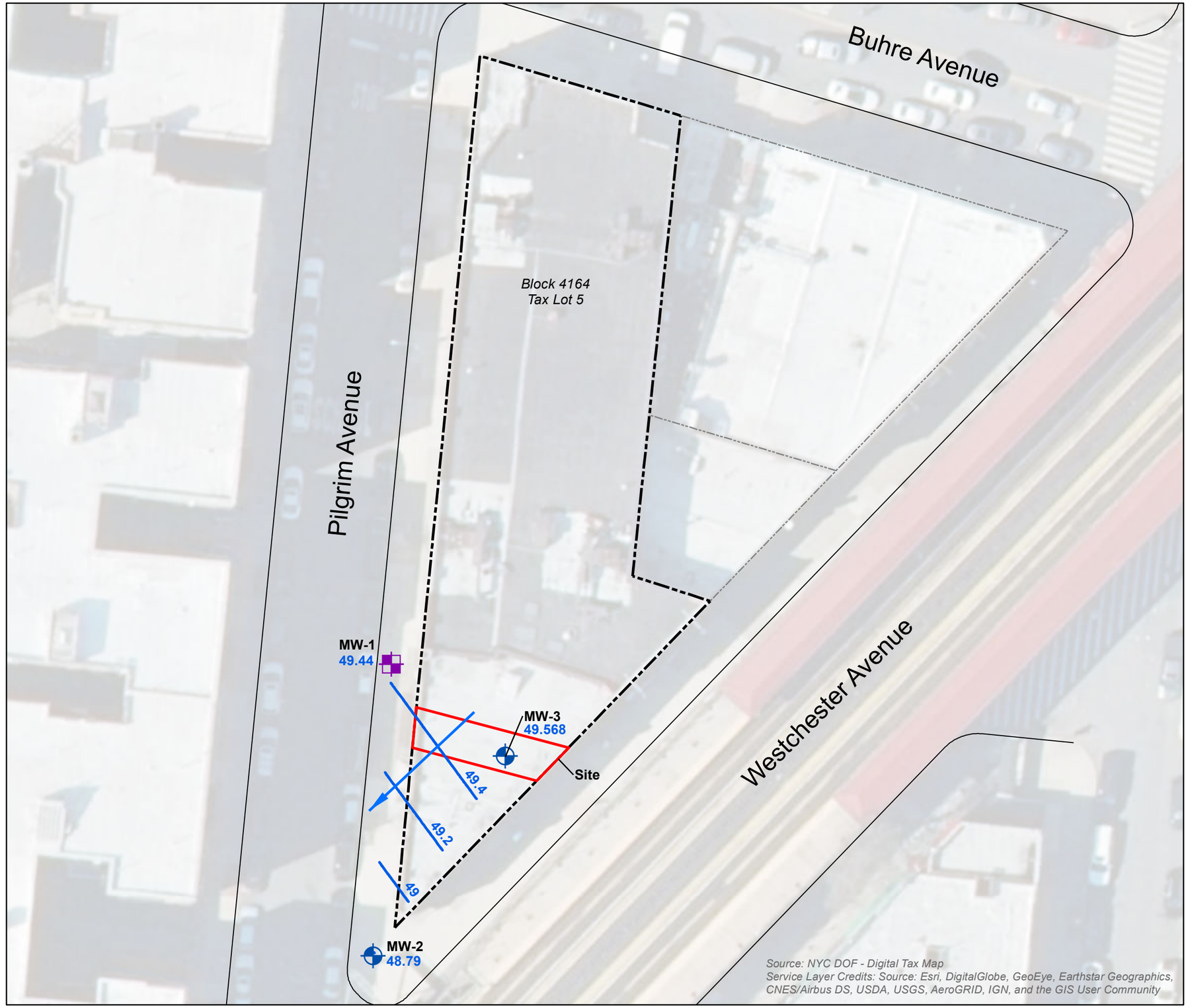
Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

Drawing Title: **Historical Sampling Locations**

Drawing No: **Figure 2**



N
NE
E
SE
S
SW
W
NW

Legend

- Groundwater Sampling Location
- Soil and Groundwater Sampling Location
- Groundwater Elevation Contour
- Neighboring Tax Lots
- Block 4164, Lot 5
- Site Location 2921 Westchester Avenue
- Groundwater Flow Direction

0 15 30 60 Feet

Site

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Bronx, New York
Block 4164, Lot 5

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Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

Drawing Title: **Groundwater Flow Map**

Drawing No: **Figure 3**

Sample Location	MW-1
Sample Depth (ft-bg)	16-18
Date	9/27/2019
Chlorinated VOCs	mg/kg
Tetrachloroethene	ND
Trichloroethene	ND
cis-1,2-Dichloroethene	ND
Methylene Chloride	ND
Vinyl Chloride	ND

MW-1

Sample Location	SB-5-W2	
Sample Depth (ft-bg)	0-1	1-2
Date	2/27/2020	
Chlorinated VOCs	mg/kg	
Tetrachloroethene	**8.1**	0.033
Trichloroethene	**1.4**	0.0089
cis-1,2-Dichloroethene	**1.3**	0.0099
Methylene Chloride	ND	ND
Vinyl Chloride	ND	ND

Sample Location	SB02
Sample Depth (ft-bg)	N/A
Date	8/9/2019
Chlorinated VOCs	mg/kg
Tetrachloroethene	0.13
Trichloroethene	0.015
cis-1,2-Dichloroethene	0.014
Methylene Chloride	ND
Vinyl Chloride	ND

Sample Location	SB-5-W		
Sample Depth (ft-bg)	0-1	1-2	2-3
Date	2/27/2020		
Chlorinated VOCs	mg/kg		
Tetrachloroethene	**20**	**16**	**7**
Trichloroethene	**3.3**	**3.6**	**1.7**
cis-1,2-Dichloroethene	**2.8**	**4.4**	**3.7**
Methylene Chloride	ND	ND	ND
Vinyl Chloride	ND	ND	ND

Sample Location	SB-5			
Sample Depth (ft-bg)	0-1	1-2	2-3	3-4
Date	2/27/2020			
Chlorinated VOCs	mg/kg			
Tetrachloroethene	**3.2**	0.0014	0.0012	0.0013
Trichloroethene	**1.8**	0.0002 J	ND	0.00013 J
cis-1,2-Dichloroethene	**1.5**	0.0013	0.00038 J	0.00016 J
Methylene Chloride	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND

Sample Location	SB-5-N		
Sample Depth (ft-bg)	0-1	1-2	2-3
Date	2/27/2020		
Chlorinated VOCs	mg/kg		
Tetrachloroethene	**34**	**22**	0.65
Trichloroethene	**8.1**	**26**	**0.67**
cis-1,2-Dichloroethene	**10**	**12**	**0.57**
Methylene Chloride	ND	**0.27 J**	ND
Vinyl Chloride	ND	**0.084 J**	ND

Sample Location	SB05
Sample Depth (ft-bg)	N/A
Date	8/9/2019
Chlorinated VOCs	mg/kg
Tetrachloroethene	**21 D**
Trichloroethene	**3.3 D**
cis-1,2-Dichloroethene	**2.7 D**
Methylene Chloride	ND
Vinyl Chloride	ND

Sample Location	SB-5-E
Sample Depth (ft-bg)	0-1
Date	2/27/2020
Chlorinated VOCs	mg/kg
Tetrachloroethene	0.17
Trichloroethene	0.031
cis-1,2-Dichloroethene	0.052
Methylene Chloride	ND
Vinyl Chloride	0.0005 J

Sample Location	SB01
Sample Depth (ft-bg)	N/A
Date	8/9/2019
Chlorinated VOCs	mg/kg
Tetrachloroethene	0.33
Trichloroethene	0.055
cis-1,2-Dichloroethene	0.086
Methylene Chloride	ND
Vinyl Chloride	ND

Sample Location	SB-5-S		
Sample Depth (ft-bg)	0-1	1-2	2-3
Date	2/27/2020		
Chlorinated VOCs	mg/kg		
Tetrachloroethene	**1.7**	0.0014	ND
Trichloroethene	**1.3**	0.00025 J	ND
cis-1,2-Dichloroethene	**15**	0.021	0.0074
Methylene Chloride	ND	ND	ND
Vinyl Chloride	0.25	0.0015	0.0042 J

Block 4164
Tax Lot 5

Pilgrim Avenue

Westchester Avenue

SB-5-W2
SB-5-N
SB-5-W
SB-5
SB-5-E
SB-5-E2
SB05
SB02
SB-5-S
SB01
Site

Analyte	NY-UNRES	NY-PGW
Chlorinated VOCs	mg/kg	
Tetrachloroethene	1.3	1.3
Trichloroethene	0.47	0.47
cis-1,2-Dichloroethene	0.25	0.25
Methylene Chloride	0.05	0.05
Vinyl Chloride	0.02	0.02

Notes:

1. **Bold and shaded yellow value indicates concentration exceeds NY-UNRES and NY-PGW SCOs**
2. NY-UNRES = 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives
3. NY-PGW = 6 NYCRR Part 375 Restricted Protection of Groundwater Soil Cleanup Objectives
4. D = Concentration is from an analysis that required a dilution
5. J = Estimated value
6. ND = Not detected
7. NS = No standard
8. Soil samples SB01, SB02, and SB05 were collected as part of Castleton's Phase II ESI and sample depths were not indicated

Legend

- Soil Delineation Sample Locations
- Soil/Groundwater Sample Location
- Castleton Environmental Soil Sample Locations
- Block 4164, Tax Lot 5
- Site Location 2921 Westchester Avenue

0 4 8 16 Feet

Site

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

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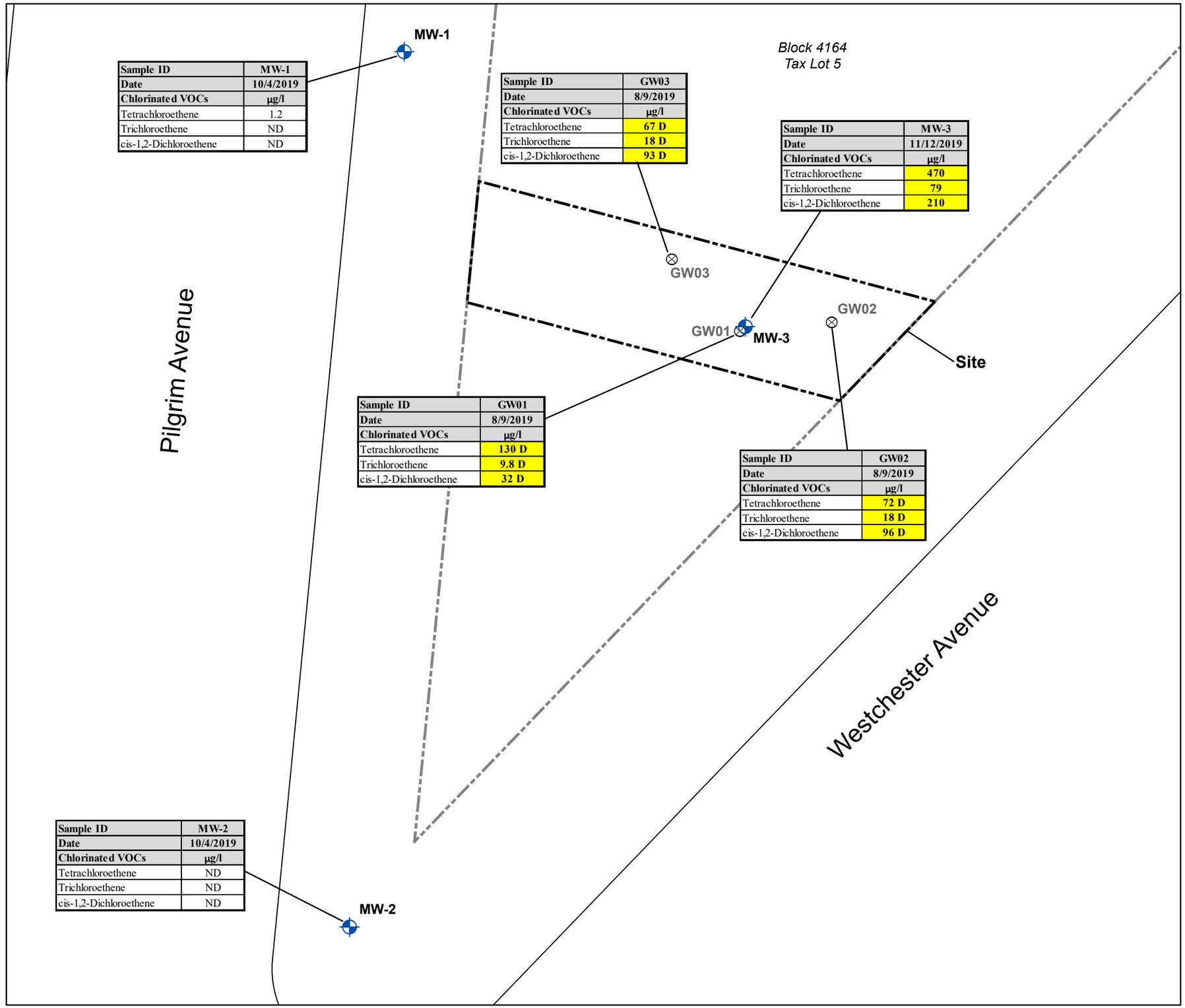
Drawn By: LM
Checked By: AC
Date: June 2020
Scale: As Noted

Drawing Title: **Chlorinated VOCs in Soil**

Drawing No: **Figure 4**



Sample ID	MW-1
Date	10/4/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	1.2
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Sample ID	GW03
Date	8/9/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	67 D
Trichloroethene	18 D
cis-1,2-Dichloroethene	93 D

Sample ID	MW-3
Date	11/12/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	470
Trichloroethene	79
cis-1,2-Dichloroethene	210

Sample ID	GW01
Date	8/9/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	130 D
Trichloroethene	9.8 D
cis-1,2-Dichloroethene	32 D

Sample ID	GW02
Date	8/9/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	72 D
Trichloroethene	18 D
cis-1,2-Dichloroethene	96 D

Sample ID	MW-2
Date	10/4/2019
Chlorinated VOCs	µg/l
Tetrachloroethene	ND
Trichloroethene	ND
cis-1,2-Dichloroethene	ND

Analyte	NY-AWQS
Chlorinated VOCs	µg/l
Tetrachloroethene	5
Trichloroethene	5
cis-1,2-Dichloroethene	5

Notes:

1. **Bold and shaded yellow value indicates concentration exceeds NY-AWQS**
2. NY-AWQS = NYSDEC Division of Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS)
3. J = Estimated value
4. ND = Not detected
5. D = Concentration is from an analysis that required a dilution
6. Groundwater samples GW01, GW02, and GW03 were collected as part of Castleton's Phase II ESI

Legend

- Soil/Groundwater Sample Location
- Castleton Environmental Groundwater Sample Locations
- Block 4164, Tax Lot 5
- Site Location 2921 Westchester Avenue

0 5 10 20 Feet

Site

2921 Westchester Avenue Bronx, New York Block 4164, Lot 5

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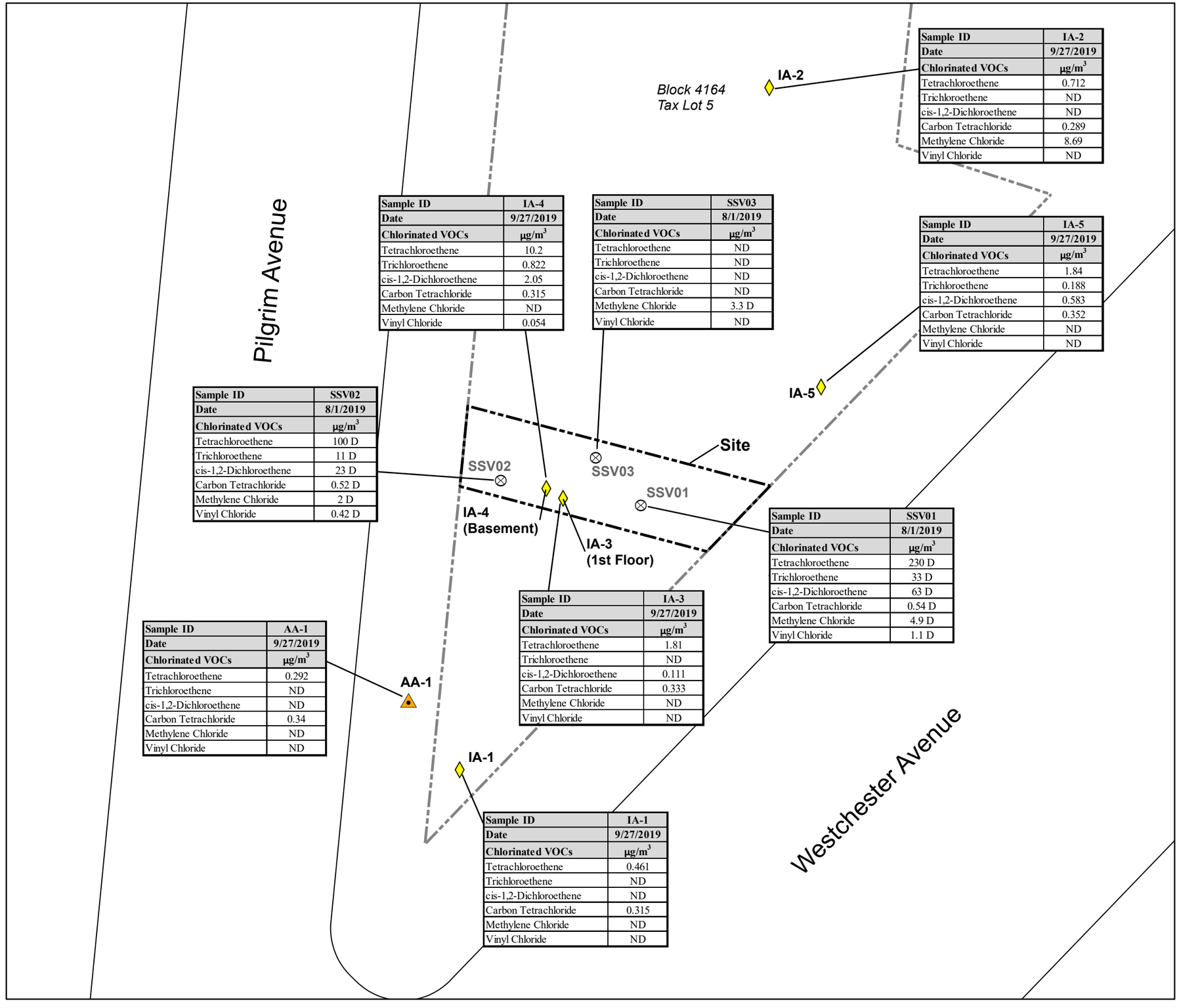
LM	AC	June 2020	As Noted

Drawing Title: **Chlorinated VOCs in Groundwater**

Drawing No: **Figure 5**



Sample ID	IA-2
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	0.712
Trichloroethene	ND
cis-1,2-Dichloroethene	ND
Carbon Tetrachloride	0.289
Methylene Chloride	8.69
Vinyl Chloride	ND

Sample ID	IA-4
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	10.2
Trichloroethene	0.822
cis-1,2-Dichloroethene	2.05
Carbon Tetrachloride	0.315
Methylene Chloride	ND
Vinyl Chloride	0.054

Sample ID	SSV03
Date	8/1/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	ND
Trichloroethene	ND
cis-1,2-Dichloroethene	ND
Carbon Tetrachloride	ND
Methylene Chloride	3.3 D
Vinyl Chloride	ND

Sample ID	IA-5
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	1.84
Trichloroethene	0.188
cis-1,2-Dichloroethene	0.583
Carbon Tetrachloride	0.352
Methylene Chloride	ND
Vinyl Chloride	ND

Sample ID	SSV02
Date	8/1/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	100 D
Trichloroethene	11 D
cis-1,2-Dichloroethene	23 D
Carbon Tetrachloride	0.52 D
Methylene Chloride	2 D
Vinyl Chloride	0.42 D

Sample ID	SSV01
Date	8/1/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	230 D
Trichloroethene	33 D
cis-1,2-Dichloroethene	63 D
Carbon Tetrachloride	0.54 D
Methylene Chloride	4.9 D
Vinyl Chloride	1.1 D

Sample ID	IA-3
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	1.81
Trichloroethene	ND
cis-1,2-Dichloroethene	0.111
Carbon Tetrachloride	0.333
Methylene Chloride	ND
Vinyl Chloride	ND

Sample ID	AA-1
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	0.292
Trichloroethene	ND
cis-1,2-Dichloroethene	ND
Carbon Tetrachloride	0.34
Methylene Chloride	ND
Vinyl Chloride	ND

Sample ID	IA-1
Date	9/27/2019
Chlorinated VOCs	µg/m³
Tetrachloroethene	0.461
Trichloroethene	ND
cis-1,2-Dichloroethene	ND
Carbon Tetrachloride	0.315
Methylene Chloride	ND
Vinyl Chloride	ND

Notes:

1. ND = Not detected
2. D = Concentration is from an analysis that required a dilution
3. All soil vapor samples were collected from the basement as part of Castleton's Phase II ESI

Legend

- Indoor Air Sampling Location
- Ambient Air Sampling Location
- Castleton Environmental Soil Vapor Locations
- Site Location 2921 Westchester Avenue
- Block 4164, Tax Lot 5

0 5 10 20 Feet

Site

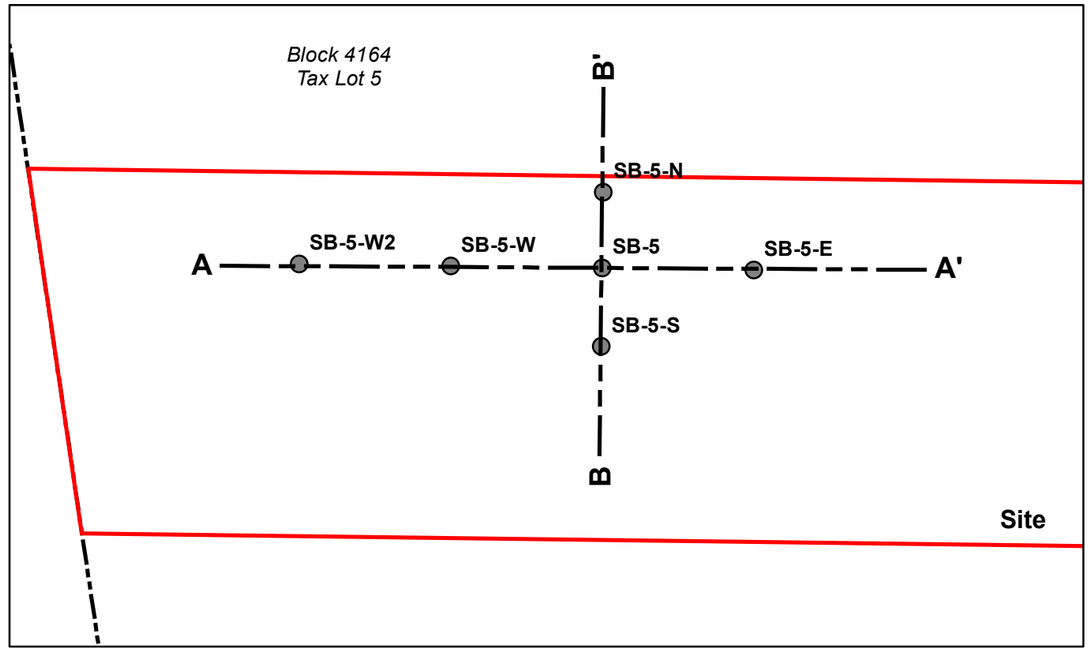
2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

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: AC
Date: June 2020
Scale: As Noted

Drawing Title: **Chlorinated VOCs in Soil Vapor & Indoor Air**

Drawing No: **Figure 6**



Plan View

0 2.5 5 10 Feet

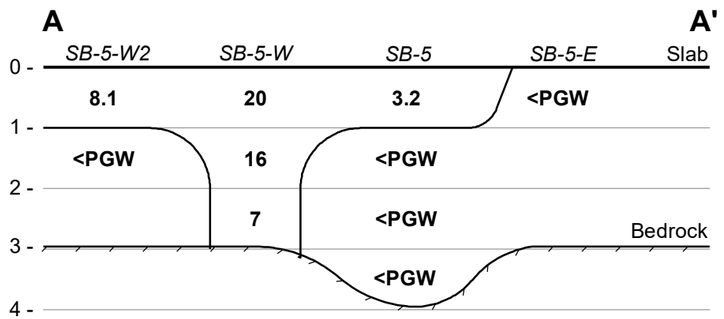
Approximate Areas of PCE in Soil		
Depth	Area > 10 mg/kg	Area <10 mg/kg, >PGW
0-1 ft	50 sf	60 sf
1-2 ft	30 sf	30 sf
2-3 ft	0	15 sf

Note:
PGW - Protection of Groundwater Standard

Legend

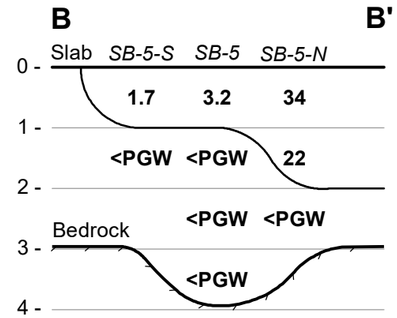
- Soil Delineation Sample Locations
- Block 4164, Tax Lot 5
- Site Location
  2921 Westchester Avenue

Source: NYC DOF - Digital Tax Map



Section A-A'

Horiz. Scale 1" = 5'
Vert. Scale 1" = 2.5'



Section B-B'

Horiz. Scale 1" = 5'
Vert. Scale 1" = 2.5'

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

Site

TENEN ENVIRONMENTAL
Tenen Environmental, LLC
121 West 27th Street
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O: (646) 606-2332
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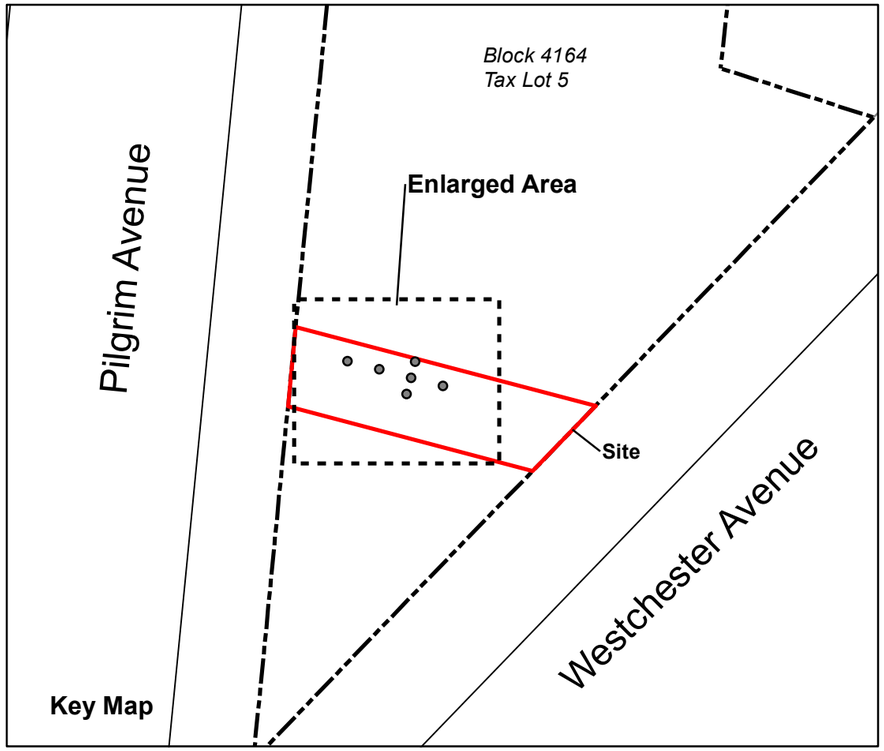
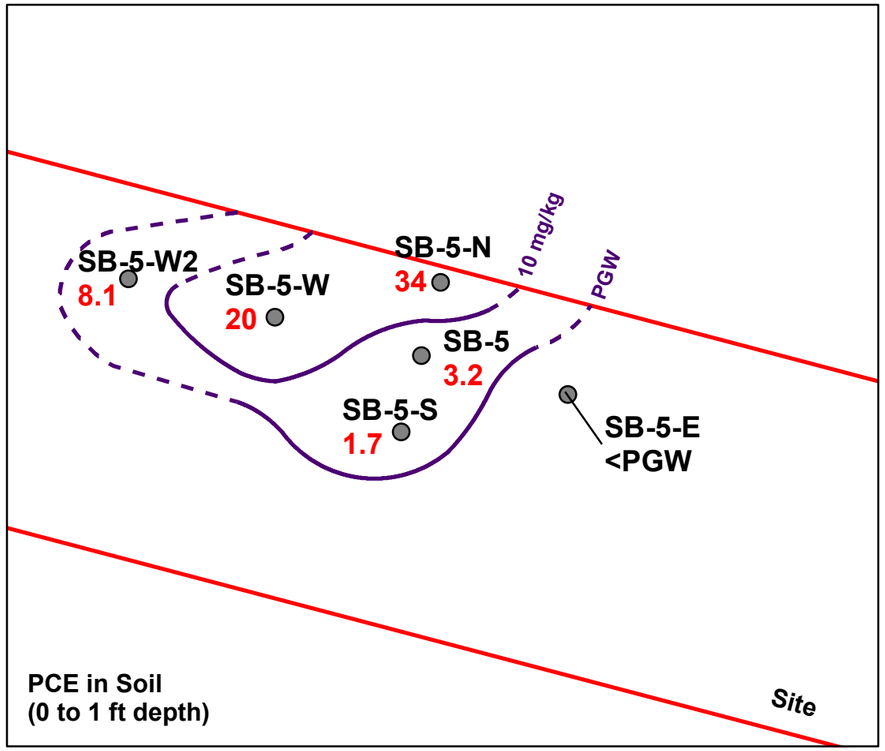
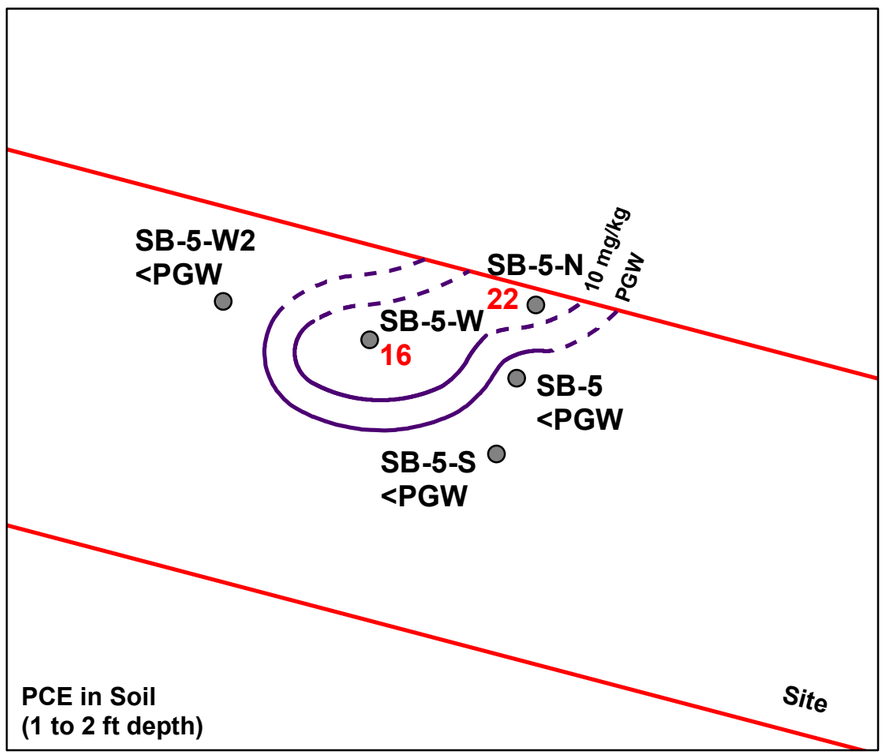
Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

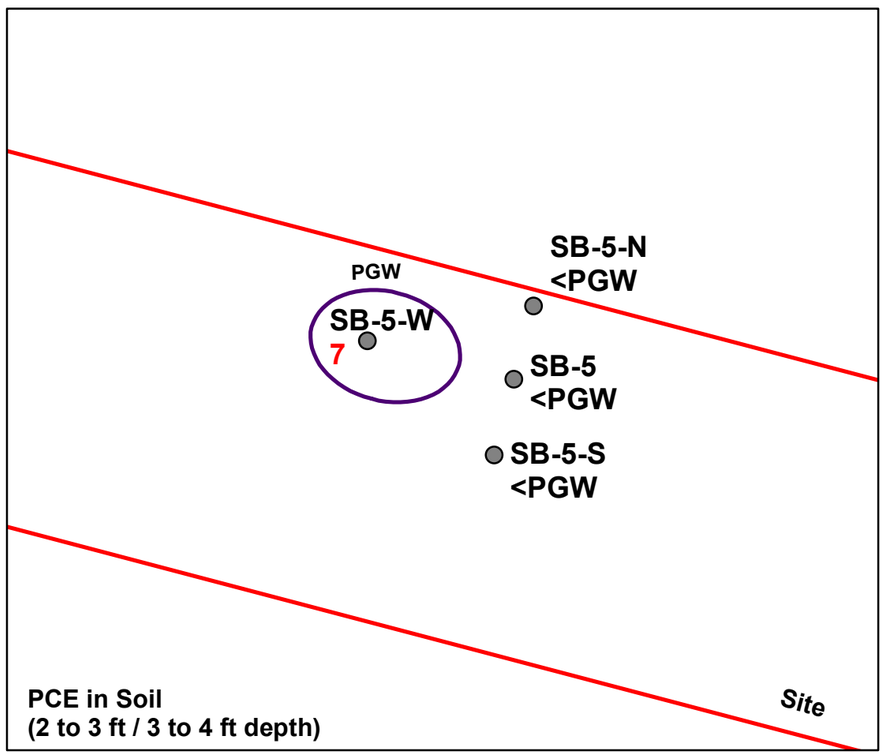
Drawing Title
PCE Impacts above Groundwater Standards - Cross-Sections

Drawing No
Figure 7









Approximate Areas of PCE in Soil		
Depth	Area > 10 mg/kg	Area <10 mg/kg, >PGW
0-1 ft	50 sf	60 sf
1-2 ft	30 sf	30 sf
2-3 ft	0	15 sf

Note:
PGW - Protection of Groundwater Standard

Legend

- Soil Delineation Sample Locations
- Contour PCE in Soil
- Contour PCE in Soil (Inferred)
- Neighboring Tax Lots
- Lot Boundary
- Site Location 2921 Westchester Avenue

Source: NYC DOF - Digital Tax Map

0 2.5 5 10 Feet

Site

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

TENEN ENVIRONMENTAL
Tenen Environmental, LLC
121 West 27th Street
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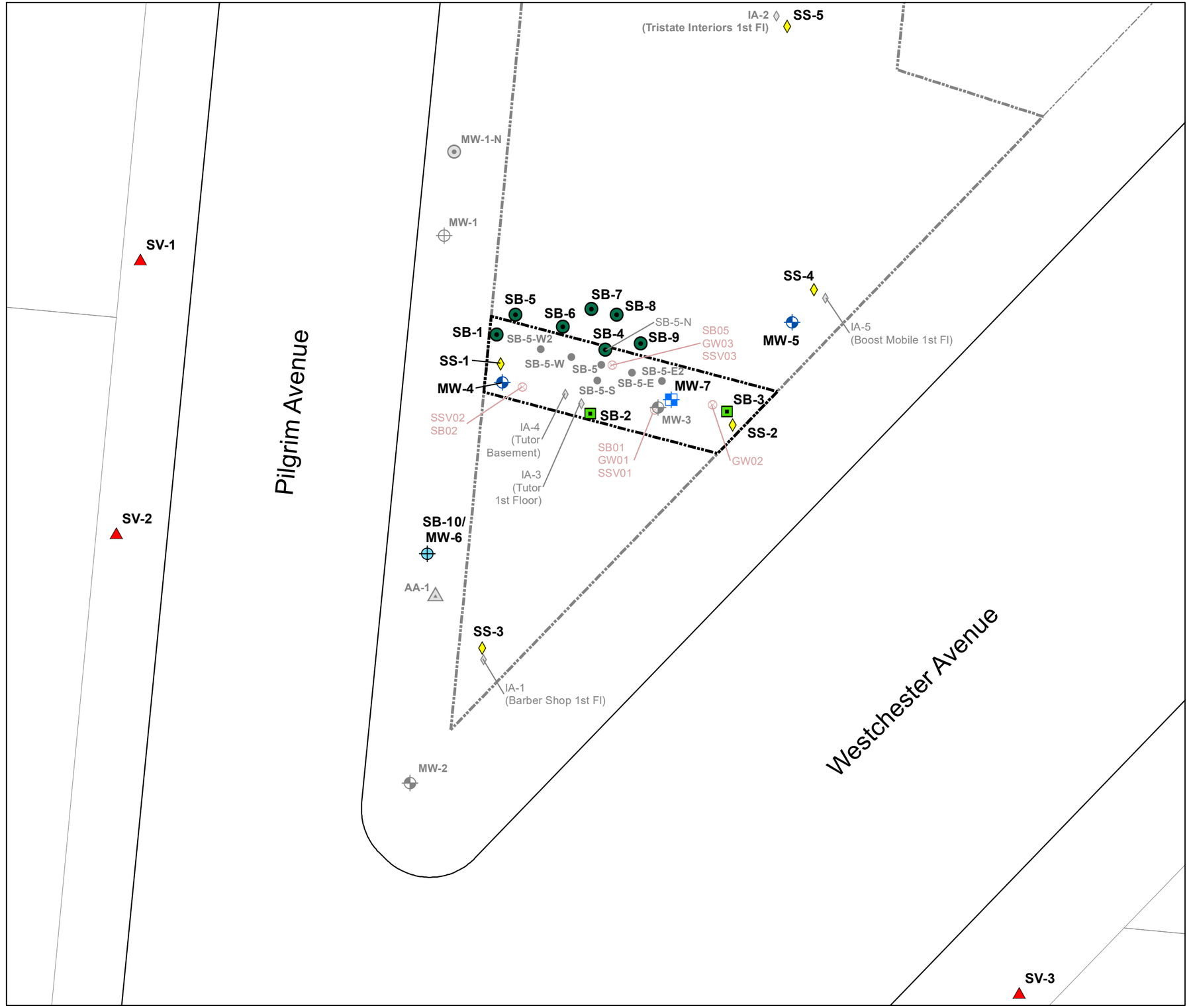
Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

Drawing Title
PCE Isopleths in Soil (0 to 1 ft, 1 ft to 2 ft, & 2 ft to 3 ft depths)

Drawing No
Figure 8



Site

2921 Westchester Avenue
Bronx, New York
Block 4164, Lot 5

TENEN ENVIRONMENTAL

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Drawn By	Checked By	Date	Scale
LM	AC	June 2020	As Noted

Drawing Title: **Proposed Sampling Locations**

Drawing No: **Figure 9**

Appendix A

Previous Reports (on cd)

Appendix B

Quality Assurance Project Plan

Quality Assurance Project Plan

for
2921 Westchester Avenue
Remedial Investigation Work Plan

2921 Westchester Avenue – Bronx, NY
Block 4164, Lot 5
BCP Site # TBD

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A
625 Broadway, 12th Floor
Albany, NY 12233-7016

Prepared for:
Ralford Realty Corp.
8 West 40th Street
New York, NY 10018

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

June 2020

TABLE OF CONTENTS

Appendices

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed for the Remedial Investigation Work Plan (RIWP) prepared for the 2921 Westchester Avenue property (the Site).

The Site, located at 2921 Westchester Avenue, is an irregularly-shaped parcel of land located on the west side of Westchester Avenue, between Pilgrim Avenue and Buhre Avenue in the Pelham Bay section of the Bronx, New York.

The Site is improved with one two-story commercial building with a partial basement that occupies the entire Site lot. The Site consists of one tenant space of the building and a portion of the partial basement. The Site is an irregularly-shaped 525 square foot parcel located in the Bronx Community Board 10 and is generally identified as a portion of Block 4164 and Lot 5. The Site is currently occupied by a tutor and afterschool program, but was historically utilized as a dry cleaning facility.

1.1 Project Scope and QAPP Objective

The proposed scope of work includes the following:

- advancement of borings for soil and soil vapor sampling on the Site;
- installation of new groundwater monitoring wells; and,
- collection of soil, groundwater, soil vapor, and ambient air samples from soil borings, new and existing permanent monitoring wells and permanent soil vapor points.

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 Investigation Work Plan. This QAPP addresses how the acquisition and handling of samples and the review 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 RIWP on behalf of Ralford Realty Corp. (the Participant) once it has been approved by the New York State Department of Environmental Conservation (NYSDEC).

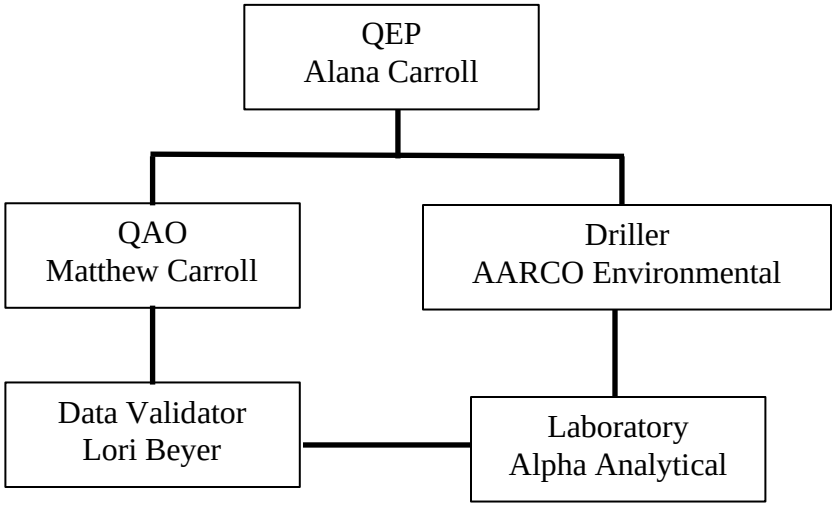
The Project Manager and Qualified Environmental Professional (QEP) will be Mrs. Alana Carroll, CPG, managing scientist at Tenen. Mrs. Carroll is a certified professional geologist with experience in all aspects of site assessment, development and implementation of remedial strategies. Her experience involves projects from inception through investigation, remediation and closure. Her 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. Mrs. Carroll received her BS in Geology from Hofstra University; her resume is included in Appendix A.

The Quality Assurance Officer will be Mr. Matthew Carroll, P.E., principal at Tenen. 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.

In addition, Tenen will utilize subcontractors for drilling (AARCO Environmental Services of Lindenhurst, NY), laboratory services (Alpha Analytical of Westborough, MA) and data validation (L.A.B. Validation Corp. of East Northport, NY). The resume for the DUSR preparer, Ms. Lori Beyer, is included in Appendix A.

Contact Information
Remedial Party (Ralford Realty Corp.), Anthony Scovotti, 718.824.1700
Tenen Environmental, Alana Carroll or Matthew Carroll, 646.606.2332

An organization chart for the implementation of the Remedial Investigation 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 the soil, soil vapor, indoor air, ambient air and groundwater samples is provided below. Proposed sample locations are shown on Figure 6 of the Work Plan. 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 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

Soil samples from borings will be collected from plastic liners collected by a direct-push Geoprobe® or manual sampling hammer. In general, select soil intervals will be screened between grade and the terminal depth of the boring. New, dedicated disposable acetate liners will be used for all soil samples collected using the Geoprobe or manual sampling hammer. All casings will be decontaminated between borings, as described in Section 3.11.

The liner for each sample interval will be opened and the soil within scanned for volatile organic compounds (VOCs) using a photoionization detector (PID) and geologically described using the Unified Soil Classification System, including documentation of observations regarding potential contamination such as odors, staining, etc. All descriptions and observations will be documented in a field notebook.

At all soil boring locations, the collected soil volumes will be screened with a PID and visual (e.g., source areas – sumps, floor drains, stains, sheens, blebs, presence of NAPL, etc.) and olfactory observations will be recorded. If evidence of VOC impacts is detected and drilling conditions allow, the borehole will be extended until no impacts are detected. The full extent of the boring will be screened and samples will be collected based on the field observations and readings. For each soil delineation boring (SB-1 and SB-4 through SB-9), samples will be collected from each one-foot interval of the soil column, from directly below the basement slab to the top of bedrock (approximately 3 to 4 feet below basement grade [ft-bbg]). Soil delineation samples will be analyzed on a stepwise basis: the one-foot interval directly below the slab will be analyzed first, if this interval contains concentrations of chlorinated VOCs (cVOCs) in excess of applicable standards, then the next interval will be analyzed (VOCs, only) until a clean interval is reached. A minimum of two soil samples will be analyzed from borings located onsite. Analysis of soil samples collected from offsite soil delineation samples will terminate when a clean

interval is present. For each characterization boring (SB-2 and SB-3), soil samples will be collected from the two-foot interval directly below the basement slab and the two-foot interval directly above bedrock. For the exterior offsite soil boring, one soil sample will be collected from the interval of highest suspected contamination based upon PID readings, visual and olfactory methods. If not contamination is observed, the sample will be collected from the two-foot interval directly above the groundwater interface. Samples will be collected at the intervals detailed above (e.g., based on screening, visual and olfactory indicators) to delineate the vertical and horizontal extent of site contaminants.

Soil samples to be analyzed will be collected directly from the plastic sleeves or hand tools. All collected soil samples will be 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.

A minimum of two soiul samples collected from each onsite boring will be analyzed for the following analytes on the Part 375 list with a Category B deliverable package:

- Target Compound List (TCL) VOCs by EPA Method 8260C;
- TCL Semivolatile Organic Compounds (SVOCs) by EPA Method 8270C;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082A;
- Pesticides by EPA Method 8081B;
- Herbicides by EPA Method 8151A;
- Target Analyte List (TAL) Metals by EPA Method 6010C / 7471B;
- Trivalent and Hexavalent Chromium by EPA Method 3060A;
- Total Cyanide by EPA Method 9010C;
- PFAS by USEPA Method 537 Modified; and
- 1,4-Dioxane by USEPA Method 8270.

All offsite samples will be analyzed for the following analytes on the Part 375 list with a Category B deliverable package:

- TCL VOCs by EPA Method 8260C.

3.8 Monitoring Well Installation and Development

Four new groundwater well locations are proposed (MW-4 through MW-7). The offsite and exterior well will be installed and screened approximately five feet into the shallow aquifer, as determined based on field readings. The interior non-bedrock wells will be installed with a four-foot pre-packed PVC screen and seated above bedrock. The bedrock well will be installed and screened approximately five feet into bedrock. For the bedrock well, the overburden will be cased off from the underlying bedrock to prevent downward migration of cVOC impacts into bedrock fractures.

The exterior monitoring well will be installed using a direct-push Geoprobe®, the interior non-bedrock monitoring wells will be installed using a manual sampling hammer, and the bedrock

monitoring well will be installed using a hydraulic drill rig with coring capabilities. A two-inch, ten-foot PVC screen (0.020-inch slot) will be installed in all exterior wells; a pre-packed, two-inch, four-foot PVC screen (0.020-inch slot) will be installed in all interior non-bedrock wells; and a two-inch five-foot screen (0.020-inch slot) will be installed five feet into bedrock for the bedrock well.

A filter of sand (US Std. sieve sizes 30 to 8) will installed in the annular space around the screen (minimum 2-inches around the circumference of the well) and will be extended two feet above the screen. The annular area around the well casing will be sealed with bentonite pellets for an interval of two feet above the filter pack in the shallow and deep wells. The annular space above the bentonite pellets to one foot below grade will be backfilled with drilling cuttings. The remaining one foot will be sealed with a concrete cap and well apron (expanding cement). A locking well cap will be installed upon completion of each well.

Following installation, at least three well volumes of the water column will be removed using a submersible pump. All permanent wells will be surveyed to a common site datum.

3.9 Groundwater Sampling

Prior to sample collection, static water levels will be measured and recorded from all monitoring wells. Monitoring wells will also be gauged for the presence of non-aqueous phase liquid (NAPL). In the event that NAPL is detected, Tenen will record the thickness and will not collect a sample. If NAPL is not detected, 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.

Field methods can impact the analysis of perfluoroalkyl acids (PFAS). A sampling guide is included in Appendix B.

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.

Groundwater samples will be collected for analysis 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.

All groundwater samples will be analyzed for the following analytes on the Part 375 list and emerging contaminants with a Category B deliverable package:

- TCL VOCs by EPA Method 8260C;
- TCL SVOCs by EPA Method 8270C;
- PCBs by EPA Method 8082A;
- Pesticides by EPA Method 8081B;
- Herbicides by EPA Method 8151A;
- Total and Dissolved TAL Metals by EPA Method 6010C / 7471B;
- Total and Dissolved Trivalent and Hexavalent Chromium by EPA Method 3060A;
- Total and Dissolved Cyanide by EPA Method 9010C;
- 1,4-dioxane by EPA Method 8270D-SIM Modified; and
- PFAS by EPA Method 537.

3.10 Sub-Slab Vapor and Soil Vapor Installation and Sampling

Sub-slab vapor and soil vapor samples will be collected in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion In the State of New York*, dated October 2006.

Five sub-slab soil vapor points (SS-1 to SS-5) will be installed within the Site basement and the northern and southern adjoining basements to characterize onsite interior conditions. The soil vapor points will be installed within the lowest building level no more than two inches below the building slab. Three offsite and exterior soil vapor points (SV-1 through SV-3) will be installed within the sidewalks of Pilgrim Avenue and Westchester Avenue in front of residential housing to characterize offsite soil vapor conditions. The soil vapor points will be advanced to approximately 10 ft-bg.

Exterior soil vapor samples will be collected using disposable points at a depth of approximately ten feet below grade (ft-bg). A Geoprobe® direct-push rig will be used to install the exterior soil vapor sampling probes. Indoor soil vapor probes will be installed using a hand-held hammer core drill. Once the soil vapor sampling probe has been driven to the desired depth, it will be attached to disposable tubing for sample collection.

The borehole above the sampling probe to grade will be sealed using an inert sealant to prevent ambient air mixing with the soil vapor. Ambient air will be purged from the boring hole by attaching the surface end of the ¼-inch diameter Teflon® tube to an air valve and then to a vacuum pump. The vacuum pump will remove three volumes of air (volume of the sample probe and tube) prior to sample collection. The flow rate for both purging and sample collection will not exceed 0.2 liter per minute (L/min).

The sub-slab and soil vapor samples will be first screened for organic vapors using a PID. A tracer gas will be used in accordance with NYSDOH protocols to verify the integrity of the soil vapor probe seal. Helium will be used as the tracer gas and a bucket will serve to keep it in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration.

A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone and chain of custody.

Sub-slab soil vapor samples will be collected in laboratory-supplied 6-liter Summa canisters using eight-hour regulators in commercial structures. Soil vapor samples will be collected in laboratory-supplied 2.7-liter Summa canisters using two-hour regulators. All soil vapor samples will be analyzed for VOCs using EPA Method TO-15.

3.11 Ambient Air Sampling Methodology

All samples will be collected in accordance with the NYSDOH Soil Vapor Guidance. Some sample locations may be adjusted based on field observations or conditions.

The ambient air samples will be collected from breathing height (three to five feet above the floor) from within the Site buildings. The sampling flow rate will not exceed 0.2 L/min. Sampling will occur for eight-hours in commercial and industrial structures. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

Three ambient air samples will be collected in laboratory-supplied 6-liter canisters using eight-hour regulators during soil vapor sample collection. Ambient air samples will be collected during soil vapor sample collection and will be analyzed for VOCs using EPA Method TO-15.

3.12 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 Times	Container
		TB	FB	DUP	MS/MSD						
Soil	33	2	2	2	2 / 2	43	VOCs	8260C	Cool to 4°C, No Headspace	14 days	(3) Encore samplers; (1) 2-oz plastic bottle
	8	0	1	1	1 / 1	12	SVOCs	8270D	Cool to 4°C		(1) 4-oz amber glass bottle
	8	0	1	1	1 / 1	12	Pesticides / Herbicides	8081B			
	8	0	1	1	1 / 1	12	PCBs	8082A			
	8	0	1	1	1 / 1	12	TAL Metals (plus Cyanide and Chromium)	8151A, 7196A, 3050B, 7471B, 9010C/9012B/ 9014, 3060A/7196		28 days for mercury; 30 days to extraction for hexavalent chromium (plus 7 days for analysis); 6 months for all others	
	8	0	1	1	1 / 1	12	1,4-Dioxane	8270		14 days	
	8	0	1	1	1 / 1	12	PFAS	537 Modified		28 days	(1) 8-oz Polypropyl-ene bottle

Matrix	Proposed Samples	QA/QC Samples				Total # Samples	Analytical Parameter	Method	Preservative	Holding Times	Container
		TB	FB	DUP	MS/MSD						
Groundwater	7	1	1	1	1 / 1	12	VOCs	8260C	Cool to 4°C, HCL	14 days	(3) 40 mL amber glass vials
	7	0	1	1	1 / 1	11	SVOCs	8270D	Cool to 4°C		(2) 1 L amber glass bottle
	7	0	1	1	1 / 1	11	Pesticides / Herbicides	8081B		7 days to extraction (plus 40 days for analysis)	(2) 1 L amber glass bottle
	7	0	1	1	1 / 1	11	PCBs	8082A		24 hours for hexavalent chromium, 14 days for all others	
	7	0	1	1	1 / 1	11	Total TAL Metals (plus Cyanide and Chromium)	200.7, 200.8, 245.2, 6010C, 6020A, 7470A, 7472, 9010C/9012B/ 9014, 7196A	Cool to 4°C, HNO3		(2) Plastic 500 mL bottles, HNO_3 preserved
	7	0	1	1	1 / 1	11	Dissolved TAL Metals (plus Cyanide and Chromium)	200.7, 200.8, 245.2, 6010C, 6020A, 7470A, 7472, 9010C/9012B/ 9014, 7196A	Cool to 4°C		(1) 500 mL plastic bottle
	7	0	1	1	1 / 1	11	1,4-Dioxane	8270D-SIM Modified			(2) 500 mL amber glass bottle
	7	0	1	1	1 / 1	11	PFAS	537	Cool to 4°C		(2) 250 mL plastic bottle

Matrix	Proposed Samples	QA/QC Samples				Total # Samples	Analytical Parameter	Method	Preservative	Holding Times	Container
		TB	FB	DUP	MS/MSD						
Sub-slab Soil Vapor	5	No QA/QC samples				5	VOCs	TO-15	None	30 days	(1) 6-L Summa
Soil Vapor	3					3					(1) 2.7-L Summa
Ambient Air	3					3					(1) 6-L Summa

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

3.13 Decontamination

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

3.14 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 –Protection of Groundwater and Restricted Commercial Use Soil Cleanup Objectives (SCOs) as listed in 6NYCRR Part 375 and NYSDEC's January 2020 PFAS Guidelines;
Groundwater – Class GA groundwater standards and guidance values for groundwater as listed in NYSDEC Technical and Operations Guidance Series (TOGS) 1.1.1 and NYSDEC's January 2020 PFAS Guidelines; and,
Soil Vapor – NYSDOH Matrices and Air Guidance Values (AGVs).

A report documenting the Remedial Investigation 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

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

Matthew Carroll, P.E.
Environmental Engineer/Principal

Experience Summary

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

Selected Project Experience

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Education and Certifications

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

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

Lori A. Beyer

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

EXPERIENCE:

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

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

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

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

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

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

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

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

EDUCATION:

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

Westchester Community College

Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

ORGANIC DATA VALIDATION COURSE (35 HOURS)

Dr. John Samuelian

Date AUGUST 1992

Assistant Dean
Professional Development Center

President

The Professional Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Westchester Community College
Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

INORGANIC DATA VALIDATION

Instructor: Dale Boshart

Date MARCH 1993

Assistant Dean
Professional Development Center

President

The Professional Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

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

Thomas C. Jorling
Commissioner

July 8, 1992

Ms. Elaine Sall
Program Coordinator
Westchester Community College
Valhalla, NY 10595-1698

Dear Elaine,

Thank you for your letter of June 29, 1992. I have reviewed the course outline for organic data validation, qualifications for teachers and qualifications for students. The course that you propose to offer would be deemed equivalent to that which is offered by EPA. The individuals who successfully complete the course and pass the final written exam would be acceptable to perform the task of organic data validation for the Department of Environmental Conservation, Division of Hazardous Waste Remediation.

As we have discussed in our conversation of July 7, 1992, you will forward to me prior to the August course deadline, the differences between the EPA SOW/90 and the NYSDEC ASP 12/91. You stated these differences will be compiled by Mr. John Samulian.

I strongly encourage you to offer an inorganic data validation course. I anticipate the same list of candidates would be interested in an inorganic validation course as well, since most of the data to be validated consists of both organic and inorganic data.

Thank you for you efforts and please contact me if I can be of any further assistance.

Sincerely,

Maureen P. Serafini

Maureen P. Serafini
Environmental Chemist II
Division of Hazardous Waste
Remediation

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

October 2, 1992

Ms. Lori Beyer
3 sparkill Drive
East Northport, NY 11731

Dear Ms. Beyer:

Congratulations upon successful completion of the Organic Data Validation course held August 17 - 21, 1992, through Westchester Community College, Professional Development Center. This course has been deemed by New York State Department of Environmental Conservation as equivalent to EPA's Organic Data Validation Course.

Enclosed is your Certificate. Holders of this Certificate are deemed competent to perform organic data validation for the New York State DEC Division of Hazardous Waste Remediation.

The Professional Development Center at Westchester Community College plans to continue to offer courses and seminars which will be valuable to environmental engineers, chemists and related personnel. Current plans include a TCLP seminar on November 17th and a conference on Environmental Monitoring Regulations on November 18th.

We look forward to seeing you again soon at another environmental program or event. Again, congratulations.

Very truly yours,

Passing Grade is 70%
Your Grade is 99%

Elaine Sall
Program Coordinator

ES/bf

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

June 21, 1993

Dear Ms. Beyer:

Enclosed is your graded final examination in the Inorganic Data Validation course you completed this past March. A score of 70% was required in order to receive a certificate of satisfactory completion. Persons holding this certificate are deemed acceptable to perform Inorganic Data Validation for the New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation.

I am also enclosing a course evaluation for you to complete if you have not already done so. The information you provide will greatly aid us in structuring further courses. We wish to make these course offerings as relevant, targeted and comprehensive as possible. Your evaluation is vital to that end.

Congratulations on your achievement. I look forward to seeing you again at another professional conference or course. We will be co-sponsoring an environmental monitoring conference on October 21, 1993 with the New York Water Pollution Control Association, Lower Hudson Chapter, at IBM's Yorktown Heights, NY site. Information regarding this event will be going out in August.

Very truly yours,

Elaine Sall

Elaine Sall
Program Coordinator

ES/bf

Enclosures

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Appendix B

EPA 537 Field Sampling Guidelines

EPA 537 (PFAS) Field Sampling Guidelines

PLEASE READ INSTRUCTIONS ENTIRELY PRIOR TO SAMPLING EVENT

Sampling for PFAS via EPA 537 can be challenging due to the prevalence of these compounds in consumer products. The following guidelines are strongly recommended when conducting sampling.

Reference-NHDES https://www.des.nh.gov/organization/divisions/waste/hwrb/documents/pfc-stakeholder-notification-20161122.pdf

FIELD CLOTHING and PPE

- No clothing or boots containing Gore-Tex®
- All safety boots made from polyurethane and PVC
- No materials containing Tyvek®
- Do not use fabric softener on clothing to be worn in field
- Do not used cosmetics, moisturizers, hand cream, or other related products the morning of sampling
- Do not use unauthorized sunscreen or insect repellant (see reference above for acceptable products)

FOOD CONSIDERATIONS

No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

OTHER RECOMMENDATIONS

Sample for PFAS first! Other containers for other methods may have PFAS present on their sampling containers

SAMPLE CONTAINERS

- All sample containers made of HDPE or polypropylene
- Caps are unlined and made of HDPE or polypropylene (no Teflon® -lined caps)

WET WEATHER (AS APPLICABLE)

Wet weather gear made of polyurethane and PVC only

EQUIPMENT DECONTAMINATION

- "PFAS-free" water on-site for decontamination of sample equipment. No other water sources to be used
- Only Alconox and Liquinox can be used as decontamination materials

FIELD EQUIPMENT

- Must not contain Teflon® (aka PTFE) or LDPE materials
- All sampling materials must be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books can be used
- No plastic clipboards, binders, or spiral hard cover notebooks can be used
- No adhesives (i.e. Post-It® Notes) can be used
- Sharpies and permanent markers not allowed; regular ball point pens are acceptable
- Aluminum foil must not be used
- Keep PFC samples in separate cooler, away from sampling containers that may contain PFAS
- Coolers filled with regular ice only - Do not use chemical (blue) ice packs

EPA 537 (PFAS) Field Sampling Guidelines

PLEASE READ INSTRUCTIONS ENTIRELY PRIOR TO SAMPLING EVENT

Sampler must wash hands before wearing nitrile gloves in order to limit contamination during sampling. Each sample set requires a set of containers to comply with the method as indicated below. **Sample set is composed of samples collected from the same sample site and at the same time.*

Container Count	Container Type	Preservative
3 Sampling Containers - Empty	250 mL container	Pre preserved with 1.25 g Trizma
1 Reagent Water for Field Blank use	250 mL container	Pre preserved with 1.25 g Trizma
P1 Field Blank (FRB) - Empty	250 mL container	Unpreserved

Sampling container must be filled to the neck. For instructional purposes a black line has been drawn to illustrate the required fill level for each of the 3 Sample containers

Field blanks are recommended and the containers have been provided, please follow the instructions below.

Field Blank Instructions:

1. Locate the Reagent Water container from the bottle order. The Reagent Water container will be pre-filled with PFAS-free water and is preserved with Trizma.
2. Locate the empty container labeled "Field Blank".
3. Open both containers and proceed to transfer contents of the "Reagent Water" container into the "Field Blank" container.
4. If field blanks are to be analyzed, they need to be noted on COC, and will be billed accordingly as a sample.

Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.

Sampling Instructions:

1. Each sampling event requires 3 containers to be filled to the neck of the provided containers for each sampling location.
2. Before sampling, remove faucet aerator, run water for 5 min, slow water to flow of pencil to avoid splashing and fill sample containers to neck of container (as previously illustrated) and invert 5 times.
3. Do not overfill or rinse the container.
4. Close containers securely. Place containers in sealed ZipLoc® bags, and in a separate cooler (no other container types).
5. Ensure Chain-of-Custody and all labels on containers contain required information. Place sample, Field Blank and empty Reagent Blank containers in ice filled cooler (do not use blue ice) and return to the laboratory. Samples should be kept at 4°C ±2. Samples must not exceed 10°C during first 48 hours after collection. Hold time is 14 days.

Please contact your Alpha Analytical project manager with additional questions or concerns.

Appendix C

Health and Safety Plan

Health and Safety Plan

for
2921 Westchester Avenue
Remedial Investigation Work Plan

2921 Westchester Avenue
Bronx, New York 10461
BCP Site # TBD

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B
625 Broadway, 12th Floor
Albany, NY 12233-7016

Prepared for:
Ralford Realty Corp.
8 West 40th Street
New York, NY 10018

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

June 2020

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Appendices

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 a Remedial Investigation.

The Site is located on the west side of Westchester Avenue, between Pilgrim Avenue and Buhre Avenue, in the Pelham Bay section of the Bronx, New York.

The Site is improved with one two-story commercial building with a partial basement that occupies the entire Site lot. The Site consists of one tenant space of the building and a portion of the partial basement. The Site is an irregularly shaped 525 square foot parcel located in the Bronx Community Board 10 and is generally identified as a portion of Block 4164 and Lot 5. The Site is currently occupied by a tutor and afterschool program, but was historically utilized as a dry cleaning facility.

1.1 Scope of HASP

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

- Soil borings and collection of soil samples;
- Installation of monitoring wells and collection of groundwater samples; and,
- Installation of soil vapor probes and collection of soil vapor samples.

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

2.0 PROJECT SAFETY AUTHORITY

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

- Project Manager, Matthew Carroll
- Health and Safety Officer (HSO), Ashley Platt

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

The Site was initially developed sometime prior to 1950 with the existing two-story building with a partial basement. The Site operated as a dry cleaning facility from 1988 to 2000. The Site is currently operated as a tutoring facility. The following previous investigations summarize contaminants of concern detected on the site:

Phase II Environmental Site Assessment, 2925 Westchester Avenue, Bronx, NY 10461, Castleton Environmental, August 2019.

Castleton Environmental conducted a soil, groundwater, and soil vapor investigation at the Site in 2019, which included the collection of three soil samples, three groundwater samples, and three sub-slab soil vapor samples from the basement of the former dry cleaner for laboratory analysis. The results were as follows:

- Chlorinated VOCs (cVOCs), specifically tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) were detected in exceedance of their respective Unrestricted Use Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs in one of three soil samples collected;
- cVOCs, specifically PCE, TCE, and cis-1,2-DCE, were detected in exceedance of their NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (Class GA Standards) in all three groundwater samples collected; and,
- Elevated concentrations of cVOCs, specifically PCE, TCE, and cis-1,2-DCE, were detected in two of three soil vapor samples collected.

Groundwater and Indoor Air Investigation and Soil Delineation Sampling Letter Report, 2925 Westchester Avenue, Bronx, NY 10461, Tenen Environmental, LLC, May 2020.

Tenen conducted a groundwater and indoor air investigation and soil delineation sampling at the Site in 2019 and 2020, which included the collection of 22 onsite soil samples and one offsite soil sample, one onsite groundwater sample and two offsite groundwater samples, and two onsite indoor air samples and three offsite indoor air samples for laboratory analysis. The results were as follows:

- Concentrations of PCE were detected in exceedance of its Unrestricted Use and Protection of Groundwater SCOs at 0-1 feet below basement grade (ft-bbg) at five boring locations, at 1-2 ft-bbg at two boring locations, and at 2-3 ft-bbg at one boring location. In addition, TCE and cis-1,2-DCE were detected in exceedance of Unrestricted Use and Protection of Groundwater sCOs at 0-1 ft-bbg at five boring locations, at 1-2 ft-bbg at two boring locations, and at 2-3 ft-bbg at two boring locations; vinyl chloride was detected in exceedance of its Unrestricted Use and Protection of Groundwater SCOs at 0-1 ft-bbg at one boring location and at 1-2 ft-bbg at one boring location; and methylene chloride was detected in exceedance of its Unrestricted Use and Protection of Groundwater SCOs at 1-2 ft-bbg at one boring location;
- A PCE hotspot in soil was horizontally and vertically delineated at the Site and is approximately 7 cubic yards in volume;

- Concentrations of cVOCs, specifically PCE, TCE, and cis-1,2-DCE were detected in exceedance of Class GA Standards in the groundwater sample collected from the basement of the Site;
- Concentrations of VOCs were not detected in exceedance of NYSDOH Air Guidance Values (AGVs) in any onsite or offsite indoor air samples collected. However, low concentrations of cVOCs were detected in all five indoor air samples collected, with the highest concentrations generally occurring in the sample collected from the basement of the Site; and,
- Concentrations of cVOCs were not detected in exceedance of applicable standards in any offsite soil or groundwater samples collected;

3.1 Human Exposure Pathways

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

3.2 Chemical Hazards

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

Chlorinated Solvents

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

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

3.3 Physical Hazards

The physical hazards associated with the field activities likely present a greater risk of injury than the chemical constituents at the Site. Activities within the scope of this project shall comply with New York State and Federal OSHA construction safety standards.

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

Foot Trauma
To avoid foot injuries, field personnel will be required to wear steel-toed safety shoes while field activities are being performed. To afford maximum protection, all safety shoes must meet

American National Standards Institute (ANSI) standards.

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

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

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

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

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

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

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

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

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

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

Traffic

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

Hazardous Weather Conditions

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

Slip, Trip and Fall

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

Biological Hazards

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

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

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

4.0 AIR MONITORING

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

VOC Monitoring, Response Levels, and Actions

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

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

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10

particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

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

The NYSDOH Generic CAMP is included as Appendix D of the RIWP.

5.0 PERSONAL PROTECTIVE EQUIPMENT

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

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

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

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

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

6.0 EXPOSURE MONITORING

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

7.0 SITE ACCESS

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

8.0 WORK AREAS

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

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

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

9.0 DECONTAMINATION PROCEDURES

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

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

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

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

10.0 GENERAL SAFE WORK PRACTICES

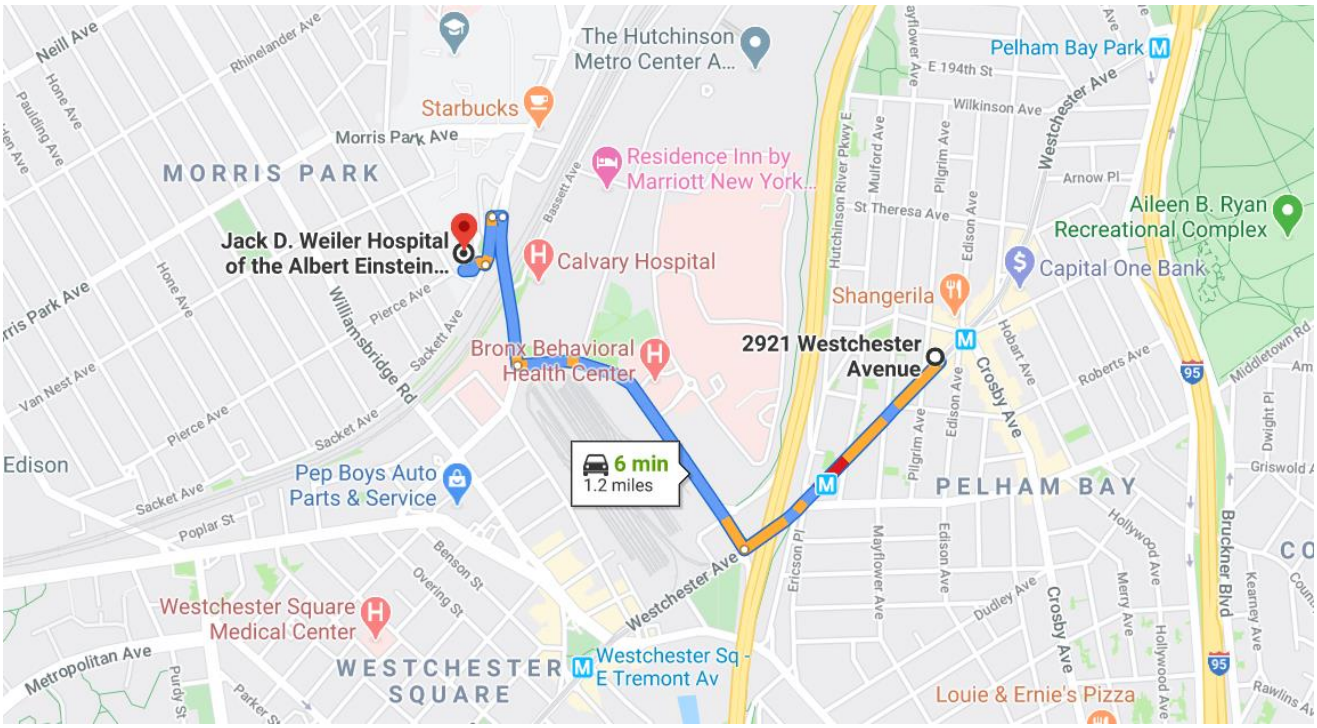
To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance.

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

11.0 EMERGENCY PROCEDURES

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the HSO will determine the nature of the emergency and will have someone call for an ambulance, if needed. If the nature of the injury is not serious—i.e., the person can be moved without expert emergency medical personnel—onsite personnel should drive injured person to a hospital. **The nearest emergency room is located at the Jack D. Weiler Hospital of the Albert Einstein College of Medicine located at 1825 Westchester Road, Bronx, NY 10461. The phone number is (718) 904-3333.** The route to the hospital is shown and detailed on the next page.

11.1 Route to Hospital



Driving directions to **Jack D. Weiler Hospital of the Albert Einstein College of Medicine** from **2921 Westchester Avenue, Bronx, New York.**

Driving Directions

1. Head southwest on Westchester Avenue towards Pilgrim Avenue (0.4 mi).
2. Turn right onto Waters Place (0.5 mi).
3. Turn right onto Eastchester Road (0.2 mi).
4. Turn left toward Sackett Avenue (75 ft).
5. Turn left onto Sackett Avenue (364 ft).
6. Turn right (194 ft). Destination will be on the right.

11.2 Emergency Contacts

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

Table 1 – Emergency Contacts

Ambulance	911
Emergency Room	(718) 918-5000
NYSDEC Spill Hotline	(800) 457-7362
NYSDEC	(518) 402-8013
Project Manager, Matthew Carroll	(917) 510-6767
On-site Personnel, Ashley Platt	(908) 892-1354
Client representative, Anthony Scovotti	(718) 824-1700

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 2921 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: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____
Signature: _____ Date: _____

Appendix B

Injury Reporting Form (OSHA Form 300)

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

Log of Work-Related Injuries and Illnesses

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

Year 20__ __

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

Form approved OMB no. 1218-0176

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

Establishment name ____________________

City ________________ State ________

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

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

Appendix C

Material Safety Data Sheets (MSDS)

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 23-Jan-2018 **Revision Number** 3

1. Identification

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

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

Synonyms cis-Acetylene dichloride.

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

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

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

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed
Harmful if inhaled

Causes serious eye irritation
Causes skin irritation
May cause respiratory irritation

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

3. Composition/Information on Ingredients

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

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.
Inhalation	Remove to fresh air. Get medical attention. If not breathing, give artificial respiration.
Ingestion	Do NOT induce vomiting. Get medical attention.
Most important symptoms and effects	Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO_2). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	6 °C / 42.8 °F
Method -	No information available
Autoignition Temperature	440 °C / 824 °F

Explosion Limits

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

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

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

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes or clothing.
Environmental Precautions	See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling

Ensure adequate ventilation. Wear personal protective equipment/face protection. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Avoid contact with skin, eyes or clothing. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage

Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

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

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures

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

Personal Protective Equipment

Eye/face Protection

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

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

No protective equipment is needed under normal use conditions.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-80 °C / -112 °F
Boiling Point/Range	60 °C / 140 °F @ 760 mmHg
Flash Point	6 °C / 42.8 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12.80%
Lower	9.70%
Vapor Pressure	201 mmHg @ 25 °C
Vapor Density	3.34 (Air = 1.0)
Specific Gravity	1.280
Solubility	No information available
Partition coefficient; n-octanol/water	No data available

Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

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

Incompatible Materials Bases

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

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Toxicologically Synergistic Products No information available

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

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

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

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

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

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

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

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

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

13. Disposal considerations

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

14. Transport information

DOT

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

TDG

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

IATA

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

IMDG/IMO

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

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
cis-1,2-Dichloroethylene	156-59-2	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
cis-1,2-Dichloroethylene	156-59-2	-	X	205-859-7	-	X	X	X	KE-10124

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA

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

U.S. State Right-to-Know Regulations

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

U.S. Department of Transportation

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

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

Other International Regulations

Mexico - Grade No information available

16. Other information

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

Creation Date 22-Sep-2009
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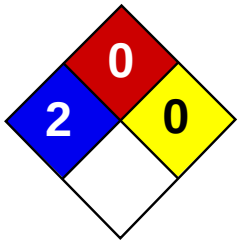
Print Date 23-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS



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; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; 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 Publishe 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. Symtoms 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, disorentiation, seizures, enotional 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 extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead 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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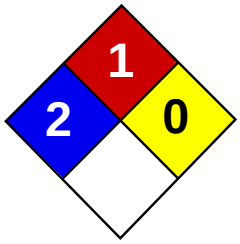

Material Safety Data Sheet
Trichloroethylene MSDS

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.

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Appendix D

NYSDOH Generic CAMP

New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

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