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SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN
2921 WESTCHESTER AVENUE SITE
2921-2925 WESTCHESTER AVENUE
BRONX, NEW YORK

by
H & A of New York Engineering and Geology, LLP
New York, New York

for
2925 Westchester LLC
Bronx, New York

and
New York State Department of Environmental Conservation
Albany, New York

File No. 0215191
May 2026

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May 21, 2026
File No. 0215191

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Subject: Supplemental Remedial Investigation Work Plan
2921 Westchester Avenue Site 2921-2925
Westchester Avenue
Bronx, New York

Ladies and Gentlemen:

On behalf of 2925 Westchester LLC, H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) is submitting for the review and approval of the New York State Department of Environmental Conservation (NYSDEC) this Supplemental Remedial Investigation Work Plan (SRIWP) for the property located at 2921-2925 Westchester Avenue in Bronx, New York (Site). This document was submitted as part of the Brownfield Cleanup Program (BCP) Application for Major Amendment for NYSDEC BCP Site C203140, which proposes expanding the existing BCP site boundary to include the northern and southern portions of the tax parcel. This SRIWP has been developed based on NYSDEC's *Technical Guidance for Site Investigation and Remediation* (Division of Environmental Remediation [DER]-10, dated May 2010). Please do not hesitate to contact us if there are any questions regarding this submittal or any other aspects of the project.

Sincerely yours,
H & A OF NEW YORK ENGINEERING AND GEOLOGY, LLP

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Certification

I, Mari C. Conlon, certify that I am currently a Qualified Environmental Professional as defined in Title 6 of the New York Codes, Rules and Regulations Part 375, and that this Supplemental Remedial Investigation Work Plan[1] was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10).

FINAL TO BE CERTIFIED

Mari C. Conlon, P.G. *Date*

[1] Certification applies to remedial investigation activities conducted after the execution of a Brownfield Cleanup Agreement (BCA).

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List of Acronyms and Abbreviations

Acronym	Definition
µg/m^3	micrograms per cubic meter
A	
Applicant	2925 Westchester LLC
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
B	
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bsg	below sidewalk grade
bbg	below basement grade
BTEX	benzene, toluene, ethylbenzene, and xylenes
C	
CAMP	Community Air Monitoring Plan
Coastal	Coastal Environmental Solutions, Inc.
CVOC	chlorinated volatile organic compounds
D	
DD	Decision Document
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
DUSR	Data Usability Summary Report
E	
ELAP	Environmental Laboratory Approval Program
EPA	U.S. Environmental Protection Agency
ESI	Environmental Site Investigation
F	
FSP	Field Sampling Plan
ft	feet/foot
G	
GPR	ground-penetrating radar
GPRS	Ground Penetrating Radar Systems, LLC

List of Acronyms and Abbreviations

Acronym	Definition
H	
Haley & Aldrich of New York	H & A of New York Engineering and Geology, LLP
HASP	Health and Safety Plan
I	
IDW	investigation-derived waste
L	
Lakewood	Lakewood Environmental Services, Corp.
M	
mg/kg	milligrams per kilogram
MTA	Metropolitan Transportation Authority
N	
NOVA	NOVA Geophysical Engineering Subsurface Mapping Solutions
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
O	
OSHA	Occupational Safety and Health Administration
P	
Pace	Pace Analytical Laboratories
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PGWSCO	Protection of Groundwater Soil Cleanup Objective
PID	photoionization detector
PM-10	particulate matter less than 10 micrometers in size
ppm	parts per million
PVC	polyvinyl chloride
Q	
QA/QC	quality assurance/quality control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment

List of Acronyms and Abbreviations

Acronym	Definition
R	
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RIR	Remedial Investigation Report
RRSCOs	Restricted-Residential Soil Cleanup Objectives
S	
Site	2925 Westchester Avenue in the Pelham Bay neighborhood of Bronx, New York
SEFA	Spreadsheets for Environmental Footprint Analysis
SRI	Supplemental Remedial Investigation
SRIR	Supplemental Remedial Investigation Report
SRIWP	Supplemental Remedial Investigation Work Plan
SVOC	semi-volatile organic compound
T	
TAL	Target Analyte List
TCE	trichloroethene
Tenen	Tenen Environmental, LLC
TCL	Target Compound List
U	
UST	underground storage tank
UUSCOs	Unrestricted Use Soil Cleanup Objectives
V	
VOC	volatile organic compound

1. Introduction

On behalf of the Applicant, 2925 Westchester LLC, H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) has prepared this Supplemental Remedial Investigation Work Plan (SRIWP) for the property located at 2921-2925 Westchester Avenue, Bronx, New York, and identified as Block 4164 Lot 5 on the New York City tax map (hereby referred to as the proposed Site). This SRIWP was submitted as part of the Brownfield Cleanup Program (BCP) Application for Major Amendment for New York State Department of Environmental Conservation (NYSDEC) BCP Site C203140, the 2921 Westchester Avenue Site (hereby referred to as the existing BCP site), which proposes expanding the existing BCP site boundary to include the northern and southern portions of the tax parcel. This SRIWP was prepared in accordance with the regulations and guidance applicable to the BCP.

The proposed Site is comprised of two non-contiguous portions of Bronx Block 4164, Lot 5 (totaling approximately 0.281 acres), separated by the existing BCP site located in the south-central portion of Lot 5 (approximately 0.032 acres of Block 4164, Lot 5). Lot 5 is improved with a vacant two-story commercial building formerly utilized by multiple tenants, including a barbershop, a tutoring center, a cellphone retail store, and a home store. A partial cellar exists below the barbershop, tutoring center, and cellphone retail store, sharing a common slab but separated by the walls of each business. The northwestern portion of the home store footprint contains a small sub-cellar consisting of a boiler room. The remainder of the home store footprint is at-grade.

The proposed Site is located in the Pelham Bay neighborhood of Bronx, New York and is bounded to the north by Buhre Avenue, followed by the Lawrence F Keene Post of the American Legion, and single- and multi-family homes; to the east by a single-story commercial building occupied by Lehigh Wines & Liquors, a two-story commercial building occupied by Madison Security Group Inc., Pruzzo's Supermarket, Pilgram Pharmacy, and Westchester Avenue, followed by the aboveground Metropolitan Transportation Authority (MTA) Subway 6 Train; to the south by the intersection of Pilgram Avenue and Westchester Avenue, followed by the aboveground MTA Subway 6 Train and a six-story mixed-use commercial and residential building; and to the west by Pilgram Avenue, followed by multiple six-story residential apartment buildings. The proposed Site location is shown in Figure 1, and a Site Plan is shown in Figure 2.

The proposed expansion to the existing BCP site will add approximately 0.281 acres in size for a total Site size of 0.313 acres (pending amendment approval). The existing BCP site is subject to an NYSDEC-approved Remedial Action Work Plan (RAWP) and an NYSDEC-issued Decision Document (DD), both dated January 2025. The remedy was selected pursuant to the remedy selection criteria set forth in NYSDEC Division of Environmental Remediation (DER)-10, Technical Guidance for Site Investigation and Remediation, and Title 6 of the New York Codes, Rules and Regulations (NYCRR) Part 375. The selected remedy is a Track 4: Restricted Commercial Use with Site-Specific Soil Cleanup Objectives remedy. The selected remedy is referred to as the Soil Excavation, Groundwater Treatment, Site Cover, and Soil Vapor Mitigation remedy.

The Site is located within a residential (R7-1) zoning area with a commercial (C2-2) overlay. The Site is located in an urban area surrounded by commercial and industrial properties served by municipal water. Surrounding land uses are depicted in Figure 3.

Redevelopment plans are still currently in the design phase; however, the proposed development includes a multi-story residential building with a full cellar.

1.1 PURPOSE

The objective of the Supplemental Remedial Investigation (SRI) is to characterize the nature and extent of environmental impacts at the proposed Site and to provide sufficient information to evaluate remedial alternatives, as required. The proposed Site was initially developed prior to 1950 with the current building. The building has been used for multiple commercial purposes, including kitchen and bath appliance sales, furniture and bedding sales, barbershops, warehousing, mobile telephone sales, and a pharmacy. The existing BCP Site was formerly operated by a dry cleaning operator.

Based on previous investigations and available Site data, including the May 2026 Limited Phase II Environmental Site Investigation (ESI), the primary contaminants of concern for the Site include chlorinated volatile organic compounds (CVOCs), specifically tetrachloroethene (PCE) and trichloroethene (TCE) in soil; CVOCs, metals, and per- and polyfluoroalkyl substances (PFAS) in groundwater; and volatile organic compounds (VOCs; including CVOCs and petroleum-related VOCs, including benzene, toluene, ethylbenzene, and xylenes [BTEX]) in soil vapor. Summaries of the soil, groundwater, and soil vapor analytical data collected on this portion of the Site are further detailed in Section 2.5 and included in Figures 5, 6, and 7, respectively.

Previous investigations did not comprehensively characterize the nature and the extent of soil, groundwater, and soil vapor contamination on the Site. Specifically, there are vertical and lateral data gaps that require additional sample collection. An SRI will be performed upon approval of this SRIWP. Results of the additional sample analyses will be used to confirm the results of the previous Site characterization activities, delineate any on-Site source(s), and determine a course for Remedial Action.

Further, upon review of the analytical results of prior reports, the project is seeking entry into the NYSDEC BCP due to soil impacted with CVOCs; groundwater impacted with CVOCs, metals, and PFAS; and soil vapor impacted with VOCs, including CVOCs and BTEX. Specifically, CVOCs were identified in soil vapor samples taken across all portions of the Site. Further evaluation of the source of impacts is necessary to ensure protection of human health and the environment.

2. Background

2.1 CURRENT LAND USE

The proposed Site is improved with a vacant two-story commercial building. A partial cellar exists below the barbershop, tutoring center, and cellphone retail store, sharing a common slab but separated by the walls of each business. The northwestern portion of the home store footprint contains a small sub-cellar consisting of a boiler room. The remainder of the home store footprint is at-grade.

2.2 SITE HISTORY

The proposed Site was initially developed prior to 1950 with the current building. The building has been used for multiple commercial purposes, including kitchen and bath appliance sales, furniture and bedding sales, barbershops, warehousing, mobile telephone sales, and a pharmacy. The existing 2921 Westchester Avenue BCP Site was formerly operated by a dry cleaning operator.

2.3 SURROUNDING LAND USE

The proposed Site is located within a mixed residential/commercial area of the Pelham Bay neighborhood of Bronx, New York, characterized by mixed-use residential/commercial buildings and residential buildings. There are no sensitive receptors within a 500-foot (ft) radius of the Site.

Properties immediately surrounding the Site are zoned for mixed commercial and residential use. A surrounding land use map is included as Figure 3.

2.4 SURROUNDING LAND USE HISTORY

The area surrounding the Site has been used primarily for industrial, manufacturing, and residential uses from the early 1900s to the present day.

2.5 PREVIOUS INVESTIGATIONS

The following previous investigations and reports were prepared for the Site and are included in the BCP Application:

- *Due Diligence Investigation Letter Report, 2921 Westchester Avenue, Bronx, New York,* Prepared by Tenen Environmental, LLC (Tenen), Prepared for Ralford Realty Corp., May 2020.
- *Remedial Investigation Report. 2921 Westchester Avenue, Bronx, New York,* Prepared by Tenen, Prepared for Ralford Realty Corp., February 2023.
- *Limited Phase II Environmental Site Assessment Report,* prepared by Haley & Aldrich of New York, prepared for 2925 Westchester LLC, May 2026.

Summaries of the environmental findings of these investigations are provided below.

***Due Diligence Investigation Letter Report,* 2921 Westchester Avenue, Bronx, New York, Prepared by Tenen, Prepared for Ralford Realty Corp., May 2020.**

Tenen conducted a Due Diligence investigation at several portions of Block 4164, Lot 5, including the existing BCP Site and the proposed BCP Site between September 27, 2019, and February 27, 2020. The purpose of this investigation was to further investigate the contamination identified in soil, groundwater, and soil vapor to provide additional information to assist in the sale of the building that included both the existing and proposed BCP Sites. The investigation included the following scope of work:

- Installation of 10 soil borings and collection of 23 soil samples;
  - Soil samples were analyzed for VOCs and Target Analyte List (TAL) metals.
- Installation of one on-Site and two off-Site permanent groundwater monitoring wells and collection of three groundwater samples;
  - Groundwater samples were analyzed for VOCs.
- Collection of five indoor air samples and one ambient air sample.

The following Site-specific findings were made during the Phase II:

- Groundwater was encountered at approximately 10 ft below sidewalk grade (bsg).
- PCE was detected at concentrations exceeding the Protection of Groundwater Soil Cleanup Objectives (PGWSCOs) in five delineation borings, at a maximum concentration of 34 milligrams per kilogram (mg/kg), in the cellar of the existing BCP Site.
- Concentrations of cis-1,2-dicholorethene and TCE were detected in exceedance of their respective PGWSCOs in five soil samples collected within the cellar of the existing BCP Site.
- Chlorinated solvents, specifically PCE, TCE, and cis-1,2-dichloroethene, were detected at concentrations exceeding their Ambient Water Quality Standards (AWQS) from on-Site groundwater samples collected from the existing BCP Site.
- One VOC, benzene, was detected in a groundwater sample collected from the northwestern portion of former Lot 44 at a concentration above the AWQS.
- Low-level concentrations of CVOCs were detected in all five indoor air samples collected
- Elevated concentrations of petroleum-related VOCs were detected in three indoor air samples, with the highest concentrations coming from the southern and northern portions of the Site.

***Remedial Investigation Report, 2921 Westchester Avenue, Bronx, New York*, Prepared by Tenen, Prepared for Ralford Realty Corp., February 2023.**

Tenen conducted a Remedial Investigation (RI) between February 15, 2021, and May 26, 2022, on behalf of Ralford Realty Corp., which included the existing BCP Site and portions of the proposed BCP Site. The RI included the following scope of work applicable to the Site:

- Installation of 17 soil borings and collection of 30 soil samples and one groundwater sample.
  - Soil samples collected from the existing BCP Site were analyzed for VOCs, semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), TAL metals, total cyanide, trivalent and hexavalent chromium, 1,4-dioxane, and PFAS.

  - Soil samples collected from portions of the proposed BCP Site were analyzed for VOCs only.
- Installation of six permanent groundwater monitoring wells and collection of six groundwater samples.
  - The groundwater sample was analyzed for VOCs, SVOCs, TAL metals, total cyanide, herbicides, and pesticides.
  - Groundwater samples collected from portions of the proposed BCP Site were analyzed for VOCs only.
- Collection of 13 sub-slab soil vapor samples and 13 co-located indoor air samples;
  - Soil vapor samples were analyzed for VOCs;

The following findings specifically related to the Site were made during the RI:

- Shallow soil samples collected at the Site contained CVOCs (specifically PCE and TCE) and petroleum-related VOCs. CVOCs were not detected in exceedance of Restricted Residential Soil Cleanup Objectives (RRSCOs) in any soil samples collected.
- No CVOCs were detected in soil samples collected from portions of the proposed BCP Site.
- Groundwater samples collected from the existing BCP Site and the proposed BCP Site both contained CVOCs, BTEX, metals, and PFAS above the NYSDEC AWQS.
- Soil vapor samples collected at the Site contained elevated detections of CVOCs and petroleum-related VOCs, including BTEX.

***Limited Phase II Environmental Site Investigation Report, 2925 Westchester Avenue, Bronx, New York,* Prepared by Haley & Aldrich of New York, Prepared for 2925 Westchester LLC, May 2026.**

On March 17, 2026, and April 16, 2026, Haley & Aldrich of New York mobilized to the Site with Coastal Environmental Solutions, Inc. (Coastal) and Lakewood Environmental Services Corp. (Lakewood) to conduct a Limited Phase II ESI. Coastal completed subsurface utility clearance prior to the initiation of ground-intrusive activities during both mobilizations. A total of eight soil borings and five temporary soil vapor points were installed by Lakewood using a limited-access Geoprobe® drill rig.

A total of 11 soil samples, up to two from each boring, were collected and analyzed for VOCs. Soil samples were biased towards intervals with the most impacted material. Five soil vapor samples were collected over a two-hour period into 2.7-liter stainless-steel SUMMA® canisters supplied by the laboratory and analyzed for VOCs via United States Environmental Protection Agency (EPA) Method TO-15.

Four CVOCs were detected in five of the eight soil samples collected. CVOC concentrations in four of these samples were below the applicable Unrestricted Use Soil Cleanup Objectives (UUSCOs) and RRSCOs; however, they were identified above the laboratory detection limits. Elevated concentrations of CVOCs were identified in soil sample HA-SB08_0-2, including cis-1,2-Dichloroethene (maximum concentration of 0.28 mg/kg) and PCE (maximum concentration of 12 mg/kg), exceeding the UUSCOs. In addition, TCE and 1,2-dichloroethene were also detected in HA-SB08_0-2 at maximum concentrations of 0.46 mg/kg and 0.28 mg/kg, respectively. One petroleum-related VOC, 2-butanone, was also detected in

HA-SB08_0-2 at an estimated concentration of 0.3 mg/kg, exceeding the UUSCO of 0.1 mg/kg. No other VOCs were detected above applicable regulatory criteria.

Total VOC concentrations in soil vapor samples ranged from 143.45 micrograms per cubic meter (µg/m^3) in SV-02 to a maximum concentration of 270.93 µg/m^3 in SV-04. Total BTEX concentrations ranged from 74.1 µg/m^3 in SV-03 to a maximum concentration of 119.91 µg/m^3 in SV-04. Total CVOC concentrations ranged from 2.21 µg/m^3 in SV-02 to a maximum concentration of 102.9 µg/m^3 in SV-04.

Specific petroleum-related VOCs detected above laboratory reporting limits in all soil vapor samples collected include benzene (maximum concentration of 19.7 µg/m^3 in SV-01), ethylbenzene (maximum concentration of 10.7 µg/m^3 in SV-01), toluene (maximum concentration of 56.5 µg/m^3 in SV-04), m,p-xylenes (maximum concentration of 33 µg/m^3 in SV-02), and o-xylene (maximum concentration of 17.6 µg/m^3 in SV-05).

Specific CVOCs detected above laboratory reporting limits in all soil vapor samples collected include methylene chloride (maximum concentration of 4.34 µg/m^3 in SV-01 and SV-05) and PCE (maximum concentration of 37 µg/m^3 in SV-01).

These findings are consistent with CVOCs detected in soil, groundwater, and soil vapor at the existing BCP Site portion of Block 4164 Lot 5, where former dry cleaning operations likely used solvents in the dry cleaning processes. Soil vapor analytical results also detected petroleum-related VOCs and CVOCs above the laboratory detection limits. The elevated CVOCs identified in sub-slab vapor and indoor air during the 2023 Tenen RI were also identified in soil vapor collected above the groundwater interface on the northern portion of the Site during this investigation. Based on these findings, in conjunction with CVOCs detected in groundwater during the 2023 RI in the northern portion of Lot 5, there is a source of CVOCs throughout the lot requiring remediation.

3. Supplemental Remedial Investigation

This section describes the field activities to be conducted during the SRI and provides the sampling scope, objectives, methods, anticipated number of samples, and sample locations. A summary of the Sampling and Analysis Plan is provided in Table 1, and proposed sample locations are shown on Figure 4. The following activities will be conducted to fill data gaps and determine the nature and extent of contamination at the proposed Site.

3.1 UTILITY MARKOUT

A Site-wide ground-penetrating radar (GPR) survey will be performed prior to the commencement of any ground-intrusive activities. The GPR scan will potentially identify any underground structures, including, but not limited to, utilities and underground storage tanks (USTs), in preparation for the proposed sampling work. It is noted that borings may be adjusted based on the results of the GPR scan, and any adjustments to the locations presented below will be communicated to NYSDEC. Field personnel will mobilize to the Site to mark out (with flagging or paint) the proposed soil sample locations. Prior to mobilization, 811-Dig Safe New York will be contacted to mark public underground utilities. If necessary, the adjacent property owners and/or private vendors will be contacted for assistance with marking out of utilities. Once the utilities are marked, field equipment and personnel will be mobilized to the Site.

3.2 SOIL SAMPLING

To further characterize soil conditions, additional on-Site soil samples will be collected to meet NYSDEC DER-10 requirements for RIs. The sampling and analysis plan is summarized in Table 1. Proposed sample locations are presented in Figure 4.

As part of this RI, a total of 12 soil borings will be installed at depths ranging to approximately 15 ft bsg to the groundwater interface. Borings installed within the existing cellars will be installed to approximately 3 ft below basement grade (bbg). Borings will be installed by a track-mounted direct-push drill rig (Geoprobe®), or other drilling technology as needed, operated by a licensed operator. Soil samples will be collected from dedicated liners using stainless-steel macrocores, casings, or sampling spoons. Samples will be collected using laboratory-provided clean bottle ware. VOC grab samples will be collected using Terra Cores® or En Cores®.

Soils will be logged continuously by a geologist or engineer using the Modified Burmister Soil Classification System. The presence of staining, odors, and photoionization detector (PID) readings will be noted. Sampling methods are described in the Field Sampling Plan (FSP) provided in Appendix A. A Quality Assurance Project Plan (QAPP) is provided in Appendix B. Laboratory data will be reported in Analytical Services Protocols (ASP) Category B deliverable format.

Soil samples representative of Site conditions will be collected at 12 locations widely distributed across the Site, as shown in Figure 4. Two or three grab samples will be collected from each soil boring. In basement locations, one surface sample from basement locations will be collected from the

groundwater interface, which is estimated immediately beneath the impervious Site cover (estimated at 0.5 to 1 ft bbg). A second sample will be collected from the 2-ft interval at the bedrock interface (estimated at 4 ft bbg). In locations at sidewalk grade, one surface sample will be collected from the top 0 to 2 ft immediately beneath the impervious Site cover. A second sample will be collected at an intermediate depth (within the last 2 ft of the fill layer, estimated 6 to 8 ft bsg, but subject to field observation). A third sample will be collected from the 2-ft interval at the groundwater interface (estimated at 8 to 10 ft bsg, but subject to field observation) or above bedrock if groundwater is not encountered in the overburden soil. If evidence of contamination is observed (staining, odors, or elevated PID readings), additional soil samples will be collected from the contaminated interval. If the contaminated interval is the deepest sample at the soil boring, then a soil sample will be collected at the next interval where there is no evidence of contamination in order to delineate the vertical extent of contamination. The number of samples collected during the RI may vary based on field conditions.

Soil samples will be analyzed for:

- Target Compound List (TCL) VOCs using EPA Method 8260B;
- TCL SVOCs using EPA Method 8270C;
- TAL metals using EPA Method 6010;
- PCBs using EPA Method 8082;
- TCL pesticides using EPA Method 8081B;
- PFAS using EPA Method 1633A; and
- 1,4-dioxane using EPA Method 8270.

Samples to be analyzed for PFAS will be collected and analyzed in accordance with the NYSDEC-issued April 2023 “Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC’s Part 375 Remedial Programs.” As needed, additional samples may be collected to satisfy waste characterization analytical needs for facilities located in neighboring states.

3.3 GROUNDWATER SAMPLING

The purpose of the groundwater sampling is to obtain current groundwater data and analyze for additional parameters (i.e., PFAS and 1,4-dioxane) to meet NYSDEC DER-10 requirements for RIs. Groundwater is presumed to flow east to west.

Five 2-inch permanent monitoring wells will be installed at least 5 ft below the groundwater interface. Monitoring wells will be installed with a solid polyvinyl chloride (PVC) riser and PVC with a slotted screen for the screened interval. Wells will be screened to straddle the groundwater table. The screen pack will consist of No. 0 certified clean sand filled to a depth of 2 ft above the screen. A bentonite seal will be placed above the sand pack for each monitoring well, and the remainder of the borehole will be filled with bentonite grout. Each monitoring well will be completed using a flush-mount well cover or a stick-up well with a secured well cap. Monitoring wells will have the appropriate 2-inch annular space and will be installed according to NYSDEC guidelines. Previous investigations have identified

groundwater at depths ranging from 8 to 10 ft bsg. Observations will be communicated with NYSDEC daily in field reports, further detailed in Section 9.1.

Monitoring wells will be developed by surging a pump in the well several times to pull fine-grained material from the well. Development will be completed until the water turbidity is 50 nephelometric turbidity units or less, or 10 well volumes are removed, if possible. Generated development water will be containerized and handled as investigation-derived waste (IDW). The well casings will be surveyed by a New York State-licensed surveyor and gauged during a round of synoptic groundwater depth readings to facilitate the preparation of a groundwater contour map and to determine the direction of groundwater flow.

The Sampling and Analysis Plan is summarized in Table 1. Proposed monitoring well locations are provided in Figure 4. Proposed locations will be dependent on field observation and will be communicated with NYSDEC in daily reporting.

Monitoring wells will be sampled and analyzed for:

- TCL VOCs using EPA Method 8260B;
- TCL SVOCs using EPA Method 8270C;
- Total metals using EPA Methods 6010/7471;
- Dissolved metals using EPA Methods 6010/7471;
- PCBs using EPA Method 8082;
- TCL pesticides using EPA Method 8081B;
- PFAS using EPA Method 1633A; and
- 1,4-dioxane using EPA Method 8270 Selective Ion Monitoring.

Samples to be analyzed for PFAS will be collected and analyzed in accordance with the NYSDEC-issued April 2023 “Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC’s Part 375 Remedial Programs.”

Groundwater wells will be sampled using low-flow sampling methods as described in the FSP. Following the low-flow purge, samples will be collected from monitoring wells for analysis of the analytes mentioned above. Groundwater sampling will be conducted at least one week after monitoring well development.

The FSP presented in Appendix A details field procedures and protocols that will be followed during field activities. The QAPP presented in Appendix B details the analytical methods and procedures that will be used to analyze samples collected during field activities. Monitoring wells sampled for PFAS will be done following the purge and sampling method detailed in the NYSDEC guidance documents (see Appendix C).

3.4 INVESTIGATION-DERIVED WASTE

Following sample collection, boreholes that are not converted to monitoring wells will be backfilled with soil cuttings and an upper bentonite plug. Boreholes will be restored to grade with the surrounding area. If soil is identified as grossly contaminated, it will be separated and placed into a sealed and labeled New York State Department of Transportation (NYSDOT)-approved 55-gallon drum pending characterization and off-Site disposal. Groundwater purged from the monitoring wells during development and sample collection will be placed into a NYSDOT-approved 55-gallon drum pending off-Site disposal.

3.5 SOIL VAPOR SAMPLING

Samples will be collected in accordance with the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, October 2006). Seven soil vapor points will be installed to 2 ft above the groundwater interface, approximately 0.5 to 2 ft bbg and 6 to 8 ft bsg but subject to field observation. The vapor implants will be installed with a direct-push drilling rig (e.g., Geoprobe®) to advance a stainless-steel probe to the desired sample depth. Sampling will occur for the duration of two hours. Should groundwater be observed immediately below the cellar slabs, NYSDEC will be informed, and sub-slab vapor samples at locations SV-05, SV-06, SV-07, and SV-08 may not be collected due to influence of groundwater.

Soil vapor samples will be collected in appropriately sized SUMMA® canisters that have been certified clean by the laboratory, and samples will be analyzed for VOCs using EPA Method TO-15. Flow rates for both purging and sampling will not exceed 0.2 liters per minute. Sampling methods are described in the FSP provided in Appendix A.

3.6 PROPOSED SAMPLING RATIONALE

Haley & Aldrich of New York has proposed the sampling plan described herein, and as shown on Figure 4, in consideration of observations reported during the October 2022 Remedial Investigation Report (RIR) by Tenen and the May 2026 Limited Phase II ESI Report by Haley & Aldrich of New York, as discussed in Section 2.5.

During the previous investigations conducted at the Site, soil, soil vapor, and groundwater samples were collected. The sample map from the previous investigations shows data gaps in both the vertical and lateral profiles. In addition, no soil or groundwater samples were analyzed for the full suite analysis.

Proposed sampling locations will include groundwater, soil, and soil vapor sampling to address data gaps, ascertain and delineate on-Site source(s), and refine the findings of the previous investigations conducted at the Site. The proposed RI will characterize the nature and extent of contamination while evaluating if there is an on-Site source of contamination or a potential off-Site source migrating onto the Site.

The Proposed Sample Location Map (included in Figure 4) is designed to generate sufficient data to identify the source of contamination, classify subsurface conditions throughout the Site as a whole, with a particular focus on sample locations in areas of the Site that have historically revealed evidence of contamination, and to be the basis for a future remedy design.

4. Green and Sustainable Remediation and Climate Resiliency

The work completed as part of this SRIWP will comply with all NYSDEC guidance documents, including DER-31: Green Remediation (NYSDEC, 2011). To ensure compliance with DER-31, the work will be completed using the best practices and techniques described below. Specific reporting methods relative to DER-31 are further described below.

4.1 BEST PRACTICES AND TECHNIQUES

DER-31 provides examples of best practices and techniques that could be applied during all phases of remediation (Attachment 1 of the DER-31 policy). In addition, the techniques identified below will be implemented at sites unless a Site-specific evaluation demonstrates impracticability or favors an alternative green approach:

Practice/Technique	Potential Benefits[1]	Applicable to this Work Plan
Use renewable energy where possible or purchase Renewable Energy Credits	Reduce/supplement purchased energy use	
Use of remediation technologies with an intermittent energy supply (i.e., energy use during peak energy generation only)	Reduce energy use	X
Incorporate green building design	Reduce future use impacts	
Reuse existing buildings and infrastructure to reduce waste	Reduce waste and material use	
Reuse and recycle construction and demolition debris and other materials (i.e., grind waste wood and other organics for on-site use)	Reduce waste and material use	
Design cover systems to be usable (i.e., habitat or recreation)	Reduce construction impacts of future development	
Reduce vehicle idling	Reduce air emissions and fuel use	X
Use of Low-Sulfur Diesel Fuel or alternate fuels (i.e., biodiesel or E85) when possible	Reduce air emissions	
Sequence work to minimize double-handling of materials	Reduce construction impacts	X
Use energy-efficient systems and office equipment in the job trailer	Reduce energy use	X

[1]*Potential benefits listed are not comprehensive and will vary depending upon the site and implementation of the practice or technique.*

In order to comply with the requirements of DER-31, the following actions will be taken:

1. All vehicles and fuel-consuming equipment on the Site will be shut off if not in use for more than three minutes;
2. Work will be sequenced, to the extent practicable, to allow the direct loading of waste containers for off-Site disposal;
3. Work will be sequenced, to the extent practicable, to limit unnecessary mobilizations to and throughout the Site; and
4. To the extent practicable, energy-efficient systems and office equipment will be utilized.

4.2 REPORTING

All green and sustainable practices and techniques employed will be discussed in the forthcoming RIR.

4.3 CLIMATE RESILIENCY EVALUATION

The Site is not located within a 100-year flood zone. The development plan is still under design but will incorporate consideration for resiliency to climate change, including the design of a cover system that will mimic, rather than alter, the current setting in the vicinity of the Site and will provide pathways for surface runoff and resiliency against future flooding events. A Climate Screening Checklist is provided in Appendix D.

4.4 ENVIRONMENTAL FOOTPRINT ANALYSIS

While the remedy plan is still under development and is dependent on findings from implementing this investigation, a preliminary analysis has been performed using Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0. The conceptual remedy components included in this analysis include excavation, along with the installation of a composite cover as an engineering control. Further refinements to the remedy, including additional engineering controls, will be incorporated into the alternatives analysis as part of a forthcoming RAWP. Results of the preliminary analysis, available in Appendix E, indicate that the majority of greenhouse gas emissions, potentially exceeding 1.64 tons, would be the product of consumables and transportation associated with the conceptual remedy.

5. Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) procedures will be used to provide performance information with regard to the accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used (1) to document that samples are representative of actual conditions at the Site and (2) to identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix or by laboratory techniques that may have introduced systematic or random errors to the analytical process.

QA/QC procedures are defined in the QAPP included in Appendix B.

6. Data Use

6.1 DATA SUBMITTAL

Analytical data will be supplied in ASP Category B Data Packages. If more stringent than those suggested by the EPA, the laboratory's in-house QA/QC limits will be utilized. Validated data will be submitted to the NYSDEC EQuIS database in an electronic data deliverable package.

6.2 DATA VALIDATION

Data packages will be sent to a qualified data validation specialist to evaluate the accuracy and precision of the analytical results. A Data Usability Summary Report (DUSR) will be created to confirm the compliance of methods with the protocols described in the NYSDEC ASP. DUSRs will summarize and confirm the usability of the data for project-related decisions. Data validation will be completed in accordance with the DUSR guidelines from the NYSDEC DER. DUSRs will be included with the submittal of an RIR, further discussed in Section 9.2. Additional details on the DUSRs are provided in the QAPP in Appendix B.

7. Project Organization

A project team for the Site has been created, based on qualifications and experience, with personnel suited for the successful completion of the project.

The NYSDEC-designated Case Manager, Yildiz Palumbo, will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDEC.

The NYSDOH-designated Case Manager, Justin Deming, will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDOH.

Mari C. Conlon, P.G., will be the Qualified Environmental Professional and Principal-in-Charge for this work. In this role, Ms. Conlon will be responsible for the overall completion of each task as per the requirements outlined in this SRIWP and in accordance with the DER-10 guidance.

Scott A. Underhill, P.E., will be the Engineer-of-Record associated with this work. In this role, Mr. Underhill will oversee the development and implementation of the forthcoming remedy.

Matthew Levy will be the Project Manager for this work. In this role, Mr. Levy will manage the day-to-day tasks, including coordination and supervision of field engineers and scientists, adherence to the SRIWP, and oversight of the project schedule. As the Project Manager, Mr. Levy will also be responsible for communications with the NYSDEC Case Manager regarding project status, schedule, issues, and updates for project work.

Sebastian Sotomayor will be the Assistant Project Manager and field team leader for this work and will also act as the Quality Assurance Officer (QAO). The QAO will ensure the application and effectiveness of the QAPP by the analytical laboratory and the project staff, provide input to the field team as to corrective actions that may be required as a result of the above-mentioned evaluations, and prepare and/or review data validation and audit reports.

Zavier Richards will be the field person responsible for implementing the field effort for this work. Mr. Richards' responsibilities will include implementing the SRIWP activities and directing the subcontractors to ensure the successful completion of all field activities.

The drilling subcontractor will be either Coastal or Lakewood. In this role, the drilling subcontractor will provide environmental drilling to implement the scope of work outlined in this SRIWP.

The geophysical survey contractor will be either NOVA Geophysical & Environmental Services (NOVA) or Ground Penetrating Radar Systems, LLC (GPRS). In this role, the geophysical survey contractor will conduct a geophysical survey throughout all accessible regions of the Site prior to the performance of ground-intrusive work.

The analytical laboratory will be Pace Analytical Laboratories (Pace) of Westborough, Massachusetts, a New York Environmental Laboratory Approval Program (ELAP)-certified laboratory (No. 11148). Pace will be responsible for analyzing samples as per the analyses and methods identified in Section 3.

8. Health and Safety

8.1 HEALTH AND SAFETY PLAN

A Site-specific Health and Safety Plan (HASP) has been prepared in accordance with NYSDEC and NYSDOH guidelines and is provided in Appendix F. The HASP includes a description of health and safety protocols to be followed by Haley & Aldrich of New York field staff during implementation of the SRIWP, including monitoring within the work area, along with response actions should impacts be observed. The HASP has been developed in accordance with the Occupational Safety and Health Administration (OSHA) Title 40 Code of Federal Regulations Part 1910.120 regulatory requirements for use by Haley & Aldrich of New York field staff who will work at the Site during planned activities. Contractors or other personnel who perform work at the Site are required to develop their own HASP and procedures of comparable or higher content for their respective personnel in accordance with relevant OSHA regulatory requirements for work at hazardous waste sites, as well as the general industry requirements as applicable based on the nature of work being performed.

8.2 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan (CAMP) will require real-time monitoring for particulates (i.e., dust) and VOCs at one location upwind of the work area/exclusion zone and one location downwind of the work area/exclusion zone. The proposed investigation work will be completed indoors at the Site. The CAMP will be implemented during all intrusive activities and the handling of contaminated or potentially contaminated media to protect downwind receptors. Ground-intrusive activities include, but are not limited to, drilling, excavation, stockpiling, equipment idling, transport, etc.

A Haley & Aldrich of New York representative will continually monitor the breathing air in the vicinity of the immediate work area using a PID to measure total VOCs in the air at concentrations as low as 1 part per million (ppm). CAMP will be performed using appropriate equipment to monitor VOCs and particulate matter less than 10 micrometers in size (PM-10). The equipment will be furnished with an audible alarm activated on all field personnel's mobile devices that notifies them when there is an exceedance of the action level. Particulate monitoring will be performed using real-time equipment capable of measuring PM-10 and integrating over a period of 15 minutes (or less) for comparison to the action level. In addition, fugitive dust migration will be visually assessed during all work activities. The equipment will be calibrated at least daily and will be capable of calculating 15-minute running average concentrations. Upwind background conditions will be evaluated prior to intrusive work and periodically throughout the day. The air in the work zone will also be monitored for visible dust generation.

If downwind VOC measurements above 5 ppm are sustained for 15 minutes or dust particulate exceeds 150 µg/m^3 above background levels, the intrusive work will be temporarily halted, and further evaluation of the source and/or necessary suppression techniques will be applied in accordance with the NYSDOH Generic CAMP; CAMP data will be provided to NYSDEC in the daily reports, further detailed in Section 9.1. Exceedances of the action levels for VOCs or particulates will be reported to NYSDEC and NYSDOH within 24 hours of the occurrence, along with the reason for the exceedance and any

mitigation completed to address as per this CAMP. The NYSDOH CAMP guidance document is included as Appendix G.

When work areas are within 20 ft of potentially exposed populations or occupied structures, Special CAMP Requirements will be considered, and the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the locations of ventilation system intakes for nearby structures. The use of engineering controls, such as vapor/dust barriers, temporary negative pressure enclosures, or special ventilation devices, should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 µg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 µg/m^3 or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special CAMP Requirements are attached in Appendix G.

8.3 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A comprehensive Qualitative Human Health Exposure Assessment (QHHEA) (on-Site and off-Site) will be performed following the collection of all RI data. The exposure assessment will be performed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a Qualitative Exposure Assessment (DER-10; Appendix 3B). The results of the QHHEA will be provided in the Supplemental Remedial Investigation Report (SRIR). Based on the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, a Fish and Wildlife Resource Impact Analysis is not required at this time.

9. Reporting

9.1 DAILY REPORTING

Daily reports will be submitted to the NYSDEC and NYSDOH summarizing the Site activities completed during the RI. Daily reports will include a Site figure, a description of Site activities, a photograph log, and a summary of community air monitoring performed. Daily reports will be submitted on the following calendar day after Site work is completed.

9.2 SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

Following completion of the work, a summary of the RI will be provided to the NYSDEC in an RIR to support the implementation of the proposed Remedial Action. The report will include:

- A description of existing Site conditions;
- Summary of the SRI activities;
- Figure showing sampling locations;
- Tables summarizing laboratory analytical results;
- Laboratory analytical data reports;
- DUSRs:
- Field sampling data sheets;
- Community air monitoring data;
- Daily reports;
- Findings regarding the nature and extent of contamination at the Site;
- Qualitative Exposure Assessment of any contamination from an on-Site source that has migrated off the Site; and
- Conclusions and recommendations.

The SRIR will include all data collected during the SRI and adhere to the technical requirements of DER-10.

10. Schedule

The Site owner plans to implement this SRIWP promptly upon execution of a Brownfield Cleanup Agreement (BCA) and after approval of the SRIWP. The below anticipated schedule highlights the BCP milestones anticipated for the Site.

Anticipated RI/BCP Schedule	
BCP Major Amendment Application, SRIWP, and 30-Day Public Comment Period (Concurrent with BCP Major Amendment Application)	May 2026 to August 2026
Executed BCA	August 2026 to September 2026
NYSDEC Approval of SRIWP and Citizen Participation Plan	September 2026 to October 2026
SRI Implementation	November 2026 to December 2026
SRIR/RAWP Submittal, NYSDEC Review, and 45-Day Public Comment Period	January 2027 to May 2027
NYSDEC Approval of SRIR/RAWP and Issuance of DD	June 2027

References

1. Castleton Environmental, 2019. Phase II Environmental Site Assessment Report, 2925 Westchester Avenue, Bronx, New York. August.

2. Haley & Aldrich of New York, 2026a. Brownfield Cleanup Program Application. 2925 Westchester Avenue, Bronx, New York.

3. Haley & Aldrich of New York, 2026b. Limited Phase II Environmental Site Investigation Summary Report, 2925 Westchester Avenue, Bronx, New York. May.

4. New York State Department of Environmental Conservation, 2006. Part 375 of Title 6 of the New York Compilation of Codes, Rules, and Regulations. Effective December 14.

5. New York State Department of Environmental Conservation, 2010. Program Policy DER-10, "Technical Guidance for Site Investigation and Remediation." May.

6. New York State Department of Environmental Conservation, 2023. Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS). Revised April.

7. New York State Department of Health, 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.

8. New York State Division of Water, 1998. Technical and Operational Guidance Series (TOGS) (1.1.1). June.

9. Tenen Environmental, LLC, 2020. Due Diligence Investigation Letter Report, 2921 Westchester Avenue, Bronx, New York. May.

10. Tenen Environmental, LLC, 2023. Remedial Investigation Report, 2921 Westchester Avenue, Bronx, New York. February.

11. Tenen Environmental, LLC, 2024. Addendum to the Final Remedial Investigation Report, 2921 Westchester Avenue, Bronx, New York. March.

12. United States Environmental Protection Agency, 2017. Low Flow Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, EQASOP-GW 001. September 19.

TABLE

TABLE 1
SAMPLING AND ANALYSIS PLAN
2925 WESTCHESTER AVENUE
BRONX, NEW YORK

Boring Number	Sample Depth	Sample Depth (feet below surface grade)	Target Compound List VOCs (8260D/5035)	Target Compound List SVOCs (8270E)/(8270)	Total Analyte List Metals (6010D)/(6010)	PCBs (8082A)	Pesticides (8081B)	PFAS (1633)	1,4-Dioxane (8270)/(8270E-SIM)	Dissolved Target Analyte List Metals (6020)	VOCs (TO-15)
SOIL											
SB-1	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-2	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8									
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-3	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-4	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-5	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-6	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-7	Surface Soil	0-2	X	X	X	X	X	X	X		
	Intermediate Fill	6-8	X	X	X	X	X	X	X		
	Groundwater Interface	8-10	X	X	X	X	X	X	X		
SB-8	Surface Soil/Groundwater Interface	0-2	X	X	X	X	X	X	X		
	Above Bedrock Interface	2-4	X	X	X	X	X	X	X		
SB-9	Surface Soil/Groundwater Interface	0-2	X	X	X	X	X	X	X		
	Above Bedrock Interface	2-4	X	X	X	X	X	X	X		
SB-10	Surface Soil/Groundwater Interface	0-2	X	X	X	X	X	X	X		
	Above Bedrock Interface	2-4	X	X	X	X	X	X	X		
SB-11	Surface Soil/Groundwater Interface	0-2	X	X	X	X	X	X	X		
	Above Bedrock Interface	2-4	X	X	X	X	X	X	X		
SB-12	Surface Soil/Groundwater Interface	0-2	X	X	X	X	X	X	X		
	Above Bedrock Interface	2-4	X	X	X	X	X	X	X		

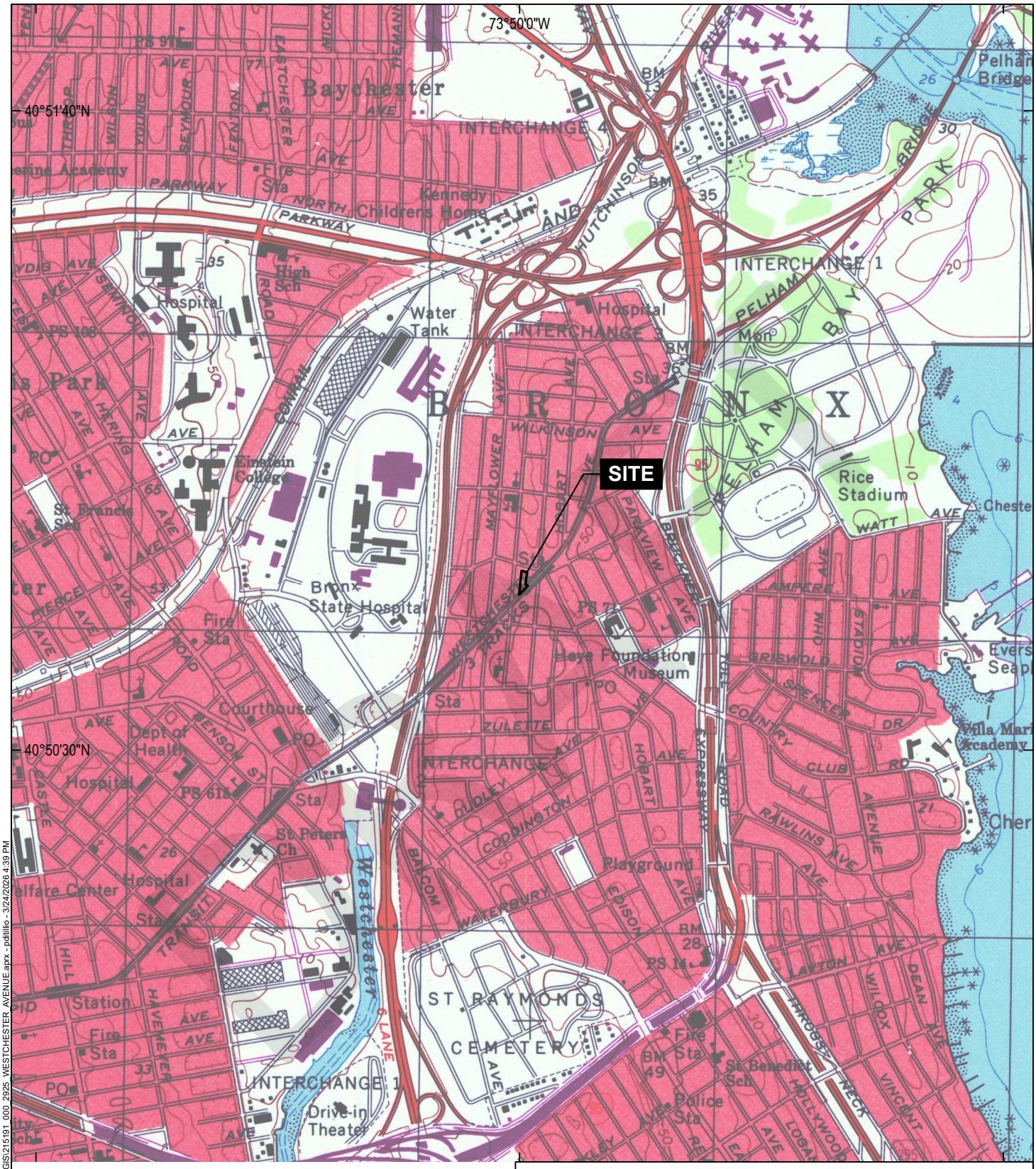
TABLE 1
SAMPLING AND ANALYSIS PLAN
2925 WESTCHESTER AVENUE
BRONX, NEW YORK

Boring Number	Sample Depth	Sample Depth (feet below surface grade)	Target Compound List VOCs (8260D/5035)	Target Compound List SVOCs (8270E)/(8270)	Total Analyte List Metals (6010D)/(6010)	PCBs (8082A)	Pesticides (8081B)	PFAS (1633)	1,4-Dioxane (8270)/(8270E-SIM)	Dissolved Target Analyte List Metals (6020)	VOCs (TO-15)
GROUNDWATER											
MW-1	Straddle water table		X	X	X	X	X	X	X	X	
MW-2	Straddle water table		X	X	X	X	X	X	X	X	
MW-3	Straddle water table		X	X	X	X	X	X	X	X	
MW-4	Straddle water table		X	X	X	X	X	X	X	X	
MW-5	Straddle water table		X	X	X	X	X	X	X	X	
SOIL VAPOR											
SV-1	1-2 ft above groundwater interface										X
SV-2	1-2 ft above groundwater interface										X
SV-3	1-2 ft above groundwater interface										X
SV-4	1-2 ft above groundwater interface										X
SV-5	6-inches below slab										X
SV-6	6-inches below slab										X
SV-7	6-inches below slab										X
SV-8	6-inches below slab										X

Notes:
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
PCBs - Polychlorinated biphenyls
PFAS - Per- and Polyfluoroalkyl Substances
bgs - below grade surface
SB-8 through SB-12, MW-4 and MW-05, and SV-05 through SV-08 are proposed to be installed in cellars

QA/QC samples include:
MS/MSD - 1 for every 20 samples
Trip Blanks - 1 per cooler per day of samples to be analyzed for VOCs
Field Blanks - 1 for every 20 samples
Duplicates - 1 for every 20 samples

FIGURES



HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

PROJECT LOCUS

MAP SOURCE: USGS
SITE COORDINATES: 40°51'80"N, 73°49'99"W

APPROXIMATE SCALE: 1 IN = 2000 FT
MARCH 2026

FIGURE 1

LEGEND

- RAILROAD
- EXISTING BROWNFIELD CLEANUP PROGRAM (BCP) SITE NO. C203140
- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
3. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025

N

0 40 80
SCALE IN FEET

HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

SITE PLAN

MARCH 2026

FIGURE 2

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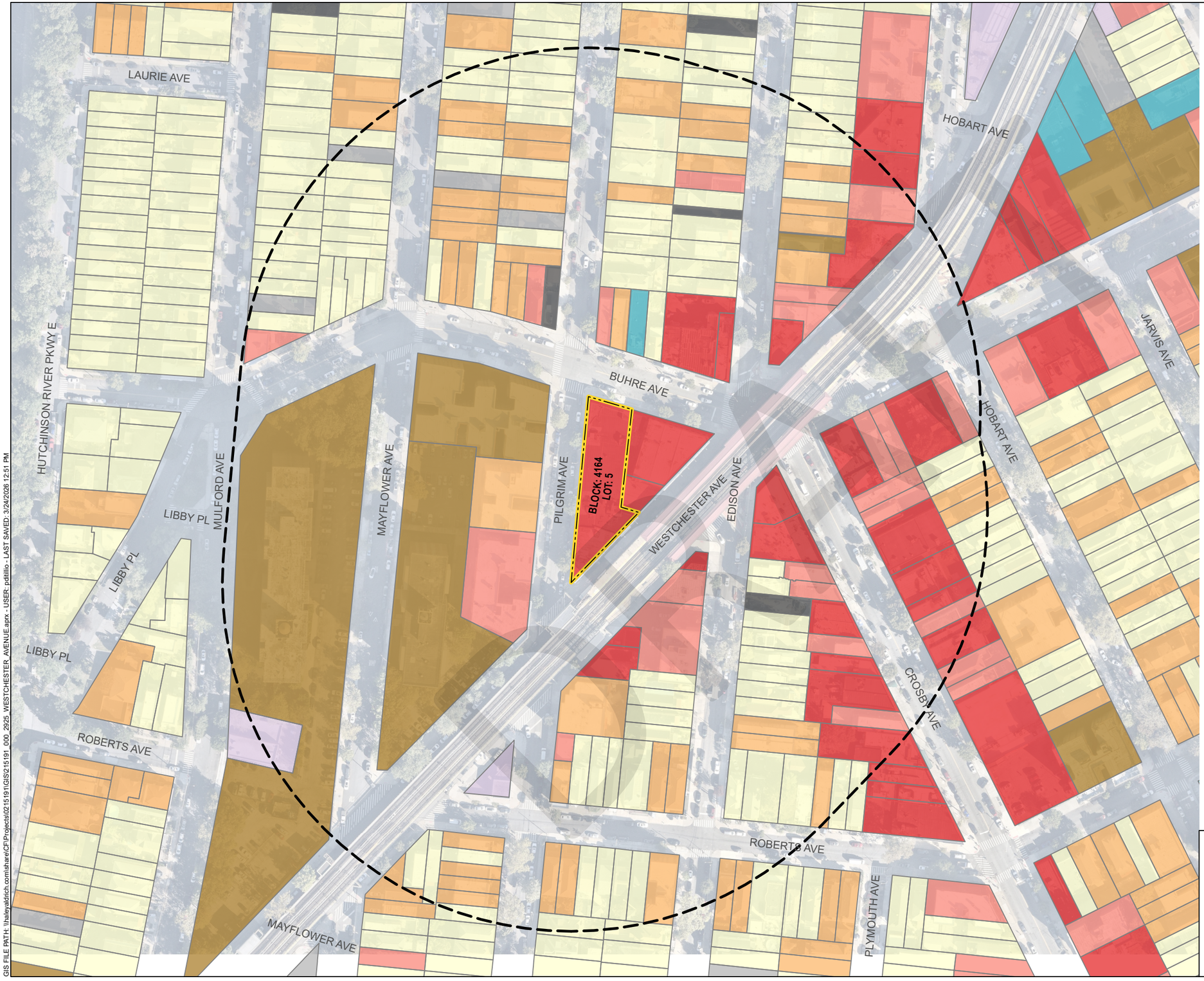

LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY

LAND USE CATEGORY

- ONE AND TWO FAMILY BUILDINGS
- MULTI-FAMILY WALK-UP BUILDINGS
- MULTI-FAMILY ELEVATOR BUILDINGS
- MIXED RESIDENTIAL AND COMMERCIAL BUILDINGS
- COMMERCIAL AND OFFICE BUILDINGS
- TRANSPORTATION AND UTILITY
- PUBLIC FACILITIES AND INSTITUTIONS
- PARKING FACILITIES
- VACANT LAND

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
3. LAND USE DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING
4. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025

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0 140 280
SCALE IN FEET

HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

SURROUNDING LAND USE

MARCH 2026

FIGURE 3

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LEGEND

- RAILROAD
- EXISTING BROWNFIELD CLEANUP PROGRAM (BCP) SITE NO. C203140
- SITE BOUNDARY
- PARCEL BOUNDARY
- EXISITNG CELLAR
- PROPSED GROUNDWATER MONITORING WELL LOCATION
- PROPSED SOIL BORING LOCATION
- PROPSED SOIL VAPOR LOCATION

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
3. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025

N

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SCALE IN FEET

HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

PROPOSED SAMPLE LOCATION PLAN

APRIL 2026

FIGURE 4

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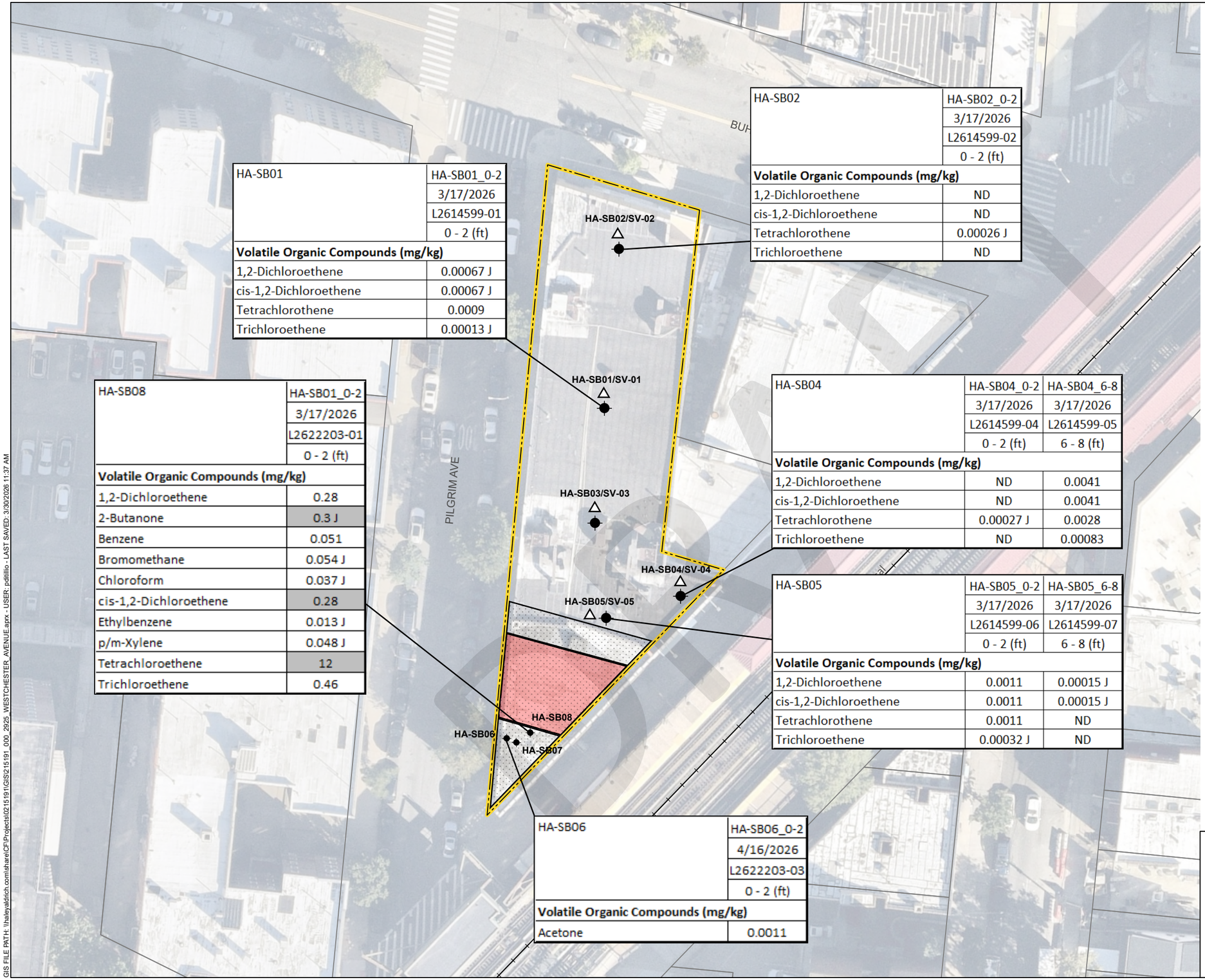

HA-SB01	HA-SB01_0-2
	3/17/2026
	L2614599-01
	0 - 2 (ft)
Volatile Organic Compounds (mg/kg)	
1,2-Dichloroethene	0.00067 J
cis-1,2-Dichloroethene	0.00067 J
Tetrachlorothene	0.0009
Trichloroethene	0.00013 J

HA-SB02	HA-SB02_0-2
	3/17/2026
	L2614599-02
	0 - 2 (ft)
Volatile Organic Compounds (mg/kg)	
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Tetrachlorothene	0.00026 J
Trichloroethene	ND

HA-SB08	HA-SB01_0-2
	3/17/2026
	L2622203-01
	0 - 2 (ft)
Volatile Organic Compounds (mg/kg)	
1,2-Dichloroethene	0.28
2-Butanone	0.3 J
Benzene	0.051
Bromomethane	0.054 J
Chloroform	0.037 J
cis-1,2-Dichloroethene	0.28
Ethylbenzene	0.013 J
p/m-Xylene	0.048 J
Tetrachloroethene	12
Trichloroethene	0.46

HA-SB04	HA-SB04_0-2	HA-SB04_6-8
	3/17/2026	3/17/2026
	L2614599-04	L2614599-05
	0 - 2 (ft)	6 - 8 (ft)
Volatile Organic Compounds (mg/kg)		
1,2-Dichloroethene	ND	0.0041
cis-1,2-Dichloroethene	ND	0.0041
Tetrachlorothene	0.00027 J	0.0028
Trichloroethene	ND	0.00083

HA-SB05	HA-SB05_0-2	HA-SB05_6-8
	3/17/2026	3/17/2026
	L2614599-06	L2614599-07
	0 - 2 (ft)	6 - 8 (ft)
Volatile Organic Compounds (mg/kg)		
1,2-Dichloroethene	0.0011	0.00015 J
cis-1,2-Dichloroethene	0.0011	0.00015 J
Tetrachlorothene	0.0011	ND
Trichloroethene	0.00032 J	ND

HA-SB06	HA-SB06_0-2
	4/16/2026
	L2622203-03
	0 - 2 (ft)
Volatile Organic Compounds (mg/kg)	
Acetone	0.0011

LEGEND

- RAILROAD
- EXISTING BROWNFIELD CLEANUP PROGRAM (BCP) SITE NO. C203140
- SITE BOUNDARY
- PARCEL BOUNDARY
- EXISITNG CELLAR
- SOIL BORING
- SOIL VAPOR

	NY-RESR	NY-UNRES
Volatile Organic Compounds (mg/kg)		
1,2-Dichloroethene	-	-
cis-1,2-Dichloroethene	41	0.19
2-Butanone	100	0.1
Acetone	100	0.03
Benzene	3.7	0.06
Bromomethane	-	-
Chloroform	24	0.37
Ethylbenzene	76	1
p/m-Xylene	-	-
Tetrachlorothene	18	1.3
Trichloroethene	6.4	0.47

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
3. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025

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SCALE IN FEET

HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

PREVIOUS SOIL RESULTS MAP

APRIL 2026

FIGURE 5

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Sample ID	MW-5	MW-5_VOC
Date	2/23/2021	3/4/2021
VOCs (ug/L)		
Tetrachloroethene	39,000	42,000
Tricholoroethene	2,900	4,000
cis-1,2-Dichloroethene	15,000	9,900
Vinyl Chloride	1,900	600
Total Metalls (ug/L)		
Iron	3,600	-
Magnesium	49,800	-
Manganese	949	-
Sodium	169,000	-
Dissovled Metals (ug/L)		
Antimony	3.15 J	-
Magnesium	52,200	-
Manganese	940	-
Sodium	187,000	-
PFAS (ug/L)		
PFOA	0.094	-
PFOS	0.111	-

LEGEND

- RAILROAD
- EXISTING BROWNFIELD CLEANUP PROGRAM (BCP) SITE NO. C203140
- SITE BOUNDARY
- PARCEL BOUNDARY
- EXISITNG CELLAR
- GROUNDWATER MONITORING WELL (TENEN, FEBRUARY 2023 RIR)

NYSDEC TOGS 1.1.1 AWGS	
VOCs (ug/L)	
Tetrachloroethene	5
Tricholoroethene	5
cis-1,2-Dichloroethene	5
Vinyl Chloride	2
Total Metalls (ug/L)	
Iron	300
Magnesium	35,000
Manganese	300
Sodium	20,000
Dissovled Metals (ug/L)	
Antimony	3
Magnesium	35,000
Manganese	300
Sodium	20,000
PFAS (ug/L)	
PFOA	0.0027
PFOS	0.0067

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION

3. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025

N

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SCALE IN FEET

HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

PREVIOUS GROUNDWATER RESULTS MAP

APRIL 2026

FIGURE 6

SV-03	3/17/2026 L2614581-03
Volatile Organic Compounds (ug/m³)	
Benzene	2.1
cis-1,2-Dichloroethene	55.9
Ethylbenzene	9.3
Methylene chloride	3.47
o-Xylene	16.1
p/m-Xylene	29.8
Tetrachloroethene	7.53
Toluene	16.7
trans-1,2-Dichloroethene	1.59
Trichloroethene	6.02
Xylenes, Total	46
SUM of Volatile Organic Compounds	189.45
SUM of BTEX	74.1
SUM of CVOCs	69.45

SV-01	3/17/2026 L2614581-01
Volatile Organic Compounds (ug/m³)	
Benzene	19.7
Ethylbenzene	10.7
Methylene chloride	4.34
o-Xylene	17
p/m-Xylene	31.9
Tetrachloroethene	37
Toluene	23.8
trans-1,2-Dichloroethene	1.98
Vinyl chloride	2.29
Xylenes, Total	48.6
SUM of Volatile Organic Compounds	190.99
SUM of BTEX	102.8
SUM of CVOCs	39.29

Location	TI-SS-6 2/24/2022	TI-IA-6 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	12.6	2.02	No Further Action
Trichloroethene	ND	0.231	No Further Action
cis-1,2-Dichloroethene	ND	0.337	No Further Action
Carbon tetrachloride	ND	0.497	No Further Action
Methylene chloride	1.98	**1,550**	Identify sources and resample or mitigate

SV-02	3/17/2026 L2614581-02
Volatile Organic Compounds (ug/m³)	
Benzene	8.24
Ethylbenzene	10
Methylene chloride	1.74
o-Xylene	17
p/m-Xylene	33
Tetrachloroethene	2.21
Toluene	23
trans-1,2-Dichloroethene	0.793
Xylenes, Total	50
SUM of Volatile Organic Compounds	143.45
SUM of BTEX	91.24
SUM of CVOCs	2.21

Location	TI-SS-5 2/24/2022	TI-IA-5 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	28.1	2.29	No Further Action
Trichloroethene	ND	0.274	No Further Action
cis-1,2-Dichloroethene	ND	0.341	No Further Action
Carbon tetrachloride	ND	0.472	No Further Action
Methylene chloride	68.8	**1,540**	Identify sources and resample or mitigate

Location	TI-SS-4 2/24/2022	TI-IA-4 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	10.6	2.9	No Further Action
Trichloroethene	2.89	0.333	No Further Action
cis-1,2-Dichloroethene	ND	0.444	No Further Action
Carbon tetrachloride	ND	0.535	No Further Action
Methylene chloride	329	**1,650**	Mitigate

Location	TI-SS-2 2/24/2022	TI-IA-2 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	43.8	7.46	Identify sources and resample or mitigate
Trichloroethene	3.27	0.844	Identify sources and resample or mitigate
cis-1,2-Dichloroethene	3.1	1.27	Identify sources and resample or mitigate
Carbon tetrachloride	ND	0.491	No Further Action
Methylene chloride	3.22	**7,540**	Identify sources and resample or mitigate

Location	TI-SS-3 2/24/2022	TI-IA-3 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	27.2	26	Identify sources and resample or mitigate
Trichloroethene	1.66	**2.85**	Identify sources and resample or mitigate
cis-1,2-Dichloroethene	1.78	4.6	Identify sources and resample or mitigate
Carbon tetrachloride	ND	0.478	No Further Action
Vinyl Chloride	ND	0.077	No Further Action
Methylene chloride	40.3	**101**	Identify sources and resample or mitigate

Location	IA-11 3/4/2021
Volatile Organic Compounds (ug/m	
Tetrachloroethene	**90.9**
Trichloroethene	**9.89**
cis-1,2-Dichloroethene	19.7
Carbon tetrachloride	0.516
Vinyl Chloride	0.629

Location	SS-7 3/4/2021	IA-12 3/4/2021	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	275	10.8	Mitigate
Trichloroethene	2.2	1.2	Identify sources and resample or mitigate
cis-1,2-Dichloroethene	ND	2.28	Identify sources and resample or mitigate
Carbon tetrachloride	14.4	0.453	Monitor
Vinyl Chloride	ND	0.079	No Further Action

Location	SS-3 3/4/2021	IA-8 3/4/2021	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	277	11	Mitigate
Trichloroethene	2.32	1.23	Identify sources and resample or mitigate
cis-1,2-Dichloroethene	3.22	2.32	Identify sources and resample or mitigate
Carbon tetrachloride	5.2	0.453	No Further Action
Vinyl Chloride	ND	0.079	No Further Action

Location	IA-9 3/4/2021
Volatile Organic Compounds (ug/m	
Tetrachloroethene	**92.2**
Trichloroethene	**10.2**
cis-1,2-Dichloroethene	20.7
Carbon tetrachloride	0.484
Vinyl Chloride	0.637

SV-05	3/17/2026 L2614581-05
Volatile Organic Compounds (ug/m³)	
Benzene	2.16
cis-1,2-Dichloroethene	2.86
Ethylbenzene	10.3
Methylene chloride	4.34
o-Xylene	17.6
p/m-Xylene	32.8
Tetrachloroethene	27.6
Toluene	17
trans-1,2-Dichloroethene	1.98
Vinyl chloride	1.48
Xylenes, Total	50.4
SUM of Volatile Organic Compounds	162.2
SUM of BTEX	79.86
SUM of CVOCs	31.94

Location	TI-SS-1 2/24/2022	TI-IA-1 2/24/2022	NYSDOH Matrix Determination
Volatile Organic Compounds (ug/m³)			
Tetrachloroethene	41.4	7.59	Identify sources and resample or mitigate
Trichloroethene	4.85	0.844	Identify sources and resample or mitigate
cis-1,2-Dichloroethene	6.78	1.26	Identify sources and resample or mitigate
Carbon tetrachloride	ND	0.535	No Further Action
Methylene chloride	14.7	**5,520**	Identify sources and resample or mitigate

SV-04	3/17/2026 L2614581-04
Volatile Organic Compounds (ug/m³)	
Benzene	6.61
Carbon tetrachloride	1.82
cis-1,2-Dichloroethene	60.7
Ethylbenzene	10.3
Methylene chloride	1.74
o-Xylene	16
p/m-Xylene	30.3
Tetrachloroethene	28.1
Toluene	56.5
trans-1,2-Dichloroethene	0.793
Trichloroethene	14.1
Xylenes, Total	46.5
SUM of Volatile Organic Compounds	270.93
SUM of BTEX	119.91
SUM of CVOCs	102.9

BOHRE AVE
PILGRIM AVE
Lexington Avenue Local
WESTCHESTER AVE
TI-SS-6/TI-IA-6
SV-02
TI-SS-5/TI-IA-5
SV-01
TI-SS-4/TI-IA-4
SV-03
SV-04
TI-SS-3/TI-IA-3
TI-SS-2/TI-IA-2
SV-05
TI-SS-1/TI-IA-1
IA-11
IA-9
SS-7/IA-12
SS-3/IA-8

LEGEND

- RAILROAD
- EXISTING BROWNFIELD CLEANUP PROGRAM (BCP) SITE NO. C203140
- SITE BOUNDARY
- PARCEL BOUNDARY
- EXISITNG CELLAR
- HALEY & ALDRICH OF NEW YORK, LIMITED PHASE II SOIL VAPOR, APRIL 2026
- TENEN, RIR SOIL VAPOR, FEBRUARY 2023

NYSDOH Air Guidance Values (AGVs)	
Volatile Organic Compounds (ug/m³)	
Tetrachloroethene	30
Trichloroethene	2
cis-1,2-Dichloroethene	NS
Carbon tetrachloride	NS
Vinyl chloride	NS
Mrthylene chloride	60

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
3. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 1, 2025
4. SHADED BLUE VALUES INDICATE "IDENTIFY SOURCES AND RESAMPLE OR MITIGATE" MATRIX DECISION
5. SHADED YELLOW VALUE INDICATES "MONITOR" MATRIX DECISION
6. SHADED ORANGE VALUES INDICATE "MITIGATE" MATRIX DECISION
7. BOLD VALUES INDICATE CONCENTRATION EXCEEDS NYSDOH AGVs
8. NYSDOH AGVs = NEW YORK STATE DEPARTMENT OF HEALTH AIR GUIDANCE VALUES, TABLE 3.1 IN NYSDOH SOIL VAPOR GUIDANCE, OCTOBER 2006 WITH MAY 2017 UPDATES
9. ONLY FEBRUARY 2023 TENEN RIR INDOOR AIR SAMPLES ARE COMPARED TO NYSDOH AGVs
10. ONLY FEBRUARY 2023 TENEN RIR SUB-SLAB SOIL SAMPLES AND INDOOR AIR SAMPLES WERE COMPARED TO THE NYSDOH MATRIX DETERMINATION
11. ND = NOT DETECTED

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HALEY ALDRICH

2925 WESTCHESTER AVENUE
BRONX, NEW YORK

PREVIOUS SOIL VAPOR RESULTS MAP

APRIL 2026

FIGURE 7

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APPENDIX A
Field Sampling Plan

HALEY ALDRICH

www.haleyaldrich.com

FIELD SAMPLING PLAN
2925 WESTCHESTER AVENUE SITE
2925 WESTCHESTER AVENUE
BRONX, NEW YORK

by
H & A of New York Engineering and Geology, LLP
New York, New York

for
2925 Westchester LLC
Bronx, New York

File No. 0215191
May 2026

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Table of Contents

List of Appendices

1. Introduction

This Field Sampling Plan (FSP) has been prepared as a component of the Supplemental Remedial Investigation Work Plan (SRIWP) for the property located at 2925 Westchester Avenue, Bronx, New York (Site). This document was prepared to establish field procedures for field data collection to be performed in support of the SRIWP for the Site.

The SRIWP includes this FSP, a Quality Assurance Project Plan (QAPP), and a Health and Safety Plan (HASP), which are included as part of this plan by reference.

The standard operating procedures (SOPs) included as components of this plan will provide the procedures necessary to meet the project objectives. The SOPs will be used as a reference for the methods to be employed for field sample collection and handling and the management of field data collected in the execution of the approved SRIWP. The SOPs include numerous methods to execute the tasks of the SRIWP. The Project Manager will select the appropriate method as required by field conditions and/or the objective of the respective project task at the time of sample collection. Field procedures will be conducted in general accordance with the New York State Department of Environmental Conservation (NYSDEC) Technical Guidance for Site Investigation and Remediation (Division of Environmental Remediation [DER]-10) and the "Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs," when applicable.

2. Field Program

This FSP provides the general purpose of sampling as well as procedural information. The SRIWP contains the details on sampling and analysis (locations, depths, frequency, analyte lists, etc.).

The field program has been designed to acquire the necessary data to comply with the SRIWP and includes the following tasks:

- Soil sampling;
- Groundwater sampling;
- Soil vapor and ambient air sampling; and
- Sampling of investigation-derived waste (IDW) as needed for disposal.

A Limited Phase II Environmental Site Investigation (ESI) was performed at the Site in April 2026 to investigate the anticipated contaminants of concern identified based on the Site's current and former uses. While the limited sampling event in April 2026 provided preliminary Site characterization data, it did not fully determine the nature and extent of contamination at the Site. In addition, a Remedial Investigation (RI) was performed at the existing Brownfield Cleanup Program (BCP) Site (BCP Site No. 203140), identified as an approximately 0.032-acre (1,415-square-foot [sq-ft]) portion of Block 4164 Lot 5. The Site characterization did not identify the complete extent of contamination on the Site; therefore, additional targeted soil, groundwater, and soil vapor sampling are proposed.

The SOPs presented herein may be changed as required, dependent on Site conditions or equipment limitations at the time of sample collection. If the procedures employed differ from the SOP, the deviations will be documented in the associated sampling report.

3. Utility Clearance

Invasive remedial activities, such as excavation or remedial construction activities, require the location of underground utilities prior to initiating work. Such clearance is sound practice in that it minimizes the potential for damage to underground facilities and, more importantly, is protective of the health and safety of personnel. Under no circumstances will invasive activities be allowed to proceed without obtaining proper utility clearance by the appropriate public agencies and/or private entities. This clearance requirement applies to all work on both public and private properties, whether located in a dense urban area or a seemingly out-of-the-way rural location.

The drilling contractor performing the work will be responsible for obtaining utility clearance.

Utility clearance is required by law, and obtaining clearance includes contacting a public or private central clearance agency via a "one-call" telephone service and providing the proposed exploration location information. It is important to note that public utility agencies may not, and usually do not, have information regarding utility locations on private property.

Before beginning subsurface work at any proposed exploration locations, it is critical that all readily available information on underground utilities and structures be obtained. This includes publicly available information as well as information in the possession of private landowners. Any drawings obtained must be reviewed in detail for information pertaining to underground utilities.

Using the information obtained, the Site should be viewed in detail for physical evidence of buried lines or structures, including pavement cuts and patches, variation in or lack of vegetation, variations in grading, etc. Care must also be taken to avoid overhead utilities as well. Presence of surface elements of buried utilities should be documented, such as manholes, gas or water service valves, catch basins, monuments, or other evidence.

Overhead utility lines must be considered when choosing exploration and excavation locations. Most states require a minimum of 10 feet (ft) of clearance between equipment and energized wires. Such separation requirements may also be voltage-based and may vary depending on state or municipality regulations. In evaluating clearance from overhead lines, the same restrictions may apply to "drops," or wires on a utility pole connecting overhead and underground lines.

Using the information obtained and observations made, proposed exploration or construction locations should be marked in the field. Marking locations can be accomplished using spray paint on the ground, stakes, or other means. All markings of proposed locations should be made in white, in accordance with the generally accepted universal color code for facilities identification (American Public Works Association [APWA]):

- White: Proposed Excavation or Drilling Location
- Pink: Temporary Survey Markings
- Red: Electrical Power Lines, Cables, Conduits, and Lighting Cables
- Yellow: Gas, Oil, Steam, Petroleum, or Gaseous Materials
- Orange: Communication, Alarm, or Signal Lines, Cables, or Conduits

- Blue: Potable Water
- Purple: Reclaimed Water, Irrigation, and Slurry Lines
- Green: Sewers and Drain Lines

In order to effectively evaluate the proposed locations with these entities, detailed, accurate measurements between the proposed locations and existing surface features should be obtained. Such features can be buildings, street intersections, utility poles, guardrails, etc.

Obtaining the utility clearance generally involves the designated "one-call" underground facilities protection organization for the area and the landowner and one or both of the following methods:

- A third-party utility locator company will be utilized to locate underground utilities outside of the public right-of-way; and/or
- "Soft dig" excavation techniques to confirm or deny the presence of underground utilities in the area.

The proposed locations should be evaluated in light of information available for existing underground facilities. The detailed measurement information described above will be required by the "one-call" agency. The owners of the applicable, participating underground utilities are obligated to mark their respective facilities at the Site in the colors described above. Utility stake-out activities will typically not commence for approximately 72 hours after the initial request is made.

The public and private utility entities generally only mark the locations of their respective underground facilities within public rights-of-way. Determination of the locations of these facilities on private property will be the responsibility of the property owner or Contractor. If available information does not contain sufficient detail to locate underground facilities with a reasonable amount of confidence, alternate measures may be appropriate, as described below. In some cases, the memory of a long-time employee of a facility on private property may be the best or only source of information. It is incumbent on the Consultant or Contractor to exercise caution and use good judgement when faced with uncertainty.

Note: It is important to note that not all utilities are participants in the "one-call" agency or process. As such, inquiries must be made with the "one-call" agency to determine which entities do not participate, so they can be contacted independently.

Most utility stakeouts have a limited time period for which they remain valid, typically two to three weeks. It is critical that this time period be considered to prevent expiration of clearance prior to completion of the invasive activities and the need to repeat the stake-out process.

Care must be exercised to document receipt of notice from the involved agencies of the presence or absence of utilities in the vicinity of the proposed locations.

Most agencies will generally provide a telephone or fax communication indicating the lack of facilities in the project area. If contact is not made by all of the agencies identified by the "one-call" process, do not assume that such utilities are not present. Re-contact the "one-call" agency to determine the status.

For complicated sites with multiple proposed locations and multiple utilities, it is advisable to arrange an on-site meeting with utility representatives. This will minimize the potential for miscommunication amongst the involved parties.

Completion of the utility stake-out process is not a guarantee that underground facilities will not be encountered in excavations or boreholes; in fact, most "one-call" agencies and individual utilities do not offer guarantees, nor do they accept liability for damage that might occur. In areas outside the public right-of-way, a utility locating service may be utilized to locate underground utilities. It is advisable that any invasive activities proceed with extreme caution in the upper 4 to 5 ft in the event the clearance has failed to identify an existing facility. This may necessitate hand-excavation or probing to confirm potential presence of shallow utilities. If uncertainty exists for any given utility, extra activities can be initiated to solve utility clearance concerns. These options include:

- Screening the proposed work areas with utility locating devices, and/or hiring a utility locating service to perform this task.
- Hand digging, augering, or probing to expose or reveal shallow utilities and confirm presence and location. In northern climates, this may require advancing to below the frost line, typically at least 4 ft.
- Using "soft dig" techniques that utilize specialized tools and compressed air to excavate soils and locate utilities. This technique is effective in locating utilities to a depth of 4 to 5 ft.

Equipment/Materials:

- White spray paint;
- Wooden stakes, painted white or containing white flagging;
- Color-code key; and
- Available drawings.

4. Field Data Recording

This procedure describes the protocol for documenting the investigation activities in the field. Field data serves as the cornerstone for an environmental project, not only for Site characterization but for additional phases of investigation or remedial design. Producing defensible data includes proper and appropriate recording of field data as it is obtained in a manner to preserve the information for future use. This procedure provides guidelines for accurate, thorough collection and preservation of written and electronic field data.

Field data to be recorded during the project generally includes, but is not limited to, the following:

- general field observations;
- numeric field measurements and instrument readings;
- quantity estimates;
- sample locations and corresponding sample numbers;
- relevant comments and details pertaining to the samples collected;
- documentation of activities, procedures, and progress achieved;
- contractor pay item quantities;
- weather conditions;
- a listing of personnel involved in Site-related activities;
- a log of conversations, Site meetings, and other communications; and
- field decisions and pertinent information associated with the decisions.

4.1 Written Field Data

Written field data will be collected using a standardized, pre-printed field log form. In general, the use of a field log form is preferable as it prompts field personnel to make appropriate observations and record data in a standardized format. This promotes completeness and consistency from one person to the next. Otherwise, electronic data collection using a handheld device produces equal completeness and consistency using a preformatted log form.

In the absence of an appropriate pre-printed form, the data should be recorded in an organized and structured manner in a dedicated project field logbook. Logbooks must be hardcover, bound so that pages cannot be added or removed, and should be made from high-grade 50 percent rag paper with a water-resistant surface.

The following are guidelines for the use of field log forms and logbooks:

1. Information must be factual and complete.
2. All entries will be made in black indelible ink with a ballpoint pen and will be written legibly. Do not use “rollerball” or felt tip-style pens, since the water-soluble ink can run or smear in the presence of moisture.

3. Field log forms should be consecutively numbered.
4. Each day's work must start on a new form/page.
5. At the end of each day, the current logbook page or forms must be signed and dated by the field personnel making the entries.
6. Make data entries immediately upon obtaining the data. Do not make temporary notes in other locations for later transfer; this only increases the potential for error or loss of data.
7. Entry errors are to be crossed out with a single line and initialed by the person making the correction.
8. Do not leave blanks on log forms; if no entry is applicable for a given data field, indicate so with "NA" or a dash ("--").
9. At the earliest practical time, photocopies or typed versions of log forms and logbook pages should be made and placed in the project file as a backup in the event the book or forms are lost or damaged.
10. Logbooks should be dedicated to one project only, i.e., do not record data from multiple projects in one logbook.

4.2 Electronic Data

Electronic data recording involves electronic measurement of field information through the use of monitoring instruments, sensors, gauges, and equipment controls. The following is a list of guidelines for proper recording and management of electronic field data:

1. Field data management should follow the requirements of a project-specific Data Management Plan (DMP), if applicable.
2. Use only instruments that have been calibrated in accordance with manufacturer's recommendations.
3. Usage of instruments, controls, and computers for the purpose of obtaining field data should only be performed by personnel properly trained and experienced in the use of the equipment and software.
4. Use only fully licensed software on personal computers and laptops.
5. Loss of electronic files may mean loss of irreplaceable data. Every effort should be made to back up electronic files obtained in the field as soon as practical. A backup file placed on the file server will minimize the potential for loss.
6. Electronic files, once transferred from field instruments or laptops to office computers, should be protected, if possible, to prevent unwanted or inadvertent manipulation or modification of data. Several levels of protection are usually available for spreadsheets, including making a file "read-only" or assigning a password to access the file.
7. Protect CDs from exposure to moisture, excessive heat or cold, magnetic fields, or other potentially damaging conditions.
8. Remote monitoring is often used to obtain stored electronic data from site environmental systems. A thorough discussion of this type of electronic field data recording is beyond the scope of this Section. Such on-site systems are generally capable of storing a limited amount of

data as a comma-delimited or spreadsheet file. Users must remotely access the monitoring equipment files via modem or other access and download the data. In order to minimize the potential for loss of data, access and downloading of data should be performed frequently enough to ensure the data storage capacity of the remote equipment is not exceeded.

Equipment/Materials:

- Appropriate field log forms, or iPad® or equivalent with preformatted log forms;
- Indelible ballpoint pen (do not use “rollerball” or felt-tip style pens);
- Straight edge;
- Pocket calculator; and
- Laptop computer (if required).

5. Aquifer Characterization

This procedure describes the measurement of water levels in groundwater monitoring. A synoptic gauging round will be completed to obtain water levels in monitoring wells. Water levels will be acquired in a manner that provides accurate data that can be used to calculate vertical and horizontal hydraulic gradients and other hydrogeologic parameters. Accuracy in obtaining the measurements is critical to ensure the usability of the data.

5.1 Procedure

In order to provide reliable data, water level monitoring events should be collected over as short a period of time as practical. Barometric pressure can affect groundwater levels, and, therefore, observation of significant weather changes during the period of water level measurements must be noted. Rainfall events and groundwater pumping can also affect groundwater level measurements. Personnel collecting water level data must note if any of these controls are in effect during the groundwater level collection period. Due to possible changes during the groundwater level collection period, it is imperative that the time of data collection at each station be accurately recorded. Water levels will also be collected prior to any sample collection that day.

The depth to groundwater will be measured with an electronic depth-indicating probe. Prior to obtaining a measurement, a fixed reference point on the well casing will be established for each well to be measured. Unless otherwise established, the reference point is typically established and marked on the north side of the well casing. Do not use protective casings or flush-mounted road boxes as a reference, due to the potential for damage or settlement. The elevation of the reference point shall be obtained by accepted surveying methods, to the nearest 0.01 ft.

The water level probe will be lowered into the well until the meter indicates (via indicator light or tone) that the water has been reached. The probe will be raised above the water level and slowly lowered again until water is indicated. The cable will be held against the side of the inner protective casing at the point designated for water level measurements and a depth reading taken. This procedure will be followed three times or until a consistent value is obtained. The value will be recorded to the nearest 0.01 ft on the Groundwater Level Monitoring Report form.

Upon completion, the probe will be raised to the surface and, together with the amount of cable that entered the well casing, will be decontaminated in accordance with the methods described in the Equipment Decontamination Procedure.

Equipment/Materials:

- Battery-operated, non-stretch electronic water level probe with permanent markings at 0.01-ft increments, such as the Solinst Model 101 or equivalent.
- The calibrated cable on the depth indicator will be checked against a surveyor's steel tape once per quarter year. A new cable will be installed if the cable has changed by more than 0.01 percent (0.01 ft for a 100-ft cable). See also the Field Instruments – Use and Calibration Procedure.
- Groundwater Level Monitoring Report form.

6. Sample Collection for Laboratory Analysis

6.1 SOIL SAMPLE COLLECTION FOR LABORATORY ANALYSIS

The following procedure is an introduction to soil sampling techniques and an outline of field staff responsibilities. All samples will be collected with dedicated sampling equipment.

6.1.1 Preparatory Requirements

Prior to the beginning of any RI or remedial measures activities, staff must attend a project briefing for the purpose of reviewing the project work plan, Site and utility plans, drawings, applicable regulations, sampling location, depth, criteria, Site contacts, and other related documents. Health and safety concerns will be documented in a Site-specific HASP.

A file folder for the field activities should be created and maintained such that all relevant documents and log forms likely to be useful for the completion of field activities by others are readily available in the event of personnel changes.

6.1.2 Soil Classification

The stratigraphic log is a factual description of the soil at the borehole location and is relied upon to interpret the soil characteristics and their influence and significance in the subsurface environment. The accuracy of the stratigraphic log is to be verified by the person responsible for interpreting subsurface conditions. An accurate description of the soil stratigraphy is essential for a reasonable understanding of the subsurface conditions. Confirmation of the field description by examination of representative soil samples by the project geologist, hydrogeologist, or geotechnical engineer (whenever practicable) is recommended.

The ability to describe and classify soil correctly is a skill that is learned from a person with experience and by systematic training and comparison of laboratory results to field descriptions.

6.1.2.1 Data Recording

Several methods for classifying and describing soils or unconsolidated sediments are in relatively widespread use. The Unified Soil Classification System (USCS) is the most common. With the USCS, a soil is first classified according to whether it is predominantly coarse-grained or fine-grained.

The description of fill soil is similar to that of natural undisturbed soil except that it is identified as fill and not classified by USCS group, relative density, or consistency. Those logging soils must attempt to distinguish between soils that have been placed (i.e., fill) and not naturally present, or soils that have been naturally present but disturbed (i.e., disturbed native).

It is necessary to identify and group soil samples consistently to determine the subsurface pattern or changes and non-conformities in soil stratigraphy in the field at the time of drilling. The stratigraphy in each borehole during drilling is to be compared to the stratigraphy found at the previously completed

boreholes to ensure that patterns or changes in soil stratigraphy are noted and that consistent terminology is used.

Visual examination, physical observations, and manual tests (adapted from ASTM International [ASTM] D2488, visual-manual procedures) are used to classify and group soil samples in the field and are summarized in this subsection. ASTM D2488 should be reviewed for detailed explanations of the procedures. Visual-manual procedures used for soil identification and classification include:

- visual determination of grain size, soil gradation, and percentage fines;
- dry strength, dilatancy, toughness, and plasticity (thread or ribbon test) tests for identification of inorganic fine-grained soil (e.g., CL, CH, ML, or MH); and
- soil compressive strength and consistency estimates based on thumb indent and pocket penetrometer (preferred) methods.

Soil characteristics like plasticity, strength, and dilatancy should be determined using the H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) Soil Identification Field Form.

6.1.2.2 Field Sample Screening

Upon the collection of soil samples, the soil is screened with a photoionization detector (PID) for the presence of organic vapor. This is accomplished by running the PID across the soil sample. The highest reading and sustained readings are recorded.

Note: The PID measurement must be done upwind of the excavating equipment or any running engines so that exhaust fumes will not affect the measurements.

Another method of field screening is headspace measurements. This consists of placing a portion of the soil sample in a sealable glass jar, placing aluminum foil over the jar top, and tightening the lid. Alternatively, plastic sealable bags may be utilized for field screening in lieu of glass containers. The jar should only be partially filled. Shake the jar and set aside for at least 30 minutes. After the sample has equilibrated, the lid of the jar can be opened; the foil is punctured with the PID probe, and the air (headspace) above the soil sample is monitored. This headspace reading on the field form or in the field book is recorded. All headspace measurements must be completed under similar conditions to allow comparability of results. Soil classification and PID readings will be recorded in the daily field report.

Equipment/Materials:

- Pocket knife or small spatula;
- Small handheld lens;
- Stratigraphic Log (Overburden) (Form 2001);
- Tape measure; and
- When sampling for PFAS, acceptable materials for sampling include stainless-steel, high-density polyethylene (HDPE), polyvinyl chloride (PVC), silicone, acetate, and polypropylene.

6.1.3 Soil Sampling

Soil samples will be collected from acetate liners installed by a track-mounted direct-push drill rig (Geoprobe®) or sonic drill rig (as necessary) operated by a licensed operator. Soil samples will be collected using a stainless-steel trowel or sampling spoon into laboratory-provided sample containers. If it is necessary to relocate any proposed sampling location due to terrain, utilities, access, etc., the Project Manager must be notified, and an alternate location will be selected.

Prior to use and between each sampling location at an environmental site, the sampling equipment must be decontaminated. All decontamination must be conducted in accordance with the project-specific plans or methods.

6.1.4 Sampling Techniques

The following procedure describes typical soil sample collection methods for submission of samples to a laboratory for chemical analysis. The primary goal of soil sampling is to collect representative samples for examination and chemical analysis (if required).

Environmental soil samples obtained for chemical analyses are collected with special attention given to the rationale behind determining the precise zone to sample, the specifics of the method of soil extraction, and the requisite decontamination procedures. Preservation, handling, and glassware for environmental soil samples vary considerably depending upon several factors, including the analytical method to be conducted and the analytical laboratory being used.

Soil sampling for PFAS will be performed in accordance with the April 2023 “Sampling, Analysis, and Assessment of PFAS Under NYSDEC’s Part 375 Remedial Programs.”

6.1.4.1 Grab Versus Composite Samples

A grab sample is collected to identify and quantify conditions at a specific location or interval. The sample is comprised of the minimum amount of soil necessary to make up the volume of sample dictated by the required sample analyses. Composite samples may be obtained from several locations or along a linear trend (in a test pit or excavation). Sampling may occur within or across stratification.

6.2 GROUNDWATER SAMPLE COLLECTION FOR LABORATORY ANALYSIS

The following section describes two techniques for groundwater sampling: “Low-Stress/Low-Flow Methods” and “Typical Sampling Methods.”

“Low-Stress/Low-Flow” methods will be employed when collecting groundwater samples for the evaluation of volatile constituents (i.e., dissolved oxygen [DO]) or in fine-grained formations where sediment/colloid transport is possible. Analyses typically sensitive to colloidal transport issues include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metals.

The “Typical Sampling Methods” will be employed where parameters less sensitive to turbidity/sediment issues are being collected (general chemistry, pesticides, and other semi-volatile organic compounds [SVOCs]).

NOTE: If non-aqueous phase liquids (NAPL) (light or dense) are detected in a monitoring well, groundwater sample collection will not be conducted, and the Project Manager must be contacted to determine a course of action.

6.2.1 Preparatory Requirements

- Verify well identification and location using borehole log details and location layout figures. Note the condition of the well and record any necessary repair work required.
- Prior to opening the well cap, measure the breathing space above the well casing with a handheld organic vapor analyzer to establish baseline breathing space VOC levels. Repeat this measurement once the well cap is opened. If either of these measurements exceeds the air quality criteria in the HASP, field personnel should adjust their personal protective equipment (PPE) accordingly.
- Prior to commencing the groundwater purging/sampling, a water level must be obtained to determine the well volume for hydraulic purposes. In some settings, it may be necessary to allow the water level time to equilibrate. This condition exists if a watertight seal exists at the well cap and the water level has fluctuated above the top of screen, creating a vacuum or pressurized area in this air space. Three water level checks will verify that static water level conditions have been achieved.
- Calculate the volume of water in the well. Typically, overburden well volumes consider only the quantity of water standing in the well screen and riser; bedrock well volumes are calculated on the quantity of water within the open core hole and within the overburden casing.

6.2.2 Well Development

Well development is completed to remove fine-grained materials from the well but in such a manner as to not introduce fines from the formation into the sand pack. Well development continues until the well responds to water level changes in the formation (i.e., a good hydraulic connection is established between the well and formation) and the well produces clear, sediment-free water to the extent practical.

- Attach the appropriate pump and lower tubing into the well.
- Gauge well and calculate one well volume. Turn on the pump. If the well runs dry, shut off the pump and allow it to recover.
- Surging will be performed by raising and lowering the pump several times to pull fine-grained material from the well. Periodically measure the turbidity level using a La Motte turbidity reader.
- The second and third steps will be repeated until turbidity is less than 50 nephelometric turbidity units (NTU) or when 10 well volumes have been removed.
- All water generated during cleaning and development procedures will be collected and contained on the Site in 55-gallon drums for future analysis and appropriate disposal.

Equipment:

- Appropriate health and safety equipment;
- Knife;

- Power source (generator);
- Field book;
- Well Development Form (Form 3006);
- Well keys;
- Graduated pails;
- Pump and tubing;
- Cleaning supplies (including non-phosphate soap, buckets, brushes, laboratory-supplied distilled/deionized water, tap water, cleaning solvent, aluminum foil, plastic sheeting, etc.); and
- Water level meter.

6.2.3 Well Purging and Stabilization Monitoring (Low-Stress/Low-Flow Method)

The preferred method for groundwater sampling will be the low-stress/low-flow method described below.

- Slowly lower the pump, safety cable, tubing, and electrical lines into the well to the depth specified by the project requirements. The pump intake must be at the midpoint of the well screen to prevent disturbance and resuspension of any sediment in the screen base.
- Before starting the pump, measure the water level again with the pump in the well, leaving the water level measuring device in the well when completed.
- Purge the well at 100 to a maximum of 500 milliliters per minute (mL/min). During purging, the water level should be monitored approximately every five minutes, or as appropriate. A steady flow rate should be maintained that results in drawdown of 0.3 ft or less. The rate of pumping should not exceed the natural flow rate conditions of the well. Care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record adjustments made to the pumping rates and water levels immediately after each adjustment.
- During the purging of the well, monitor and record the field indicator parameters (pH, temperature, conductivity, oxidation-reduction (redox) reaction potential (ORP), DO, and turbidity) approximately every five minutes. Stabilization is considered to be achieved when the final groundwater flow rate is achieved, and three consecutive readings for each parameter are within the following limits:
  - pH: 0.1 pH units of the average value of the three readings;
  - Temperature: 3 percent of the average value of the three readings;
  - Conductivity: 0.005 milliSiemen per centimeter (mS/cm) of the average value of the three readings for conductivity less than 1 mS/cm and 0.01 mS/cm of the average value of the three readings for conductivity greater than 1 mS/cm;
  - ORP: 10 millivolts (mV) of the average value of the three readings;
  - DO: 10 percent of the average value of the three readings; and
  - Turbidity: 10 percent of the average value of the three readings, or a final value of less than 50 NTU.
- The pump must not be removed from the well between purging and sampling.

6.2.4 Sampling Techniques

- If an alternate pump is utilized, the first pump discharge volumes should be discarded to allow the equipment a period of acclimation to the groundwater.
- Samples are collected directly from the pump, with the groundwater being discharged directly into the appropriate sample container. Avoid handling the interior of the bottle or bottle cap, and don new gloves for each well sampled to avoid contamination of the sample.
- Order of sample collection:
  - PFAS;
  - Volatile organic compounds (VOCs);
  - 1,4-dioxane;
  - SVOCs;
  - Target Analyte List (TAL) metals; and
  - PCBs, pesticides, and herbicides
- No sampling equipment components or sample containers should come in contact with aluminum foil, low-density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials, including plumber's tape and sample bottle cap liners with a PTFE layer.
- For low-stress/low-flow sampling, samples should be collected at a flow rate between 100 and 500 mL/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft.
- The pumping rate used to collect a sample for VOC should not exceed 100 mL/min. Samples should be transferred directly to the final container of 40-mL glass vials, completely full and topped with a Teflon™ cap. Once capped, the vial must be inverted and tapped to check for headspace/air presence (bubbles). If air is present, the sample will be discarded and recollected until free of air.
- Groundwater sampling for PFAS will be performed in accordance with the April 2023 "Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs."
- All samples must be labeled with:
  - A unique sample number;
  - Date and time;
  - Parameters to be analyzed;
  - Project Reference ID; and
  - Sampler's initials.
- Labels should be written in indelible ink and secured to the bottle with clear tape.

Equipment/Materials:

- pH meter, conductivity meter, DO meter, ORP meter, nephelometer, and temperature gauge;
- Field filtration units (if required);
- Purging/sampling equipment;
  - Peristaltic pump;

- Water level probe;
- Sampling materials (containers, logbook/forms, coolers, chain of custody [COC]);
- Work Plan;
- HASP; and
- When sampling for PFAS, acceptable materials for sampling include stainless-steel, HDPE, PVC, silicone, acetate, and polypropylene.

Note: Peristaltic pump use for VOC collection is not acceptable on NYSDEC/U.S. Environmental Protection Agency (EPA)/Resource Conservation and Recovery Act (RCRA) sites; this technique has gained acceptance in select areas where it is permissible to collect VOCs using a peristaltic pump at a low-flow rate (e.g., Michigan).

Note: 1,4-dioxane and PFAS purge and sample techniques will be conducted following the NYSDEC guidance documents (see Appendix C of the SRIWP). Acceptable groundwater pumps include a stainless-steel inertia pump with HDPE tubing, a peristaltic pump equipped with HDPE tubing and silicone tubing, and a stainless-steel bailer with a stainless-steel ball or bladder pump (identified as PFAS-free) with HDPE tubing.

Field Notes:

- Field notes must document all the events, equipment used, and measurements collected during the sampling activities. Section 2 describes the data/recording procedure for field activities.
- The logbook should document the following for each well sampled:
  - Identification of well;
  - Well depth;
  - Static water level depth and measurement technique;
  - Sounded well depth;
  - Presence of immiscible layers and detection/collection method;
  - Well yield – high or low;
  - Purge volume and pumping rate;
  - Time well purged;
  - Measured field parameters;
  - Purge/sampling device used;
  - Well sampling sequence;
  - Sampling appearance;
  - Sample odors;
  - Sample volume;
  - Types of sample containers and sample identification;
  - Preservative(s) used;
  - Parameters requested for analysis;
  - Field analysis data and method(s);
  - Sample distribution and transporter;

- Laboratory shipped to;
- COC number for shipment to laboratory;
- Field observations on sampling event;
- Name collector(s);
- Climatic conditions, including air temperature; and
- Problems encountered and any deviations made from the established sampling protocol.

A standard log form for documentation and reporting groundwater purging and sampling events is presented on the Groundwater Sampling Record, Low Flow Groundwater Sampling Form, and Low Flow Monitored Natural Attenuation (MNA) Field Sampling Form. Refer to Appendix A for example field forms.

Groundwater/Decon Fluid Disposal:

- Groundwater disposal methods will vary on a case-by-case basis but may range from:
  - Off-site treatment at private treatment/disposal facilities or publicly owned treatment facilities
  - On-site treatment at facility-operated facilities
  - Direct discharge to the surrounding ground surface, allowing groundwater infiltration to the underlying subsurface regime
- Decontamination fluids should be segregated and collected separately from wash waters/groundwater containers.

6.3 SOIL VAPOR SAMPLING

The following procedure is an introduction to soil vapor sampling techniques and an outline of field staff responsibilities.

6.3.1 Preparatory Requirements

Prior to collecting the field sample, ensure the stainless-steel or polyethylene soil vapor probe has been installed to the desired depth and sealed completely to the surface using a material such as bentonite. As part of the vapor intrusion evaluation, a tracer gas should be used in accordance with New York State Department of Health (NYSDOH) protocols to serve as a quality assurance/quality control (QA/QC) to verify the integrity of the soil vapor probe seal. A container (box, plastic pail, etc.) will serve to keep the tracer gas in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer gas prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling round, tracer monitoring should be performed a second time to confirm the integrity of the probe seals.

6.3.2 Sampling Techniques

Samples will be collected in appropriately sized Summa canisters that have been certified clean by the laboratory, and samples will be analyzed using EPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 liters per minute (L/min). One to three implant volumes shall be purged prior to the collection of any soil-gas samples. 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 COC protocols.

6.4 SAMPLE HANDLING AND SHIPPING

Sample management is the continuous care given to each sample from the point of collection to receipt at the analytical laboratory. Good sample management ensures that samples are properly recorded, properly labeled, and not lost, broken, or exposed to conditions that may affect the sample's integrity.

All sample submissions must be accompanied by a COC document to record sample collection and submission. Personnel performing sampling tasks must check the sample preparation and preservation requirements to ensure compliance with the QAPP.

The following sections provide the minimum standards for sample management.

6.4.1 Sample Handling

Prior to entering the field area where sampling is to be conducted, especially at sites with defined exclusion zones, the sampler should ensure that all materials necessary to complete the sampling are on hand. If samples must be maintained at a specified temperature after collection, dedicated coolers and ice must be available for use. Conversely, when sampling in cold weather, proper protection of water samples, trip blanks, and field blanks must be considered. Sample preservation will involve pH adjustment, cooling to 4 degrees Celsius, and sample filtration and preservation.

6.4.2 Sample Labeling

Samples must be properly labeled immediately upon collection.

Note that the data shown on the sample label is the minimum data required. The sample label data requirements are listed below for clarity:

- Project name;
- Sample name/number/unique identifier;
- Sampler's initials;
- Date of sample collection;
- Time of sample collection;
- Analysis required; and
- Preservatives.

To ensure that samples are not confused, a clear notation should be made on the container with a permanent marker. If the containers are too soiled for marking, the containers can be put into a "Zip-Lock" bag, which can then be labeled.

All sample names will be as follows:

- Sample unique identifier: Enter the sample name or number. There should be NO slashes, spaces, or periods in the date.
- Date: Enter the six-digit date when the sample was collected. Note that for one-digit days, months, and/or years, add zeros so that the format is MMDDYY (050210). There should be NO slashes, dashes, or periods in the date.

The QA/QC samples will be numbered consecutively as collected with a sample name, date, and number of samples collected throughout the day (i.e., when multiple QA/QC samples are collected in one day).

Examples of this naming convention are as follows:

Sample Name:	Comments
TB-050202-0001	TRIP BLANK
TB-050202-0002	TRIP BLANK
FD-050202-0001	FIELD DUPLICATE
FD-050202-0002	FIELD DUPLICATE

NOTE: The QA/QC sample number resets to 0001 EACH DAY; this will avoid having to look back to the previous day for the correct sequential number.

6.4.3 Field Code

The field code will be written in the "Comments" field on the COC for EVERY sample but will not be a part of the actual sample name. Enter the one/two-character code for the type of sample (must be in CAPITALS):

N	Normal Field Sample
FD	Field Duplicate (note sample number [i.e., 0001] substituted for time)
TB	Trip Blank (note sample number [i.e., 0001] substituted for time)
EB	Equipment Blank (note sample number [i.e., 0001] substituted for time)
FB	Field Blank (note sample number [i.e., 0001] substituted for time)
KD	Known Duplicate
FS	Field Spike Sample
MS	Matrix Spike Sample (note on "Comments" field of COC – laboratory to spike matrix).
MD	Matrix Spike Duplicate Sample (note on "Comments" field of COC – laboratory to spike matrix).
RM	Reference Material

The sample labeling – both chain and sample bottles must be EXACTLY as detailed above. In addition, the Field Sample Key for each sample collected must be filled out.

6.4.4 Packaging

Sample container preparation and packing for shipment should be completed in a well-organized and clean area, free of any potential cross-contamination. The following is a list of standard guidelines that must be followed when packing samples for shipment.

- Double-bag ice in "Zip-Lock" bags.
- Double-check to ensure trip and temperature blanks have been included for all shipments containing VOCs, or where otherwise specified in the QAPP.
- Enclose the COC form in a "Zip-Lock" bag.
- Ensure custody seals (two, minimum) are placed on each cooler. Coolers with hinged lids should have both seals placed on the opening edge of the lid. Coolers with "free" lids should have seals placed on opposite diagonal corners of the lid. Place clear tape over custody seals.
- Containers should be wiped clean of all debris/water using paper towels (paper towels must be disposed of with other contaminated materials).
- Clear, wide packing tape should be placed over the sample label for protection.
- Do not bulk pack. Each sample must be individually padded.
- Large glass containers (1 liter and up) require much more space between containers.
- Ice is not a packing material due to the reduction in volume when it melts.

Note: Never store sterile sample containers in enclosures containing equipment that uses any form of fuel or volatile petroleum-based product. When conducting sampling in freezing conditions at sites without a heated storage area (free of potential cross-contaminants), unused trip blanks should be isolated from coolers immediately after receipt. Trip blanks should be double-bagged and kept from freezing.

6.4.5 Chain of Custody Records

COC forms will be completed for all samples collected. The form documents the transfer of sample containers. The COC record completed at the time of sampling will contain, but not be limited to, the sample number, date and time of sampling, and the name of the sampler. The COC document will be signed and dated by the sampler when transferring the samples.

Each sample cooler being shipped to the laboratory will contain a COC form. The cooler will be sealed properly for shipment. The laboratory will maintain a copy for its records. One copy will be returned with the data deliverables package.

The following list provides guidance for the completion and handling of all COCs:

- COCs used should be a Haley & Aldrich of New York standard form or supplied by the analytical laboratory.
- COCs must be completed in black ballpoint ink only.

- COCs must be completed neatly using printed text.
- If a simple mistake is made, cross out the error with a single line and initial and date the correction.
- Each separate sample entry must be sequentially numbered.
- If numerous repetitive entries must be made in the same column, place a continuous vertical arrow between the first entry and the next different entry.
- When more than one COC form is used for a single shipment, each form must be consecutively numbered using the "Page ___ of ___" format.
- If necessary, place additional instructions directly onto the COC in the Comment section. Do not enclose separate instructions.
- Include a contact name and phone number on the COC in case there is a problem with the shipment.
- Before using an acronym on a COC, define clearly the full interpretation of your designation (i.e., polychlorinated biphenyls [PCBs]).

6.4.6 Shipment

Prior to the start of the field sampling, the carrier should be contacted to determine if pickup will be at the field Site location. If pick-up is not available at the Site, the nearest pick-up or drop-off location should be determined. Sample shipments must not be left at unsecured drop locations.

Copies of all shipment manifests must be maintained in the field file.

7. Field Instruments – Use and Calibration

A significant number of field activities involve usage of electronic instruments to monitor environmental conditions and for health and safety purposes. It is imperative that the instruments are used and maintained properly to optimize their performance and minimize the potential for inaccuracies in the data obtained. This section provides guidance on the usage, maintenance, and calibration of electronic field equipment.

- All monitoring equipment will be in proper working order and operated in accordance with manufacturer's recommendations.
- Field personnel will be responsible for ensuring that the equipment is maintained and calibrated in the field in accordance with manufacturer's recommendations.
- Instruments will be operated only by personnel trained in the proper usage and calibration.
- Personnel must be aware of the range of conditions, such as temperature and humidity, for instrument operation. Usage of instruments in conditions outside these ranges will only proceed with the approval of the Project Manager and/or Health and Safety Officer as appropriate.
- Instruments that contain radioactive source material, such as x-ray fluorescence (XRF) analyzers or moisture-density gauges, require specific transportation, handling, and usage procedures that are generally associated with a license from the Nuclear Regulatory Commission (NRC) or an NRC-Agreement State. Under no circumstance will the operation of such instruments be allowed on Site unless by properly authorized and trained personnel, using the proper personal dosimetry badges or monitoring instruments.

7.1 GENERAL PROCEDURE DISCUSSION

Care must be taken to minimize the potential for transfer of contaminated materials to the ground or onto other materials. Regardless of the size or nature of the equipment being decontaminated, the process will utilize a series of steps that involve the removal of gross material (dirt, grease, oil, etc.), washing with a detergent, and multiple rinsing steps. In lieu of a series of washes and rinse steps, steam cleaning with low-volume, high-pressure equipment (i.e., steam cleaner) is acceptable.

Exploration equipment and all monitoring equipment in contact with the sampling media must be decontaminated prior to initiating Site activities, in between exploration locations to minimize cross-contamination, and prior to mobilizing off-Site after completion of Site work.

The following specific decontamination procedure is recommended for sampling equipment and tools:

- Brush loose soil off equipment;
- Wash equipment with laboratory-grade detergent (i.e., Alconox or equivalent);
- Rinse with tap water;
- Rinse equipment with distilled water;
- Allow water to evaporate before reusing equipment; and
- Wrap equipment in aluminum foil when not being used.

7.2 DECONTAMINATION OF MONITORING EQUIPMENT

Because monitoring equipment is difficult to decontaminate, care should be exercised to prevent contamination. Sensitive monitoring instruments should be protected when they are at risk of exposure to contaminants. This may include enclosing them in plastic bags, allowing an opening for the sample intake. Ventilation ports should not be covered.

If contamination does occur, decontamination of the equipment will be required; however, immersion in decontamination fluids is not possible. As such, care must be taken to wipe the instruments down with detergent-wetted wipes or sponges, and then with deionized water-wetted wipes or sponges.

7.3 DISPOSAL OF WASH SOLUTIONS AND CONTAMINATED EQUIPMENT

All contaminated wash water, rinses, solids, and materials used in the decontamination process that cannot be effectively decontaminated (such as polyethylene sheeting) will be containerized and disposed of in accordance with applicable regulations. All containers will be labeled with an indelible marker as to contents and date of placement in the container, and any appropriate stickers required (such as PCBs). Storage of decontamination wastes on the Site will not exceed 90 days under any circumstances.

Equipment/Materials:

Decontamination equipment and solutions are generally selected based on ease of decontamination and disposability.

- Polyethylene sheeting;
- Metal racks to hold equipment;
- Soft-bristle scrub brushes or long-handle brushes for removing gross contamination and scrubbing with wash solutions;
- Large, galvanized wash tubs, stock tanks, or wading pools for wash and rinse solutions; and
- Plastic buckets or garden sprayers for rinse solutions.

Large plastic garbage cans or other similar containers lined with plastic bags can be used to store contaminated clothing. Contaminated liquids and solids should be segregated and containerized in New York State Department of Transportation (NYSDOT)-approved plastic or metal drums, appropriate for off-Site shipping/disposal if necessary.

8. Investigation-Derived Waste Disposal

8.1 RATIONALE/ASSUMPTIONS

This procedure applies to the disposition of IDW, including soils and/or groundwater. IDW is dealt with the following "Best Management Practices" and is not considered a listed waste due to the lack of generator knowledge concerning chemical source, chemical origin, and timing of chemical introduction to the subsurface.

Consequently, waste sampling and characterization are performed to determine if the wastes exhibit a characteristic of hazardous waste. The disposal of soil cuttings, test pit soils, and/or purged groundwater will be reviewed on a case-by-case basis prior to initiation of field activities. Two scenarios typically exist:

- When no information is available in the area of activity or investigation, and impacted media/soils are identified. Activities such as new construction and/or maintenance below grade may encounter environmental conditions that were unknown.
- Disposal Required/Containerization Required – When sufficient Site information regarding the investigative Site conditions warrants that all materials handled will be contained and disposed.

If a known listed hazardous and/or characteristically hazardous waste/contaminated environmental media is being handled, then handling must be performed in accordance with RCRA Subtitle C (reference 2, Part V, Section 1(a),(b),(c)).

The following outlines the waste characterization procedures to be employed when IDW disposal is required.

The following procedure describes the techniques for characterization of IDW for disposal purposes. IDW may consist of soil cuttings (augering, boring, well installation soils, or test pit soils), rock core or rock flour (from coring or reaming operations), groundwater (from well development, purging, and sampling activities), decontamination fluids, PPE, and disposal equipment (DE).

8.2 PROCEDURE

The procedures for handling and characterization of field activity-generated wastes are:

A.) Soil Cuttings - Soils removed from boring activities will be contained within an approved container, suitable for transportation and disposal.
- Once placed into the approved container, any free liquids (i.e., groundwater) will be removed for disposal as waste fluids or solidified within the approved container using a solidification agent such as Speedy Dri (or equivalent).
- Contained soils will be screened for the presence of VOCs, using a PID; this data will be logged for future reference.
- Once screened, full, and closed, the container will be labeled and placed into the container storage area. At a minimum, the following information will be shown on each container label: date of filling/generation, Site name, source of soils (i.e., borehole or well), and contact.

- Prior to container closure, representative samples from the containers will be collected for waste characterization purposes and submitted to the project laboratory.
- Typically, at a location where an undetermined site-specific parameter group exists, sampling and analysis may consist of the full RCRA Waste Characterization (ignitability, corrosivity, reactivity, toxicity), or a subset of the above based upon data collected, historical information, and generator knowledge.

B.) Groundwater - Purging and sampling groundwater, which requires disposal, will be contained.

- Containment may be performed in 55-gallon drums, tanks suitable for temporary storage (i.e., Nalgene tanks 500 to 1,000 gallons), or, if large volumes of groundwater are anticipated, tanker trailers (5,000 to 10,000 gallons ±) or drilling "Frac" tanks may be utilized (20,000 gallons ±). In all cases, the container/tank used for groundwater storage must be clean before use, such that cross-contamination does not occur.

C.) Decon Waters/Decon Fluids - Decon waters and/or fluids will be segregated, contained, and disposed of accordingly.

- Decon waters may be disposed of with the containerized groundwater once analytical results have been acquired.

D.) PPE/DE – A number of disposal options exist for spent PPE/DE generated from investigation tasks. The options typically employed are:

- Immediately disposed of within on-Site dumpster/municipal trash; or
- If known to be contaminated with RCRA hazardous waste, dispose off-Site at an RCRA Subtitle C facility.
- Spent Solvent/Acid Rinses - The need for sampling must be determined in consultation with the waste management organization handling the materials. If known that only the solvent and/or acids are present, then direct disposal/treatment using media-specific options may be possible without sampling (i.e., incineration).
- PPE/DE – Typically not sampled and included with the disposal of the solid wastes.

Equipment/Materials:

- Sample spoons, trier, and auger;
- Sample mixing bowl;
- Sampling bailer, or pump; and
- Sample glassware.

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APPENDIX A
Field Forms

EQUIPMENT CALIBRATION LOG

Project: _____

Location: _____

Model Name: _____

Model Number: _____ **Serial Number:** _____

Cal. Standards: _____

_____

_____

Instruments will be calibrated in accordance with manufacturer's recommendations at least once per day.

Date	Time	Calibration Satandard Solution	Calibration Result	Calibrated by

Other Comments: _____

_____

_____

_____

_____

_____

_____

_____

Groundwater Field Sampling Form

Location:

Job Number: _____
Well ID: _____
Field Sampling Crew: _____

Date: _____
Start Time: _____
Finished Time: _____

Initial Depth to Water: _____
Well Depth: _____
Depth to top of screen: _____
Depth to bottom of screen: _____
Depth of Pump Intake: _____

Purging Device: _____
Tubing present in well? _____
Tubing type: _____

Time Elapsed (24 hour)	Depth to Water (from casing)	Pump Setting (ml/min or gal/min)	Purge Rate (ml/min or gal/min)	Cumulative Purge Volume (liters or gallons)	Temperature (degrees Celsius)	pH	Conductivity us/cm	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP/eH (mv)	Comments

Comments:

HALEY ALDRICH

SAMPLE IDENTIFICATION KEY

PROJECT _____ **H&A FILE NO.** _____

LOCATION _____ **PROJECT MGR.** _____

CLIENT _____

CONTRACTOR _____

Sample ID	Parent Sample ID	Location ID	Sample Date	Sample Time (military)	Sample Type Code	Filtered (Water Only T/D/N)	Composite Y/N	Soil Type	Depth To Top Of Sample	Depth To Bottom Of Sample	C.O.C. Number	Notes	Collected By

Notes:

Common Sample Type Codes:

N Normal Environmental Samp	WG Groundwater	WS Surface Water	SO Soil	GS Soil Gas	SE Sediment
WQ Water for Quality Control	FD Field Duplicate	EB Equipment Blank	TB Trip Blank	MS Matris Spike	MSD Matrix Spike Duplicate

see Memorandum dated 08/08/05 from Melanie Satanek "Sample Labeling for Submission to Analytical Laboratory" for less common codes

DAILY FIELD REPORT

Page of

Project		Report No.	
Location		Date	
Client		Page	of
Contractor		File No.	
Weather		Temperature	

Field Representative(s)	Time on site	Report/Travel/Other	Total hours

Distribution:

Haley & Aldrich, Inc.

GEOPROBE BORING REPORT

BORING NO.

Page 1 of

PROJECT
LOCATION
CLIENT
CONTRACTOR
DRILLER

PROJECT MGR.
FIELD REP.
DATE STARTED
DATE FINISHED

Elevation ft. Datum

Boring Location

Item	Casing	Sampler	Core Barrel
Type			
Inside Diameter (in.)			
Hammer Weight (lb.)			
Hammer Fall (in.)			

Rig Make & Model

☐ Truck ☐ Tripod ☐ Cat-Head
☐ ATV ☐ Geoprobe ☐ Winch
☐ Track ☐ Air Track ☐ Roller Bit
☐ Skid ☐ _____ ☐ Cutting Head

Hammer Type: ☐ Safety ☐ Doughnut ☐ Automatic

Drilling Mud: ☐ Bentonite ☐ Polymer ☐ None

Casing Advance: Type Method Depth

Drilling Notes:

Depth (ft.)	Casing Blows	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft)	Elev./ Depth (ft)	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth in feet to: Bottom of Casing	Bottom of Hole	Water
Date					

Sample ID

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon Sample
G Geoprobe

Summary

Overburden (Linear ft.) _____
Rock Cored (Linear ft.) _____
Number of Samples _____

BORING NO.

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil descriptions based on a modified Burmister method of visual-manual identification

Form #3000

Synoptic Water Level Measurement Log

PROJECT	
LOCATION	
CLIENT	
H&A FILE NO.	
PROJECT MANAGER	
FIELD REP.	
GAUGING DATE	
WEATHER	

MONITORING WELL ID	TIME	DEPTH TO WATER (FT BELOW TOC)	TOP OF CASING (FT)	GROUNDWATER ELEVATION (FT)

Comments:

1. Monitoring wells "X" through "X" were surveyed by "Insert Name of Surveyor" on "Day Month Year"
2. Wells were gauged on "Day Month Year"
3. Elevation refers to the North American Vertical Datum of 1988 (NAVD88).
4. All dimensions are in US survey feet.

WELL DEVELOPMENT LOG

HALEY ALDRICH

Well No.

Comments

PROJECT		DEVELOPMENT DATE	
LOCATION		DEVELOPMENT START	
CLIENT		DEVELOPMENT END	
H&A FILE NO.		WELL DEPTH (FT)	
PROJECT MANAGER		STATIC WATER LEVEL (FT)	
FIELD REP.		WATER COLUMN HEIGHT (FT)	
DATE INSTALLED		WELL VOLUME (GAL)	
DRILLER		TOTAL VOLUME PURGED (GAL)	

Time	Time Elapsed (min)	Volume (gal)	Color	Comments

APPENDIX B
Quality Assurance Project Plan

HALEY ALDRICH

www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
2925 WESTCHESTER AVENUE SITE
2925 WESTCHESTER AVENUE
BRONX, NEW YORK

by
H & A of New York Engineering and Geology, LLP
New York, New York

for
2925 Westchester LLC
Bronx, New York

File No. 0210433
May 2026

Executive Summary

This Quality Assurance Project Plan outlines the scope of the quality assurance and quality control activities associated with the site monitoring activities associated with the Supplemental Remedial Investigation (SRI) for the Site located at 2925 Westchester Avenue, Bronx, New York.

Protocols for sample collection, sample handling and storage, chain-of-custody procedures, and laboratory and field analyses are described herein or specifically referenced to related project documents.

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List of Attachments

1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared by H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) as a component of the Supplemental Remedial Investigation Work Plan (SRIWP) for the Site located at 2925 Westchester Avenue, Bronx, New York (Site).

1.1 PROJECT OBJECTIVES

The primary objective for data collection activities is to collect sufficient data necessary to characterize the subsurface conditions at the Site and determine the nature and extent of contamination.

1.2 SITE DESCRIPTION AND HISTORY

The general Site description and Site history are provided in the Site Description and History Summary that accompanies the SRIWP appended to the Brownfield Cleanup Program (BCP) Major Amendment application for the Site and incorporated herein by reference.

1.3 LABORATORY PARAMETERS

The laboratory parameters for soil include:

- Target Compound List (TCL) volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (EPA) Method 8260D;
- TCL semi-volatile organic compounds (SVOCs) using EPA Method 8270E;
- Target Analyte List (TAL) metals using EPA Method 6010D;
- TCL pesticides using EPA Method 8081B;
- Polychlorinated biphenyls (PCBs) using EPA Method 8082A;
- Per- and polyfluoroalkyl substances (PFAS) using EPA Method 1633; and
- 1,4-dioxane using EPA Method 8270-SIM.

The laboratory parameters for groundwater include:

- TCL VOCs using EPA Method 8260C;
- TCL SVOCs using EPA Method 8270D;
- Total and dissolved TAL metals using EPA Method 6020;
- Total PCBs using EPA Method 8082A;
- TCL Pesticides using EPA Method 8081B;
- PFAS using EPA Method 1633; and
- 1,4-dioxane using EPA method 8270-SIM.

Note: PFAS will be collected in accordance with the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), "Sampling, Analysis, and

Assessment of Per- and Polyfluoroalkyl Substances *(PFAS) Under NYSDEC's Part 375 Remedial Programs," April 2023.*

During the collection of groundwater samples, pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation/reduction potential (ORP) will be measured until stabilized.

The analytical laboratory parameters for soil vapor samples include:

- VOCs using EPA Method TO-15

Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

1.4 SAMPLING LOCATIONS

The SRIWP provides the locations of soil borings, soil vapor implants, and groundwater monitoring wells that will be sampled (as applicable).

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the Supplemental Remedial Investigation (SRI) monitoring activities. A New York State Department of Health (NYSDOH)-certified analytical laboratory will perform the analyses of environmental samples collected at the Site.

2.1 PROJECT TEAM

The following project personnel are anticipated for oversight of the SRI implementation. Project team resumes are included in Attachment A.

NYSDEC Case Manager	Yildiz Palumbo
NYSDOH Case Manager	Justin Deming
Remediation Engineer	Scott A. Underhill, P.E.
Project Manager/Qualified Environmental Professional (QEP)	Mari C. Conlon, P.G.
Haley & Aldrich of New York Health & Safety Director	Brian Fitzpatrick, CHMM
Health and Safety Officer (HSO)	Brian Ferguson
Quality Assurance (QA) Officer	Sebastian Sotomayor
Third-Party Validator	Katherine Miller

2.2 MANAGEMENT RESPONSIBILITIES

The Project Manager is responsible for managing the implementation of the SRI and monitoring and coordinating the collection of data. The Project Manager is responsible for technical quality control (QC) and project oversight. The Project Manager's responsibilities include the following:

- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule restraints;
- Review work performed to ensure quality, responsiveness, and timeliness;
- Communicate with the client point of contact concerning the progress of the monitoring activities;
- Assure corrective actions are taken for deficiencies cited during audits of SRI monitoring activities; and
- Assure compliance with the Site Health and Safety Plan (HASP).

2.3 QUALITY ASSURANCE RESPONSIBILITIES

The QA team will consist of a QA Officer and the Data Validation Staff. QA team responsibilities are described as follows:

2.3.1 Quality Assurance Officer

The QA Officer reports directly to the Project Manager and will be responsible for overseeing the review of field and laboratory data. Additional responsibilities include the following:

- Ensure the application and effectiveness of the QAPP by the analytical laboratory and the project staff;
- Provide input to the Project Manager as to corrective actions that may be required as a result of the above-mentioned evaluations; and
- Review data validation and audit reports.

2.3.2 Data Validation Staff

The Data Validation Staff will be independent of the laboratory and familiar with the analytical procedures performed. The validation will include a review of each validation criterion as prescribed by the guidelines presented in Section 9.2 of this document and will be presented in a Data Usability Summary Report (DUSR) for submittal to the QA Officer.

2.4 LABORATORY RESPONSIBILITIES

The Environmental Laboratory Approval Program (ELAP)-approved laboratory to be used will be Alpha Analytical Inc., located in Westborough, Massachusetts. Laboratory services in support of the SRI monitoring include the following personnel.

2.4.1 Laboratory Project Manager

The Laboratory Project Manager will report directly to the QA Officer and Project Manager and will be responsible for ensuring all resources of the laboratory are available on an as-required basis. The Laboratory Project Manager will also be responsible for the approval of the final analytical reports.

2.4.2 Laboratory Operations Manager

The Laboratory Operations Manager will report to the Laboratory Project Manager and will be responsible for coordinating laboratory analysis, supervising in-house chain-of-custody (COC) reports, scheduling sample analyses, overseeing data reviews, and overseeing the preparation of analytical reports.

2.4.3 Laboratory QA Officer

The Laboratory QA Officer will have sole responsibility for the review and validation of the analytical laboratory data. The Laboratory QA Officer will provide Case Narrative descriptions of any data quality issues encountered during the analyses conducted by the laboratory. The QA Officer will also define appropriate QA procedures, overseeing QA/QC documentation.

2.4.4 Laboratory Sample Custodian

The Laboratory Sample Custodian will report to the Laboratory Operations Manager and will be responsible for the following:

- Receive and inspect the incoming sample containers;
- Record the condition of the incoming sample containers;
- Sign appropriate documents;

- Verify COC and its correctness;
- Notify the Project Manager and Operations Manager of sample receipt and inspection;
- Assign a unique identification number and enter each into the sample receiving log;
- Initiate transfer of samples to laboratory analytical sections; and
- Control and monitor access/storage of samples and extracts.

2.4.5 Laboratory Technical Personnel

The Laboratory Technical Personnel will have the primary responsibility for the performance of sample analysis and the execution of the QA procedures developed to determine the data quality. These activities will include the proper preparation and analysis of the project samples in accordance with the laboratory's Quality Assurance Manual and associated Standard Operating Procedures (SOPs).

2.5 FIELD RESPONSIBILITIES

2.5.1 Field Coordinator

The Field Coordinator is responsible for the overall operation of the field team and reports directly to the Project Manager. The Field Coordinator works with the project HSO to conduct operations in compliance with the project HASP. The Field Coordinator will facilitate communication and coordinate efforts between the Project Manager and the field team members.

Other responsibilities include the following:

- Develop and implement field-related work plans, ensuring schedule compliance and adhering to management-developed project requirements;
- Coordinate and manage field staff;
- Perform field system audits;
- Oversee QC for technical data provided by the field staff;
- Prepare and approve text and graphics required for field team efforts;
- Coordinate and oversee technical efforts of subcontractors assisting the field team;
- Identify problems in the field, resolve difficulties in consultation with the Project QA Officer and Project Manager, and implement and document corrective action procedures; and
- Participate in preparation of the final reports.

2.5.2 Field Team Personnel

Field Team Personnel will be responsible for the following:

- Perform field activities as detailed in the SRIWP and in compliance with the Field Sampling Plan (FSP) and QAPP; and
- Immediately report any accidents and/or unsafe conditions to the Site HSO and take reasonable precautions to prevent injury.

3. Sampling Procedures

The FSP provides the SOPs for sampling required by the SRI. Sampling will be conducted in general accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10) and the "Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023) when applicable.

3.1 SAMPLE CONTAINERS

Sample containers for each sampling task will be provided by the laboratory performing the analysis. The containers will be cleaned by the manufacturer to meet or exceed the analyte specifications established in the EPA's "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers," April 1992, OSWER Directive #9240.0-0.5A. Certificates of analysis for each lot of sample containers used will be maintained by the laboratory.

The appropriate sample containers, preservation method, maximum holding times, and handling requirements for each sampling task are provided in Table I.

3.2 SAMPLE LABELING

Each sample will be labeled with a unique sample identifier that will facilitate tracking and cross-referencing of sample information. Field blanks and field duplicate samples will also be numbered with a unique sample identifier to prevent analytical bias of field QC samples.

Refer to the FSP for the sample labeling procedures.

3.3 FIELD QC SAMPLE COLLECTION

3.3.1 Field Duplicate Sample Collection

3.3.1.1 Water Samples

Field duplicate samples will be collected by filling the first sample container to the proper level, sealing, and then repeating for the second set of sample containers.

1. The samples are properly labeled as specified in Section 3.2.
2. The samples are collected in order of decreasing analyte volatility.
3. COC documents are executed.
4. The samples will be handled as specified in Table I.

3.3.1.2 Soil Samples

Soil field duplicates will be collected as specified in the following procedure:

1. Soils will be sampled directly from acetate liners.

2. Soil for VOC analysis will be removed from the sampling device as specified in the FSP. Soil for non-VOC analysis will be removed from the sampling device and collected into clean laboratory-provided containers.

3.4 GENERAL DECONTAMINATION PROCEDURES

Care must be taken to minimize the potential for transfer of contaminated materials to the ground or onto other materials. Regardless of the size or nature of the equipment being decontaminated, the process will utilize a series of steps that involve the removal of gross material (dirt, grease, oil, etc.), washing with a detergent, and multiple rinsing steps. In lieu of a series of washes and rinse steps, steam cleaning with low-volume, high-pressure equipment (i.e., steam cleaner) is acceptable.

Exploration equipment and all monitoring equipment in contact with the sampling media must be decontaminated prior to initiating Site activities, in between exploration locations to minimize cross-contamination, and prior to mobilizing off the Site after completion of Site work.

The following specific decontamination procedure is recommended for sampling equipment and tools:

- Brush loose soil off equipment;
- Wash equipment with laboratory-grade detergent (i.e., Alconox or equivalent);
- Rinse with tap water;
- Rinse equipment with distilled water;
- Allow water to evaporate before reusing equipment; and
- Wrap equipment in aluminum foil when not being used.

4. Custody Procedures

Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final project files. Custody of a sample begins when it is collected by or transferred to an individual and ends when that individual relinquishes or disposes of the sample.

A sample is under custody if:

1. The item is in actual possession of a person;
2. The item is in the view of the person after being in actual possession of the person;
3. The item was in actual possession and subsequently stored to prevent tampering; or,
4. The item is in a designated and identified secure area.

4.1 FIELD CUSTODY PROCEDURES

Field personnel will keep written records of field activities on applicable pre-printed field forms or in a bound field notebook to record data collecting activities. These records will be written legibly in ink and will contain pertinent field data and observations. Entry errors or changes will be crossed out with a single line, dated, and initialed by the person making the correction. Field forms and notebooks will be periodically reviewed by the Field Coordinator.

The beginning of each entry in the logbook or preprinted field form will contain the following information:

- Date;
- Start time;
- Weather;
- Names of field personnel (including subcontractors);
- Level of personal protection used at the Site; and
- Names of all visitors and the purpose of their visit.

For each measurement and sample collected, the following information will be recorded:

- Detailed description of sample location;
- Equipment used to collect the sample or make the measurement and the date equipment was calibrated;
- Time sample was collected;
- Description of the sample conditions;
- Depth sample was collected (if applicable);
- Volume and number of containers filled with the sample; and
- Sampler's identification.

4.1.1 Field Procedures

The following procedure describes the process to maintain the integrity of the samples.

- Upon collection, samples are placed in the proper containers. In general, samples collected for organic analysis will be placed in pre-cleaned glass containers, and samples collected for inorganic analysis will be placed in pre-cleaned plastic (polyethylene) bottles. Refer to the FSP for sample packaging procedures.
- Samples will be assigned a unique sample number and will be affixed to a sample label. Refer to the FSP for sample labeling procedures.
- Samples will be properly and appropriately preserved by field personnel in order to minimize loss of the constituent(s) of interest due to physical, chemical, or biological mechanisms.
- Appropriate volumes will be collected to ensure that the appropriate reporting limits can be successfully achieved and that the required QC sample analyses can be performed.

4.1.2 Transfer of Custody and Shipment Procedures

- A COC record will be completed at the time of sample collection and will accompany each shipment of project samples to the laboratory. The field personnel collecting the samples will be responsible for the custody of the samples until the samples are relinquished to the laboratory. Sample transfer will require the individuals relinquishing and receiving the samples to sign, date, and note the time of sample transfer on the COC record.
- Samples will be shipped or delivered in a timely fashion to the laboratory so that holding times and/or analysis times as prescribed by the methodology can be met.
- Samples will be transported in containers (coolers) that will maintain the refrigeration temperature for those parameters for which refrigeration is required in the prescribed preservation protocols.
- Samples will be placed in an upright position and limited to one layer of samples per cooler. Additional bubble wrap or packaging material will be added to fill the cooler. Shipping containers will be secured with strapping tape and custody tape for shipment to the laboratory.
- When samples are split with the NYSDEC representatives, a separate COC will be prepared and marked to indicate with whom the samples are shared. The person relinquishing the samples will require the representative's signature acknowledging sample receipt.
- If samples are sent by a commercial carrier, a bill of lading will be used. A copy of the bill of lading will be retained as part of the permanent record. Commercial carriers will not sign the custody record as long as the custody record is sealed inside the sample cooler and the custody tape remains intact.
- Samples will be picked up by a laboratory courier or transported to the laboratory the same day they are collected, unless collected on a weekend or holiday. In these cases, the samples will be stored in a secure location until delivery to the laboratory. Additional ice will be added to the cooler as needed to maintain proper preservation temperatures.

4.2 LABORATORY CHAIN-OF-CUSTODY PROCEDURES

A Sample Custodian will be designated by the laboratory and will have the responsibility to receive all incoming samples. Once received, the custodian will document if the sample is received in good condition (e.g., unbroken, cooled) and that the associated paperwork, such as COC forms, has been completed. The custodian will sign the COC forms.

The custodian will also document if sufficient sample volume has been received to complete the analytical program. The Sample Custodian will then place the samples into secure, limited-access storage (refrigerated storage, if required). The Sample Custodian will assign a unique number to each incoming sample for use in the laboratory. The unique number will then be entered into the sample-receiving log, with the verified time and date of receipt also noted.

Consistent with the analyses requested on the COC form, analyses by the laboratory's analysts will begin in accordance with the appropriate methodologies. Samples will be removed from secure storage, with internal COC sign-out procedures followed.

4.3 STORAGE OF SAMPLES

Empty sample bottles will be returned to secure and limited-access storage after the available volume has been consumed by the analysis. Upon completion of the entire analytical work effort, samples will be disposed of by the Sample Custodian. The length of time that samples are held will be at least 30 days after reports have been submitted. Disposal of remaining samples will be completed in compliance with all federal, state, and local requirements.

4.4 FINAL PROJECT FILES CUSTODY PROCEDURES

The final project files will be the central repository for all documents with information relevant to sampling and analysis activities as described in this QAPP. The Haley & Aldrich of New York Project Manager will be the custodian of the project file. The project files, including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports, and data reviews, will be maintained in a secured, limited-access area and under the custody of the Project Director or their designee.

The final project file will include the following:

- Project plans and drawings;
- Field data records;
- Sample identification documents and soil boring/monitoring well logs;
- All COC documentation;
- Correspondence;
- References and literature;
- Laboratory data deliverables;
- Data validation and assessment reports;
- Progress reports and QA reports; and
- A final report.

The laboratory will be responsible for maintaining analytical logbooks, laboratory data, and sample COC documents. Raw laboratory data files and copies of hard copy reports will be inventoried and maintained by the laboratory for a period of six years, at which time the laboratory will contact the Haley & Aldrich of New York Project Manager regarding the disposition of the project-related files.

5. Calibration Procedures and Frequency

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES

Several field instruments will be used for both on-Site screening of samples and for health and safety monitoring, as described in the HASP. On-Site air monitoring for health and safety purposes may be accomplished using a vapor detection device, such as a photoionization detector (PID).

Field instruments will be calibrated at the beginning of each day and checked during field activities to verify performance. Instrument-specific calibration procedures will be performed in accordance with the instrument manufacturer's requirements.

5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES

Reference materials of known purity and quality will be utilized for the analysis of environmental samples. The laboratory will carefully monitor the preparation and use of reference materials, including solutions, standards, and reagents, through well-documented procedures.

All solid chemicals and acids/bases used by the laboratory will be rated as "reagent grade" or better. All gases will be "high" purity or better. All Standard Reference Materials (SRMs) or Performance Evaluation materials will be obtained from approved vendors of the National Institute of Standards and Technology (NIST; formerly National Bureau of Standards), the EPA Environmental Monitoring Support Laboratories, or reliable Cooperative Research and Development Agreement (CRADA)-certified commercial sources.

6. Analytical Procedures

Analytical procedures to be utilized for analysis of environmental samples will be based on referenced EPA analytical protocols and/or project-specific SOPs.

6.1 FIELD ANALYTICAL PROCEDURES

Field analytical procedures include the measurement of pH, temperature, ORP, DO, and specific conductivity during sampling of groundwater, and the qualitative measurement of VOCs during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

Laboratory analyses will be based on the EPA methodology requirements promulgated in:

- "Test Methods for Evaluating Solid Waste," SW-846, EPA, Office of Solid Waste; and
- Promulgated Updates, 1986.

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

The method detection limits studies are performed by the laboratories in accordance with the procedures established in the Code of Federal Regulations, Title 40, Part 136.

Laboratory parameters for soil samples are listed in the SRI. Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

6.2.2 List of Method-Specific Quality Control Criteria

The laboratory SOPs include a section that presents the minimum QC requirements for the project analyses. Section 7 of this QAPP references the frequency of the associated QC samples for each sampling effort and matrix.

7. Internal Quality Control Checks

This section presents the internal QC checks that will be employed for field and laboratory measurements.

7.1 FIELD QUALITY CONTROL

7.1.1 Field Blanks

Internal QC checks will include analysis of field blanks to validate equipment cleanliness. Whenever possible, dedicated equipment will be employed to reduce the possibility of cross-contamination of samples.

7.1.2 Trip Blanks

Trip blank samples will be prepared by the project laboratory using American Society of Testing and Materials(ASTM) Type II or equivalent water placed within pre-cleaned 40-milliliter (mL) VOC vials equipped with Teflon™ septa. Trip blanks will accompany each sample delivery group (SDG) of environmental samples collected for analysis of VOCs.

Trip blank samples will be placed in each cooler that stores and transports project samples that are to be analyzed for VOCs.

7.2 LABORATORY PROCEDURES

Procedures which contribute to the maintenance of overall laboratory QA/QC include appropriate cleaning of sample containers, proper sample identification and logging, applicable sample preservation, storage, and analysis within prescribed holding times, and use of controlled materials.

7.2.1 Field Duplicate Samples

The precision or reproducibility of the data generated will be monitored through the use of field duplicate samples. Field duplicate analysis will be performed at a frequency of one in 20 project samples.

Precision will be measured in terms of the absolute value of the relative percent difference (RPD) as expressed by the following equation:

$$RPD = [|R1-R2|/[(R1+R2)/2]] \; X \; 100 \; percent$$

Acceptance criteria for duplicate analyses performed on solid matrices will be 100 percent, and aqueous matrices will be 35 percent (or the absolute difference rule was satisfied if detects were less than five times the reporting limit [RL]). RPD values outside these limits will require an evaluation of the sampling and/or analysis procedures by the project QA Officer and/or Laboratory QA Director. Corrective actions may include re-analysis of additional sample aliquots and/or qualification of the data for use.

7.2.2 Matrix Spike Samples

Ten percent of each project sample matrix for each analytical method performed will be spiked with known concentrations of the specific target compounds/analytes.

The amount of the compound recovered from the sample compared to the amount added will be expressed as a percent recovery. The percent recovery of an analyte is an indication of the accuracy of an analysis within the Site-specific sample matrix. Percent recovery will be calculated for matrix spike and matrix spike duplicate (MS/MSD) samples using the following equation.

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x\,100\%$$

If the QC value falls outside the control limits (upper control limit [UCL] or lower control limit [LCL]) due to sample matrix effects, the results will be reported with appropriate data qualifiers. To determine the effect a non-compliant MS recovery has on the reported results, the recovery data will be evaluated as part of the validation process.

7.2.3 Laboratory Control Sample Analyses

The laboratory will perform laboratory control sample (LCS) analyses prepared from SRMs. The SRMs will be supplied from an independent manufacturer and traceable to NIST materials with known concentrations of each target analyte to be determined by the analytical methods performed. In cases where an independently supplied SRM is not available, the LCS may be prepared by the laboratory from a reagent lot other than that used for instrument calibration.

The laboratory will evaluate LCS analyses in terms of percent recovery using the most recent laboratory-generated control limits.

LCS recoveries that do not meet acceptance criteria will be deemed invalid. Analysis of project samples will cease until an acceptable LCS analysis has been performed. If sample analysis is performed in association with an out-of-control LCS sample analysis, the data will be deemed invalid.

Corrective actions will be initiated by the Haley & Aldrich of New York QA Officer and/or Laboratory QA Officer to investigate the problem. After the problem has been identified and corrected, the solution will be noted in the instrument run logbook, and re-analysis of project samples will be performed, if possible.

The analytical anomaly will be noted in the SDG Case Narrative and reviewed by the Data Validator. The Data Validator will confirm that appropriate corrective actions were implemented and recommend the applicable use of the affected data.

7.2.4 Surrogate Compound/Internal Standard Recoveries

For VOCs, surrogates will be added to each sample prior to analysis to establish purge and trap efficiency. Quantitation will be accomplished via internal standardization techniques.

The recovery of surrogate compounds and internal standards will be monitored by laboratory personnel to assess possible Site-specific matrix effects on instrument performance.

For SVOC analyses, surrogates will be added to the raw sample to assess extraction efficiency. Internal standards will be added to all sample extracts and instrument calibration standards immediately before analysis for quantitation via internal standardization techniques.

Method-specific QC limits are determined as per laboratory method SOPs. Surrogate compound/internal standard recoveries that do not fall within accepted QC limits for the analytical methodology performed will have the analytical results flagged with data qualifiers as appropriate by the laboratory and will not be noted in the laboratory report Case Narrative.

To ascertain the effect non-compliant surrogate compound/internal standard recoveries may have on the reported results, the recovery data will be evaluated as part of the validation process. The Data Validator will provide recommendations for corrective actions, including but not limited to additional data qualification.

7.2.5 Calibration Verification Standards

Calibration verification (CV) standards will be utilized to confirm instrument calibrations and performance throughout the analytical process. CV standards will be prepared as prescribed by the respective analytical protocols. Continuing calibration will be verified by compliance with method-specific criteria prior to additional analysis of project samples.

Non-compliant analysis of CV standards will require immediate corrective action by the project Laboratory QA Officer and/or designated personnel. Corrective action may include re-analysis of each affected project sample, a detailed description of the problem, the corrective action undertaken, the person who performed the action, and the resolution of the problem.

7.2.6 Laboratory Method Blank Analyses

Method blank sample analysis will be performed as part of each analytical batch for each methodology performed. If target compounds are detected in the method blank samples, the reported results will be flagged by the laboratory in accordance with SOPs. The Data Validator will provide recommendations for corrective actions, including but not limited to additional data qualification.

8. Data Quality Objectives

Sampling that will be performed as described in the SRI is designed to produce data of the quality necessary to achieve the minimum standard requirements of the field and laboratory analytical objectives described below. These data are being obtained with the primary objective of assessing levels of contaminants of concern associated with the Site.

The overall project data quality objective (DQO) is to implement procedures for field data collection, sample collection, handling, and laboratory analysis and reporting that achieve the project objectives. The following section is a general discussion of the criteria that will be used to measure the achievement of the project DQO.

8.1 PRECISION

8.1.1 Definition

Precision is defined as a quantitative measure of the degree to which two or more measurements are in agreement. Precision will be determined by collecting and analyzing field duplicate samples and by creating and analyzing laboratory duplicates from one or more of the field samples. The overall precision of measurement data is a mixture of sampling and analytical factors. The analytical results from the field duplicate samples will provide data on sampling precision. The results from duplicate samples created by the laboratory will provide data on analytical precision. The measurement of precision will be stated in terms of RPD. RPD is defined as the absolute difference of duplicate measurements divided by the mean of these analyses, normalized to a percentage.

8.1.2 Field Precision Sample Objectives

Field precision will be assessed through the collection and measurement of field duplicate samples at a rate of one duplicate per 20 investigative samples. The RPD criteria for the project field duplicate samples will be +/- 100 percent for soil and +/- 35 percent for groundwater for parameters of analysis detected at concentrations greater than five times the laboratory RL.

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of LCS and laboratory control sample duplicates (LCSD) and MS/MSD samples for groundwater and soil samples and the analysis of laboratory duplicate samples for air and soil vapor samples. Air and soil vapor laboratory duplicate sample analyses will be performed by analyzing the same Summa canister twice. The RPD criteria for the air/soil vapor laboratory duplicate samples will be +/- 35 percent for parameters of analysis detected at concentrations greater than five times the laboratory RL.

8.2 ACCURACY

8.2.1 Definition

Accuracy relates to the bias in a measurement system. Bias is the difference between the observed and the “true” value. Sources of error are the sampling process, field contamination, preservation techniques, sample handling, sample matrix, sample preparation, and analytical procedure limitations.

8.2.2 Field Accuracy Objectives

Sampling bias will be assessed by evaluating the results of field equipment rinse and trip blanks. Equipment rinse and trip blanks will be collected as appropriate based on sampling and analytical methods for each sampling effort.

If non-dedicated sampling equipment is used, equipment rinse blanks will be collected by passing ASTM Type II water over and/or through the respective sampling equipment utilized during each sampling effort. One equipment rinse blank will be collected for each type of non-dedicated sampling equipment used for the sampling effort. Equipment rinse blanks will be analyzed for each target parameter for the respective sampling effort for which environmental media have been collected.

Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.

Trip blank samples will be prepared by the laboratory and provided with each shipping container, which includes containers for the collection of groundwater samples for the analysis of VOC. Trip blank samples will be analyzed for each VOC for which groundwater samples have been collected for analysis.

8.3 LABORATORY ACCURACY OBJECTIVES

Analytical bias will be assessed through the use of LCS and Site-specific MS sample analyses. LCS analyses will be performed with each analytical batch of project samples to determine the accuracy of the analytical system.

One set of MS/MSD analyses will be performed with each batch of 20 project samples collected for analysis to assess the accuracy of the identification and quantification of analytes within the Site-specific sample matrices. Additional sample volume will be collected at sample locations selected for the preparation of MS/MSD samples so that the standard laboratory RLs are achieved.

The accuracy of analyses that include a sample extraction procedure will be evaluated through the use of system monitoring or surrogate compounds. Surrogate compounds will be added to each sample, standard, blank, and QC sample prior to sample preparation and analysis. Surrogate compound percent recoveries will provide information on the effect of the sample matrix on the accuracy of the analyses.

8.4 REPRESENTATIVENESS

8.4.1 Definition

Representativeness expresses the degree to which sample data represent a characteristic of a population, a parameter variation at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the design of the sampling program. The representativeness criterion is satisfied through the proper selection of sampling locations, the quantity of samples, and the use of appropriate procedures to collect and analyze the samples.

8.4.2 Measures to Ensure Representativeness of Field Data

Representativeness will be addressed by prescribing sampling techniques and the rationale used to select sampling locations. Sampling locations may be biased (based on existing data, instrument surveys, observations, etc.) or unbiased (completely random or stratified-random approaches).

8.5 COMPLETENESS

8.5.1 Definition

Completeness is a measure of the amount of valid (usable) data obtained from a measuring system compared to the total amount anticipated to be obtained. The completeness goal for all data uses is that a sufficient amount of valid data be generated so that determinations can be made related to the intended data use with a sufficient degree of confidence. Valid data is determined by independent confirmation of compliance with method-specific and project-specific DQOs. The calculation of data set completeness will be performed using the following equation.

$$\frac{Number\ of\ Valid\ Sample\ Results}{Total\ Number\ of\ Samples\ Planned} X\ 100 = \%\ Complete$$

8.5.2 Field Completeness Objectives

Field completeness is a measure of the amount of valid measurements obtained from measurements taken in this project versus the number planned. The field completeness objective for this project will be greater than 90 percent.

8.5.3 Laboratory Completeness Objectives

The laboratory data completeness objective is a measure of the amount of valid data obtained from laboratory measurements. The evaluation of the data completeness will be performed at the conclusion of each sampling and analysis effort.

The completeness of the data generated will be determined by comparing the amount of valid data, based on independent validation, with the total laboratory data set. The completeness goal will be greater than 90 percent.

8.6 COMPARABILITY

8.6.1 Definition

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another.

8.6.2 Measures to Ensure Comparability of Laboratory Data

Comparability of laboratory data will be measured from the analysis of SRM obtained from either EPA CRADA suppliers or NIST. The reported analytical data will also be presented in standard units of mass of contaminant within a known volume of environmental media. The standard units for various sample matrices are as follows:

- Solid Matrices – micrograms per kilogram for PFAS analyses, milligrams per kilogram of media (Dry Weight).
- Aqueous Matrices – nanograms per liter for PFAS analyses, micrograms per liter of media for organic analyses, and milligrams per liter for inorganic analyses.

8.7 LEVEL OF QUALITY CONTROL EFFORT

If non-dedicated sampling equipment is used, equipment rinse blanks will be prepared by field personnel and submitted for analysis of target parameters. Equipment rinse blank samples will be analyzed to check for potential cross-contamination between sampling locations that may be introduced during the investigation. One equipment rinse blank will be collected per sampling event to the extent that non-dedicated sampling equipment is used.

If necessary, a separate equipment rinse blank sample will be collected for PFAS.

Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.

Trip blanks will be used to assess the potential for contamination during sample storage and shipment. Trip blanks will be provided with the sample containers to be used for the collection of groundwater samples for the analysis of VOCs. Trip blanks will be preserved and handled in the same manner as the project samples. One trip blank will be included along with each shipping container containing project samples to be analyzed for VOC.

Method blank samples will be prepared by the laboratory and analyzed concurrently with all project samples to assess potential contamination introduced during the analytical process.

Field duplicate samples will be collected and analyzed to determine sampling and analytical reproducibility. One field duplicate will be collected for every 20 or fewer investigative samples collected for off-Site laboratory analysis.

MS will provide information to assess the precision and accuracy of the analysis of the target parameters within the environmental media collected. One MS/MSD will be collected for every 20 or fewer investigative samples per sample matrix.

Note: Soil MS/MSD samples require triple sample volume for VOC only. Aqueous MS/MSD samples require triple the normal sample volume for VOC analysis and double the volume for the remaining parameters.

9. Data Reduction, Validation, and Reporting

Data generated by the laboratory operation will be reduced and validated prior to reporting in accordance with the following procedures:

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. The pH, conductivity, temperature, turbidity, DO, ORP, and breathing zone VOC readings collected in the field will be generated from direct-read instruments. The data will be written into field logbooks immediately after measurements are taken. If errors are made, data will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original entry.

9.1.2 Laboratory Data Reduction Procedures

Laboratory data reduction procedures are provided by the appropriate chapter of EPA's "Test Methods for Evaluating Solid Waste," SW-846, Third Edition. Errors will be noted, and corrections made with the original notations crossed out legibly. Analytical results for soil samples will be calculated and reported on a dry-weight basis.

9.1.3 Quality Control Data

QC data (e.g., laboratory duplicates, surrogates, MS, and MSD) will be compared to the method acceptance criteria. Data determined to be acceptable will be entered into the laboratory information management system.

Unacceptable data will be appropriately qualified in the project report. Case Narratives will be prepared, which will include information concerning data that fell outside acceptance limits and any other anomalous conditions encountered during sample analysis.

9.2 DATA VALIDATION

Data validation procedures of the analytical data will be performed by the Haley & Aldrich of New York QA Officer or designee using the following documents as guidance for the review process:

- "U.S. EPA National Functional Guidelines for Organic Data Review," "Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15," "Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances Under NYSDEC's Part 375 Remedial Programs," and the "U.S. EPA National Functional Guidelines for Inorganic Data Review."
- The specific data qualifiers used will be applied to the reported results as presented and defined in the EPA National Functional Guidelines. Validation will be performed by qualified personnel at the direction of the Haley & Aldrich of New York QA Officer. Tier 1 data validation (the equivalent of EPA's Stage 2A validation) will be performed to evaluate data quality.

- The completeness of each data package will be evaluated by the Data Validator. Completeness checks will be administered on all data to determine that the deliverables are consistent with the NYSDEC Analytical Services Protocol (ASP) Category A and Category B data package requirements. The validator will determine whether the required items are present and will request copies of missing deliverables (if necessary) from the laboratory.

9.3 DATA REPORTING

Data reporting procedures will be carried out for field and laboratory operations as indicated below:

- Field Data Reporting: Field data reporting will be conducted principally through the transmission of report sheets containing tabulated results of measurements made in the field and documentation of field calibration activities.
- Laboratory Data Reporting: The laboratory data reporting package will enable data validation based on the protocols described above. The final laboratory data report format will include the QA/QC sample analysis deliverables to enable the development of a DUSR based on NYSDEC DER-10, Appendix 2B.

10. Performance and System Audits

A performance audit is an independent quantitative comparison with data routinely obtained in the field or the laboratory. Performance audits include two separate, independent parts: internal and external audits.

10.1 FIELD PERFORMANCE AND SYSTEM AUDITS

10.1.1 Internal Field Audit Responsibilities

Internal audits of field activities will be initiated at the discretion of the Project Manager and will include the review of sampling and field measurements. The audits will verify that all procedures are being followed. Internal field audits will be conducted periodically during the project. The audits will include examination of the following:

- Field sampling records, screening results, instrument operating records;
- Sample collection;
- Handling and packaging in compliance with procedures;
- Maintenance of QA procedures; and
- COC reports.

10.1.2 External Field Audit Responsibilities

External audits may be conducted by the Project Coordinator at any time during the field operations. These audits may or may not be announced and are at the discretion of the NYSDEC. The external field audits can include (but are not limited to) the following:

- Sampling equipment decontamination procedures;
- Sample bottle preparation procedures;
- Sampling procedures;
- Examination of HASPs;
- Procedures for verification of field duplicates; and
- Field screening practices.

10.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS

10.2.1 Internal Laboratory Audit Responsibilities

The laboratory system audits are typically conducted by the Laboratory QA Officer or designee on an annual basis. The system audit will include an examination of laboratory documentation, including sample receiving logs, sample storage, COC procedures, sample preparation and analysis, and instrument operating records.

At the conclusion of internal system audits, reports will be provided to the laboratory's operating divisions for appropriate comment and remedial/corrective action where necessary. Records of audits and corrective actions will be maintained by the Laboratory QA Officer.

10.2.2 External Laboratory Audit Responsibilities

External audits will be conducted as required by the NYSDOH or designee. External audits may include any of the following:

- Review of laboratory analytical procedures;
- Laboratory on-site visits; and
- Submission of performance evaluation samples for analysis.

Failure of any of the above audit procedures can lead to laboratory decertification. An audit may consist of, but is not limited to, the following:

- Sample receipt procedures;
- Custody, sample security, and log-in procedures;
- Review of instrument calibration logs;
- Review of QA procedures;
- Review of logbooks;
- Review of analytical SOPs; and
- Personnel interviews.

A review of a data package from samples recently analyzed by the laboratory can include (but is not limited to) the following:

- Comparison of resulting data to the SOP or Method;
- Verification of initial and continuing calibrations within control limits;
- Verification of surrogate recoveries and instrument timing results;
- Review of extended quantitation reports for comparisons of library spectra to instrument spectra, where applicable; and
- Assurance that samples are run within holding times.

11. Preventive Maintenance

11.1 FIELD INSTRUMENT PREVENTIVE MAINTENANCE

The field equipment preventive maintenance program is designed to ensure the effective completion of the sampling effort and to minimize equipment downtime. Program implementation is concentrated in three areas:

- Maintenance responsibilities;
- Maintenance schedules; and
- Inventory of critical spare parts and equipment.

The maintenance responsibilities for field equipment will be assigned to the task leaders in charge of specific field operations. Field personnel will be responsible for daily field checks and calibrations and for reporting any problems with the equipment. The maintenance schedule will follow the manufacturer's recommendations. In addition, the field personnel will be responsible for determining that an inventory of spare parts will be maintained with the field equipment. The inventory will primarily contain parts that are subject to frequent failure, have limited useful lifetimes, and/or cannot be obtained in a timely manner.

11.2 LABORATORY INSTRUMENT PREVENTIVE MAINTENANCE

Analytical instruments at the laboratory will undergo routine and/or preventive maintenance. The extent of the preventive maintenance will be a function of the complexity of the equipment.

Generally, annual preventive maintenance service will involve cleaning, adjusting, inspecting, and testing procedures designed to reduce instrument failure and/or extend useful instrument life. Between visits, routine operator maintenance and cleaning will be performed according to manufacturer's specifications by laboratory personnel.

12. Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness

12.1 FIELD MEASUREMENTS

Field-generated information will be reviewed by the Field Coordinator and typically includes evaluation of bound logbooks/forms, data entry, and calculation checks. Field data will be assessed by the Project Coordinator, who will review the field results for compliance with the established QC criteria that are specified in Sections 7.0 and 8.0 of this QAPP. The accuracy of pH and specific conductance will be assessed using daily instrument calibration, calibration checks, and blank data. Accuracy will be measured by determining the percent recovery of calibration check standards. Precision of the pH and specific conductance measurements will be assessed on the basis of the reproducibility of duplicate readings of a field sample and will be measured by determining the RPD. The accuracy and precision of the soil VOC screening will be determined using duplicate readings of calibration checks. Field data completeness will be calculated using the following equation:

$$Completeness = \frac{Valid\ (usable)\ Data\ Obtained}{Total\ Data\ Planned} \ X\ 100$$

12.2 LABORATORY DATA

Laboratory data will be assessed by the Haley & Aldrich of New York QA Officer or designee, who will review the laboratory results for compliance with the established QC criteria that are specified in Sections 7 and 8 of this QAPP.

13. Quality Assurance Reports

Critically important to the successful implementation of the QAPP is a reporting system that provides the means by which the program can be reviewed, problems identified, and programmatic changes made to improve the plan.

QA reports to management can include:

- Audit reports, internal and external audits, with responses;
- Performance evaluation sample results, internal and external sources; and
- Daily QA/QC exception reports/corrective actions.

QA/QC corrective action reports will be prepared by the Haley & Aldrich of New York QA Officer when appropriate and presented to the project and/or laboratory management personnel so that performance criteria can be monitored for all analyses from each analytical department. The updated trend/QA charts prepared by the laboratory QA personnel will be distributed and reviewed by various levels of laboratory management.

References

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3. EPA, 1993. Data Quality Objectives Process for Superfund Interim Final Guidance. U.S. EPA/540/R-93-071, Office of Solid Waste and Emergency Response (OSWER), September.

4. EPA, 1999. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R-5 Interim Final, November 1999.

5. EPA. U.S. EPA National Functional Guidelines for Organic Data Review. U.S. EPA 540/R-2017-002.

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8. NYSDEC, 2010. Division of Environmental Remediation, Technical Guidance for Site Investigation and Remediation, DER-10, May.

9. NYSDEC, 2023. Division of Environmental Remediation, Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program, 2023.

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TABLE

TABLE I
SUMMARY OF ANALYSIS METHOD, PRESERVATION METHOD, HOLDING TIME, SAMPLE SIZE REQUIREMENTS AND SAMPLE CONTAINERS
2925 WESTCHESTER AVENUE
BRONX, NEW YORK

Analysis/Method	Sample Type	Preservation	Holding Time	Volume/Weight	Container
Volatile Organic Compounds/8260C/5035	Soil	1 - 1 Vial MeOH/2 Vial Water, Cool, 4 ± 2 °C	14 days[1]	120 mL	3 - 40ml glass vials
Semi-volatile Organic Compounds/8270D	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Metals/6010C	Soil	Cool, 4 ± 2 °C	180 days	60 mL	1 - 2 oz Glass
Polychlorinated Biphenyls/8082A	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Pesticides (8081B)	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
PFAS 1633	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
1,4-Dioxane 8270	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Volatile Organic Compounds/8260B	Groundwater	HCl, Cool, 4 ± 2 °C	14 days	120 mL	3 - 40 mL glass vials
Semi-volatile Organic Compounds/8270C	Groundwater	Cool, 4 ± 2 °C	7 days	500 mL	2 - 250 mL amber glass
TAL Metals 6010/7471	Groundwater	HNO_3Cool, 4 ± 2 °C	180 days	500 mL	1 - 500 mL plastic bottle
Polychlorinated Biphenyls/8082	Groundwater	Cool, 4 ± 2 °C	365 days	2000 mL	2 - 1000 mL amber glass
Pesticides & Herbicides (8081B and 8151A)	Groundwater	Cool, 4 ± 2 °C	7 days	3000 mL	2 - 500 mL amber glass 2 - 1000 mL amber glass
PFAS 1633	Groundwater	H2O Cool, 4 ± 2 °C	14 days	500 mL	2 - Teflon free 250 mL plastic containers
1,4-Dioxane 8270D	Groundwater	Cool, 4 ± 2 °C	7 days	500 mL	1 - 500 mL plastic bottle
Volatile Organic Compounds/TO-15	Soil Vapor	N/A	30 days	2.7 - 6 L	1 2.7 or 6 L Summa Canister

Notes:
1. Terra Cores and encores must be frozen within 48 hours of collection
2. Refer to text for additional information.

ATTACHMENT A
Project Team Resumes

SEBASTIAN SOTOMAYOR

Project Environmental Engineer

EDUCATION

B.S., Geological Sciences, Rutgers University

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA Hazardous Waste Worker Refresher Training (29 CFR 1910.120)
30-Hour OSHA
NYSDEC 4-Hour Erosion and Sediment Control Training
OSHA HAZWOPER Site Supervisor
8-Hour DOT Hazmat Employee
10-Hour OSHA Construction Safety Training
NY SST Training
RCRA Hazardous Waste Generator Training

Sebastian is an engineer with six years of experience in environmental consulting, including soil, groundwater, and soil vapor investigations, subsurface investigations, in-situ chemical oxidation remediation, preparation of technical reports, and data collection and analysis. He has extensive experience conducting Phase I Environmental Site Assessments (ESAs), Phase II ESAs, Remedial Investigations, Waste Characterizations, and Remedial/Construction Oversight. He has drafted remedial investigation reports, remedial investigation work plans, remedial action work plans, remedial progress reports, along with various other letters and memos.

He focuses his time at Haley & Aldrich leading remedial investigations, monitoring subsurface exploration activities, training junior staff, task managing complex remedial projects, completing technical reports, and assisting in the development of remedial work plans.

RELEVANT PROJECT EXPERIENCE

Environmental

NP Staten Island Industrial, LLC, Former Port Mobil – Staten Island, Staten Island, NY. Sebastian serves as task manager and is responsible for on-site field management of a 240+ acre redevelopment with a significant history as a major oil storage facility (MOSF), and vast contamination of petroleum-related light nonaqueous phase liquid (LNAPL), training junior staff in leading in-field investigations including site-wide gauging & quarterly groundwater sampling events, preparing quarterly reports for the client, and overseeing the execution and oversight of remedial efforts. Under heavy regulatory oversight, Sebastian coordinated and managed the field effort during implementation of interim remedial measures. He managed daily operations and field staff performing inspections to ensure compliance with technical plans and construction specifications. He attended and participated in weekly meetings with the client and construction team to provide technical, regulatory, and risk management status updates and guidance.

Eleven W46 Realty LLC, 616 11th Avenue & 555 45th Street, New York, NY. Sebastian served as the task manager and was responsible for daily coordination with field staff, supporting them during their daily work, and interfaced with project team daily to keep field efforts focused and on track. Along with reviewing daily reports, preparation of sampling matrices, and coordination with subcontractors, he ensured that project milestone schedules were achieved, and provided site training and skill development to junior staff.

159 Third Residence LLC, 151-169 Third Avenue, Brooklyn, NY. Sebastian served as the task manager and was responsible for daily coordination with field staff, supporting them during their daily work, and interfaced with project

team daily to keep field efforts focused and on track. Along with reviewing daily reports, preparation of sampling matrices, and coordination with subcontractors, he ensured that project milestone schedules were achieved, and provided site training and skill development to junior staff.

Bedford Beverly Acquisitions LLC, Bedford Beverly Brownfield Site, BCP Site – C224384. Sebastian was the lead field engineer conducting the waste characterization event, successfully delineating both vertical and horizontal extents of contamination on-site. He was responsible for data collection, analysis, and drafted the waste characterization report. This event included 39 waste characterization grids and involved coordination with office support and in-field adjustments to complete the work.

Ferry Landing, LLC, Tarrytown Former MGP Site, Tarrytown, New York. Sebastian serves as the task manager and was responsible for preparing periodic review reports for the New York State Department of Environmental Conservation to comply with the approved remedial action. These reports summarize remedial actions completed during each reporting period. Remedial actions overseen by him include tri-annual dense nonaqueous phase liquid (DNAPL) extraction events, groundwater sampling events, compilation of data, and coordination with multiple parties.

Madison Realty Capital, New York State Superfund Site, Former NuHart Plastics, Site, New York State Superfund Site (NuHart West) and Brownfield Cleanup Program (BCP) Site (NuHart East), Brooklyn, New York. Sebastian served the lead staff engineer for the execution and oversight of the excavation and remediation of NuHart East. During remediation, Sebastian observed and documented the excavation and proper disposal of on-site soil required for the installation of foundation elements. In addition, he oversaw the proper cleaning and removal of several 10,000-gallon underground storage tanks encountered during the site-wide excavation. He also oversaw the in-situ mixing of zero valent iron at bottom of excavation for remedial purposes. NuHart is a high-profile site that requires coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York Office of Environmental Remediation (NYCOER), local regulatory agencies, community stakeholders, and local elected officials.

Waterfront Management of NY, 89-91/93 Gerry Street, Brooklyn, New York. Sebastian conducted waste characterization events for both sites and successfully delineated the vertical and horizontal extent of lead contamination on site. He was responsible for data collection, analysis, and drafted both waste characterization reports. Sebastian also served as a field engineer during the remedial oversight phase of the project, and was responsible for excavation oversight, collection of endpoint samples, implementation of community air monitoring, and proper disposal of on-site soil required for the installation of foundation elements.

Madison Realty Capital, River North, Staten Island, New York. As the lead field engineer, Sebastian was responsible for the execution of the remedial investigation, at this approximately 2-acre site. He coordinated with drillers for the installation of approximately fifty soil borings, twenty soil vapor points, including soil borings to bedrock. Sebastian was also responsible for data collection and analysis, and competition of the remedial investigation report (RIR). Sebastian also led field staff through the waste characterization event, which included the installation of 115 soil borings to bedrock.

Madison Realty Capital, 644 East 14th Street, New York, New York. Sebastian was the lead field engineer during both the remedial investigation and waste characterization event. He successfully delineated the vertical and lateral extents of lead contamination on site and was responsible for data collection and analysis.

Panoramic Hudson LLC, 541 West 37th Street, Hudson Yards, New York. Sebastian served as a staff engineer for the preparation of off-site investigative reports, which included a limited ESA and a remedial investigation work plan (RIWP). He also led waste characterization activities, which included monitoring drilling activities, recording soil recovered by the drilling rig, and collecting suitable samples of soil to be analyzed.

The Jay Group, Speedway Portfolio, Multiple Boroughs, New York. As a staff engineer, Sebastian was responsible for the preparation of remedial investigations and leading field staff through said investigations. He was also responsible for data collection and analysis, competition of the remedial investigation reports (RIR). Sebastian also led remedial

oversight efforts, observed and documented excavation activities, implemented community air monitoring, and proper disposal of on-site soil required for the installation of foundation elements.

21 Craig Road, Montvale, New Jersey. Sebastian served as the lead field engineer for this project. Responsibilities included preparing the quarterly scopes of work, preparing field team for extensive groundwater sampling event, and leading its execution. This project spanned over two townships (Park Ridge, NJ, and Montvale, NJ) and over 100 monitoring wells. Groundwater sampling and gauging events were completed quarterly. Sebastian kept project timelines on schedule and completed each event within the given timeframe. Sebastian also compiled lab data, created groundwater contours, geologic contours, and isopleths used in reports submitted to the client.

Chemtrade, WR Grace, 235 Snyder Ave Berkley Heights, New Jersey. Sebastian served as the field engineer leading storm and wastewater investigations in an active chemical manufacturing facility. Client buying property needed to map out all stormwater and wastewater lines inside the facility to outfall location. Sebastian mapped water lines from respective sources across a web of pipes, storm drains, manholes, and outlets using dye tests and downhole CCTV camera inspections. Sebastian also sampled storm and wastewater from multiple points, created figures for both the site-wide piping and implementation of a new stormwater retention basin, and presented findings during client meetings.

34 Ackerly Road, Clarks Summit, Pennsylvania. Sebastian served as a field engineer executing In-Situ chemical mixing on a former steel plating factory in Pennsylvania. This involved the mixing of emulsified vegetable oil and molasses as a means to break down cancerous chemical hexavalent chromium. Sebastian also participated in bi-annual groundwater sampling across the 12-acre site and assisted in preparation of remedial action reports for the client.

iPark Edgewater, Brownfield Redevelopment, Edgewater, New Jersey. Sebastian conducted quarterly groundwater sampling on-site, along with data collection, compilation, and completed quarterly reports for the client. Sebastian also led sediment sampling efforts on site to delineate the extents of contamination, collecting sediment samples during low tide in the Hudson River, and again analyzing the lab data to be used in reports submitted to the client.

MARI C. CONLON, PG

Senior Client Account Manager

EDUCATION

M.S., Geology, Boston College

B.S., Geology with a minor in Economics and Business, Lafayette College

PROFESSIONAL REGISTRATIONS

NY: Professional Geologist (License No. 000769)

PROFESSIONAL SOCIETIES

Big Apple Brownfield Awards, Co-Chair, 2018-2022

Big Apple Brownfield Awards Nomination Committee, 2016-2025

New York City Brownfield Partnership Executive Board, 2021-2025

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)

10-Hour OSHA Construction Safety

8-Hour OSHA Supervisor of Hazardous Waste (29 CFR 1910.120 & 29 CFR 1926.65)

Mari is a senior client account manager with experience in soil, groundwater, and soil vapor investigation and a focus on remedial design and implementation. She is also experienced in completion of numerous Phase I Environmental Site Assessments and Phase II Environmental Site Investigations, site characterization, hazardous materials analysis, regulatory closure reports as well as remedial design and implementation.

Mari has experience in composing site closure documentation, including Remedial Closure Reports and Noise Installation Reports reviewed by the Office of Environmental Remediation as well as Final Engineering Reports and Site Management Plans reviewed by the New York State Department of Environmental Conservation. Mari has also worked on city rezoning proposals by performing work associated with and composing the Hazardous Materials Analysis chapter included in Final Environmental Impact Statements published by the New York City Department of Planning. Analysis methods were performed in accordance with the City Environmental Quality Review (CEQR) guidelines for neighborhoods, including East New York, Brooklyn, Jerome Avenue, Brooklyn, Inwood, and Manhattan.

Mari has managed the investigation, remedial design, remediation and closeout of multiple inactive Resource Conservation and Recovery Act (RCRA) hazardous waste sites, New York State Superfund sites and petroleum spill case sites. Her background includes developing and complying with approved site management plans, overseeing the operation and maintenance of on-site engineering controls, such as soil vapor extraction systems, sub-slab depressurization systems, product recovery systems, etc., and ensuring the protection of human health and the environment.

RELEVANT PROJECT EXPERIENCE

State and City Agencies

School Construction Authority, Waste Characterization and Excavation Materials Disposal Plan, Brooklyn, New York. Project manager for consulting services for New York Public School 127. Services included composition of an Excavated Materials Disposal Plan, collection of waste characterization samples, and preparation of a findings and recommendations report.

Department of City Planning, Rezoning Environmental Impact Statement, Bronx, New York. Project lead for analysis and composing the Hazardous Materials Chapter as per City Environmental Quality Review (CEQR) Technical Manual guidelines, included in the Final Environmental Impact Statement (FEIS) for an approximately 92-block area primarily along Jerome Avenue and its east-west commercial corridors in the Bronx. The review assessed the potential for the

presence of hazardous materials in soil and/or groundwater at both the projected and potential development sites identified in the reasonable worst-case development scenario under the proposed East New York Rezoning Proposal. Procedures involved site inspections and review of historic Sanborn fire insurance maps, city directories and city/state regulatory databases. The assessment identified that each of the 146 projected and potential development sites has some associated concerns regarding environmental conditions. As a result, the proposed zoning map actions include (E) designations (E-366) for all privately-held projected and potential development sites.

Department of City Planning, Rezoning Environmental Impact Statement, Brooklyn, New York. Project lead for performance analysis and composing the Hazardous Materials Chapter as per CEQR Technical Manual guidelines included in the FEIS for an approximately 190-block area of East New York, Cypress Hills, and Ocean Hill neighborhoods of Brooklyn, New York. The review assessed the potential for the presence of hazardous materials in soil and/or groundwater at both the projected and potential development sites identified in the reasonable worst-case development scenario under the proposed East New York Rezoning Proposal. Procedures involved site inspections and review of historic Sanborn fire insurance maps, city directories and city/state regulatory databases. The assessment identified that each of the 186 projected and potential development sites has some associated concerns regarding environmental conditions. As a result, the proposed zoning map actions include (E) designations (E-366) for all privately-held projected and potential development sites.

Redevelopment and Remediation

Titan Equity Group, Hotel Redevelopment, Bronx, New York. Project manager for a hotel redevelopment in the south Bronx. The site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials, noise, and air quality. Services included completion of a remedial investigation, composition of a Remedial Investigation Report and development of Hazardous Material Remedial Action Work Plan and Air Quality/Noise Remedial Action Plan as per NYC OER requirements.

The Related Companies, Chelsea Mixed-Use Redevelopment, New York, New York. Field geologist for oversight of the remediation of a mixed-use residential and commercial building, the second of a two-building development on 30th Street. Contaminants of concern included volatile and semi-volatile organic compounds associated with historic operations and underground storage tanks (USTs) located on the Site. The Site was given an E-designation (E-142) for hazardous materials and noise as part of the Highline/West Chelsea rezoning proposal. To satisfy the requirements of the E-designation program, soil was excavated to at least 12 feet below grade and bottom endpoint collected, showing no contaminants of concern exceeding the New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives (SCO). By achieving Unrestricted Use SCOs, no engineering controls were necessary, although the building slab was included as part of development, and removal of the hazardous materials E-designation was requested.

Tishman Speyer, Long Island City Residential Development, Long Island City, New York. Field geologist for remedial oversight and implementation of a Community Air Monitoring Program during concurrent remediation and development of three Brownfield Cleanup Program (BCP) sites located in Long Island City, New York. The Sites were grossly contaminated with creosote, a carcinogenic chemical formed from the distillation of various tars. Remediation strategies included soil excavation and in-situ soil stabilization. To prevent migration of groundwater off-site, a temporary and later a permanent capture well system was installed on the western boundary of the property. The BCP site, located on the western portion of the property, left residual contamination in place, requiring installation of a sub-slab depressurization system.

Queens West Development Corporation, Queens Waterfront Development, Long Island City, New York. Field geologist for performance of site management post-remedial action. Services included annual groundwater monitoring, evaluation of engineering and institutional controls, and completion of Period Review Reports. In addition to conducting annual site management activities, responsibilities included composing a work plan to evaluate the transition from active sub-slab depressurization systems to passive. Upon NYSDEC approval, active systems were shut down for 30 days prior to a sub-slab vapor sampling event, evaluation of soil vapor, and indoor and outdoor air

conditions for potential vapor intrusion risk. As results indicated no evidence of vapor intrusion, continued pressure monitoring was conducted from the existing monitoring ports for one year, assessing whether negative pressure was held by the existing slab by stack-effect or other passive processes.

Jim Beam Brands Co., Brownfield Cleanup Program Remediation Site, Long Island City, New York. Field geologist for oversight of the installation of an Electrical Resistive Heating (ERH) system implemented in order to remediate trichloroethylene groundwater plumes in shallow/intermediate and deep groundwater on- and off-site. The Site, a former stapler manufacturing facility, underwent various remedies, including a Soil Vapor Extraction system, air sparging, ozone injection and chemical oxidation using potassium permanganate injections, which resulted in little reduction to contamination levels and rebounding chlorinated solvents. Components of the ERH system installed included electrodes for delivery of steam, vapor recovery wells, and groundwater monitoring wells. The site is currently under remediation in the state BCP program.

Due Diligence and Site Characterization

Manufacturing Plants, Multiple Investors, Environmental and Compliance Assessment Portfolio, United States. Project lead for completion of Phase I Environmental Site Assessments (ESAs) and Limited Compliance Reviews for multiple auto parts manufacturing facilities throughout the United States. Services included completion of Phase I ESAs in accordance with the American Society for Testing and Materials E1527-13 requirements and a limited review of each facility's compliance liabilities, including issues pertaining to the Resource Conservation and Recovery Act, Greenhouse Gas Emission Standards and Tier II Emergency and Hazardous Chemical Inventory reporting requirements.

ARM Parking, Environmental Site Assessment and Subsurface Investigation, Brooklyn, New York. Project manager for site assessment and subsurface investigation of parking facility in Sunset Park neighborhood, Brooklyn, New York. Services included ground penetrating radar survey for former and current petroleum USTs, completion of a subsurface investigation of soils and composition of the Limited Subsurface Investigation Report.

Spill Consulting

The Trump Organization, Spill Consulting Services, New York, New York. Project manager for consulting services provided after incidental release of calcium carbonate ice rink paint to the Central Park Pond from Wollman Rink. Services included liaising with NYSDEC regarding violations, consent order and required corrective action. Corrective action included designing alterations to the existing on-site drainage plans and routing all meltwater containing paint into the combined sewer system. Coordination was required with property owner, operations personnel, the New York City Department of Parks, and NYSDEC.

Richmond Gardens Apartments, Spill Management and Closure Services, Staten Island, New York. Project lead responsible for spill closure activities and reporting for Spill 1105661 located at the Richmond Gardens Apartment Complex in the Richmond neighborhood of Staten Island, New York. The spill was opened in 2011 when several underground storage tanks were identified adjacent to the apartments at Jersey Street and Hendricks Avenue. The tanks were cleaned and removed and impacted soils surrounding the tank area excavated to the extent possible. Excavation of all impacted material was not feasible due to the proximity of the tanks to the apartment buildings. Residual contamination in soil and groundwater remained and was monitored through 2016. Upon reviewing the groundwater monitoring data from over 12 consecutive quarters, it was apparent that monitored natural attenuation was not a feasible option and an in situ chemical oxidation (ISCO) remedy was approved by NYSDEC. Due to the success of the pilot test, the ISCO injection event was implemented utilizing pressure pulse technology to deliver the alkaline-activated persulfate solution to the subsurface.

BRIAN A. FERGUSON

Senior Health & Safety Manager

EDUCATION

M.S., Geotechnical Engineering, Tufts University, Medford, Massachusetts
B.S., Civil Engineering, State University of New York - Environmental, Science, and Forestry, Syracuse, New York
A.S., Applied Science and Technology (Nuclear Engineering), Thomas A. Edison State College, Trenton, New Jersey

CERTIFICATIONS

BCSP Certified Safety Professional (#CSP-45145)
BCSP Associate Safety Professional (#ASP-31270)

PROFESSIONAL SOCIETIES

Associate Safety Professional – 2019
Order of the Engineer – 2000
Boston Society of Civil Engineers (BSCE)
American Society of Civil Engineers (ASCE)

SPECIAL STUDIES AND COURSES

American Concrete Institute – Certified Field Technician Certified Grade 1
Radiation Safety and Operations of Nuclear Testing Equipment – Troxler
40-Hour OSHA Hazardous Waste Operations Training (+ 8-Hour annual refresher)
10-Hour OSHA Construction training
Confined Space Entry Training
16-Hour Asbestos Operations and Maintenance
24-Hour Asbestos Inspector
Asbestos Inspector License (June 2018 and renewed annually)

ENGINEERING EXPERIENCE

Brian has over 23 years of experience serving as a project engineer on a variety of real estate development projects. His project experience has included monitoring field investigations, performing construction oversight, performing due diligence, engineering analyses, performing geotechnical analyses, developing geotechnical recommendations, and preparing geotechnical reports, and project specifications.

As a project engineer, in addition to providing engineering design support, Brian has managed and participated in many field service activities. Field work has included construction monitoring and documentation of contractors' deep and shallow foundation-related construction, including slurry walls, caissons, pile driving, pile cap installation, earthwork, backfilling and compaction, installation of soldier pile and wood lagging support systems, installation of tie backs and rock anchors, reading inclinometers, conducting in-place field unit weight tests, tie-back load testing, seismograph installation, monitoring, and evaluating, and preparation of footing bearing surfaces. Other responsibilities have included site development activities, including placement of utilities and subgrade preparation for roads; observations and testing to determine that work is completed in compliance with contract documents; on-site soil management; sampling of soil and groundwater for chemical laboratory testing and conducting in situ field screening; maintenance of job records including pile driving logs, results of field density tests, records of caisson and footing installations; preparation of daily field reports; in contact with key personnel; and resolution of field related problems.

RELEVANT PROJECT EXPERIENCE

Fenway Center. Project engineer for the construction of laboratory space constructed over the Massachusetts Turnpike, two residential towers, and the Fenway Area, consisting of 8 to 14 stories and multiple levels below grade. Construction responsibilities included coordination of construction monitoring, observing Support of Excavation (SOE) and footing installation, coordination of installation of Slurry Walls, assisting with project management, reviewing

weekly field construction reports, reviewing, and responding to geotechnical design submittals, and attending project meetings.

Massachusetts Institute of Technology, The Schwarzman College of Computing Project. Project Engineer for a new approximately eight-story above-ground and one-story below-ground building containing approximately 189,000 gross square feet (gsf) of mixed-use space for: offices, research laboratory, academic, event, collaboration, meetings, café, convening, and associated services. Responsibilities included coordination of construction monitoring, observing SOE, micropile, and Caisson Installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals, and attending project meetings. Brian was also the main point of contact for construction-related issues with the project owner and contractors.

Massachusetts Institute of Technology, Graduate Housing Project. Project Engineer for construction of two new five- to eight- story residential buildings with a total gross floor space of approximately 261,000 square feet (sq ft). Responsibilities included coordination of construction monitoring, observing SOE, micropile, and Caisson Installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals, and attending project meetings. Brian was the main point of contact for construction-related issues with the project owner and contractors and conducted Health & Safety Audits of Haley & Aldrich personnel during construction.

Edwards Vacuum Project. Project Engineer for a new single-level 101,000-sq ft building with a mezzanine located in the south portion of the proposed building. Responsibilities included developing subsurface exploration program coordination, writing the Geotech Report, and coordinating field staff to observe construction activities, including mass excavation of approximately 100,000 cubic yards of soil, installation of spread footing, and construction dewatering. Brian assisted with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals, and attending project meetings. Brian was the main point of contact for construction-related issues with the project owner and contractors and conducted Health & Safety Audits of Haley & Aldrich personnel during construction.

St. Elizabeth's Hospital – **West Campus Forensic Evaluations, Washington, D.C.** Project Engineer for forensic evaluations on the adaptive reuse of former hospital buildings. Responsibilities included coordination of a field exploration program, including test borings and test pits to obtain subsurface information for project design and construction, overseeing multiple field personnel and subcontractors, assisting with project management, reviewing subcontractors' invoices, reviewing and summarizing subsurface data, and writing data reports.

BRIAN FITZPATRICK, CHMM

Corporate Director, Health and Safety

EDUCATION

M.P.A., Environmental Policy, Syracuse University
B.S., Environmental Science, University of Massachusetts-Amherst
A.S., Chemistry, Valley Forge Military Junior College
Commissioned Officer, United States Army

CERTIFICATIONS

Certified Hazardous Materials Manager (Reg. No. 13454)
Certified Department of Transportation Shipper
Certified International Air Transport Authority Shipper

PROFESSIONAL SOCIETIES

Alliance of Hazardous Materials Professionals
Academy of Certified Hazardous Materials Managers, New England Chapter

SPECIAL STUDIES AND COURSES

Department of Transportation
International Air Transport Authority
Incident Commander
Confined Space Entry and Rescue
Radiation Safety Officer
RCRA Hazardous Waste
Massachusetts Industrial Waste Water Operator Grade 2I (expired)

AWARDS

Presidents Club Award (one million hours worked without a recordable injury), Cabot Corporation
Chancellors Award for Excellence, Syracuse University

Brian ensures the work we do for our clients is done safely – knowing this reduces costs, improves service quality and site conditions, and ultimately protects our clients' reputations. In addition to building the Haley & Aldrich Health & Safety (H&S) culture, Brian is hands-on with clients to help improve their and their partners' safety cultures.

He has extensive expertise in the Occupational Safety and Health Administration (OSHA) general industry, process safety management, and construction safety programs. He is an active member of the Alliance of Hazardous Materials Professionals and the New England chapter of the Academy of Certified Hazardous Materials Managers.

Brian knows an organization's success is predicated on empowering its people to safely work within the complex, living processes in which they operate. He is a student of human factors in the workplace, of the phenomena of human error and drift into failure, and of the safety applications of Lean techniques.

RELEVANT PROJECT EXPERIENCE

Haley & Aldrich, Inc., Burlington, Massachusetts. As Chief Health and Safety Officer, Brian has led and facilitated the development and implementation of corporate health and safety (H&S) improvement plans to enhance compliance and improve H&S performance. In Brian's time with Haley & Aldrich, Inc., the company has realized dramatic improvement on H&S goals and in Key Performance Indicators. Brian is responsible for developing a risk competence culture, where our staff are empowered to look for and engage to address risk before anyone is injured. Brian oversees the development, implementation and continuous improvement of all H&S programs for the company. Additional responsibilities include:

- Developing a safety culture through incident reporting, root cause analysis, behavior-based safety, hazard recognition and risk assessment, communication, and developing leaders;

- Monitoring proposed and existing SH&E regulations and legislation to determine their impact on operations and to ensure continued compliance;
- Overseeing the safety, industrial hygiene, and toxicology programs for over 600 staff members engaged in remediation, construction, health and safety, consulting, and general office work across 28 offices in the United States and on assignment to international project sites;
- Continuously seeks to improve H&S performance as measured by the OSHA Incident Rating (IR) and Worker's Compensation Experience Modification Rating (EMR), as well as Leading Indicators developed with the management team; and
- Participating in the corporate audit program as an auditor or lead auditor;

Energy Client, California. As Chief Health and Safety Officer, Brian led and facilitated the Alliance Partnership Safety Council in 2017, is still an active contributor to the council, and hosts routine contractor safety forums for the client. Brian is actively involved in the development and implementation of program safety, health, and environmental (SH&E) plans to ensure safe operations on project sites. Brian developed permits and Health and Safety Plans for large projects and routinely audits the site safety. Additional responsibilities include:

- Driving reporting and behavior-based safety initiatives to support our internal safety culture and developing monthly summary reports to illustrate performance to our client.
- Develop, assess, and continuously improve site safety plans and practices, including specific safety protocols for working safely over and around water.
- Worked as an extension of the client's organization to provide assurance that the remedy was completed safely and consistent with client-specific requirements.
- Support on-site safety personnel in ensuring the health and safety of the general public, our staff, and our sub-contracted employees.
- Audits and visits sites to ensure compliance with our internal policies and client-specific requirements.

Energy Client, Ohio. As Chief Health and Safety Officer, Brian supports the project team in developing and executing client and project-specific health and safety measures, such as a site-specific Health and Safety Plan, Job Hazard Analyses, Industrial Hygiene program, and site-specific training. Brian also routinely visits the site to assess current practices and conditions and to ensure continuous improvement. Additional responsibilities include:

- Develop, assess, and continuously improve site safety plans and practices, including specific safety protocols to comply with supplemental EH&S requirements such as the Duke Health and Safety Handbook, Environmental Supplemental, and EHS Keys to Life.
- Develop, assess, and continuously improve site safety plans and practices to address the risks associated with the work being performed on site, as well as the environmental conditions and simultaneous operations, including trenching and excavation, hot work, work over and near water, heavy equipment, HAZWOPER, etc.
- Worked as an extension of the client's organization to provide assurance that the remedy was completed safely and consistent with client-specific requirements.
- Support on-site safety personnel in ensuring the health and safety of the general public, our staff, and our subcontracted employees.
- Audits and visits site to ensure compliance with our internal policies and client-specific requirements.

KATHERINE R. MILLER

Project Manager

EDUCATION

B.S., Chemistry, University of Arizona

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120 and 40 CFR 265.16)
8-Hour OSHA Refresher Training (29 CFR 1910.120)
Level IV Data Validation Training

AWARDS

Pinnacle Award, 2009
Pathfinder Award, 2014

In her 10 years at Haley & Aldrich, Katherine has worked on soil and groundwater environmental investigations and the preparation of environmental reports for private, industrial, and government-based project clients. She is a qualified Data Validator capable of performing various levels of validation on laboratory water quality data according to U.S. Environmental Protection Agency (EPA) National Functional Guidelines and to U.S. Department of Energy radiochemical guidelines. She also has experience designing and maintaining databases for project-specific needs.

Project management responsibilities for a $1.5 million per year stormwater project include preparation of subcontractor bids and contracts; preparation of cost estimates, proposals, and reports; coordination of field testing programs; and interpretation of chemical testing results. She has interacted with local regulatory agencies.

RELEVANT PROJECT EXPERIENCE

Confidential Aerospace Manufacturer, Groundwater Monitoring, Western U.S. Katherine served as project manager for the comprehensive stormwater management program. Responsibilities included project finance management and data management including quality assurance/quality control (QA/QC) and interpretation of chemical testing results. Evaluated QA/QC of groundwater quality data, prepared reports and managed data for the site. Performed data validation of quarterly water quality data from over 300 locations according to EPA National Functional Guidelines and to DOE radiochemical guidelines over a six-year period. Also, responsible for updating and maintaining the integrity of over 200,000 records during that time period. Assisted with management of sampling, analysis, and reporting of constituents of concern, ensured compliance with post-closure permit monitoring and reporting requirements, Data Management Plan, QAPP, and Environmental Data Management System, and ensured and maintained 100% compliance with the QAPP and Data Management Plan. Additionally, prepared groundwater data summaries for proposed extraction wells including comparisons to site NPDES outfall limits in support of Groundwater Interim Measures planning.

Asarco Hayden Plant Site, Hayden, Arizona. Katherine assisted with field preparation, QA/QC of analytical data, and data validation as part of the Remedial Investigation/Feasibility Work Plan including soil, sediment, air, process water, surface water, and stormwater.

Former MGP Site, California. Katherine assisted with report preparation, QA/QC of soil and/or groundwater quality data, and data validation for the investigation of three large former MGP sites in an urban, residential setting; includes over 200 residential properties.

General Manufacturing, Leitchfield, Kentucky. Katherine assisted with report preparation, QA/QC of soil and/or groundwater quality data, and data validation for a soil and groundwater RCRA site. Groundwater monitoring is conducted annually at more than 50 locations for volatile organic compounds (VOCs), including 1,4-dioxane and semi-volatile organic compound (SVOCs).

Skyworks Solutions, Inc., Newbury Park, California. Katherine assisted with report preparation, QA/QC of soil and/or groundwater quality data, and data validation at groundwater remediation site. She monitored for VOCs, including 1,4-dioxane, and inorganic chemicals, including hexavalent chromium.

Teledyne Scientific Company, Thousand Oaks, California. Katherine assisted with report preparation for this groundwater assessment site. Monitored natural attenuation has been instituted as the long-term site remedy.

Port of Redwood City, Permitting and Sediment Characterization, California. Katherine assisted with report preparation, QA/QC of sampling data, and data validation.

Kiewit Infrastructure West, Sediment Quality Study, California. Katherine assisted with report preparation, QA/QC of sampling data, and data validation.

Aeolian Yacht Harbor, Permitting, Eel Grass Conservation and Sediment Characterization, California. Katherine assisted with report preparation, QA/QC of sampling data, and data validation.

Marin County, Paradise Cay Permitting and Sediment Characterization, California. Katherine assisted with report preparation, QA/QC of sampling data, and data validation.

APPENDIX C
NYSDEC Emerging Contaminant Field Sampling Guidance

NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt).Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	"In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L"	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)… criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text… LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the text ….EPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix D	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	"These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report."	"These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER)."	
Appendix H	"The holding time is 14 days…"	"The holding time is 28 days…"	
Appendix H, Initial Calibration	"The initial calibration should contain a minimum of five standards for linear fit…"	"The initial calibration should contain a minimum of six standards for linear fit…"	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R^2 value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

[2] The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

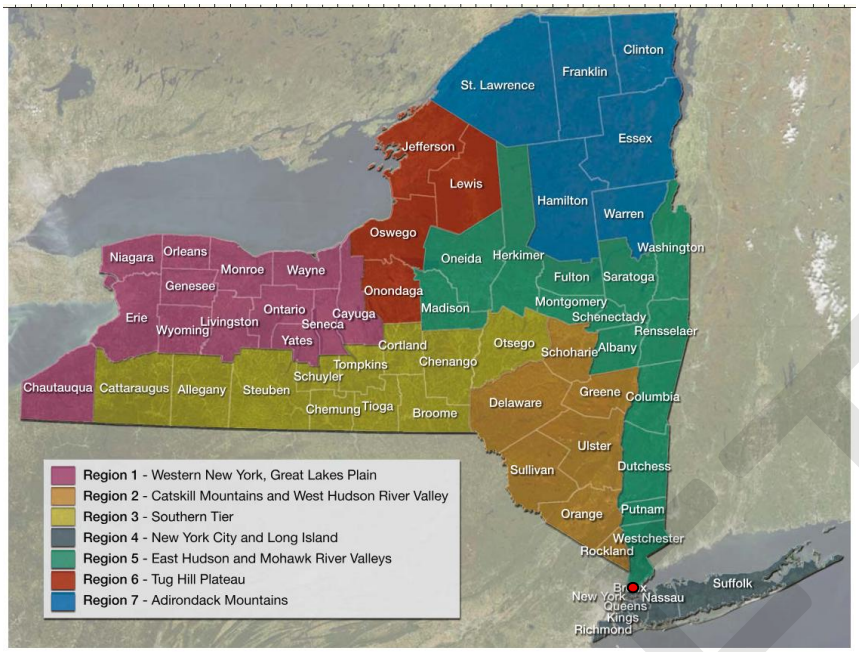
APPENDIX D
Climate Screening Checklist

Climate Screening Checklist

Background Information

- Project Manager: **Yildiz Palumbo**
- Site Name: 2925 Westchester Avenue Site (the "Site")
- Site Number: **Proposed Amendment to C203140**
- Site Location: 2925 Westchester Avenue, Bronx, New York
- Site Elevation (average above sea level): Approximately 45 feet (ft) above sea level (Google Earth)

- ClimAID Region (Responding Climate Change in New York State (ClimAID) - NYSERDA): Region 4 – New York City and Long Island



- Remedial Stage/Site Classification: Pending BCP Acceptance
- Contamination - Media Impacted/ Contaminants of Concern: chlorinated volatile organic compounds (CVOCs); specifically, tetrachloroethene (PCE) and trichloroethene (TCE) in soil; CVOCs, metals, and per- and polyfluoroalkyl substances (PFAS) in groundwater; and VOCs (including CVOCs and petroleum-related VOCs, including benzene, toluene, ethylbenzene, and xylenes [BTEX]) in soil vapor
- Proposed/Current Remedy: The remedy will be proposed upon completion of the pending Supplemental Remedial Investigation (SRI), when the extent of environmental impacts at the Site has been determined, in order to evaluate remedial alternatives, as required.
- What is the predicted timeframe of the remedy? Will components of the remedy still be in place in 10+ years? Remedy is anticipated for completion in approximately two years. If required, engineering controls will remain in place, be maintained, or replaced as needed for the duration of the requirement under future site management.
- Is the site in proximity to any sensitive receptors? (e.g., wetlands, waterbodies, residential properties, hospitals, schools, drinking water supplies, etc.) There are no sensitive receptors within 500 ft of the Site

Is the site in a disadvantaged community (DAC) or potential environmental justice area (PEJA) (Use DECinfolocator: DECinfo Locator (ny.gov))?

☐ **Yes** X **No**

If the site is in a DAC or PEJA, will climate impacts be magnified? If yes, list how and why.

☐ **Yes X No**

Should thresholds of concern be lowered to account for magnification of impacts? If yes, indicate how lower thresholds will be used in the screening.

☐ **Yes X No**

Climate Screening Table*

Potential Climate Hazards	**Relevant to the Site Location** (Y/N/NA)[1]	**Projected Change** (Resilience Analysis and Planning Tool (RAPT)/arcgis.com[3]	**Potential to Impact Remedy** (Y/N)	**Is remedy/site already resilient?** (Y/N)[4]
Precipitation	N	N/A	N/A	N/A
Temperature[2] (Extreme Heat or Cold Weather Impacts)	Y	N/A (Resilience Analysis and Planning Tool-RAPT)	N	N/A
Sea Level Rise	N	N/A (NOAA Relative Sea Level Trends)	N/A	N/A
Flooding	N	N/A (FEMA FloodMapper)	N	N/A
Storm Surge	N	N/A (NWS Storm Surge Hazard Map)	N	N/A
Wildfire	N	N/A (NYSDEC Fire Danger Map)	N/A	N/A
Drought	N	N/A (NYSDEC Drought Condition Map)	N/A	N/A
Storm Severity	Y	N/A (Resilience	N	N/A

Potential Climate Hazards	**Relevant to the Site Location** (Y/N/NA)[1]	**Projected Change** (Resilience Analysis and Planning Tool (RAPT)/arcgis.com[3]	**Potential to Impact Remedy** (Y/N)	**Is remedy/site already resilient?** (Y/N)[4]
		Analysis and Planning Tool-RAPT)		
Landslides	N	N/A	N/A	N/A
Other Hazards:	N/A	N/A	N/A	N/A

* Links to potential data sources can be found on the following page

[1] If the first column is N --> The rest of the columns will be N/A, the hazard is not applicable to the site.

[2] Extreme Heat: periods of three or more days above 90°F- Extreme Cold: Individual days with minimum temperatures at or below 0 degrees F (NYSERDA ClimAID report)

[3] List the projected change in specific terms or units e.g. inches of rainfall, feet of sea level rise, etc.

[4] If final column is Y, provide reasoning, if the final column is N --> Climate Vulnerability Assessment (CVA) required.

Required Next Steps (If no further action is required, provide justification):

Upon development of the future remedy, more robust analysis of elements needed to aid in resiliency planning for the redevelopment will be incorporated into a Climate Vulnerability Assessment.

Potential Data Sources (not an exhaustive list)- from Superfund Climate Resilience: Vulnerability Assessment | US EPA

NYSERDA ClimAID report- Responding Climate Change in New York State (ClimAID) - NYSERDA

FEMA- National Flood Hazard Layer | FEMA.gov

NOAA- National Storm Surge Risk Maps - Version 3 (noaa.gov)

Department of Agriculture Forest Service Wildfire Risk to Communities

EPA Climate Change Indicators in the United States

EPA Climate Resilience Evaluation & Awareness Tool (CREAT) | U.S. Climate Resilience Toolkit

EPA National Stormwater Calculator

National Integrated Drought Information System U.S. Drought Portal

National Interagency Coordination Center National Interagency Fire Center

National Oceanic and Atmospheric Administration Coastal Services Digital Coast

- Resources to help communities assess coastal hazards, such as the Sea Level Rise Viewer for visualizing community-level impacts of flooding or sea level rise and downloadable LIDAR data

National Oceanic and Atmospheric Administration National Centers for Environmental Information website

National Oceanic and Atmospheric Administration Sea Level Trends

National Weather Service Climate Prediction Center

National Weather Service National Hurricane Center

National Weather Service Sea, Lake, and Overland Surges from Hurricanes (SLOSH)

National Weather Service Storm Surge Hazard Maps

U.S. Federal Government Climate Resilience Toolkit: The Climate Explorer

U.S. Army Corps of Engineers Climate Preparedness and Resilience

U.S. Geological Survey Coastal Change Hazards Portal

U.S. Geological Survey Landslide Hazards Program

U.S. Geological Survey National Ground-water Monitoring Network Data Portal

U.S. Geological Survey National Climate Change Viewer

U.S. Geological Survey National Water Dashboard

U.S. Geological Survey StreamStats

NYS Department of State- Assess | Department of State (ny.gov)

NYSERDA NY Costal Floodplain Mapper- Home Page (ny.gov)

NYSDEC Coastal Erosion Hazards- Coastal Areas Regulated By The CEHA Permit Program - NYDEC

NYSDOH Heat Index- health.ny.gov/environmental/weather/vulnerability_index/county_maps.htm

APPENDIX E
Green Sustainable Remediation Documentation

H & A OF NEW YORK ENGINEERING
AND GEOLOGY, LLP
213 W. 35th Street
7th Floor
New York, NY 10001
646.277.5685

May 13, 2026
File No. 0214715

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

Attention: Ms. Yildiz Palumbo

Subject: Green Site Remediation
2925 Westchester Avenue Redevelopment Site
NYSDEC BCP SITE C203140
2925 Westchester Avenue
Bronx, New York

H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) presents the following environmental footprint analysis[1] in accordance with U.S. Environmental Protection Agency (EPA) 542-R-12-002 for the remedy associated with the 2925 Westchester Avenue Redevelopment Site at 2925 Westchester Avenue, Bronx, New York (Site). The estimated footprint of the remedy includes the remediation of the Site in accordance with the Supplemental Remedial Investigations Work Plan.

2925 WESTCHESTER AVENUE REDEVELOPMENT SITE – TOTALS

The estimated totals for all components of the installation and operation of the remedy are:

- 79.08 Metric Million British Thermal Units (MMBtus) of energy used;
- 5.58 tons of total greenhouse gas emissions (CO2e [includes consideration of carbon dioxide, methane, and nitrous oxide emissions]);
- 323.06 pounds (lbs) of nitrogen oxides (NOx) + sulfur oxides (SOx) + particulate matter (PM) emissions; and
- 19.37 lbs of hazardous air pollutant (HAP) emissions.

Energy

- 15.04 MMBtus used for on-Site activities, such as excavation, drilling, and the use of air handlers to create a negative pressure enclosure.
- 0.06 MMBtus used for grid electricity generation.

[1] *Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019.*

- 22.46 MMBtus used for transportation of personnel, remedy materials, and waste disposal.
- 41.51 MMBtus used for off-Site activities.

Greenhouse Gas Emissions (CO2e)

- 1.10 tons of CO2e will be produced from on-Site activities, such as excavation and drilling.
- 0 tons of CO2e will be produced from grid electricity generation.
- 1.64 tons of CO2e will be produced from the transportation of personnel, remedy materials, and waste disposal.
- 2.31 tons will be produced from off-Site activities.

Overall, the estimated environmental footprint of the Supplemental Remedial Investigation (SRI) is dominated by off-Site activities, which include off-Site laboratory analysis. Transportation of personnel, equipment, and materials is the next largest contributor to the environmental footprint of the SRI, with an anticipated generation of 1.64 tons of CO2e and use of 22.46 MMbtus of energy. Off-Site energy use is anticipated to comprise 52.5% of all energy use, and off-Site greenhouse gas emissions comprise 45.65% of all emissions for the investigation.

Sincerely yours,
H & A OF NEW YORK ENGINEERING AND GEOLOGY, LLP

https://haleyaldrich.sharepoint.com/sites/WestbridgeRealtyCo/Shared Documents/0215191.2925 Westchester Avenue/Deliverables/3. SRIWP/Appendices/Appendix E - GSR/1. SEFA_Summary_Letter_DRAFT.docx

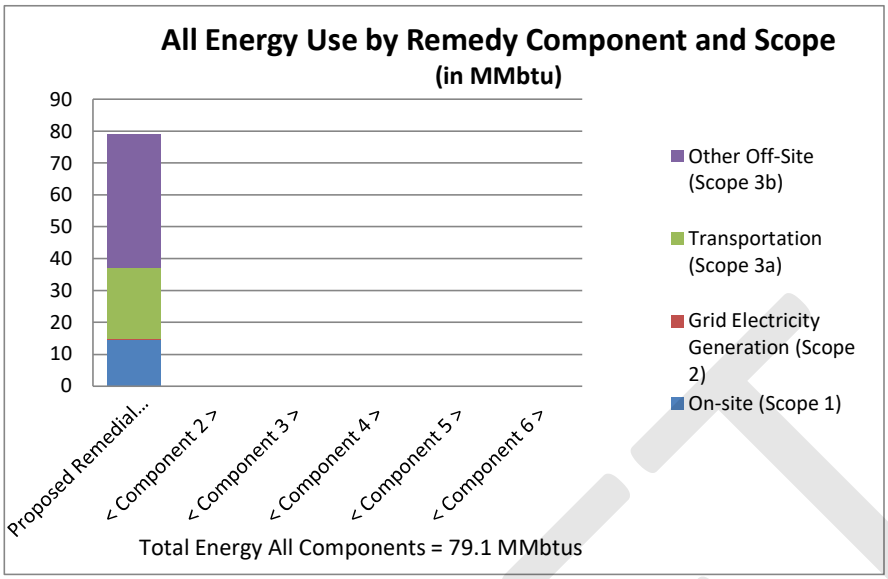
Proposed Remedial Investigation - Energy & Air Compiled Results

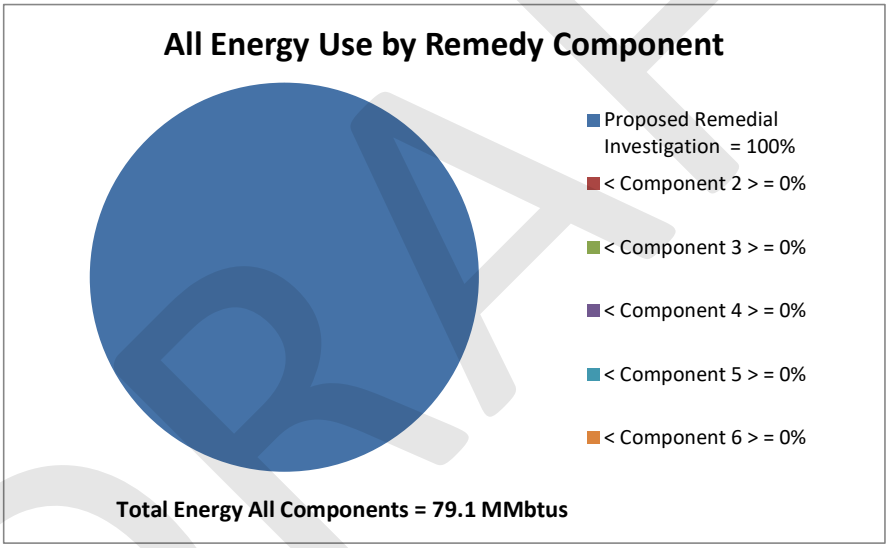
Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	**15**	**2,430**	**18**	**1**	**0**	**19**	**0**
Grid Electricity Generation (Scope 2)	**0.059**	**10**	**0**	**0**	**0**	**0**	**0**
Transportation (Scope 3a)	**22**	**3,624**	**23**	**1**	**1**	**24**	**0**
Other Off-Site (Scope 3b)	**42**	**5,094**	**77**	**175**	**28**	**280**	**19**
Remedy Totals	**79**	**11,158**	**118**	**177**	**28**	**323**	**19**

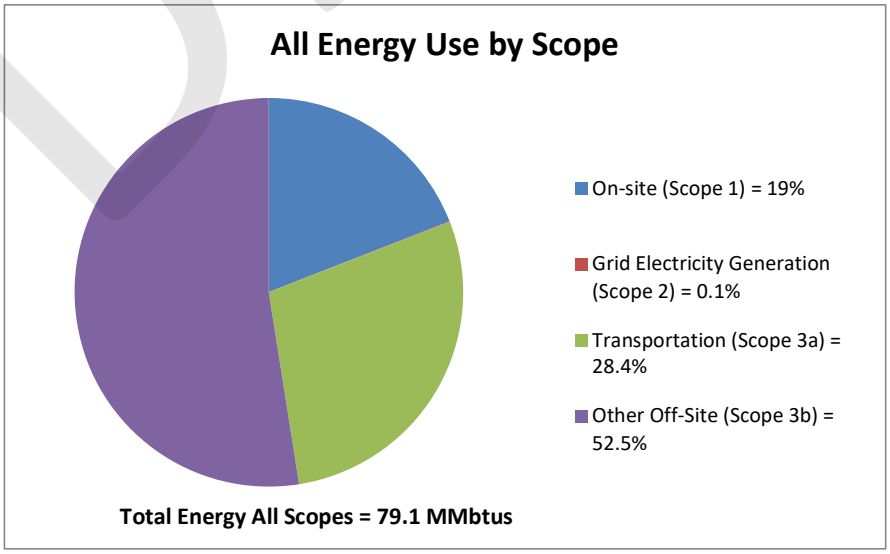
Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity	
On-site renewable energy generation or use	MMBtu	**0**	
On-site biodiesel use	MMBtu	**0**	
Biodiesel and other renewable resource use for transportation	MMBtu	**0**	
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	**0**	*(This value is the sum of the three rows above)*
Voluntary purchase of renewable electricity	MWh	**0**	
Voluntary purchase of RECs	MWh	**0**	

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx


All Energy Use by Remedy Component and Scope
(in MMbtu)
90
80
70
60
50
40
30
20
10
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 79.1 MMbtus


All Energy Use by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
Total Energy All Components = 79.1 MMbtus

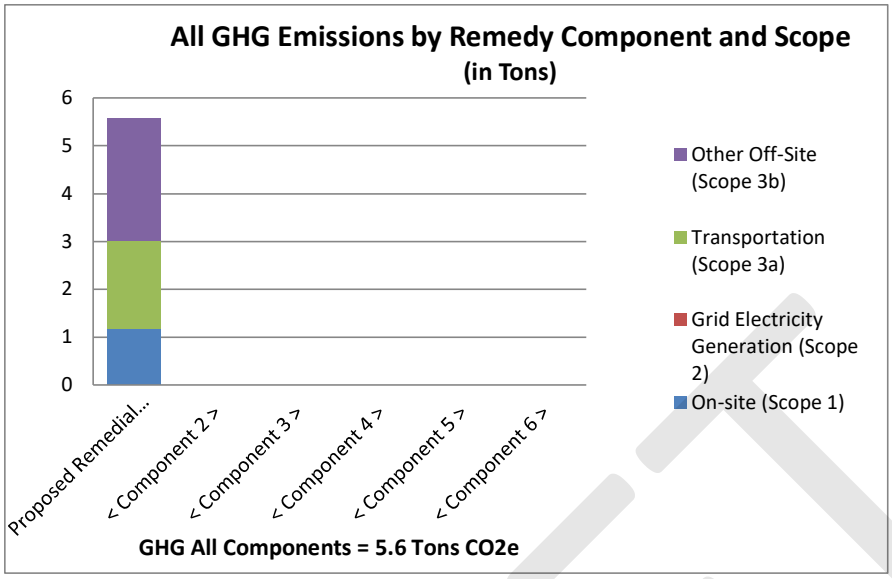

All Energy Use by Scope
On-site (Scope 1) = 19%
Grid Electricity Generation (Scope 2) = 0.1%
Transportation (Scope 3a) = 28.4%
Other Off-Site (Scope 3b) = 52.5%
Total Energy All Scopes = 79.1 MMbtus

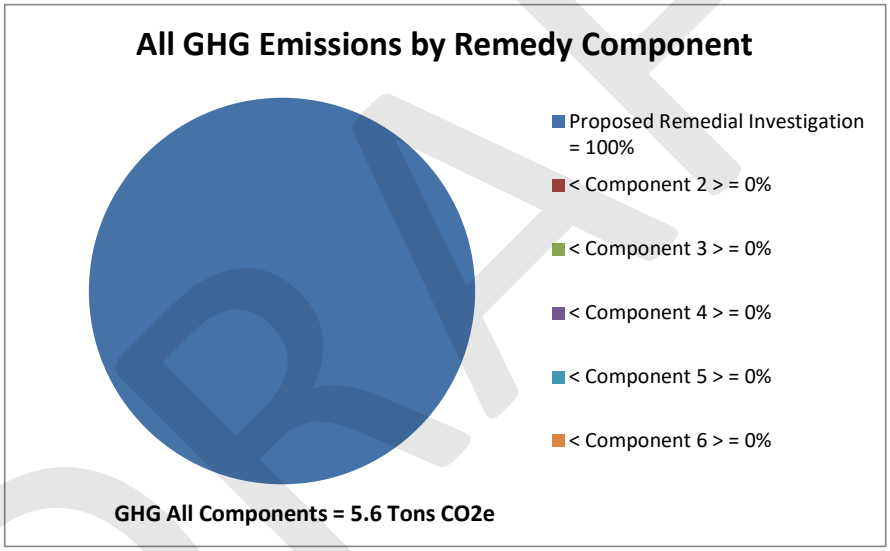
Total Energy MMbtus	Proposed F	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	15.0	0.0	0.0	0.0	0.0	0.0	15.0	
Generation (Scope 2)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	d Electricity
nsportation (Scope 3a)	22.5	0.0	0.0	0.0	0.0	0.0	22.5	Tran
ner Off-Site (Scope 3b)	41.5	0.0	0.0	0.0	0.0	0.0	41.5	Oth
Total	79.1	0.0	0.0	0.0	0.0	0.0	79.1	

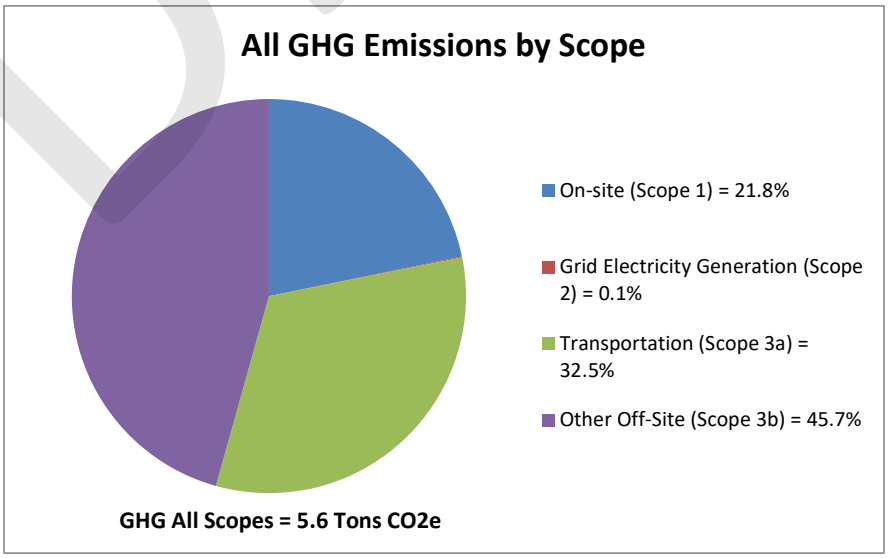
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 19%
Grid Electricity Generation (Scope 2) = 0.1%
Transportation (Scope 3a) = 28.4%
Other Off-Site (Scope 3b) = 52.5%

Total Energy All Components = 79.1 MMbtus
Total Energy All Scopes = 79.1 MMbtus


All GHG Emissions by Remedy Component and Scope
(in Tons)
6
5
4
3
2
1
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 5.6 Tons CO2e


All GHG Emissions by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
GHG All Components = 5.6 Tons CO2e


All GHG Emissions by Scope
On-site (Scope 1) = 21.8%
Grid Electricity Generation (Scope 2) = 0.1%
Transportation (Scope 3a) = 32.5%
Other Off-Site (Scope 3b) = 45.7%
GHG All Scopes = 5.6 Tons CO2e

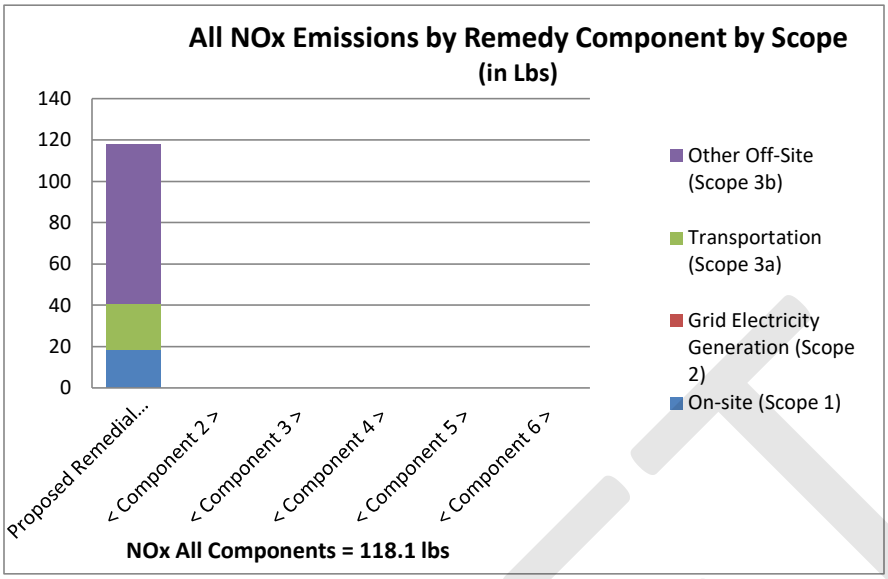
GHG
Tons CO2e

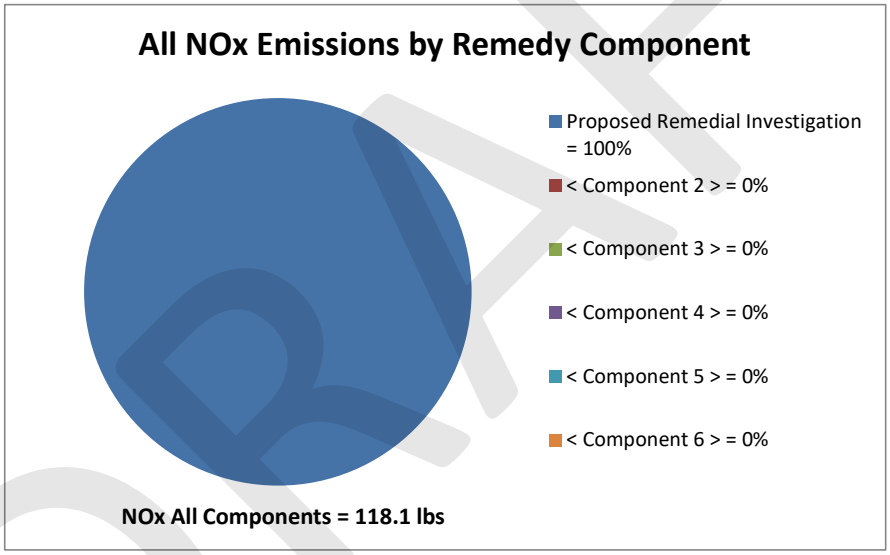
	Proposed F	< Compone	< Compone	< Compone	< Compone	< Compone	Total	
On-site (Scope 1)	1.2	0.0	0.0	0.0	0.0	0.0	1.2	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	1.8	0.0	0.0	0.0	0.0	0.0	1.8	Tran
ıer Off-Site (Scope 3b)	2.5	0.0	0.0	0.0	0.0	0.0	2.5	Oth
Total	5.6	0.0	0.0	0.0	0.0	0.0	5.6	

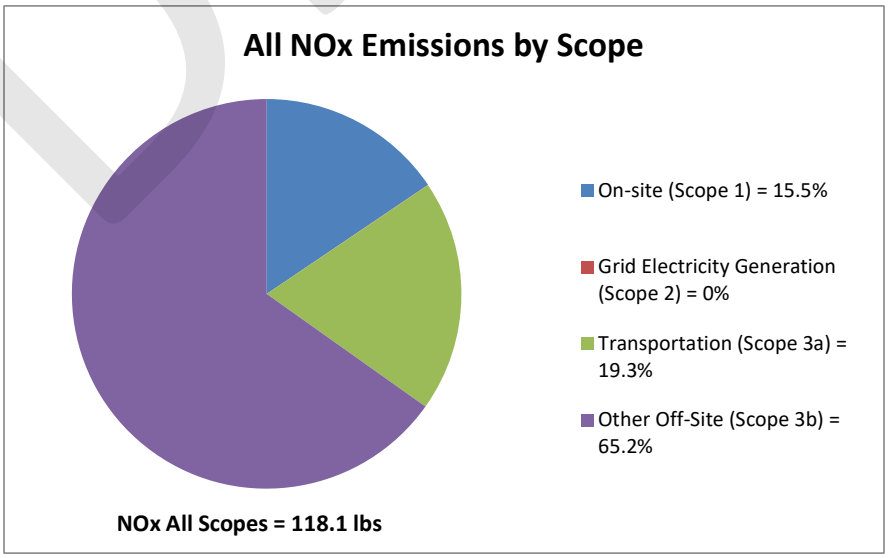
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 21.8%
Grid Electricity Generation (Scope 2) = 0.1%
Transportation (Scope 3a) = 32.5%
Other Off-Site (Scope 3b) = 45.7%

GHG All Components = 5.6 Tons CO2e
GHG All Scopes = 5.6 Tons CO2e


All NOx Emissions by Remedy Component by Scope
(in Lbs)
140
120
100
80
60
40
20
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 118.1 lbs


All NOx Emissions by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
NOx All Components = 118.1 lbs


All NOx Emissions by Scope
On-site (Scope 1) = 15.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 19.3%
Other Off-Site (Scope 3b) = 65.2%
NOx All Scopes = 118.1 lbs

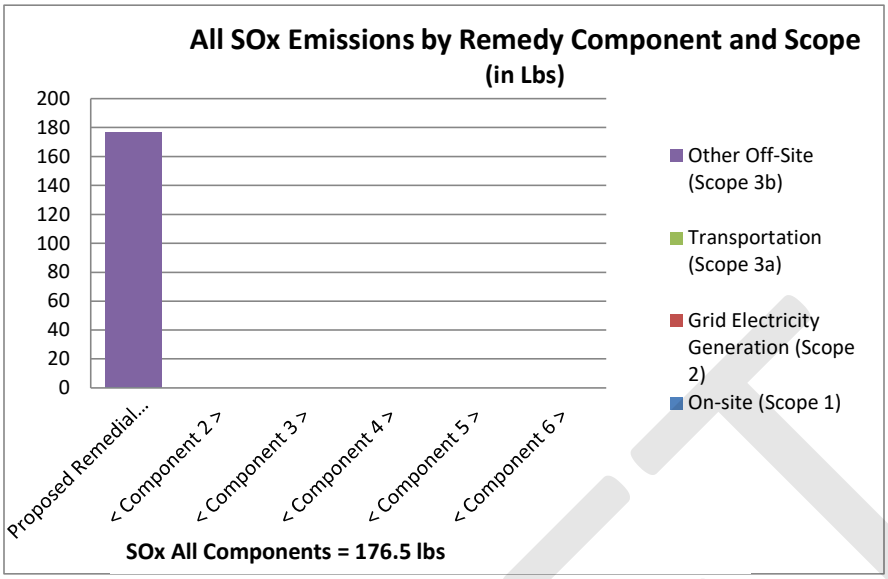
NOx
lbs

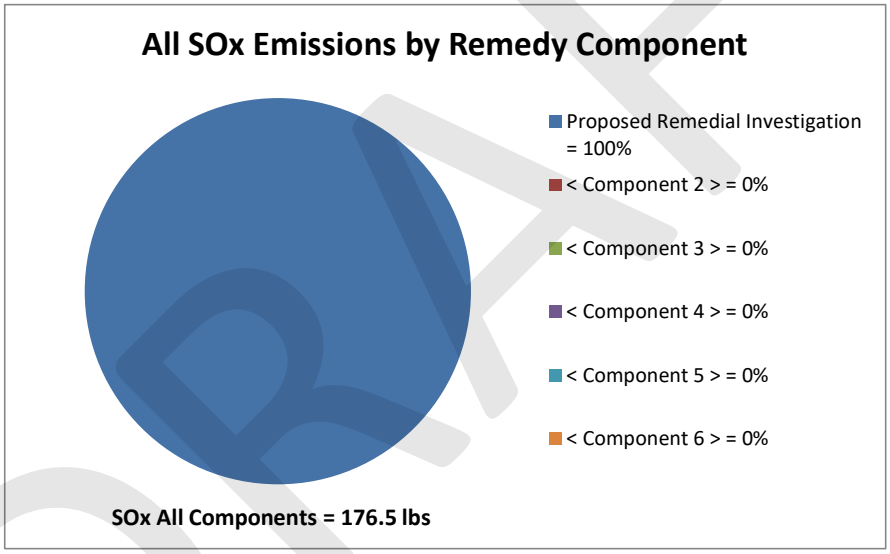
	Proposed F	< Compone	< Compone	< Compone	< Compone	< Compone	Total	
On-site (Scope 1)	18.4	0.0	0.0	0.0	0.0	0.0	18.4	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	22.8	0.0	0.0	0.0	0.0	0.0	22.8	Tran
ıer Off-Site (Scope 3b)	77.0	0.0	0.0	0.0	0.0	0.0	77.0	Oth
Total	118.1	0.0	0.0	0.0	0.0	0.0	118.1	

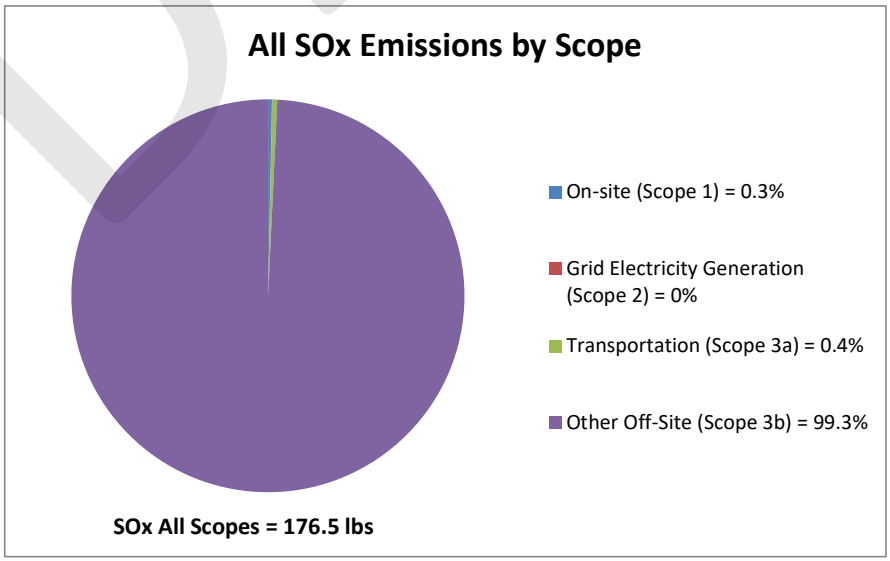
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 15.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 19.3%
Other Off-Site (Scope 3b) = 65.2%

NOx All Components = 118.1 lbs
NOx All Scopes = 118.1 lbs


All SOx Emissions by Remedy Component and Scope
(in Lbs)
200
180
160
140
120
100
80
60
40
20
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 176.5 lbs


All SOx Emissions by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
SOx All Components = 176.5 lbs


All SOx Emissions by Scope
On-site (Scope 1) = 0.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.4%
Other Off-Site (Scope 3b) = 99.3%
SOx All Scopes = 176.5 lbs

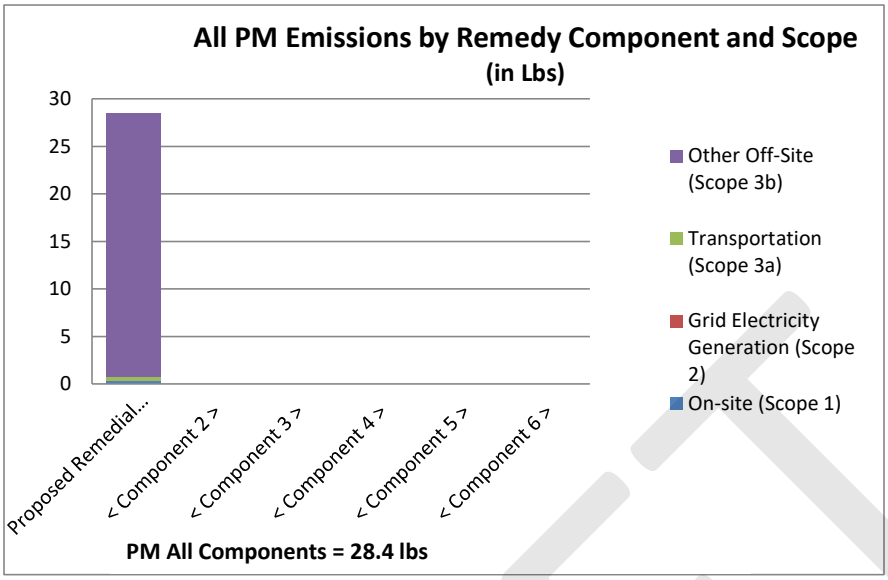
SOx
lbs

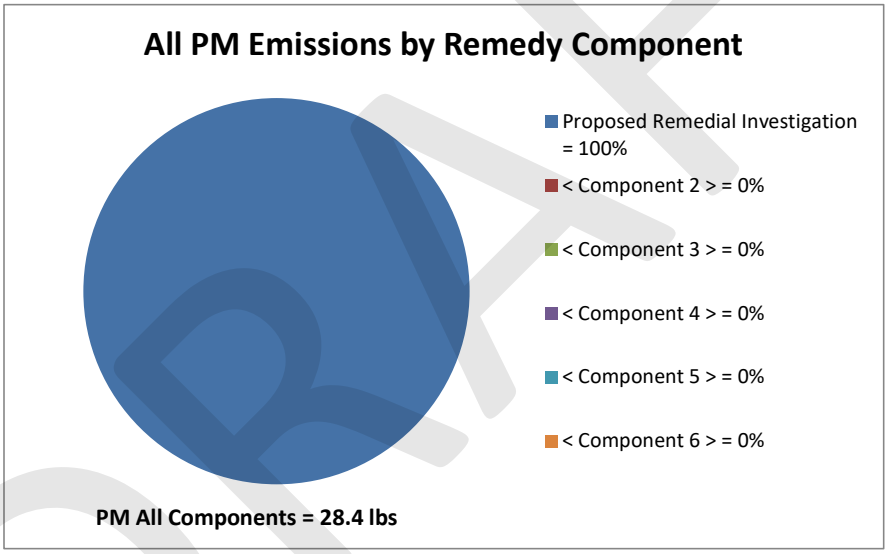
	Proposed F	< Compone	< Compone	< Compone	< Compone	< Compone	Total	
On-site (Scope 1)	0.6	0.0	0.0	0.0	0.0	0.0	0.6	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	0.7	0.0	0.0	0.0	0.0	0.0	0.7	Tran
ıer Off-Site (Scope 3b)	175.2	0.0	0.0	0.0	0.0	0.0	175.2	Oth
Total	176.5	0.0	0.0	0.0	0.0	0.0	176.5	

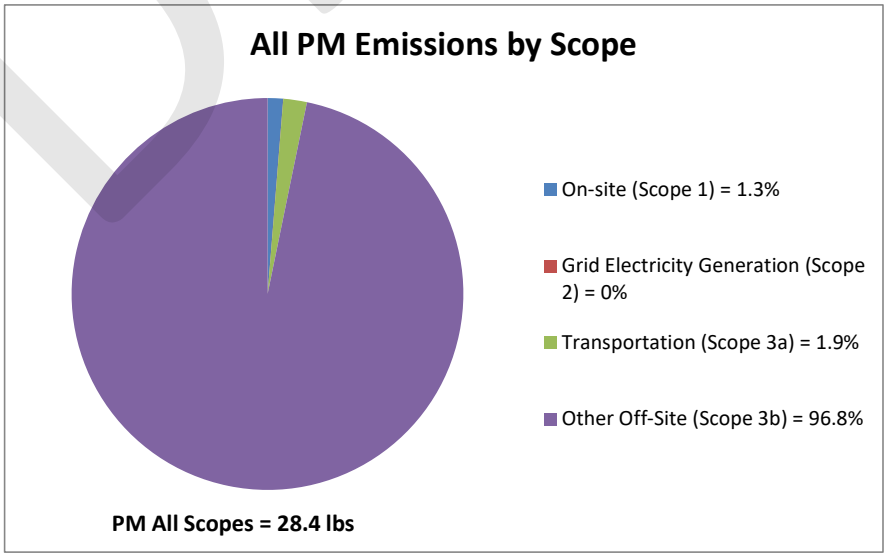
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

SOx All Components = 176.5 lbs
SOx All Scopes = 176.5 lbs

On-site (Scope 1) = 0.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.4%
Other Off-Site (Scope 3b) = 99.3%


All PM Emissions by Remedy Component and Scope
(in Lbs)
30
25
20
15
10
5
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 28.4 lbs


All PM Emissions by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
PM All Components = 28.4 lbs

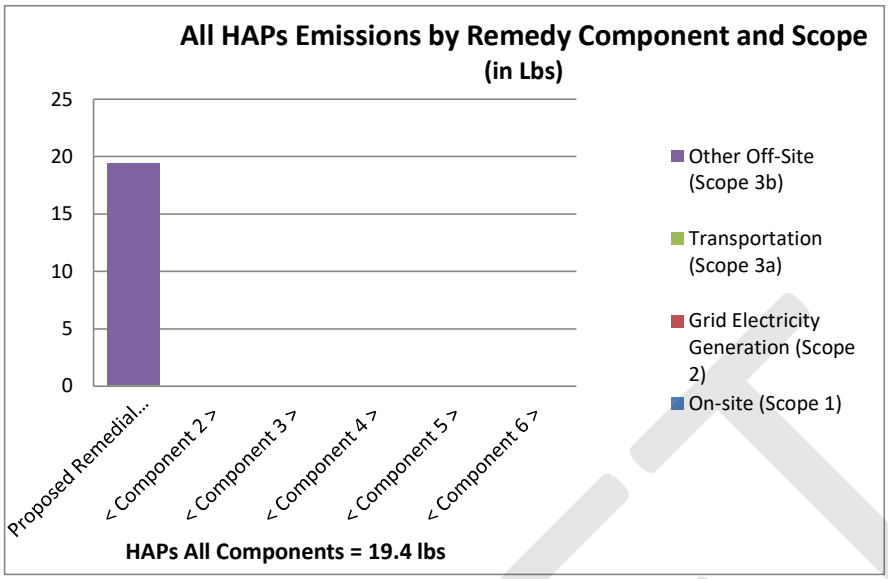

All PM Emissions by Scope
On-site (Scope 1) = 1.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.9%
Other Off-Site (Scope 3b) = 96.8%
PM All Scopes = 28.4 lbs

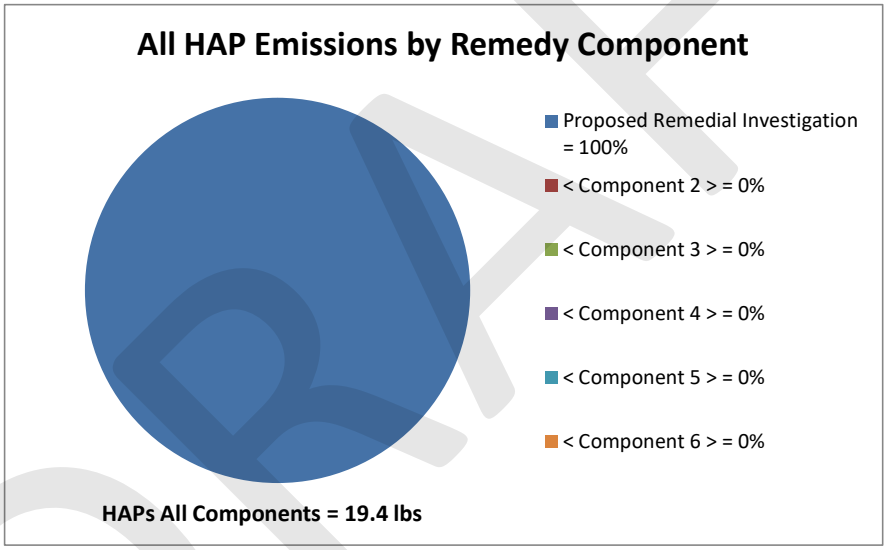
PM lbs	Proposed F	< Compone	< Compone	< Compone	< Compone	< Compone	Total	
On-site (Scope 1)	0.4	0.0	0.0	0.0	0.0	0.0	0.4	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	0.5	0.0	0.0	0.0	0.0	0.0	0.5	Tran
ıer Off-Site (Scope 3b)	27.5	0.0	0.0	0.0	0.0	0.0	27.5	Oth
Total	28.4	0.0	0.0	0.0	0.0	0.0	28.4	

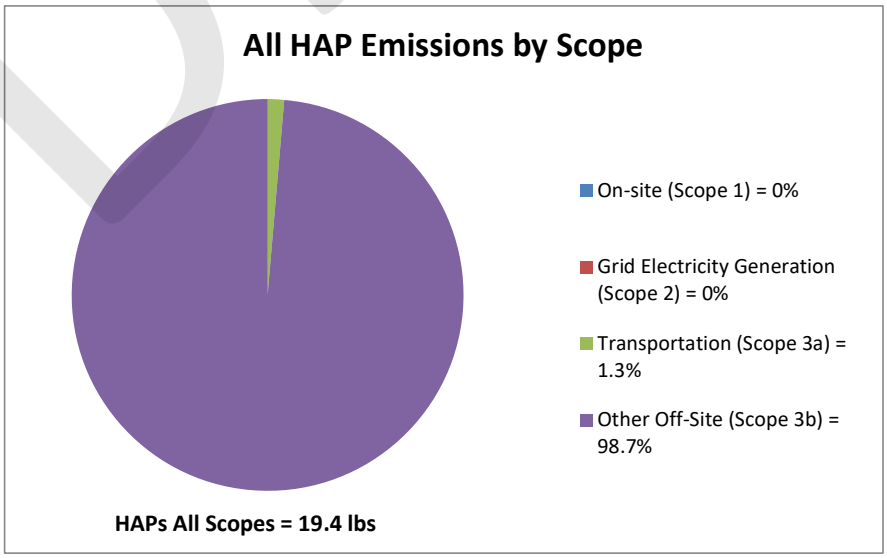
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

PM All Components = 28.4 lbs
PM All Scopes = 28.4 lbs

On-site (Scope 1) = 1.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.9%
Other Off-Site (Scope 3b) = 96.8%


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
25
20
15
10
5
0
Proposed Remedial...
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 19.4 lbs


All HAP Emissions by Remedy Component
Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
HAPs All Components = 19.4 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.3%
Other Off-Site (Scope 3b) = 98.7%
HAPs All Scopes = 19.4 lbs

HAPs
lbs

	Proposed F	< Compone	< Compone	< Compone	< Compone	< Compone	Total
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ısportation (Scope 3a)	0.3	0.0	0.0	0.0	0.0	0.0	0.3
ıer Off-Site (Scope 3b)	19.1	0.0	0.0	0.0	0.0	0.0	19.1
Total	19.4	0.0	0.0	0.0	0.0	0.0	19.4

Proposed Remedial Investigation = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

HAPs All Components = 19.4 lbs
HAPs All Scopes = 19.4 lbs

On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.3%
Other Off-Site (Scope 3b) = 98.7%

Environmental Footprint Summary

Core Element	Metric		Unit of Measure	Footprint						
				Proposed Remedial Investigation	< Component 2 >	< Component 3 >	< Component 4 >	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.8	0.0	0.0	0.0	0.0	0.0	0.8
	M&W-2	% of refined materials from recycled or reused material	%	0.0%						0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%							
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	2.4	0.0	0.0	0.0	0.0	0.0	2.4
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%						0.0%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	79.1	0.0	0.0	0.0	0.0	0.0	79.1
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.009	0.000	0.000	0.000	0.000	0.000	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	19.3	0.0	0.0	0.0	0.0	0.0	19.3
	A-2	On-site HAP emissions	Pounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A-3	Total NOx, SOx, and PM emissions	Pounds	323.1	0.0	0.0	0.0	0.0	0.0	323.1
	A-3A	Total NOx emissions	Pounds	118.1	0.0	0.0	0.0	0.0	0.0	118.1
	A-3B	Total SOx emissions	Pounds	176.5	0.0	0.0	0.0	0.0	0.0	176.5
	A-3C	Total PM emissions	Pounds	28.4	0.0	0.0	0.0	0.0	0.0	28.4
	A-4	Total HAP emissions	Pounds	19.4	0.0	0.0	0.0	0.0	0.0	19.4
	A-5	Total greenhouse gas emissions	Tons CO2e*	5.6	0.0	0.0	0.0	0.0	0.0	5.6
Land & Ecosystems	Qualitative Description									

** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes:

APPENDIX F
Health and Safety Plan

PROJECT-SPECIFIC PLAN

1.0 GENERAL INFORMATION	
Project name: 2925 Westchester Avenue Redevelopment Site	Client: Westbridge Realty Co.
Site name and location: 2925 Westchester Ave, Bronx, New York	Project #: 0214715
Field work start date: 5/1/2026	Anticipated field work end date: 5/15/2026
Reviewed and approved by Project Manager: Sebastian Sotomayor	Date: 4/17/2026
Reviewed and approved by H&S: Brian Ferguson	Date: 5/1/2026

2.0 PROJECT TEAM

	Office Phone #	Cell Phone #
Client/Site Contact: Steven Westreich	-	Click here to enter text.
H&A Project Manager: Sebastian Sotomayor	646.568.9308	646.532.9079
Alternate Project Contact: Mari C. Conlon	646.277.5688	347.271.1521
H&A Regional Safety Manager: Brian Ferguson	617.886.7439	617.908.2761
H&A Site Safety Officer: Sebastian Sotomayor	646.568.9393	646.532.9079
Subcontractor Information: Marc Morgenstern, Coastal Environmental Solutions inc.	631.256.6974	516.587.9570

3.0 EMERGENCY ACTION PLAN

Emergency Contact List

In the event of an emergency, contact 911 immediately. If it is not an emergency, contact Acuity at 888-397-8099 for support.

Contact	Name	Location	Phone
Hospital	Montefiore Medical Center: Einstein Campus	1825 Eastchester Rd, Bronx, NY 10461	718.904.2000
Police	Bronx 49 Precinct Police Department	2121 Eastchester Rd, Bronx, NY 10461	718.918.2000
Fire	FDNY Engine 89, Ladder 50	2924 Bruckner Blvd, Bronx, NY 10465	718.999.2000

Liberty Mutual Claim Policy – WC6-Z11-254100-036

3.0 EMERGENCY ACTION PLAN

Required Site Maps

Complete and add site map(s) as an individual file to safety folder in Teams, indicating the site perimeter and work zones (e.g., exclusion zone, decontamination zone), evacuation routes, and primary and secondary muster points.

4.0 SCOPE OF WORK

Use this space to provide a description of the work being performed. If work is in a high crime area, remote location, or will include night work or extended shifts, you will need to attach applicable JHAs.

☐ **Is this a HAZWOPER project? If yes, you must edit and attach personal monitoring plans and decontamination JHA task pages.**

The scope of the work includes conducting a ground penetrating radar (GPR) survey to identify subsurface features, followed by the collection of soil, groundwater, and soil vapor samples. At this time, we estimate up to 13 soil borings (Up to 36 samples), 5 monitoring wells, and 8 soil vapor samples will be collected as part of this investigation.

SITE OVERVIEW - ***Use this space to provide a description of the site, historical data, current uses, surrounding neighborhood, etc.***

The Site is located in the Pelham Bay neighborhood of the Bronx and is identified as two non-contiguous portions of Block 4164, Lot 5 on the New York City tax map. The site is zoned R7-1/C2-2 for residential and commercial use and is currently improved by a seven-story mixed use building with full cellar. The site is improved with a vacant two-story commercial building formerly utilized by multiple tenants, including a barbershop, a tutoring center, a cellphone retail store, and a home store. A partial cellar exists below the barbershop, tutoring center, and cellphone retail store, sharing a common slab but separated by the walls of each business. The northwestern portion of the home store footprint contains a small sub-cellar consisting of a boiler room. The site is bound by a mix of residential and commercial buildings.

5.0 SITE HAZARDS

Use this table to identify risks in our work. Use the Energy Wheel to deeply consider all risks that may be present and attach applicable site hazard sheets to the JHA package.

TASKS AND HAZARDS THAT MAY BE INCLUDED IN THIS SCOPE OF WORK OR SIMULTANEOUS OPERATIONS:

REQUIRES ADDITIONAL TRAINING, PLANNING, PERMITS, AND/OR MEDICAL SURVEILLANCE

☐ Air monitoring plan ☐ Heat injury and illness prevention plan ☒ Underground utility clearance checklist	☒ Decontamination ☐ Traffic control plan ☐ Respiratory protection ☐ Nuclear density gauge	☐ X-ray fluorescence analyzer ☐ Subpart Z chemicals (e.g., lead, silica, inorganic arsenic, asbestos, hexavalent chromium, benzene, etc.)	☐ Confined space entry permit ☐ Critical lift plan	☐ Hot work permit ☐ Fall protection plan ☐ Work over water

5.0 SITE HAZARDS

Use this table to identify risks in our work. Use the Energy Wheel to deeply consider all risks that may be present and attach applicable site hazard sheets to the JHA package.

SITE HAZARDS – note that this is not a comprehensive list of hazards that may be on your site. For a full list of hazards, see the appendices of the Company HASP. All boxes checked must be present in either task or site JHA attachments.

GRAVITY	MOTION	MECHANICAL	ELECTRICAL	PRESSURE
☐ Work overhead (e.g., lifting, dropped objects, loading, unloading, suspended loads) ☒ Uneven work surfaces, slips, trips, falls ☐ Other	☒ Traffic (vehicle, pedestrian, heavy equipment, plant operations) ☒ Driving (e.g., vehicle, UTV) ☒ Projectiles ☒ Congested area ☐ Other	☒ Rotating equipment ☒ Line of fire ☒ Sharp objects ☐ Other	☒ Extension cords ☒ Overhead utilities ☒ Energized equipment ☒ Inadequate lighting ☒ Batteries ☐ Other	☒ Compressed gases ☒ Line of fire (hydraulics, etc.) ☐ Other
SOUND	**RADIATION**	**BIOLOGICAL**	**CHEMICAL**	**TEMPERATURE**
☒ Loud equipment (e.g., impact noise, noise from tools) ☐ Other	☐ Sun ☐ Welding ☐ Lasers ☐ Naturally occurring radioactive material ☐ Other	☒ Mammals (large and small) ☒ Insects (biting and stinging) ☐ Poisonous plants ☐ Poisonous snakes ☒ Droppings (human and animal) ☐ Needles ☐ Bacteria ☐ Contaminated water ☐ Disease (e.g., BBP, hepatitis, legionnaires) ☐ Other	☒ Chemicals ☒ Hazardous materials ☒ Wastes ☒ Dusts ☐ Flammable and combustible vapors ☐ Toxic compounds ☐ Potential Indoor Fumes (Carbon Monoxide – see hazard sheets)	☐ Cold stress ☒ Extreme weather (tornado, tsunami, lightning, high winds, blizzard, hurricane) ☐ Wildfire and air quality ☐ Fire ☐ Hot surfaces ☐ Other

ACKNOWLEDGEMENT PAGE		
NOTE – by signing this document, I acknowledge that I have reviewed all JHA materials, including the cover page, site hazard sheets, task pages, and any other applicable forms.		
Staff Member Name	**Staff Member Signature**	**Date**
Click or tap here to enter text.		Click dropdown arrow to add date
Click or tap here to enter text.		Click dropdown arrow to add date
Click or tap here to enter text.		Click dropdown arrow to add date

HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Mobilization/Demobilization

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Set Up/Break Dow Work Zone	Struck-By	Physical Injury	• Set up work zones and use spotters/traffic control to direct traffic around loading and unloading areas. • Designate travel path and stop/direct traffic during moving of equipment and supplies. • Always maintain awareness of traffic flow and swing radius of large equipment. • Ensure to get visible/verbal confirmation from operators and spotters before approaching or crossing in path of heavy equipment (e.g., nod, hands-off-controls signal).
2. Unloading/Loading Equipment	Manual Lifting	Muscle Strains/Sprains	• Keep load in close to the body; keep hips and shoulders aligned (no twisting); maintain stability (keep a balanced position) and use two people for lifts greater than 50 pounds. • Reduce travel distance when there is a need to carry/lift materials and make use of utility carts/dollies.
	Pinch	Physical Injury	• Avoid placing hands/body parts in pinch points.
	Hand Tools	Pinch/Puncture/Cut Points	• Inspect all tools prior to use and tag out or discard defective tools. • Avoid placing hands in pinch points.
	Noise	Hearing Loss	• Personnel will wear ear plugs or muffs (NRR 33) within 25 feet of any operating equipment and implement a system of hand signals understood by all.
	Caught Between / Vehicle Collision	Serious Injury or Fatality (SIF)	• Review loading/unloading plan with delivery drivers. Verbalize plan for truck staging, loading/unloading process, hand signal communication, and roles/responsibilities. • Utilize spotter and/or flaggers to maintain safe exclusion zone during loading/unloading activities.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT	
Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots
PPE Type:	

HALEY ALDRICH	6. JOB HAZARD ANALYSIS
	Job/Operation Title: Utility Locate

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Observe Private Locator While They Are Determining and Marking Underground Utility Locations. **Verify Dig Safe number(s) are valid.**	Pressurized Paint Can	Injury from Contents Under Pressure Illness from Odor	• Consult Safety Data Sheet (SDS) for safe handling procedures and first aid measures for marking paint; keep face away from spray nozzle. • Consult SDS for appropriate storage. Can contents are under pressure and should not be exposed to heat above 120 degrees Fahrenheit. If the can contents freeze due to cold weather, do not try to quickly heat up the can by placing it over a vehicle defroster as it can explode. • Consult the following color guide for 811 markings and their meaning. White — Proposed Excavation Pink — Temporary Survey Markings Red — Electric Power Lines, Cables, Conduit, and Lighting Cables Yellow — Gas, Oil, Steam, Petroleum, or Gaseous Materials Orange — Communication, Alarm or Signal Lines, Cables, or Conduit Blue — Potable Water Purple — Reclaimed Water, Irrigation, and Slurry Lines Green — Sewers and Drain Lines
	Energized Equipment	Electric Shock/Fire	• All equipment should be inspected prior to being brought on site. • Additionally, ensure subcontractors perform a pre-use inspection. • Equipment must be operated and maintained in accordance with manufacturers guidelines.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
	Underground Utilities Overhead Utilities	Utility Strike/Injury	• Ensure that the appropriate tools are used to identify potential underground utilities (e.g., Concrete Scanner, Ground Penetrating Radar, Electromagnetic Locator). • Concrete scanner should be used when work requires coring through, drilling, or otherwise removing concrete. • Scan the work area for potential markers of underground utilities (stub ups, drains, etc.) • A minimum 50-foot radius around work locations should be scanned by a private utility locator to determine what could be leading into the work area. • Ensure utility locator verifies markings made by utility providers. • Visually check area to validate overhead clearance, utility mark outs, and for visual indicators of utilities.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots	
PPE Type:	Choose item or enter text.	

HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Perimeter Air Monitoring

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Set Up and Calibrate Perimeter Air Monitoring Stations	Manual Lifting	Muscle Strains/Sprains	• Keep load in close to the body; keep hips and shoulders aligned (no twisting); lift with leg, not back muscles; maintain stability (keep a balanced position) • Use two people for lifts greater than 50 pounds. • Reduce travel distance when there is a need to carry/lift materials and make use of utility carts/dollies.
	Hand Tools	Pinch/Puncture/Cut Points	• Inspect all tools prior to use and tag out or discard defective tools. • Avoid placing hands in pinch points. • Wear protective palm and cut resistant work gloves (American National Standards Institute [ANSI] A2 min.).
	Compressed Gases	Pressurized Release/Fire	• **Complete the Compressed Gas Safety Checklist in OP1048 prior to using or transporting the cylinder.** • Handle compressed gases with care. Ensure canisters of compressed gas are stored upright and secured from falling or being knocked over. • Keep the cylinder clear of all electrical circuits, flame, and sparks. Consult Safety Data Sheet (SDS) for storage and handling procedures. Store away from extreme temperatures, excessive moisture, corrosive chemicals or fumes, or near combustibles. • Use compressed gas only with an appropriately fitting regulator. • Protect cylinders from striking against each other or other surfaces. Never drag, slide, or roll a cylinder. • Do not use the valve cover to lift the cylinders. • Tag out empty containers and continue to handle with care.
	Chemical Exposure	Illness from Inhalation Irritation to Skin/Eyes	• Ensure to follow the project specific air monitoring plans. • Air monitoring should be conducted at your breathing zone during all activities of concern. • Safety glasses with side shields, and nitrile gloves shall be worn. • Face shields will be worn if splash hazards are likely. • Consult SDS for chemical specific first aid measures and exposure controls.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
2. Conduct Routine Monitoring Checks	Heavy Equipment	Struck By/Line of Fire	• Always maintain awareness of traffic flow and swing radius of large equipment. • Ensure to get visible/verbal confirmation from operators and spotters before approaching or crossing in path of heavy equipment (e.g., nod, hands-off-controls signal). • Make use of remote air monitoring tools to conduct routine checks. • If a sample must be taken in an active work area due to elevated readings, request work be paused with on-site construction management to ensure safe access into the work zone.
	Elevated Dusts or VOCs	Worker and/or Community Chemical Exposure	• If elevated air monitoring readings are observed on the photoionization detectors (PIDs) or DustTrak, personnel will notify the on-Site Site Safety Officer (SSO) or Construction Manager to implement vapor or dust suppression as applicable. • **If real-time samples need to be collected, consult respiratory protection requirements** for the project and worker air monitoring action levels/responses prior to collecting a sample.
3. Elevated Readings	Security	Negative Public Interaction, Property Damage	• Ensure that the Site is secure when closing down the Site for the day. Utilize the buddy system as needed. • Secure any outdoor equipment with chains and locks or store in a secure, locked area.

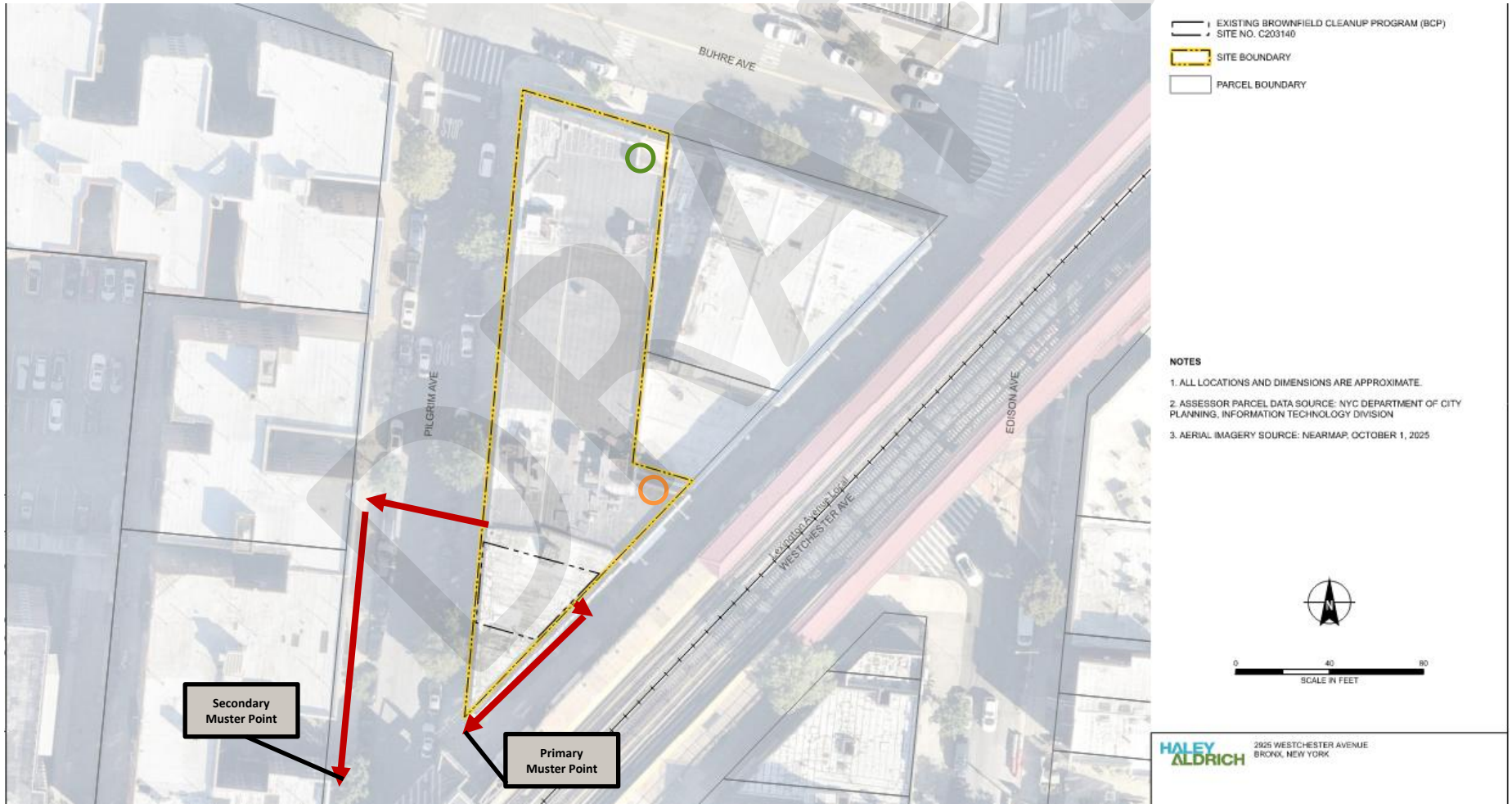
7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots					
PPE Type:	Choose item or enter text.	Choose item or enter text.	Nitrile - Chemical	Choose item or enter text.	Consult H&S if levels are elevated	Choose item or enter text.

REQUIRED SITE MAPS

Add a site map and indicate the following items as needed. Drag and drop icons onto the map! To change any shapes, click the shape, select "shape format" and "edit shape".

Site Perimeter	Exclusion Zone	Contamination Reduction Zone	Support Zone	Evacuation Routes	Primary Muster Point	Secondary Muster Point	Restrooms
					Primary Muster Point	Secondary Muster Point	Restrooms



HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Driving

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Pre-Trip Assessment	Inclement Weather	Vehicle Incident, Inadequate Equipment	• Verify weather conditions are safe for travel and any additional equipment is available (raincoat, umbrella, etc.).
	Route Conditions, Road Closure, Construction	Vehicle Accidents, Traffic	• Review current road conditions for hazards, warnings, and requirements prior to the start of all travel.
2. Perform Vehicle Inspection & 360 Walkaround	Cargo	Injury, Damaged Equipment	• All loads and potential "projectiles" must be secured prior to starting travel.
	Damaged Vehicle	Serious Injury or Fatality (SIF)	• Check for damage including flat tires, broken lights, cracked windows, dented panels and bumpers. • Check for wear and tear including unusual wear patterns, cracked wipers, insufficient tread on tires. • Verify any loose equipment or supplies are secured. Ensure that no items are left behind (drinks, supplies, equipment, cones, or personal items). • Ensure windshield and window glass is clean. • Check behind vehicle for obstructions (wildlife, pets, public, children, debris, plastic, tools, toys, etc.). • Check under vehicle engine for evidence of fluid leaks. • Check and adjust seat, mirrors, head lights, turn signals, washer/wipers, defroster, gas level, and warning lights. • Be aware of blind spots. • Ensure all seat belts are in good condition and fastened.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
3. Drive To Destination	Collision with Other Vehicles, Pedestrians, or Objects	Serious Injury or Fatality (SIF)	• Check mirrors when slowing or stopping vehicle. • Scan mirrors and road frequently for hazards while driving (other vehicles, pedestrians, cyclists, objects in the road). • Maintain adequate spacing between your vehicle and the vehicle in front of you. Rule of thumb is the 3-second rule: – **Step 1:** Locate a fixed point ahead of you. – **Step 2:** When the vehicle in front of you passes the fixed point, count to three (one-1000, two-1000, three-1000). – **Step 3:** If you pass the fixed point before counting to 3, then you are following too closely and need to increase the distance. • Double your following distance during poor road conditions.
	Distracted Driving	Serious Injury or Fatality (SIF)	• Do not use cellular phones or other electronic devices when driving. • Plan all necessary use of electronics prior to starting a drive (setting up GPS, music, turning off notifications).
4. Parking	Collision	Injury, Damaged Vehicles	• When possible and it is safe to do so, park vehicles so that you can move forward out of the parking space. • As feasible, opt to park away from other cars or in low traffic areas. • Engage parking brake.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

PPE Type:	Sunglasses Recommended

6.0 JOB HAZARD ANALYSIS

Job/Operation Title: Drilling Oversight

<table>
<tr><th>Task/Step</th><th>Hazard/Energy Source</th><th>Risk/Impact</th><th>Recommended Safe Job Procedures</th></tr>
<tr><td>1. Verify Lines of Evidence Near Drilling Locations

Verify Dig Safe number(s) are valid prior to any ground disturbance and utility/site owners have marked utilities before the start of any ground disturbance task.</td><td>Underground Utilities

Overhead Utilities</td><td>Utility Strike/Physical Injury</td><td>• Ensure utility clearance is conducted in accordance with procedures outlined in OP1020 Working Near Utilities.
• Visually inspect work area to confirm overhead clearance, utility mark outs, and visual indicators of marked utilities.
• The buffer zones below comply with Occupational Safety and Health Administration (OSHA) 1962.1408(h) Power Line Safety.
<table>
<tr><th>Voltage (Nominal, kV, alternating current)</th><th>Required Minimal Radial Clearance Distance (feet)</th></tr>
<tr><td>Up to 50</td><td>10</td></tr>
<tr><td>Over 50 to 200</td><td>15</td></tr>
<tr><td>Over 200 to 350</td><td>20</td></tr>
<tr><td>Over 350 to 500</td><td>25</td></tr>
<tr><td>Over 500 to 750</td><td>35</td></tr>
<tr><td>Over 750 to 1,000</td><td>45</td></tr>
<tr><td>Over 1,000</td><td>Established by utility owner operator or registered PE qualified with respect to electrical power</td></tr>
</table></td></tr>
<tr><td>2. Confirmation of Drill Rig Inspection</td><td>Heavy Equipment</td><td>Serious Injury or Fatality (SIF)/Spill-Release</td><td>• Ensure a drill rig inspection is completed prior to use.
• Inspect for signs of wear, damage, or other defects.
• Ensure emergency shut-off switches are functional and a spill kit is readily available.</td></tr>
<tr><td>3. Position and Setup Drill Rig</td><td>Drilling Equipment</td><td>Struck By</td><td>• Keep body parts clear of rig when adjusting and raising mast, drill rods, or hammer assembly.
• Inspect rods and sampler prior to and while equipment is operating, remove damaged equipment from use.
• Keep clear of drive caps, thread connections, and sampler shoe when assembling/disassembling the tool string, advancing, and withdrawing the sampler.
• Individuals who are not involved in the work activity should remain clear of the work zone by 25 feet.</td></tr>
</table>

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
3. Position and Setup Drill Rig	Overhead Hazards	Tip Over/Loss of Control of Equipment/Electric Shock	• Ensure adequate clearance from drill rig mast and potential overhead utilities, trees, and architectural features, etc. • Discuss plans to move rig prior to movement and scan proposed path for potential hazards. • Ensure a spotter is monitoring during movement of the drill rig and mast. Stop work and adjust boring location as needed to avoid overhead hazards.
4. Advance Boring **5. Backfill Boring Location/ Surface Completion**	Noise	Hearing Loss	• Personnel will wear ear plugs or muffs (NRR 33) within 25 feet of any operating equipment and implement a system of hand signals understood by all.
	Energized/Rotating Equipment	Electric Shock/Fire/Physical Injury	• Ensure type ABC, fully charged fire extinguisher is within 25 feet of work area. • Stay away and keep hands clear from moving parts and wear fitted clothing to reduce likelihood of being caught in rotating equipment. • If necessary to work around moving parts, driller is to disengage and stop moving part while keeping hands off controls until work is completed. • Stay upwind and a minimum of 15 feet away from augers when they are being pulled out.
	Chemical Exposure	Illness from Inhalation Irritation to Skin/Eyes	• Chemical hazards may be present in the subsurface. • Ensure to follow the project specific air monitoring plans. • Air monitoring should be conducted in the breathing zone during ground disturbance activities. • Safety glasses with side shields, and nitrile gloves shall be worn. • Consult SDS for chemical specific first aid measures and exposure controls.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
4. Advance Boring **5. Backfill Boring Location/ Surface Completion**	Slip Trip Fall / Silica Inhalation	Physical Injury	• Stay upwind and minimum 15 feet away from grout mixing activities and tremie removal in the event of pressure build up. • Maintain awareness of slip/trip/fall hazard from grout on ground. • Ensure open boreholes are appropriately backfilled and or covered before leaving the site. • Mark open boreholes with a cone or other visible marker to prevent trips and/or ankle injuries. • For skin or eye contact with concrete or grout, immediately wash/ flush area per the SDS first aid measures.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots		
PPE Type:	Choose item or enter text.	Choose item or enter text.	Choose item or enter text.

HALEY ALDRICH	**6.0 JOB HAZARD ANALYSIS**
	Job/Operation Title: Decontamination

Location of decontamination areas, including showers and changing rooms:
N/A

Location of where contaminated materials can be disposed:
Drill refuse and water will be staged in 55-gallon drums and staged on site for disposal.

DECONTAMINATION SUPPLIES

All decontamination should be conducted at the project site in designated zones or as dictated by Client requirements. Decontamination should not be carried out on Haley & Aldrich owned or leased premises.

☐ Acetone	☒ Distilled Water	☐ Polyethylene Sheeting
☒ Alconox Soap	☒ Drums	☐ Pressure/Steam Cleaner
☐ Brushes	☐ Hexane	☐ Tap Water
☒ Disposal Bags	☐ Methanol	☐ Wash Tubs
☒ 5 Gallon Buckets	☒ Paper Towels	☐ Other: Click here to enter text.

STANDARD SMALL EQUIPMENT DECONTAMINATION

Process	Mitigations
Pretreatment of heavily contaminated equipment may be conducted as necessary: • Remove gross contamination using a brush or wiping with a paper towel. • Soak in a solution of Alconox and water (if possible). • Wipe off excess contamination with a paper towel. Standard decontamination procedure: • Wash using a solution of Alconox and water. • Rinse with potable water. • Rinse with methanol (or equivalent). • Rinse with distilled/deionized water. Inspect the equipment for any remaining contamination and repeat as necessary	• Decontamination activities will be performed in a controlled area to prevent cross-contamination and environmental release. • Personnel will utilize appropriate PPE, and disposable equipment will be discarded following each sample location. • Decontamination of drilling equipment will be conducted between sampling locations.

STANDARD PERSONAL DECONTAMINATION PROCEDURES	
Process	**Mitigations**
Outer gloves and boots should be decontaminated periodically as necessary and at the end of the day. Brush off solids with a hard brush and clean with soap and water or another appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. Non-disposable overalls and outer work clothing should be bagged onsite prior to laundering. If gross contamination is encountered on-site, contact the Project Manager (PM) and Regional Safety Manager (RSM) to discuss proper decontamination procedures. The steps required for decontamination will depend upon the degree and type of contamination, but will generally follow the sequence below. • Rinse boots and gloves of gross contamination. • Scrub boots and gloves clean. • Rinse boots and gloves. • Remove outer boots (if applicable). • Remove outer gloves (if applicable). • Remove and wipe clean hard hat. • Remove Tyvek coverall (if applicable). • Remove respirator, wipe clean and store (if applicable). • Remove inner gloves (if outer gloves were used).	Containment Measures • Decontamination activities shall be conducted within a controlled area to prevent release of contaminants. • Wash water and residual materials generated during personal decontamination shall be contained and managed appropriately. PPE Handling & Disposal • Disposable PPE (e.g., Tyvek, gloves) shall be placed in designated containers (e.g., lined drums or bags) for proper disposal. • Reusable PPE (e.g., boots, hard hats, respirators) shall be cleaned prior to storage or reuse.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT			
Standard PPE (unless otherwise indicated)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots		
PPE Type:	Nitrile - Chemical	Choose item or enter text.	Choose item or enter text.

HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Groundwater Sampling

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Tailgate **2. Set Up Sampling Area and Work Zone** **3. Inspect/Calibrate Sampling Equipment** **4. Open/Close Well Covers**	Exclusion Zone	Unauthorized Access	• Delineate work zone to prevent unauthorized access during sampling activities.
	Equipment Hazards	Hand Injury/Pinch Point	• Check all equipment to ensure it is in proper working order and has been calibrated to manufacturer's standards. • Avoid placing hands in pinch points. • Use open face wrench/socket wrench when opening closing well covers. • Ensure area is clear before moving or rotating equipment.
5. Well Gauging **6. Sample Collection** **7. Pack Samples in Coolers**	Chemical Exposure	Illness from Inhalation	• Ensure to follow the project specific air monitoring plans. • If applicable, air monitoring should be conducted at your breathing zone during groundwater sampling activities. Reference Personal Air Monitoring JHA for air monitoring plan details.
		Irritation to Skin/Eyes	• Safety glasses with side shields, and nitrile gloves shall be worn. • Face shields will be worn if splash hazards are likely. • Consult chemical safety card for chemical specific first aid measures and exposure controls.
		Illness from Ingestion	• No eating or drinking in the work area; designated areas will be made available.
	Contact with Preservation Solution	Irritation to Skin/Eyes	• Nitrile gloves shall be worn while handling acid preserved bottles. Avoid contact with skin, eyes, and clothes. • Maintain the portable emergency eyewash station/bottle within reach of sample preservation activities in the event that employee's eyes come into contact with preservation solution. • If preservation solution is splashed onto skin or in eyes, immediately flush per first aid measures described in the Safety Data Sheet (SDS).

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
5. Well Gauging **6. Sample Collection** **7. Pack Samples in Coolers**	Loss of Containment	Spill/Release	• Site will be examined for any sensitive receptors and if observed, will be protected. • Sampling activities as feasible, should be conducted over secondary containment. • Containers containing liquids should be placed in secondary containment when not in use.
	Energized Equipment	Electric Shock/Fire	• All equipment will be inspected prior to being brought on site. • Additionally, prior to each use, personnel will perform a pre-use inspection of wiring, clamps, cables; avoid arcing.
	Ergonomics	Muscle Strains/Sprains	• Use knee pads if kneeling for extended periods of time. • Take adequate breaks when working in positions that require bending, reaching, carrying, or working in one position. • Avoid working in awkward postures; when possible, try to work in a neutral position (shoulders down and relaxed, arms close to sides, elbows bent, wrists and hands straight).
	Manual Lifting	Muscle Strains/Sprains	• Limit weight in coolers to 50 lbs. or less when packing samples for shipment. • Keep load in close to the body; keep hips and shoulders aligned (no twisting); maintain stability (keep a balanced position) and use two people for lifts greater than 50 pounds. • Reduce travel distance when there is a need to carry/lift materials and make use of utility carts/dollies.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots	
PPE Type:	Nitrile gloves	Choose item or enter text.

HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Sample Processing

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Set up Sampling Area and Work Zone **2. Inspect Sampling Equipment**	Slips, Trips, Falls	Physical Injury	• Establish an exclusion zone for sampling activities. • Keep materials organized and out of walkways. Equipment should be stored unless in use. • Work areas should be clear of trash and other debris. • Place excess sample media in a container or drum away from foot traffic. • If using visqueen and/or berms for secondary containment, ensure that plastic is laid to avoid bunching and/or slipping. • Highlight berms and other potential trip hazards. Exercise caution when walking over visqueen.
	Ergonomics	Muscle Strains/Sprains	• Consider the ergonomics of your sampling set up. • Avoid working in awkward postures; when possible, try to work in a neutral position (shoulders down and relaxed, arms close to sides, elbows bent, wrists and hands straight). • Use knee pads if kneeling for extended periods of time. • Take adequate breaks when working in positions that require bending, reaching, carrying, or working in one position.
	Hand Tools	Pinch/Puncture/Cut Points	• Inspect all tools prior to use and tag out or discard defective tools. • Avoid placing hands in pinch points.
3. Collect Samples	Chemical/Sample Media Exposure	Illness from Inhalation Irritation to Skin/Eyes	• Ensure to follow the project specific air monitoring plans in the Personal Air Monitoring JHA. • Air monitoring should be conducted at the breathing zone during all activities where chemical exposure is possible. • A minimum of safety glasses and nitrile gloves shall be worn. Alternate personal protective equipment (PPE) should be evaluated based on the Chemicals of Concern identified. • Face shields will be worn if splash hazards are likely. • Consult Safety Data Sheet (SDS) for chemical specific first aid measures and exposure controls.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
3. Collect Samples	Sharp Objects	Hand Injury	• Ensure to wear cut-resistant gloves and/or thick nitrile gloves when collecting samples that may have sharp objects (e.g., rocks, metal or glass debris, shells etc.)
	Contact with Preservation Solution	Irritation to Skin/Eyes	• Safety glasses and nitrile gloves shall be worn while handling acid preserved bottles. Avoid contact with skin, eyes, and clothes. • Maintain the emergency eyewash station/bottles within reach of sample preservation activities in the event that employee's eyes come into contact with preservation solution. • If preservation solution is splashed onto skin or in eyes, immediately flush the area in accordance with SDS first aid measures.
4. Loading Sample Containers/ Coolers	Glass Containers	Physical Injury	• Package sample containers with protective bubble wrap etc. to prevent breakage. • If a container is broken, ensure to don appropriate gloves (e.g. nitrile gloves layered over cut-resistant gloves) before cleaning up.
	Manual Lifting	Muscle Strains/Sprains	• Keep load in close to the body; keep hips and shoulders aligned (no twisting); maintain stability (keep a balanced position) and use two people for lifts greater than 50 pounds. • Reduce travel distance when there is a need to carry/lift materials and make use of utility carts/dollies.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots				
PPE Type:	Safety Glasses	Nitrile - Chemical	Choose item or enter text.	Choose item or enter text.	Choose item or enter text.

6.0 JOB HAZARD ANALYSIS

Job/Operation Title: Property Survey/Site Walk

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Scan Work Area to Identify Hazards **2. Conduct Site Walk/Inspection**	Slips, Trips, Falls	Physical Injury	• Survey area for uneven surfaces and other tripping hazards; communicate potential trip hazards. • Avoid, to the extent feasible, areas with slippery surfaces or standing water. • Do not take photographs or talk on the phone while walking.
	Struck-By	Physical Injury	• Always maintain awareness of traffic. • Utilize crosswalks, designated paths and ensure to follow applicable pedestrian traffic laws. • Abide by all local traffic laws when working on the shoulder with appropriate permits and signage. • Position vehicle to protect workers from oncoming traffic in the event of an accident.
4. If Survey/Site Walk is on a Construction Site	Heavy Equipment	Struck By/Line of Fire	• Always maintain awareness of traffic flow and swing radius of large equipment. • Ensure to get visible/verbal confirmation from operators and spotters before approaching or crossing in path of heavy equipment (e.g., nod, hands-off-controls signal).
	Noise	Hearing Loss	• Personnel will wear ear plugs or muffs (NRR 33) within 25 feet of any operating equipment and implement a system of hand signals understood by all.
	Simultaneous Operations	Serious Injury or Fatality (SIF)	• Identify and understand the hazards associated with potential simultaneous operations on site. • Integrate site communication protocols and communicate to all project staff. • Integrate site emergency response protocols, where appropriate, and communicate to all project staff.

7.0 TASK-SPECIFIC HAZARD CONTROL MEASURES

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots	
PPE Type:	Choose item or enter text.	Choose item or enter text.

HALEY ALDRICH	6.0 JOB HAZARD ANALYSIS
	Job/Operation Title: Soil Vapor Sampling

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
1. Set Up Exclusion Zone **2. Calibrate and Inspect Air Monitoring Equipment**	Unauthorized Access	Public Safety	• Establish an exclusion zone to prevent unauthorized access during sampling activities.
	Compressed Gases	Release/Fire	• **Complete the Compressed Gas Safety Checklist in OP1048 prior to using or transporting the cylinder.** • Handle compressed gases with care. Ensure canisters of compressed gas are stored upright. • Keep the cylinder clear of all electrical circuits, flame, and sparks. Consult Safety Data Sheet (SDS) for storage and handling procedures. • Use compressed gas only with an appropriately fitting regulator. • Use appropriate material such as chain, plastic-coated wire cable, commercial straps to properly secure the cylinders for transportation. And utilize protective caps to cover valves when transporting the cylinder or when not in use. • Protect cylinders from striking against each other or other surfaces. Never drag, slide, or roll a cylinder. • Do not use the valve cover to lift the cylinders. • Tag out empty containers and continue to handle with care.
	Tools/Energized Equipment	Pinch/Puncture/Cut Points/Electric Shock	• Inspect all tools prior to use and tag out or discard defective tools. • Avoid placing hands in pinch points. • Ensure powered tools are connected to a Ground Fault Circuit Interrupter (GFCI). • Ensure type ABC, fully charged fire extinguisher is within 25 feet of work area. • Do not run power cord through water or other liquids.

Task/Step	Hazard/Energy Source	Risk/Impact	Recommended Safe Job Procedures
3. Use of Helium/Compressed Gas Cylinders	Compressed Gases	Physical Injury, Release, Improper Handling	• American National Standards Institute (ANSI) Z87 face shield must be worn when connecting and disconnecting regulators and lines. • Inspect to ensure the cylinder is equipped with the correct regulator and inspect the regulator for any deficiencies. Cylinders should not be transported with the regulators attached. • Only use wrenches or tools that are provided by the cylinder supplier to open/close valve. If the valve is frozen and cannot be operated by hand, return the cylinder to the rental facility. • Maintain cylinders in an appropriate stand during sampling to prevent them from tipping or being knocked over. • Use the cylinder valve for turning gas off and not the regulator.
4. Purge Air from Sampling Port **5. Collect Soil Vapor Sample**	Chemical Exposure	Illness from Inhalation	• Ensure to follow the project specific air monitoring plans. • Air monitoring should be conducted at your breathing zone during all activities of concern.
	Hand Tools	Hand Injuries/Strain	• 10-mil nitrile gloves can be used instead of cut-resistant gloves when putting together small fittings to reduce potential for hand fatigue. • Cut tubing away from body and any bystanders and do not use excessive force when cutting the tubing. Tubing cutters or scissors are the preferred tool. Blades that are not self-retracting are not permitted to be used. • Use caution in drawing soil gas sample with a syringe to avoid piercing injuries.

7.0 TASK-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Standard PPE (edit as applicable)	• Hard Hat • Safety Vest • Cut Resistant Gloves • Safety Glasses • Ear Plugs • Safety-Toed Boots		
PPE Type:	Choose item or enter text.	Choose item or enter text.	Choose item or enter text.

SITE HAZARD SHEET

BIOLOGICAL	
Bacteria	• Wear appropriate personal protective equipment (PPE), such as gloves, eye protection (goggles or face shields), and disposable clothing, when working with potentially contaminated materials or in areas where bacterial exposure is possible. • Wash your hands and any exposed skin with soap and water immediately or as soon as feasible after contact with potentially infectious materials or contaminated surfaces. • Disinfect potentially contaminated surfaces to reduce potential for bacteria to spread.
Disease (e.g., BBP, hepatitis, legionnaires)	**General Disease information** • The primary routes of infectious disease transmission are contact, droplet, and airborne. • General practices, such as the following, can help reduce the risk of disease: – Regular handwashing – Covering coughs and sneezes – Proper cleaning and disinfection of surfaces – Staying home when sick – Wearing face coverings – Wearing gloves
Disease (e.g., BBP, hepatitis, legionnaires) *(continued)*	**Bloodborne Pathogens (BBP)** • While Haley & Aldrich staff members should not anticipate occupational exposure to bloodborne pathogens in their normal daily activities, there is always potential for an incident that could lead to exposure. • Bloodborne pathogens are bacteria, viruses, and other pathogenic microorganisms that can only be detected by medical tests. • Any time you come in contact with another individual's blood or other potentially infectious material (OPIM), you are at risk of becoming infected. • Therefore, staff members must treat all blood and OPIM as if they could get infected. • Offices are equipped with BBP response kits, and field staff members have the option to collect the same BBP kits to have on hand as a resource. • Proper PPE, disposal, and handwashing are critical to limit exposure to BBP. • For more information, see OP1058 Bloodborne Pathogens.

SITE HAZARD SHEET

BIOLOGICAL	
Droppings (human and animal)	• Do not touch droppings with unprotected hands. • Avoid disturbing the droppings and generating dust. • Staff member work practices and dust control measures that eliminate or reduce dust generation during removal of manure from a building will also reduce risks of infection and development of disease. • Use an industrial vacuum cleaner with a high-efficiency (HEPA) filter to bag contaminated material.
Insects (biting and stinging)	**Bees, Wasps, and Hornets** • Bees generally fly in straight lines between flower and hive, hence collisions with unsuspecting individuals occur. • If a single bee approaches, STAY STILL, do not try to swat the insect as this may cause it to react. • If it lands, gently try to blow it off the skin. • If a swarm of bees approach, run for shelter. Bees release a chemical when they sting, which may attract other bees to sting. • If stung, try to look for the stinger and carefully remove it by flicking it or scratching it out of the skin from the stinger sack. • Stings to the head and neck are more dangerous. • When stung, immediately apply ice or cold compresses to the sting site.

BIOLOGICAL	
Insects (biting and stinging) *(continued)*	**Bees, Wasps, and Hornets** *(continued)* • Life threatening reactions are more likely to occur in people who are already known to be very allergic to bee venom, older people with pre-existing heart and chest complaints, or with multiple stings. • Wasps and bees are drawn to flower fragrances and clothing with bright colors (white is safest), perfumes, fruit juices and eating fruit outdoors, hair tonics, suntan lotions, and floral odors. • Hornets are drawn to food and sources of moisture. • Carefully shake out any clothing left on the ground. • Cover open containers and any food outdoors. • Individuals who are prone to severe reactions to bee stings should notify the Site Safety Officer (SSO) and carry their prescribed medication(s) with them for self-administration. • Emergency medical treatment should be sought immediately for individuals who are allergic to bee stings or other individuals who exhibit severe reactions described above. **Mosquitoes** • Take appropriate precautions to minimize the potential transmission of viruses carried by mosquitoes. • Use of PPE techniques is essential to prevent mosquito bites especially when working at sites where mosquitoes may be active and biting. • Use repellents containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and para-menthane-diol products provide longer-lasting protection. To optimize safety and effectiveness, repellents should be used according to the label instructions. • Cover as much of your skin as possible by wearing shirts with long sleeves, long pants, and socks whenever possible. • Avoid use of perfumes and colognes when working outdoors during peak times when mosquitoes may be active; mosquitoes may be more attracted to individuals wearing perfumes and colognes. • Treat bites by cleaning the affected area with warm soapy water. • Place an ice pack on the affected area to reduce swelling. • Take or apply an antihistamine to reduce itchiness. • Avoid scratching the bite to reduce risk of infection.

BIOLOGICAL	
Insects (biting and stinging) *(continued)*	**Ticks** • Wear light-colored clothing so ticks stand out and long-sleeved shirts and long pants to reduce skin exposure. • Tuck your shirt into your pants and tuck your pants into your socks to close gaps. • Use repellent containing 20-30% DEET (N, N-diethyl-m-toluamide) on exposed skin and clothing. • Avoid hands, eyes, and mouth and wash off repellent when back indoors. • Treat clothing with or purchase clothing with products containing 0.5% permethrin. • Conduct frequent tick checks on clothing and skin. Have others check your back, scalp, and behind your ears and check gear for "hitchhikers." • As soon as you return indoors, take a bath or shower and do a full-body inspection using a mirror. • Wash field clothes and tumble dry on high to kill any ticks that may be hidden. • If working in an area of significant tick habitat, PPE may need to be upgraded to a Tyvek suit. • Implementation of controls is crucial to minimize or eliminate the possibility of a tick bite. • If a staff member has been bitten contact Corporate H&S and Acuity at 888-397-8099 to initiate the Tick Management Protocol. Once bitten, it takes approximately 48 hours to transmit Lyme Disease. • For removal, a fine-tipped tweezer is recommended for tick removal tool and should be in the first-aid kit. • Follow these steps: – Pull upward with steady, even pressure. – Do not twist or jerk the tick; this can cause mouth parts to break off and remain in the skin. – If this happens, remove the parts with tweezers. – If unable to remove easily with tweezers, leave them alone and let the skin heal. – After removing the tick, thoroughly clean the bite area and hands with rubbing alcohol, iodine scrub, or soap & water. – Dispose of live ticks by submersal in alcohol, placing it in a sealed bag/container, wrap it tightly in tape, or flush it down the toilet. – Never crush ticks with your fingers. – Do not attempt to use nail polish remover, petroleum jelly, lotion, or heat to try to get the tick to exit skin. – Swift removal is key.

SITE HAZARD SHEET

BIOLOGICAL	
Insects (biting and stinging) *(continued)*	**Venomous spiders** • Inspect or shake out any clothing, shoes, towels, or equipment before use. • Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials. • Minimize the empty spaces between stacked materials. • Remove and reduce debris and rubble from around the outdoor work areas. • Trim or eliminate tall grasses from outdoor work areas. • Store apparel and outdoor equipment in tightly closed bags. • Keep tetanus boosters up to date (every 10 years). • Spider bites can become infected with tetanus spores. • Additional information in the case of bites can be obtained from the Poison Center (1-800-222-1222).
Mammals (large and small)	**Large mammals** • Avoid contact with animals whenever possible. • If an animal displays aggressive behavior and charges, do not run or turn your back. • When confronted by a large mammal it is important not to run or exhibit any behavior that may be construed as a challenge (e.g., looking the animal in the eyes, showing your teeth, etc.). • Stand still and place your work bag between you and the animal and then begin to move slowly away from the animal, while not turning your back. **Small mammals** • Avoid contact with rodents, if possible. • Avoid contact with rodent excrement. • Do not eat food or water that may have encountered rodent excrement. • If exposed, wash hands and avoid touching your face with your hands.

BIOLOGICAL	
Needles	• If you find a discarded needle, stop and do not approach or attempt to pick up the needle, even if wearing gloves. • Notify the client, controlling employer, or other designated safety personnel immediately. • Clearly describe the location of the needle to ensure it can be safely addressed. • Treat all needles, blood, and other potentially infectious materials as if they are infectious. • When discarded, needles must be placed in SHARPS containers and not in traditional trash.
Poisonous plants	Poisonous plants that can cause skin irritation include poison ivy, poison oak, and poison sumac. Poisonous plants are found throughout the United States (except Alaska and Hawaii). **Poison Ivy** • Eastern poison ivy is typically a hairy, ropelike vine with three shiny green leaves budding from one small stem. The leaves may be red in the fall. Western poison ivy is typically a low shrub with three leaves that does not form a climbing vine. It may have yellow or green flowers and white to green-yellow or amber berries. **Poison Oak** • Poison oak is typically a shrub with three leaves, like poison ivy. Pacific poison oak may be vine-like. It may have yellow or green flowers and clusters of green-yellow or white berries. **Poison Sumac** • Poison sumac is a woody shrub that has stems with 7–13 leaves arranged in pairs. It may have glossy, pale yellow, or cream-colored berries. Poison ivy, poison oak, and poison sumac release an oil (urushiol) when part of the plant is damaged or burned. When the oil gets on the skin, most exposed people have an allergic reaction (contact dermatitis). Workers can become exposed to urushiol through: • Direct contact with the plant. • Indirect contact, such as touching tools, livestock, or clothing that have urushiol on them. • Inhaling particles containing urushiol from burning plants.

BIOLOGICAL	
Poisonous plants *(continued)*	**Prevention** • Wear long sleeves, long pants, boots, and gloves. Wash exposed clothing separately in hot water with detergent. • Use barrier skin creams, such as Ivy X pre contact towelettes. • Clean tools with rubbing alcohol (isopropanol or isopropyl alcohol) or soap and lots of water. Urushiol can remain active on the surface of objects for up to five years. Wear disposable gloves while cleaning. **Symptoms of contact with poisonous plants include:** • Red rash within a few days of skin contact. • Bumps, red patches or streaking, or weeping blisters. • Note: fluids in blisters will not cause blisters to spread on you or others. • Swelling. • Itching. **First Aid** • Rinse skin immediately. • Use rubbing alcohol, poison plant washes (Ivy X Contact wipes), or dishwashing soap, and lots of water. • Rinse often to prevent wash solutions from drying on the skin and further spreading the urushiol. • Apply cold compresses, follow directions on treatment wipes, do not apply to broken skin. • Emergency medical treatment should be sought immediately for individuals who are allergic to poisonous plants or other individuals who exhibit severe reactions described above.

BIOLOGICAL	
Poisonous snakes	The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches. The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt. If someone is bitten by a potentially poisonous snake, the following treatment should be initiated: • Keep patient calm. • Notify emergency medical services. • Wash the wound and keep the affected body part still. • Apply direct pressure to the site of bite if bleeding is extreme. • Keep the affected area lower than the heart. • Carry a victim who must be transported or have them walk slowly. • Transport to the closest medical facility.

SITE HAZARD SHEET

CHEMICAL	
Chemicals	• Chemical hazards must be identified and addressed on a project-by-project basis. • Include Safety Data Sheets (SDS) for all applicable chemicals. • Project-specific air monitoring plans shall be developed and described in the project-specific JHA. • Additionally, other routes of exposure to chemical hazards (e.g., absorption, injection, ingestion) and associated controls must be addressed in a Job Hazard Analysis (JHA). • All project-specific or task-specific JHAs are to be modified when new chemical hazards are identified.
Dusts	**Dust control** • Minimize the escape of dust from process equipment or ventilation systems; • Use dust collection systems and filters; • Utilize surfaces that minimize dust accumulation and facilitate cleaning; • Provide access to all hidden areas to permit inspection; • Inspect for dust residues in open and hidden areas, at regular intervals; • Clean dust residues at regular intervals; • Use cleaning methods that do not generate dust clouds, if ignition sources are present; • Only use vacuum cleaners approved for dust collection; • Locate relief valves away from dust hazard areas; and • Develop and implement a hazardous dust inspection, testing, housekeeping, and control program (preferably in writing with established frequency and methods).

SITE HAZARD SHEET

CHEMICAL	
Dusts *(continued)*	**Silica dust** • Use of wet methods must be utilized to minimize dust production and ensure enough water is supplied. • Water-integrated delivery system that supplies water to cutting surface will be a requirement for stationary mason saws, hand-held power saws, walk behind saws, drivable saws, rig mounted core saw/drills, jackhammers, and hand-held grinders. • All water must be collected for sampling and disposal off-site. • All drain inlets will need to be identified and secured with plastic sheeting and absorbent snakes or sandbags and will need to be identified by the use of a cone or delineator. • Personnel must ensure drain valve is safely secured and washed soils will be shoveled from the unit and will be transported into appropriate labeled drums. • Evaluation must be completed to determine whether dusk mask/respirator is required to prevent inhalation of particles (based on equipment used – see below). • The slurry from utilizing the wet methods must be removed before it dries to prevent the dried material from generating dust that can spread to other areas of the Site.
Flammable and combustible vapors	• If working with flammable or combustible vapors, contact H&S to ensure proper planning is in place. Additional items, such as an Air Monitoring Plan may be applicable depending on the material, exposure levels, and environment. • When working with flammable liquids, ensure appropriate containers and storage cabinets are used. • Store flammable and combustible liquids in cool, well-ventilated areas, away from heat sources, open flames, and potential ignition sources like sparks, smoking, cutting, and welding. • Use the smallest amount of flammable liquid necessary for the task at hand. • Ensure proper ventilation systems are in place and working correctly. • Always review the Safety Data Sheet (SDS) for specific material to understand its hazards and specific safety precautions. • Staff members must be aware of Lower Explosion Limit/Lower Flammable Limit (LEL/LFL), and work must stop if vapors rise above these levels. • Wear appropriate PPE, as recommended on the SDS, such as aprons and goggles, when handling flammable liquids.

SITE HAZARD SHEET

CHEMICAL	
Toxic compounds	• Do not consume food or beverages in areas where hazardous chemicals are used. • Always wash hands thoroughly with soap and water after handling chemicals. • Ensure adequate ventilation to remove hazardous vapors from the work area. • Store chemicals according to their hazard classification and manufacturer's instructions. • Know the location of emergency equipment (e.g., eyewash stations, showers, spill kits) and procedures for handling spills and exposures. • Understand the hazards associated with any contaminants of concern. • Adhere to all lab-specific and general procedures for handling chemicals. • If unsure about any aspect of chemical handling, consult with a supervisor or safety professional. • Know the appropriate exposure limits, develop an air monitoring plan, and follow the plan to ensure there is no exposure to staff.

SITE HAZARD SHEET

ELECTRICAL	
Batteries	• Battery inspection: Determine the functionality and potential damage of each battery cell. • Voltage checks: Implement procedures to check battery voltage before and after charging. • Discharge prevention: Shut down the battery's ability to discharge below 20 volts. • Alarm fixes: Improve the specificity of "battery abnormality" alarms and raise the threshold for maximum charge alarms. • Standard work: Develop a Standard Operating Procedure (SOP), Job Hazard Analysis (JHA), or other standard work guidance for infrequent activities. • Workplace exams: Conduct regular workplace examinations and eliminate hazardous conditions. • Proper training: Train staff in the correct use and care of lithium battery-powered equipment, including appropriate personal protective equipment (PPE) usage. • Follow instructions: Adhere to the manufacturer's guidelines for the storage, use, charging, and maintenance of lithium batteries. • Fire safety: Keep fire extinguishing equipment readily available and ensure a smoke or heat alarm is installed in areas where devices are charged or stored.
Energized equipment	• Document process to de-energize or isolate energy sources. • Ensure staff are appropriately trained to conduct work requiring lockout/tagout. • Affix log or tag to equipment to ensure improper start-up or release of energy. • Execute an Energy Isolation Permit. • Electrical equipment and power tools must be operated and maintained in accordance with manufacturers' requirements. • Electrical equipment, tools, switches, and outlets must be protected from environmental elements. • Check manufacturers' requirements.
Extension cords	• Maintain order on project sites to avoid tripping hazards. Equipment, tools, extension cords, coolers and supplies must be kept away from areas with foot traffic. These items must be put away and stored in a safe manner at the end of the workday. • Extension cords with three-pronged grounding plugs must be plugged into a three-pronged outlet when using grounded tools.

SITE HAZARD SHEET

GRAVITY	
Uneven work surfaces, slips, trips, falls	• Keep site and walking pathways clear of obstacles and debris. • Keep work surfaces dry where possible. • Wear appropriate footwear for the conditions. Add traction devices (ice cleats, 'Yaktrax', etc.) to footwear as needed. • Take your time, stay alert, and be aware of the conditions. • Carry lightly: Avoid carrying heavy loads that could affect your balance. • Reduce your walking speed to allow for better balance and reaction time. • In mixed vegetation, rubble or debris, or walking over snow/ice use a walking stick/staff to 'investigate the ground' of your path. Or, lightly tap the ground with your foot to assess its stability.
Work overhead (e.g., lifting, dropped objects, loading, unloading)	• Always approach heavy equipment with an awareness of the swing radius and traffic routes of each piece of equipment and never go beneath a hoisted load. • Install barriers, shields, or screens around unsafe areas. • Identify and maintain safe walking areas. • Address overhead work concerns and avoid unsafe zones. • Keep a safe distance between you and any suspended loads, heavy equipment, or other line of fire hazards. • Never stand under a suspended load. • Avoid areas where there is potential for dropped objects. • Remain aware of stored energy, and where equipment or objects may fall when energy is released.

SITE HAZARD SHEET

MECHANICAL	
Hot surfaces	• Cover hot surfaces with materials that can withstand high temperatures and prevent direct contact. • Implement measures like ventilation, reflective shields, and air conditioning to reduce heat exposure. • Provide appropriate gloves, heat-resistant clothing, and other gear to protect workers from burns. • Identify potential hazards associated with hot surfaces and assess the risk of burns. • Educate workers on the risks of hot surfaces, how to identify hazards, and how to use personal protective equipment (PPE) effectively. • Conduct routine inspections to ensure controls are effective and PPE is in good condition. • Use clear warning signs, labels, and physical barriers to alert workers to hot surfaces.
Line of fire	• Install barriers, shields, or screens around unsafe areas. • Identify and maintain safe walking areas. • Address overhead work concerns and avoid unsafe zones. • Keep a safe distance between you and any suspended loads, heavy equipment, or other line of fire hazards. • Never stand under a suspended load. • Avoid areas where there is potential for dropped objects. • Remain aware of stored energy, and where equipment or objects may fall when energy is released.
Rotating equipment	• Personnel should exercise caution when working near rotating equipment to prevent entanglement with clothing, placing body parts near pinch points on equipment, or using equipment on slopes or unstable surfaces. • Site personnel and visitors who are not performing the necessary work shall remain at a distance of at least 15 feet away from moving parts on such equipment.
Sharp objects	• Staff members are required to wear ANSI cut score A2 gloves whenever there is potential for cutting hazards on site.

SITE HAZARD SHEET

MOTION	
Driving (e.g., vehicle, UTV)	• Always wear seat belts when operating vehicles or heavy equipment, unless the equipment is designed for stand-up operation or lacks a rollover protective structure. • Check vehicles and equipment before each shift to ensure all parts and accessories are in safe working condition. • Obey all traffic laws and any additional on-site vehicle rules. • Do not use cell phones or other distractions while driving. • Allow adequate travel time to avoid speeding. • Only drive on roadways or grades that are safely constructed and maintained. • Do not exceed a vehicle's rated load or lift capacity. • Do not carry passengers unless the vehicle is equipped with a designated and safe seating area. • Operators must meet all requirements (e.g., licenses, certifications, training) for the specific equipment they are using. • Do not drive in reverse with an obstructed rear view unless the vehicle has an audible reverse alarm or a spotter signals it is safe. • Use a dedicated spotter when operating or maneuvering heavy equipment. • Set parking brakes when vehicles are parked, and chock wheels if on an incline. • Lower or block buckets and place all controls in neutral when equipment is not in use. • Ensure all vehicles have adequate braking systems and safety devices. • Use traffic signs, barricades, or flaggers when working near public roadways. • Clearly define work zones using reflective tape, traffic cones, or similar markers. • Use orange flashing lights to alert drivers to hazards or changes in traffic patterns. • Workers must wear high-visibility clothing.
Projectiles	• Be aware that many tasks, such as cutting, grinding, or prying, can create flying debris or projectiles. • Implement controls to prevent tools and materials from falling, such as securing tools, using toe boards, guardrails, debris nets, or canopies. • Secure materials that could become airborne or projectiles. • Use tool tethers to prevent tools from falling from heights and becoming projectiles.

HALEY ALDRICH

SITE HAZARD SHEET

MOTION	
	• Barricade areas where work creating projectiles is taking place and prevent unauthorized personnel. • Wear proper personal protective equipment (PPE), including hard hats, eye protection, and safety toed boots.
Traffic (vehicle, pedestrian, heavy equipment, plant operations)	• Stay clear of traffic patterns and high-traffic areas. • Watch for debris that may be kicked up by passing vehicles. • Avoid inhaling exhaust fumes from heavy equipment. • Obey all traffic laws and on-site vehicle rules. • Use traffic signs, barricades, or flaggers when working near public roadways. • Wear high-visibility clothing. • Always establish eye contact with the equipment operator before entering a work zone. • The operator must place the equipment in a neutral energy state (e.g., stop coring or rotating) and remove hands from the controls. • Only approach once the equipment is neutralized and the operator's hands are off the controls. • The operator must keep hands off the controls while anyone is in the work zone. • Maintain visual contact with the operator at all times. • Stay out of the equipment's strike zone and swing radius. • Never position yourself between a fixed object and moving equipment or two pieces of moving equipment. • Use a spotter or backer when moving equipment, if possible. • Be especially alert near heavy equipment due to the risk of mechanical failure or breakage.

SITE HAZARD SHEET

PRESSURE	
Compressed gases	Compressed gases pose both physical and chemical hazards, depending on the type of gas. These gases can range from inert and non-reactive to highly toxic, flammable, or explosive. Due to the high pressure inside cylinders, any physical damage or exposure to high temperatures can result in serious incidents. • All compressed gas cylinders must be: – Clearly labeled with the name of their contents in accordance with the Occupational Safety and Health Administration (OSHA) and other applicable regulations. – Accompanied by a Safety Data Sheet (SDS), which must be obtained and maintained for each type of gas. • Always store, transport, and use cylinders upright with the valve facing up. Secure them using appropriate supports such as racks, straps, chains, or stands to prevent tipping or falling. • Protect cylinder valves with standard caps when not in use—this applies to both full and empty cylinders. • Never force a cap or regulator; caps should be hand-tightened only. • Avoid exposing cylinders to excessive moisture, corrosive chemicals, or fumes. • Do not store cylinders near combustible materials or in areas subject to extreme temperatures. • Never transfer gases from one cylinder to another (except for dry ice or cryogenic materials). Do not attempt to refill compressed gas cylinders. • Before use, slowly "crack" the valve to clear dust or debris—ensure the opening is pointed away from people. Take extra precautions with toxic or flammable gases. • Do not stand in front of the regulator gauge when opening the valve. • Always use the correct pressure regulator for specific gas. Never operate a cylinder without a regulator. • Before opening the cylinder, ensure the regulator's adjusting screw is released. Never allow gas to enter the regulator suddenly. • If a leak occurs between the cylinder and regulator, close the valve before attempting to tighten the union nut. • Never strike an electric arc on a cylinder. • Do not use damaged, corroded, or leaking cylinders. Remove them from service immediately and contact the supplier for a return or replacement.

SITE HAZARD SHEET

PRESSURE	
Line of fire (hydraulics, etc.)	• Prior to work on hydraulic or pneumatic systems, the energy source shall be turned off and existing pressure drained. • Install barriers, shields, or screens around unsafe areas. • Identify and maintain safe walking areas. • Injection hoses operating under pressure may release stored energy if connections fail or hoses otherwise become dislodged. • Oversight personnel may be sprayed with injection chemicals and/or be injured by violent hose movements. • Staff members shall maintain a safe distance from connection points during injection activities and wear safety glasses. • Should the need arise to stand closer to connection points, a face shield should be worn over safety glasses. • Contractors should be using whip checks to secure hoses that may become loose or dislodged.

SITE HAZARD SHEET

RADIATION	
Sun	• Exposure to ultraviolet light from working outdoors can cause sunburn and can lead to skin cancer. Staff members are encouraged to liberally apply sunscreen, with a minimum sun protection factor of SPF 30. when working outdoors. Sunscreen selected should protect against both ultraviolet A/ultraviolet B (UVA/UVB) rays. Staff members should work in the shade whenever practical. • Prevention of over-exposure and sunburn will be completed by wearing appropriate clothing and using sunscreen. Long-sleeve breathable shirts are recommended to avoid sun exposure to the arms. All staff members are required to wear long pants and boots as part of their PPE and will eliminate sun exposure to legs and feet. • Additionally, staff wear safety glasses offering protection from UVA/UVB rays.

SITE HAZARD SHEET

SOUND	
Loud equipment (e.g., impact noise, noise from tools)	• Wear appropriate hearing protection, such as earplugs or earmuffs in high-noise areas. • Check the Noise Reduction Rating (NRR) of your hearing protection to ensure it provides adequate protection for the noise levels you're exposed to. • Maintain distance from loud equipment whenever possible to reduce noise exposure. • Take regular breaks in quiet areas to give your ears time to recover from prolonged noise exposure. • Use tools like the National Institute for Occupational Safety and Health (NIOSH) Sound Level Meter app to monitor and understand noise levels on-site and assess the need for hearing protection. • Be aware of the potential for sudden loud noises. While it's best to wear hearing protection at all times in noisy environments, always follow posted signage indicating when hearing protection is required.

APPENDIX G
NYSDOH CAMP Guidance Document

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.