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REMEDIAL INVESTIGATION WORK PLAN
PROPOSED 227 WESTCHESTER AVENUE DEVELOPMENT
PORT CHESTER, NEW YORK

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

for
Yorkland Partners, LLC, 227 Westchester LLC, and 204 Irving Two LLC
New York, New York

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August 2025



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PROPOSED 227 WESTCHESTER AVENUE DEVELOPMENT

223-225, 227 WESTCHESTER AVENUE & 204, 206-208, 214-220 IRVING AVENUE

PORT CHESTER, NEW YORK

PREPARED ON BEHALF OF

YORKLAND PARTNERS, LLC, 227 WESTCHESTER LLC & 204 IRVING TWO LLC

NEW YORK, NEW YORK

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Certification

I, Mari C. Conlon, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with the applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation's Technical Guidance for Site Investigation and Remediation (DER-10).

Mari Cate Conlon

Mari C. Conlon, P.G.

August 8, 2025

Date

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1. Introduction

On behalf of the Applicants, Yorkland Partners, LLC, 227 Westchester LLC and 204 Irving Two LLC (the Applicants), H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) has prepared this Remedial Investigation Work Plan (RIWP) for the Proposed 227 Westchester Avenue Development located at 223-225, 227 Westchester Avenue (Lots 24 and 25, respectively) & 204, 206-208, 214-220 Irving Avenue (Lots 30, 31, 32, and 33, respectively) (see Figure 1) in Port Chester, New York (Site). This RIWP was prepared in accordance with the regulations and guidance applicable to the Brownfield Cleanup Program (BCP).

The Site is currently composed of six lots (pending lot merger), four of which are developed and two are undeveloped. Site features include a one-story commercial building occupied by a restaurant and a three-story residential building with a partial basement and an adjoining paved alleyway (Lot 24), a three- to four-story mixed-use building with a full basement and rear yard occupied by office/retail spaces on the upper floors and a restaurant and tap room on the first floor (Lot 25), a one-story commercial building occupied by offices and a carpentry workshop/warehouse (Lot 30) and a three-story mixed-use building occupied by an auto parts retail shop and auto-maintenance garage on the first floor and residential spaces on upper floors (Lot 31). Lots 32 and 33 are undeveloped.

According to the Port Chester Zoning Map, the Site is located within an urban core character district (CD-6) characterized by low-rising commercial and residential buildings.

The project is in the pre-development phase. The proposed future development will consist of the construction of a new twelve-story residential building with 410 units, including 10 percent or 41 affordable units, sub-grade and at-grade parking with 365 parking spaces, and approximately 2,140 square feet of retail space at street level. The new development is anticipated to encompass the entire Site footprint and require Site-wide excavation to approximately 25 feet (ft) below grade surface (bgs) to accommodate construction. The Village of Port Chester Planning and Development Board issued final site plan approval on November 27, 2023.

1.1 PURPOSE

Previous investigations conducted at the Site identified the presence of contaminated soil/fill with exceedances of heavy metals and semi-volatile organic compounds (SVOCs), specifically polycyclic aromatic hydrocarbons (PAHs), in surficial soils, total metals and PAHs in subsurface soils, petroleum-related volatile organic compounds (VOCs) in groundwater, and chlorinated volatile organic compounds (CVOCs), including tetrachloroethene (PCE) and trichloroethene (TCE), in soil vapor. Contaminants of concern identified are believed to have resulted from previous operations, including dry cleaning and an oil service station relating to auto repair, and an observed aboveground storage tank (AST). Historical soil, groundwater, and soil vapor analytical data collected at the Site are provided as attachments to the reports included in Appendix A.

Previous investigations did not comprehensively delineate the extent of soil, groundwater, and soil vapor contamination on the Site. Results of the additional sample analyses proposed in this RIWP will be used to confirm results of previous investigations, delineate on-Site source(s), and determine a course for remedial action.

2. Background

2.1 CURRENT LAND USE

The Site is currently composed of six lots, four of which are developed and two are undeveloped. Site features include a one-story commercial building occupied by a restaurant and a three-story residential building with a partial basement and an adjoining paved alleyway (Lot 24), a three- to four-story mixed-use building with a full basement and rear yard occupied by office/retail spaces on the upper floors and a restaurant and tap room on the first floor (Lot 25), a one-story commercial building occupied by offices and a carpentry workshop/warehouse (Lot 30) and a three-story mixed-use building occupied by an auto parts retail shop and auto-maintenance garage on the first floor and residential spaces on upper floors (Lot 31). Lots 32 and 33 are undeveloped with grassy and partially asphalt paved areas.

2.2 SITE HISTORY

Based on the Phase I Environmental Site Assessment (ESA) completed by Haley & Aldrich of New York in March 2023, the Site was partially developed with dwellings, commercial storefronts and a church as early as 1890. By the 1930s, the Site was entirely developed with commercial and residential buildings. Former operations at Lot 30 include a garage, warehouse, and Empire Oil Service operating from the 1930s through the 1980s. Former operations such as these have the potential to impact the subsurface conditions with petroleum-related compounds. Several current and former uses at the Site are also known to frequently involve the use of chlorinated solvents. Operations such as these include a former bowling alley at Lot 25 operating from the 1930s through the 1950s, and a former dry cleaner at Lot 24, operating from the 1970s through the 1980s. Site structures have remained unchanged since at least 1950.

Based on findings from the February 2024 Limited Phase II Environmental Site Investigation (ESI), material underlying the Site generally consists of light brown to black sand with varying amounts of gravel, brick, concrete, asphalt, and organic material observed from surface grade to depths between 5 and 12 ft bgs in each soil boring. Specifically, this material was observed to a depth of 5 ft bgs on Lots 24 and 33; 6 ft bgs on Lots 25 and 30; 7 ft bgs on Lot 31; and 12 ft bgs on Lot 32. At locations where exploration extended deeper than the observed surficial soil layer, surficial soils were underlain by brown sand that extended to depths of at least 20 ft bgs (the maximum depth of exploration).

The topography of the Site is generally flat with a gentle slope to the east. The ground level elevation on the Site is approximately 50 ft above mean sea level (amsl). During the February 2024 Limited Phase II ESI, groundwater was generally encountered at depths ranging from about 6 to 10 ft bgs, with one location in the eastern portion of the Site at about 4 ft bgs. The ground elevation at the Site slopes to the east, and the disparity in depth to groundwater is due to this elevation difference. The inferred regional groundwater flow direction for the area surrounding the Site is to the southeast toward the Byram River and Long Island Sound. The depth to bedrock is unknown.

Contaminants of concern identified are believed to have resulted from previous operations, including dry cleaning and an oil service station, relating to auto repair and an observed AST.

There are two Spill Cases associated with the Site, both of which have received regulatory closure. It is noted that the contamination resulting from these historic spill cases is unrelated to the contamination identified in the February 2024 Limited Phase II ESI discussed in Section 2.5. Historic Spill Cases are detailed below:

- Spill Case No. 0314125, located on the northeast corner of Lot 25, was reported in 2004 when one 5,000-gallon fuel oil underground storage tank (UST) and one 1,000-gallon fuel oil UST were removed from Lot 25. Reportedly, the spill resulted from tank failure, and petroleum-impacted soil was encountered during subsequent excavation. The environmental database report indicates that the Westchester County Department of Health recommended No Further Action, and the case received regulatory closure on May 3, 2004. A Subsurface Investigation was performed in October 2013 to investigate the soil in the former UST area. Five soil samples, collected between 5 and 8 ft bgs, were submitted to a laboratory for VOCs and SVOC analysis. Analytical results were compared to Soil Cleanup Levels for Fuel Oil-Contaminated Soil provided in the NYSDEC CP-51 Soil Cleanup Guidance. No exceedances of these criteria were noted.
- Spill Case No. 9803446, located on Lot 24, was reported on June 17, 1998, when petroleum-impacted soils were noted during removal of a #2 fuel oil UST. The Site was observed on June 22, 1998, but the excavation where impacted soils were observed had already been filled and paved over. Spill Case No. 9803446 received regulatory closure on December 11, 1998. No further information is provided in the environmental database report.

While the spill cases above resulted in petroleum-based contamination, the petroleum impacts identified on Lot 31 during the February 2024 Limited Phase II ESI discussed in Section 2.5 are approximately 100 ft to the west of the impacts associated with these spill cases. Further, as observed in the Limited Phase II, the assumed source of this contamination was independent of the USTs noted above and is the likely result of an aboveground storage tank and auto-related operations observed at Lot 31.

2.3 SURROUNDING LAND USE

According to the Port Chester Zoning Map, the Site is located within an urban core character district (CD-6).

The Site is bound by Irving Avenue followed by mixed-use commercial and residential buildings to the north, Westchester Avenue followed by mixed-use commercial buildings to the south, mixed-use commercial buildings and the Port Chester Fire Department to the east, and a parking lot followed by mixed-use commercial buildings to the west. The Site is located within a disadvantaged community based on the Criteria defined by the Climate Justice Working Group and is also 100 percent within an En-zone.

There are four sensitive receptors within a 500-ft radius of the Site, listed below and shown on Figure 2:

1) Port Chester Head Start school, 17 Spring Street, Port Chester, New York 10573.
2) Sunny Side Daycare Center, 27 Smith Street, Port Chester, New York 10573.
3) Port Chester-Rye Brook Public Library, 1 Haseco Avenue, Port Chester, New York 10573.

4) Saavedra Healthcare Center medical clinic, 216 Westchester Avenue, Port Chester, New York 10573.

2.4 SURROUNDING LAND USE HISTORY

Historical uses of the surrounding properties up- and cross-gradient to the Site were for commercial and residential purposes. Historical use of adjoining and up-gradient properties included auto body shops, potential dry cleaners, restaurants, barber shops, dwellings, and a small garage. Auto body facilities and potential dry cleaners may have included the use and disposal of hazardous materials and petroleum.

2.5 PREVIOUS INVESTIGATIONS

To date, the following reports and investigations have been performed at the Site:

1. September 2013 Phase I ESA, 223-225 Westchester Avenue, prepared by GO Environmental (included as appendix to March 2023 Phase I ESA prepared by Haley and Aldrich of New York).
2. October 2013 Subsurface Investigation Report, 223-225 Westchester Avenue, prepared by GO Environmental (included as appendix to March 2023 Phase I ESA prepared by Haley & Aldrich of New York).
3. November 2021 Phase I ESA, 227 Westchester Avenue, prepared by Property Solutions Inc. (included as appendix to March 2023 Phase I ESA prepared by Haley & Aldrich of New York).
4. September 2022 Phase I ESA, 206-208 and 214-220 Irving Avenue, prepared by Property Solutions Inc. (included as appendix to March 2023 Phase I ESA prepared by Haley and Aldrich of New York).
5. March 2023 Phase I ESA, 223-225 and 227 and 204, 206-208, 214-220 Irving Avenue, prepared by Haley & Aldrich of New York.
6. February 2024 Limited Phase II ESI, 223-225, 227, 204, 206-208, and 214-220 Irving Avenue prepared by Haley & Aldrich of New York.

Full copies of the above-referenced reports are included in Appendix A. A summary of environmental findings of these investigations is provided below.

September 2013 Phase I Environmental Site Assessment, 223-225 Westchester Avenue Prepared by GO Environmental

GO Environmental conducted a Phase I ESA for Lot 25 in September 2013. Lot 25 was developed with a Church in the late 1800s prior to being improved with the current three- to four-story mixed-use building, which originally housed retail stores on the first floor, a bowling alley on the second floor, and offices on the third and fourth floors. The bowling alley was later converted to a dance hall, and ultimately to office spaces. The first floor currently houses a restaurant. The Phase I ESA revealed one Recognized Environmental Condition (REC) in connection with the Site. In March 2004, one 5000-gallon UST and one 1,000-gallon UST, both holding fuel oil, were removed from an area northwest of the Building on Lot 25. Petroleum-impacted soils were reportedly remediated at the time of the tank removal; however, closure documentation for the USTs was not available at the time of the Phase I ESA. The Environmental Data Resources (EDR) Radius Map Report indicates that the Westchester County

Department of Health (DOH) reviewed a closure report and recommended no further action; however, no additional information was provided to confirm that the DOH issued a No Further Action letter. A Freedom of Information Request was submitted to DOH on July 25, 2013. On September 12, 2013, the DOH responded that they had no information or records on file regarding the Site. The lack of documentation regarding the subsurface soil conditions and the lack of written confirmation of the DOH recommendation for no further action represent data gaps.

Historical uses of the surrounding properties up- and cross-gradient to the Site were for commercial and residential purposes. Historical use of adjoining and up-gradient properties included auto body shops, potential dry cleaners, restaurants, barber shops, dwellings, and a small garage. Auto body facilities and potential dry cleaners may have included the use and disposal of hazardous materials and petroleum.

October 2013 Subsurface Investigation Report, 223-225 Westchester Avenue Prepared by GO Environmental

On October 17, 2013, GO Environmental completed a sampling event at the Site (Lot 25) to investigate whether petroleum-impacted soils remained in the area of the former fuel oil USTs. A total of five soil borings were advanced to depths of 6 to 8 ft bgs using a direct-push rig, with one soil sample collected from each soil boring (B1-B5) and submitted to a laboratory for VOC and SVOC analysis. Soils recovered consisted primarily of dark brown, fine- and medium-grained sand and clay. SVOCs were detected in one soil boring (B1) at concentrations below New York State Department of Environmental Conservation (NYSDEC) soil cleanup levels. No VOCs or SVOCs were detected in any other soil samples submitted for analysis.

November 2021 Phase I Environmental Site Assessment of Mixed-Use Property 227 Westchester Avenue Prepared by Property Solutions Inc.

Based on a Phase I ESA completed by Property Solutions Inc. for Lot 24 in November 2021, the Site has been utilized for residential purposes since pre-1890 and for commercial purposes since the mid-1930s. The Phase I ESA revealed four RECs in connection with the Site, as follows:

REC #1: Review of the city directories identified a potential dry cleaner on the subject property from at least 1962 to 1987 (Piel's Tailor and Cleaners). The dry cleaner was presumably located in the commercial subject building, which is currently occupied by Delicia Restaurant. No other information was available. Due to the historic use of chlorinated solvents in dry cleaning operations, the absence of a RCRA hazardous waste listing for proper management and disposal practices during this time period, and the ability of chlorinated solvents to migrate through concrete floors, the former dry cleaner represents a REC.

REC #2: The subject property is listed in the NY SPILLS database in the environmental database report and the NYSDEC Spill Incidents database for Spill No. 9803446. According to these listings, the subject property was being converted from fuel oil to natural gas. Con Edison reportedly found soil contamination during the conversion activities and/or removal of the UST on June 17, 1998. The subject property was examined on June 22, 1998, but the excavation where contamination was observed had already been filled and paved over. No further information is provided in the Spill case listing summarized in the environmental database report.

Based on the information available, the removed UST contained #2 fuel oil apparently for onsite consumption at the residential building, and therefore was a non-regulated UST. While the spill case was closed on December 11, 1998, the identified soil contamination without any records of follow-up investigation and remediation indicates that soil contamination remains. The listing also does not discuss the condition of the UST upon its removal; therefore, the source of the soil contamination is not identified. It should be noted that the east adjoining property at Lot 25 has an LTANKS case related to the removal of a #2 fuel oil UST in 2004.

Based on the limited information in the listings for the subject property, and no follow-up investigation and remediation records, it appears that soil contamination was identified at the subject property and was not addressed. Consequently, this is identified as a REC.

September 2022 Phase I Environmental Site Assessment of 206-208 and 214-220 Irving Avenue Prepared by Property Solutions Inc.

Based on a Phase I ESA completed by Property Solutions Inc. for the Site (Lots 31, 32, and 33) in September 2022, the Site has been utilized for residential and commercial purposes since 1910. The Phase I ESA revealed two RECs in connection with the Site. The RECs identified for Lots 31, 32, and 33 are as follows:

REC #1: Review of the fire insurance maps revealed that the subject building was constructed after 1895 and prior to 1902. The building on the western portion of the subject property was constructed in the early 1900s and demolished between 1990 and 1994. The 1934 and 1950 Sanborn maps show that the subject building and half of the western building were occupied by a cleaning and pressing tenant. It is likely that dry cleaning operations occurred on the subject property. Due to the historic use of chlorinated solvents in dry cleaning operations, the absence of a RCRA hazardous waste listing for proper management and disposal practices during this time period, and the ability of chlorinated solvents to migrate through concrete floors, the former dry cleaner represents a REC.

REC #2: The AST located on the south side of the subject building reportedly contains used motor oil generated from vehicular oil changes conducted at the subject property. The AST was observed to be in direct contact with the ground, with the bottom minimally buried in surface soils. Significant staining was observed on the soils surrounding the AST. Based on the above information, the AST represents a REC.

March 2023 Phase I ESA Prepared by Haley & Aldrich of New York

Based on the Phase I ESA completed by Haley & Aldrich of New York in March 2023, the Site was partially developed with dwellings, commercial storefronts, and a church as early as 1890. By the 1930s, the subject property was entirely developed with commercial and residential buildings. By the 1930s, the subject property's uses changed to operations that are known to frequently use materials with the potential to impact the subsurface soil, groundwater, and/or soil vapor conditions. Former operations at Lot 30 include a garage, warehouse, and Empire Oil Service operating from the 1930s through the 1980s. Former operations such as these have the potential to impact the subsurface conditions with petroleum-related compounds. Several current and former uses at the subject property are also known to frequently involve the use of chlorinated solvents. Operations such as these include a bowling alley at

Lot 25 from the 1930s through the 1950s, and a dry cleaner at Lot 24, operating from the 1970s through the 1980s.

The March 2023 Phase I ESA identified the following RECs and Historical RECs (HRECs) in connection with the Site[1]:

<u>REC #1: Used Motor Oil Aboveground Storage Tank (AST) at Lot 31</u>
An AST located outside along the rear wall of the auto repair and parts store at 206 Irving Avenue was observed to be staged directly on the ground surface, with no secondary containment or spill prevention measures in place. Petroleum-like odors were noted near the tank, and staining was observed on the ground surrounding the tank. Due to the poor integrity of the tank and lack of preventative measures in place, coupled with the petroleum-like odors and staining observed surrounding the tank, the potential for former release(s) exists and subsurface media may have been impacted; therefore, this is considered a REC.

<u>REC #2: Dry Cleaning, Furniture Restoration, and Bowling Alley Operations</u>[2]
According to historical records, the subject property has been previously operated by dry cleaners, both at Lot 31 and Lot 24, and a former bowling alley at the Lot 25 parcel. Additionally, there is a current furniture restoration operation at Lot 30. Due to the frequent use of chlorinated solvents in these operations, lack of documented disposal practices during the operational time periods, and the ability of chlorinated solvents to migrate to the subsurface, these former and current operations represent a REC.

<u>REC #3: Historical Operations at Lot 30</u>
According to historical records, the Lot 30 parcel has been previously operated by Empire Fuel Oil Service in addition to being operated as a garage and warehouse. The nature of these operations has the potential to adversely impact the subject property, and therefore represents a REC.

The following RECs listed below were identified in connection with the subject property due to the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment.

<u>REC #4: Semi-Volatile Organic Compounds and Metals in Soil</u>
Analytical results from soil samples collected as part of this Limited Phase II Environmental Site Investigation (ESI) reported semi-volatile organic compounds (SVOCs) and metals above NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs) at the subject property.

[1] RECs #4, #5, and #6 make references to data that was collected in November 2022, August 2, 2023, and January 9, 2024, during the subsurface investigation described in this letter report.
[2] Operations at Lot 30 were further reviewed when the Applicant purchased the property in December 2023. The property is currently utilized as a carpentry workshop/warehouse, specifically for constructing high-end cabinetry. The current occupant indicated that occasional painting is performed in a designated room with no floor drains and all paints are non-toxic. Non-toxic paints and electric-powered air circulators are used to facilitate ventilation.

<u>REC #5: Petroleum-Related Volatile Organic Compounds and LNAPL in Groundwater</u>
Analytical results from a groundwater sample collected as part of this Limited Phase II ESI reported petroleum VOCs above NYSDEC Ambient Water Quality Standards (AWQS) at the subject property. Light non-aqueous phase liquid (LNAPL) was observed in temporary monitoring well TWP-02 between approximately 6.2 and 6.25 feet below ground surface (bgs).

<u>REC #6: Chlorinated Volatile Organic Compounds in Soil Vapor</u>
Analytical results from soil vapor samples collected as part of this Limited Phase II ESI reported detections of chlorinated volatile organic compounds (CVOCs) in soil vapor at the subject property.

<u>HREC #1: Historic Fuel Oil Spill at Lot 25</u>
Two fuel oil USTs associated with the buildings at Lot 25 were reportedly removed in March 2004. NY SPILL case No. 0314125 was initiated, and fuel oil-contaminated soil was reportedly encountered. An environmental database report included a description of a memo stating that the Westchester County Department of Health recommended No Further Action and noted that the case was closed in May 2004. In 2013, soil samples were collected from between 5 and 8 feet bgs in the location of the former USTs and analyzed for volatile organic compounds (VOCs) and SVOCs. Soil analytical results were not reported above the current Soil Cleanup Levels for Fuel Oil-Contaminated Soil provided in the NYSDEC CP-51 Soil Cleanup Guidance standards. Due to the listed regulatory closure and results of the subsurface investigation, this is considered to represent an HREC.

February 2024 Limited Phase II ESI Prepared by Haley & Aldrich of New York

Haley & Aldrich of New York completed a limited Phase II ESI at the Site to investigate soil, groundwater, and soil vapor quality beneath the site. Fill material underlying the Site generally consists of light brown to black sand with varying amounts of gravel, brick, concrete, asphalt, and organic material was observed from surface grade to depths between 5 and 12 ft bgs Site-wide. At locations where exploration extended deeper than the observed fill layer, underlain material was comprised of brown sand that extended to depths of at least 20 ft bgs (the maximum depth of exploration).

Field observations and analytical results identified fill contaminated with heavy metals and SVOCs (specifically PAHs). PAHs and total metals exceeding RRSCOs were observed throughout the Site in soil samples collected up to 5 ft bgs. Petroleum impacts were noted in the vicinity of the auto repair shop and operational AST located at Lot 31, including elevated VOC detections in soil and groundwater, observed light non-aqueous phase liquid (LNAPL) in groundwater from a temporary well point, and petroleum-like odors and elevated photoionization detector (PID) readings in soil down to 12 ft bgs. Soil vapor analytical results indicated the presence of CVOCs, specifically TCE and PCE, above laboratory detection limits in multiple soil vapor samples. TCE and PCE were also reported below the RRSCOs but above laboratory detection limits in shallow soil samples. A summaries of the soil, groundwater, and soil vapor analytical data obtained from previous investigations conducted at the Site are displayed on Figures 3, 4, and 5.

3. Remedial Investigation

This section describes the field activities to be conducted during the Remedial Investigation (RI) 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 Figure 6. The following activities will be conducted to fill data gaps and determine the nature and extent of contamination at the Site.

3.1 UTILITY MARKOUT

A geophysical survey was performed by Coastal Environmental Solutions, Inc. (Coastal) for the entire Site on November 3, 2022. The geophysical findings report, provided in the Phase II ESA Report by Coastal, dated November 8, 2022, is provided as Appendix B.

A GPR scan 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 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 the 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 SELECTIVE DEMOLITION AND CLEARING/GRUBBING

Although Site-wide demolition is not required prior to RI fieldwork, partial selective demolition may occur to improve access and support Site characterization. Asbestos abatement will be completed prior to demolition.

The existing structures limit access for implementing the RI due to interior wall configuration, low ceilings, and above-grade structural obstructions in certain areas. To facilitate intrusive investigation activities, selective demolition will involve partial removal of above-grade interior building elements, such as non-structural walls, ceilings, and partitions. This work will improve access and working space while maintaining structural stability. No below-grade structural components will be removed, and all existing floor slabs will remain in place and be undisturbed until notice of planned foundation demolition is provided to NYSDEC. Should selective demolition be insufficient to facilitate RI activities, full demolition of above-grade structures may be required; however, foundation and existing concrete floor slabs would not be disturbed and remain intact until the selected remedy is approved by NYSDEC.

Figure 7 identifies the areas currently anticipated will need partial selective demolition to facilitate RI activities.

3.3 SOIL SAMPLING

To further characterize surface soil conditions, additional on-Site soil samples will be collected to meet NYSDEC Division of Environmental Remediation (DER)-10 requirements for remedial investigations.

The sampling and analysis plan is summarized in Table 1. A total of 17 soil borings will be installed to 25 ft bgs by a track-mounted direct-push drill rig (Geoprobe®) or a sonic drill rig operated by a licensed operator. Soil samples will be collected from acetate liners using a stainless-steel trowel or sampling spoon. Samples will be collected using laboratory-provided clean bottle ware. VOC grab samples will be collected using terra cores or encores.

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

Soil samples representative of Site conditions will be collected at 17 locations widely distributed across the Site, as shown in Figure 6. Soil samples proposed from areas with concrete or asphalt cover will be collected from shallow soil below the cover (0 to 0.5 ft bgs); the 2-ft interval at the groundwater interface (to be determined in the field but anticipated to range from 4 to 6 ft bgs in the eastern region of the Site and between 8 to 10 ft bgs in the western region of the Site); the deepest interval of urban fill observed (to be determined in the field but anticipated between 5 to 12 ft bgs) or the greatest degree of impacts observed; and the approximate development depth (23 to 25 ft bgs). To assess immediate potential human exposure via direct contact, shallow soil sampling at proposed soil boring locations where vegetative cover and/or exposed soil are present will include a 0 to 2-inch (in.) sample for all analytes except VOCs, and a 2- to 6-in. sample for VOCs analysis. Additional samples will be collected from any interval exhibiting elevated PID readings or visual and olfactory impacts. Soil samples will be analyzed for:

- Target Compound List (TCL) VOCs + 10 highest-concentration VOC tentatively identified compounds (TICs) using United States Environmental Protection Agency (USEPA) method 8260C;
- TCL SVOCs + 20 highest-concentration SVOC TICs using USEPA method 8270D;
- Total Analyte List (TAL) metals using USEPA method 6010;
- Total cyanide using USEPA method 9012;
- Polychlorinated biphenyl (PCBs) using USEPA method 8082A;
- TCL pesticides using USEPA method 8081B;
- Per- and polyfluoroalkyl substances (PFAS) by USEPA method 1633A; and
- 1,4-dioxane by USEPA method 8270.

Samples to be analyzed for PFAS and 1,4-dioxane will be collected and analyzed in accordance with the NYSDEC April 2023 “Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS)” and the June 2019 Sampling for “1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under

DECs Part 375 Remedial Programs," respectively. All PFAS samples collected after July 15, 2025 will be analyzed using EPA Method 1633A.

Soil analytical results will be compared to NYSDEC Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs), Protection of Groundwater SCOs (PGWSCOs), and Restricted Residential SCOs (RRSCOs).

3.4 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 remedial investigations.

Groundwater at the Site was encountered between approximately 6 and 10 ft bgs during the February 2025 Limited Phase II. Specifically, groundwater was encountered at approximately 6 ft bgs in the eastern region of the Site, with a shallower depth of approximately 4 ft bgs observed at one location, and 8 to 10 ft bgs in the western region of the Site. Of note, the ground elevation at the Site slopes to the east, and the disparity in depth to groundwater is due to this elevation difference. Groundwater is still anticipated to flow in a southeasterly direction toward the Byram River, located approximately 0.32 miles from the Site, and Long Island Sound, located approximately 1 mile from the Site.

Seven 2-in. permanent monitoring wells will be installed using a direct-push drill rig (e.g., Geoprobe®) operated by a licensed operator. If necessary, another appropriate and industry-standard drilling method may be used based on subsurface conditions. Wells will be advanced to approximately 15 ft bgs or to at least 5 ft below the groundwater interface (if encountered at a shallower depth).

Each monitoring well will be constructed using a 2-in. diameter polyvinyl chloride (PVC) riser pipe with 5- or 10-ft long, 0.010-in. (10-slot) slotted PVC screen installed to straddle the groundwater interface. The annular space will be backfilled with clean No. 2 silica sand to approximately 2 ft above the top of the screen. A bentonite seal (minimum 2 ft thick) will be placed above the sand pack, and the remaining borehole will be grouted to the surface using bentonite, cement, bentonite, or non-impacted soil cuttings. Each well will be completed at grade with steel flush-mount protective covers or stick-up covers equipped with protective bollards and secure lock mechanisms.

Monitoring wells will be developed in accordance with ASTM D5521 after the grout seal has sufficiently cured to remove water which may have been introduced during the drilling process. Development will be performed using a surge pump to mobilize fine-grained material from the well. Development will continue until turbidity is at or below 50 nephelometric turbidity units (NTU), or until ten well volumes have been removed, if possible.

Groundwater sampling will occur at a minimum of one week after monitoring well installation and development. 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 6. A conceptual monitoring well construction diagram is provided in Figure 8. Actual well construction details may vary based on field conditions.

Monitoring wells will be sampled and analyzed for:

- TCL VOCs + TICs (10 VOCs highest-concentration TICs) using USEPA method 8260C;
- TCL SVOCs + TICs (20 SVOCs highest-concentration TICs) using USEPA method 8270D;
- TAL metals (filtered and unfiltered) using USEPA method 6010;
- Total cyanide (filtered and unfiltered) using USEPA method 9012;
- PCBs using USEPA method 8082;
- TCL pesticides using USEPA method 8081B;
- PFAS using USEPA method 1633A; and
- 1,4-dioxane using USEPA method 8270D SIM isotope dilution.

PFAS and 1,4-dioxane samples will be collected and analyzed in accordance with the NYSDEC April 2023 "Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS)" and the June 2019 Sampling for "1,4-dioxane and PFAS Under DECs Part 375 Remedial Programs," respectively. All PFAS samples collected after July 15, 2025 will be analyzed using EPA Method 1633A.

Groundwater wells will be sampled using low-flow sampling methods 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 C details field procedures and protocols that will be followed during field activities. The QAPP presented in Appendix D details the analytical methods and procedures that will be used to analyze samples collected during field activities. PFAS sampling at each monitoring well will be conducted following the purge and sampling method detailed in the NYSDEC guidance documents (see Appendix E).

Groundwater analytical results will be compared to 6 NYCRR Part 703.5 NYSDEC Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values (AWQS).

3.5 INVESTIGATION DERIVED WASTE

All investigation-derived waste (IDW) will be managed in accordance with Section 3.3(e) of DER-10. Drill cuttings and/or spoil generated during the RI that appear to be clean (i.e., no visual contamination or presence of contamination-related odors) may be used to backfill the borehole from which they were removed. All excess drill cuttings and drill cuttings/spoil that appear to be contaminated will be containerized for off-Site disposal at a properly permitted treatment, storage, or disposal facility. Boreholes will be restored to grade with the surrounding area.

Groundwater purged from the monitoring wells during development and sample collection will be placed into a New York State Department of Transportation (NYSDOT)-approved 55-gallon drum pending off-Site disposal. All IDW, including soil, groundwater, and decontamination fluids, will be stored in labeled drums or other appropriate containers and staged in a secure, impervious area on the Site in a manner to prevent leakage, deterioration, or release of waste. All IDW will be transported off Site for disposal in a timely manner by a hauler licensed in accordance with 6 NYCRR Part 364. If the waste is determined to be hazardous, it will be shipped with a manifest in accordance with 6 NYCRR Part 372.

3.6 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). Thirteen vapor implants will be installed using a direct-push drill rig (e.g., Geoprobe®) or a sonic drill rig, depending on subsurface conditions, to advance a stainless-steel probe to the desired sampling depth. Soil vapor probes will be installed approximately 1 to 2 ft above the groundwater interface, with installation depths anticipated between 5 to 7 ft bgs, to be confirmed based on field observations. Sampling will occur over a two-hour duration.

Samples will be collected in appropriately sized Summa® canisters that have been certified clean by the laboratory, and samples will be analyzed by using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 liters per minute (L/min). Sampling methods are described in the FSP provided as Appendix C.

3.7 PROPOSED SAMPLING RATIONALE

Haley & Aldrich of New York has proposed the sample plan described herein and as shown in Figure 6, in consideration of the data generated during the previous investigations conducted at the Site. Previous investigations left data gaps throughout the Site, including a lack of analytical data for potentially high-risk areas that may have been impacted during historical Site operations. To properly characterize the Site and identify and delineate potential source areas, all phases of media will be comprehensively investigated as part of this RI, and data gaps will be evaluated.

In addition, the Limited Phase II ESI conducted by Haley & Aldrich of New York identified heavy metals and SVOCs (specifically PAHs) exceeding RRSCOs throughout the Site in soil up to 5 ft bgs. Petroleum impacts were noted in the vicinity of the auto repair shop and operational AST located at Lot 31, including elevated VOC detections in soil and groundwater, LNAPL observed in groundwater from a temporary well point, and petroleum-like odors and elevated PID readings in soil down to 12 ft bgs. In addition, CVOCs, including TCE and PCE, were identified in multiple soil vapor samples. TCE and PCE were also reported below the RRSCOs but above laboratory detection limits in shallow soil samples. These findings require additional investigation to ascertain and delineate on-Site source(s) and refine the findings of the previous investigations conducted at the Site.

The Proposed Sample Location Plan (included as Figure 6) is designed to generate sufficient data to identify the source of contamination and 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.

4. Green and Sustainable Remediation and Climate Resiliency

The work completed as part of this work plan will comply with all NYSDEC guidance documents, including Division of Environmental Remediation-31 (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 (LSDF) or alternate fuels (i.e., biodiesel or E85) when possible	Reduce air emissions	X
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 Remedial Investigation Report (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 H.

4.4 ENVIRONMENTAL FOOTPRINT ANALYSIS

A preliminary environmental footprint analysis has been performed using Spreadsheets for the Environmental Footprint Analysis (SEFA) for the RI. The RI would potentially export up to approximately 11.7 tons of non-hazardous waste off the Site to a recycling facility. Additionally, the RI will potentially result in air emissions during drilling and off-Site disposal required. The RI will require the collection, transportation, and analysis of soil, groundwater, and soil vapor samples. Results of the preliminary analysis, available in Appendix H, indicate the majority of greenhouse gas emissions to be the product of consumables and transportation associated with the RI.

5. Quality Assurance and Quality Control

Quality Assurance/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 D.

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 United States Environmental Protection Agency, 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 (EDD) 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 Division of Environmental Remediation. DUSRs will be included with the submittal of a Remedial Investigation Report (RIR), further discussed in Section 8.

7. Project Organization

A project team for the Site has been created based on qualifications and experience with personnel suited for successfully completing the project.

Mari Cate Conlon, P.G., will be the Principal in Charge and Qualified Environmental Professional (QEP) for this work. As the Principal in Charge, Ms. Conlon will be responsible for the overall completion of each task as per requirements outlined in this work plan and in accordance with the DER-10 guidance. As the QEP, Ms. Conlon will manage the day-to-day tasks, including coordination and supervision of field engineers and scientists, adherence to the work plan, and oversight of project schedule.

Elizabeth Fitzgerald will be the Project Manager for this work. Ms. Fitzgerald will be responsible for communications with the NYSDEC Case Manager regarding project status, schedule, issues, and updates for project work.

Nicole Mooney will be the Assistant Project Manager for this work and will also function as the Quality Assurance Officer (QAO). The QAO will assure the application and effectiveness of the QAPP by the analytical laboratory and the project staff, provide input to 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.

Matthew Cal will be the field geologist responsible for implementing the field effort for this work. His responsibilities will include implementing the work plan activities and directing the subcontractors to ensure successful completion of all field activities.

The drilling subcontractor will be Lakewood Environmental Services Corporation (Lakewood). Lakewood will provide a Geoprobe® operator to implement the scope of work in this RIWP.

The analytical laboratory will be Alpha Analytical of Westborough, Massachusetts, a New York Environmental Laboratory Approval Program (ELAP) certified laboratory. Alpha Analytical will be responsible for analyzing samples as per the analyses and methods identified in Section 2.

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 as Appendix F of this work plan. 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 remedy, 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) 40 CFR 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 health and safety plan 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 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 two locations downwind of the work area/exclusion zone. The proposed investigation work may be completed both indoors and outdoors. The CAMP will be implemented during all intrusive activities and the handling of contaminated or potentially contaminated media to protect downwind receptors. Background readings will be collected at each station prior to intrusive activities each day. 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 mobile devices that notifies 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 visible dust generation is observed, the intrusive work will be temporarily halted, and a more rigorous monitoring of VOCs and dust using recordable meters will be implemented in accordance with the NYSDOH Generic CAMP; CAMP data will be provided to NYSDEC in the daily reports, further detailed in Section 8. 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.

8.3 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT (QHHEA)

A comprehensive 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 EA (DER-10; Appendix 3B). The results of the QHHEA will be provided in the RIR. According to Section 3.10 of DER-10 and the Fish and Wildlife Resources Impact Analysis Decision Key in DER-10 Appendix 3C, a Fish and Wildlife exposure assessment will be performed (if needed) based on the results of the RI.

9. Reporting

Daily reports will be submitted to NYSDEC and NYSDOH summarizing the Site activities completed during the RI. Daily reports will include a Site figure, a description of Site activities, a photo log, and CAMP data. Daily reports will be submitted by the following business day after Site work is completed.

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

- A description of existing Site conditions;
- A summary of the fieldwork performed during RI activities;
- Figure showing sampling locations;
- Tables summarizing laboratory analytical results;
- Laboratory analytical data reports;
- DUSRs
- CAMP logs;
- Soil boring, test pit, and monitoring well logs;
- Daily reports;
- Findings regarding the nature and extent of contamination at the Site; and
- Conclusions and recommendations.

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

10. Schedule

The Site owner plans to implement this scope promptly after approval of this RIWP.

Task	Duration (days)	Start	End	2024									2025											2026										
				Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Preparation and Submission of BCP Application	90	4/1/2024	6/28/2024																															
30-Day Public Comment Period for BCP Application	30	7/17/2024	8/16/2024																															
Execute BCA and Preparation and Submission of CPP and RIWP	300	8/16/2024	6/1/2025																															
NYSDEC & NYSDOH Approval of RIWP	30	6/2/2025	7/1/2025																															
Implementation of Remedial Investigation	30	7/1/2025	8/1/2025																															
Preparation and Submission of RIR and RAWP	60	8/1/2025	10/1/2025																															
NYSDEC & NYSDOH Review of RIR & RAWP	60	10/1/2025	12/1/2025																															
45-Day Public Comment Period for RAWP and Issuance of Decision Document	45	12/1/2025	1/15/2026																															
Implementation of RAWP with Engineering Oversight	120	1/15/2026	5/15/2026																															
Preparation of FER and SMP (if required)	90	5/15/2026	8/1/2026																															
NYSDEC & NYSDOH Review of FER (and SMP, if required)	60	8/1/2026	10/1/2026																															
NYSDEC Issues COC	30	10/2/2027	12/31/2026																															

Notes:

1. *Schedule is estimated and subject to change.*
2. *Implementation of RAWP does not include completion of building construction*
3. *NYSDEC - New York State Department of Environmental Conservation*
4. *NYSDOH - New York State Department of Health*
5. *BCP - Brownfield Cleanup Program*
6. *BCA = Brownfield Cleanup Agreement*
7. *RIWP = Remedial Investigation Work Plan*
8. *CPP = Citizen Participation Plan*
9. *RIR = Remedial Investigation Report*
10. *RAWP - Remedial Action Work Plan*
11. *FER - Final Engineering Report*
12. *SMP - Site Management Plan*
13. *COC - Certificate of Completion*

References

1. Brownfield Cleanup Program Application. Proposed 227 Westchester Avenue Development. Prepared by Yorkland Partners, LLC & Haley & Aldrich of New York. Submitted March 2024.

2. Draft Phase I Environmental Assessment of Mixed Use Property 227 Westchester Avenue, prepared by Property Solutions Inc., November 5, 2021.

3. Draft Phase I Environmental Assessment of 206-208 and 214-220 Irving Avenue, prepared by Property Solutions Inc., September 16, 2022.

4. Limited Phase II Environmental Site Investigation Report, Proposed 227 Westchester Avenue Development, 223-225, 227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue, prepared by Haley & Aldrich of New York, February 12, 2024.

5. Phase I Environmental Site Assessment, 223-225 Westchester Avenue, Port Chester, New York, prepared by GO Environmental, September 16, 2013.

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

7. Subsurface Investigation Report, 223-225 Westchester Avenue, Port Chester, New York, prepared by GO Environmental, October 28, 2013.

TABLES

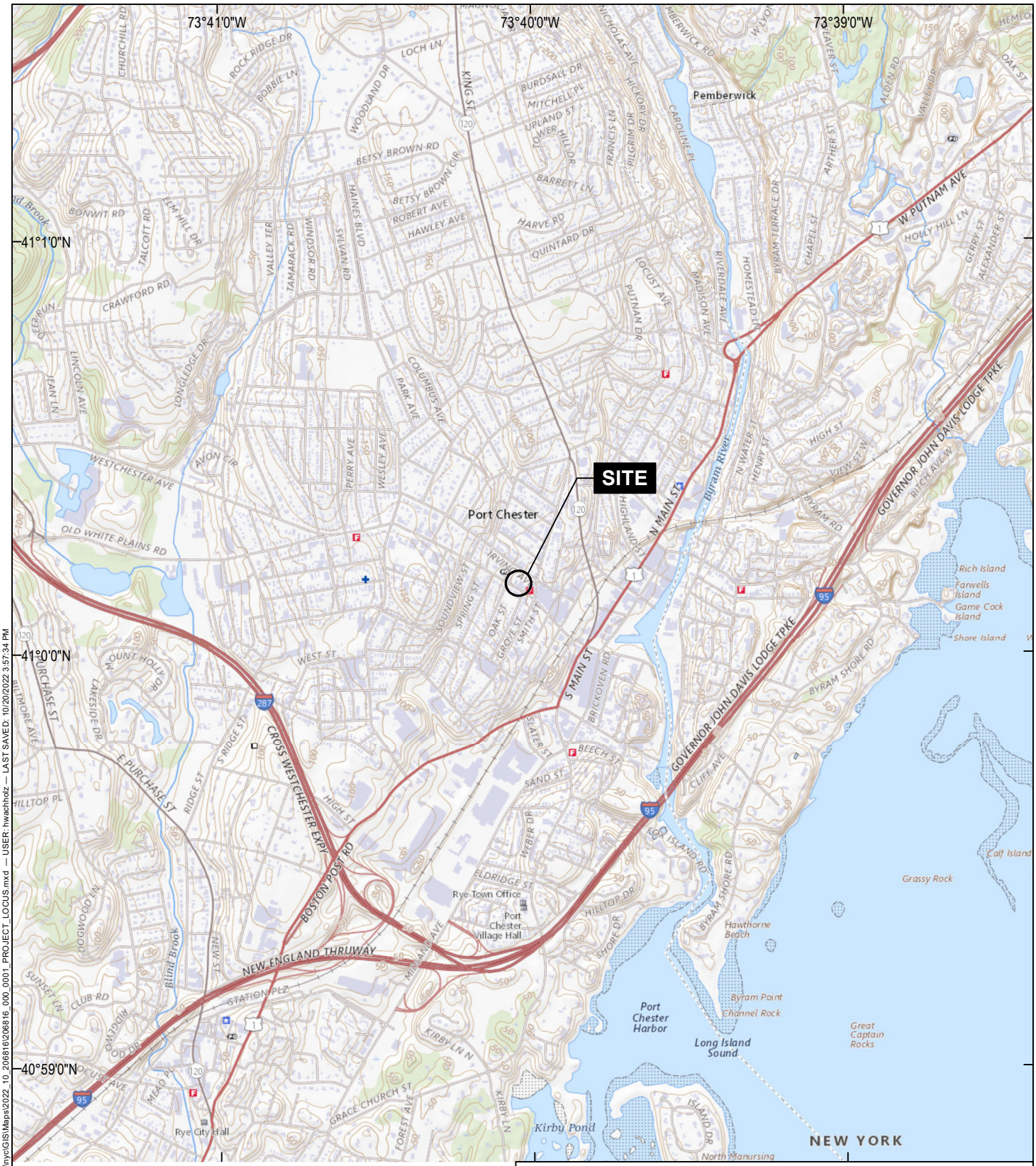
TABLE 1
SAMPLING AND ANALYSIS PLAN
PROPOSED 227 WESTCHESTER AVENUE DEVELOPMENT
PORT CHESTER, NEW YORK

Boring Number	Sample Location	Rationale	TCL VOCs + 10 VOC TICs (8260)	TCL SVOCs + 20 SVOC TICs (8270)	TAL Metals (6010)	Total Cyanide (9012)	PCBs (8082)	Pesticides (8081B)	PFAS (1633A)	1,4-Dioxane (8270 SIM)	VOCs (TO-15)
SOIL											
SB01	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB02	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB03	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB04	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB05	0-2"	shallow soil exposed at surface		X	X	X	X	X	X	X	
	2-6"	shallow soil	X								
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB06	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB07	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB08	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB09	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB10	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB11	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB12	0-2"	shallow soil exposed at surface		X	X	X	X	X	X	X	
	2-6"	shallow soil	X								
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB13	0-2"	shallow soil exposed at surface		X	X	X	X	X	X	X	
	2-6"	shallow soil	X								
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB14	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB15	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB16	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
SB17	0-0.5'	shallow soil beneath cover	X	X	X	X	X	X	X	X	
	anticipated between 4-10'	2' interval at the groundwater interface	X	X	X	X	X	X	X	X	
	anticipated between 5-12'	2' interval at bottom of fill layer or fill with greatest degree of impacts observed	X	X	X	X	X	X	X	X	
	23-25'	development depth	X	X	X	X	X	X	X	X	
GROUNDWATER											
MW01	At groundwater interface	-	X	X	X	X	X	X	X	X	
MW02		-	X	X	X	X	X	X	X	X	
MW03		-	X	X	X	X	X	X	X	X	
MW04		-	X	X	X	X	X	X	X	X	
MW05		-	X	X	X	X	X	X	X	X	
MW06		-	X	X	X	X	X	X	X	X	
MW07		-	X	X	X	X	X	X	X	X	
SOIL VAPOR											
SV01	anticipated 5-7'	above groundwater interface									X
SV02	anticipated 5-7'	above groundwater interface									X
SV03	anticipated 5-7'	above groundwater interface									X
SV04	anticipated 5-7'	above groundwater interface									X
SV05	anticipated 5-7'	above groundwater interface									X
SV06	anticipated 5-7'	above groundwater interface									X
SV07	anticipated 5-7'	above groundwater interface									X
SV08	anticipated 5-7'	above groundwater interface									X
SV09	anticipated 5-7'	above groundwater interface									X
SV10	anticipated 5-7'	above groundwater interface									X
SV11	anticipated 5-7'	above groundwater interface									X
SV12	anticipated 5-7'	above groundwater interface									X
SV13	anticipated 5-7'	above groundwater interface									X

Notes:
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TICs -Highest Concentration Tentatively Identified Compounds
PCBs - Polychlorinated biphenyls
PFAS - Per- and Polyfluoroalkyl Substances
Groundwater to be sampled for total and dissolved metals

QAQC samples include:
MS/MSD - 1 for every 20 samples
Field Duplicate - 1 for every 20 samples
Trip Blanks - 1 per cooler of samples to be analyzed for VOCs
Field Blanks - 1 for every 20 samples

FIGURES


73°41'0"W
73°40'0"W
73°39'0"W
41°1'0"N
41°0'0"N
40°59'0"N
SITE
Port Chester
Pemberwick
Rye Town Office
Port Chester Village Hall
Rye City Hall
Kirby Pond
Rich Island
Farwells Island
Game Cock Island
Shore Island
Calf Island
Grassy Rock
Hawthorne Beach
Byram Point
Channel Rock
Great Captain Rocks
Port Chester Harbor
Long Island Sound
NEW YORK
N MAIN ST
S MAIN ST
W PUTNAM AVE
GOVERNOR JOHN DAVIS LODGE TPKE
CROSS WESTCHESTER EXPY
BOSTON POST RD
NEW ENGLAND THRUWAY
WESTCHESTER AVE
OLD WHITE PLAINS RD
PURCHASE ST
E PURCHASE ST
BYRAM SHORE RD
BYRAM RIVER
WEST ST
HIGH ST
SAND ST
BEECH ST
ELDRIDGE ST
STATION PLZ
GRACE CHURCH ST
KIRBY LN
HILLTOP DR
SHORE DR
ISLAND RD
CLIFF AVE
CRAWFORD RD
BONWIT RD
BETSY BROWN RD
HARVE RD
QUINTARD DR
HOLLY HILL LN
BYRAM TERRACE DR
HOMESTEAD LN
CHAPEL ST
ARTHER ST
CAROLINE PL
HICKORY DR
PILGRIM DR
BURDSALL DR
MITCHELL PL
UPLAND ST
LOWER HILLTOP DR
KING ST
LOCH LN
ROCK RIDGE DR
BOBBIE LN
CHURCHILL RD
WOODLAND DR
TALCOTT RD
ELM HILL DR
VALLEY TER
TAMARACK RD
WINDSOR RD
SYLVAN RD
OAK ST
ALDEN RD
VALLEY DR
HEMLOCK
ALEXANDER ST
GERRY ST
LOCUST AVE
PUTNAM DR
MADISON AVE
RIVERDALE AVE
COLUMBUS AVE
PARK AVE
PERRY AVE
WESLEY AVE
AVON CIR
LINCOLN AVE
JEAN LN
LONGLEDGE DR
DEER RUN
HIGHLANDS
IRVING
SPRING ST
SOUNDVIEW ST
OAK ST
GROVE ST
SMITH ST
BRICKOVEN RD
SLATER ST
WEBER DR
MIDLAND AVE
NEW ST
RIDGE ST
S RIDGE ST
LAKESIDE DR
MOUNT HOLLY DR
BILTMORE AVE
DOGWOOD LN
SUNSET LN
CLUB RD
RIDGEWOOD RD
OLD OAK DR
MEAD PL
FOREST AVE
KIRBY LN N
ISLAND DR
N WATER ST
HENRY ST
VIEW ST W
RITCH AVE W
HIGH ST
BYRAM RD
Blind Brook
Brook
NY
N
MAP SOURCE: USGS
SITE COORDINATES: 41°0'9"N, 73°40'2"W
HALEY ALDRICH
WESTCHESTER AVENUE DEVELOPMENT SITE
223-225, 227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK
PROJECT LOCUS
APPROXIMATE SCALE: 1 IN = 2000 FT
MAY 2025
FIGURE 1
GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\GIS\Maps\2022_10_206816206816_000_0001_PROJECT_LOCUS.mxd — USER: hwachholz — LAST SAVED: 10/20/2022 3:57:34 PM



LEGEND

- 500-FT RADIUS SURROUNDING SITE
- SITE BOUNDARY
- PARCEL BOUNDARY

LAND USE TYPE

- ONE-FAMILY RESIDENCE DISTRICT (CD-3.R5)
- GENERAL URBAN (CD-4)
- URBAN CENTER (CD-5)
- URBAN CORE (CD-6)
- URBAN CORE HIGHEST DENSITY (CD-6T)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: NYC DEPARTMENT OF CITY PLANNING
3. LAND USE SOURCE: PORT CHESTER, NEW YORK
4. AERIAL IMAGERY SOURCE: NEARMAP, 6 SEPTEMBER 2023

N

0 130 260
SCALE IN FEET

HALEY ALDRICH

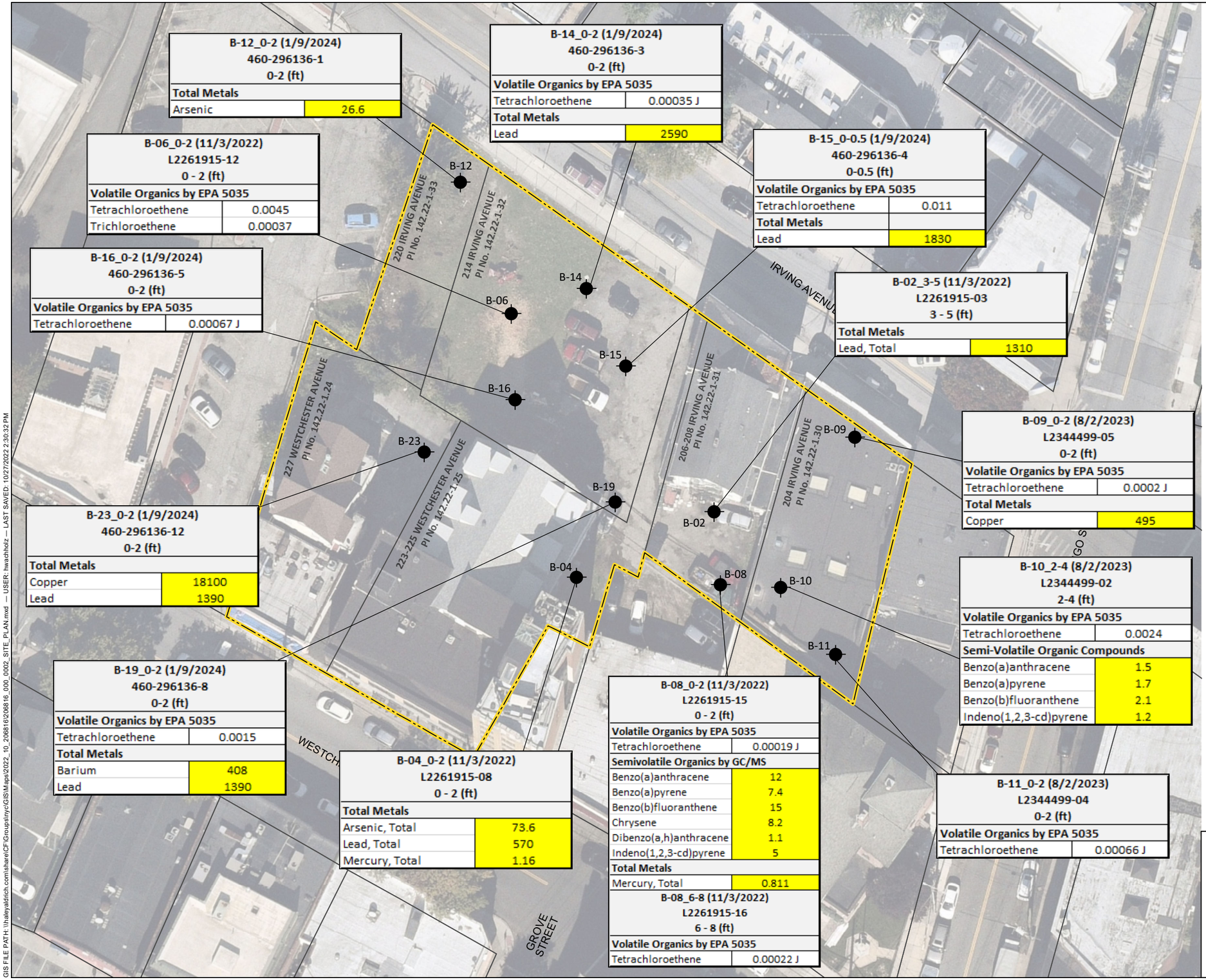
WESTCHESTER AVENUE DEVELOPMENT SITE
223 - 225, 227 WEST CHESTER AVENUE &
204, 206 - 208, 214 - 220 IRVING AVENUE
PORT CHESTER, NEW YORK

SURROUNDING LAND USE - SENSITIVE RECEPTOR MAP

MAY 2025

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\CP\Projects\0206816\GIS\206816_WESTCHESTER_AVE_NY\206816_WESTCHESTER_AVE_NY.aprx - USER: mnjones - LAST SAVED: 3/20/2024 4:35 PM



L EGEND

- CURRENT PARCEL BOUNDARY
- PROPOSED BCP SITE BOUNDARY (PENDING FUTURE LOT MERGER)
- SOIL BORING AND SAMPLE LOCATION

Analyte	Units	NY-RESR
Semivolatile Organics		
Benzo(a)anthracene	mg/kg	1
Benzo(a)pyrene	mg/kg	1
Benzo(b)fluoranthene	mg/kg	1
Chrysene	mg/kg	3.9
Dibenzo(a,h)anthracene	mg/kg	0.33
Indeno(1,2,3-cd)pyrene	mg/kg	0.5
Total Metals		
Arsenic, Total	mg/kg	16
Barium, Total	mg/kg	400
Copper, Total	mg/kg	270
Lead, Total	mg/kg	400
Mercury, Total	mg/kg	0.81

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: WESTCHESTER COUNTY TAX ASSESSOR
3. AERIAL IMAGERY SOURCE: NEAR MAP, 28 SEPTEMBER 2022
4. ONLY BORINGS WITH EXCEEDANCES OF APPLICABLE CRITERIA OR DETECTIONS OF CHLORINATED VOLATILE ORGANIC COMPOUNDS ARE SHOWN.
5. YELLOW SHADED RESULTS EXCEED TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 RESTRICTED RESIDENTIAL USE SCOs (NY-RESR)
6. RESULTS ARE DISPLAYED IN MILLIGRAMS PER KILOGRAM (mg/kg)
7. J = ESTIMATED VALUE
8. PROPERTY IDENITIFICATION NUMBER (PI)
9. PARCELS CURRENTLY WITHIN THE PROPOSED BCP SITE BOUNDARY ARE PENDING A FUTURE LOT MERGER.

N

0 40 80

SCALE IN FEET

HALEY ALDRICH

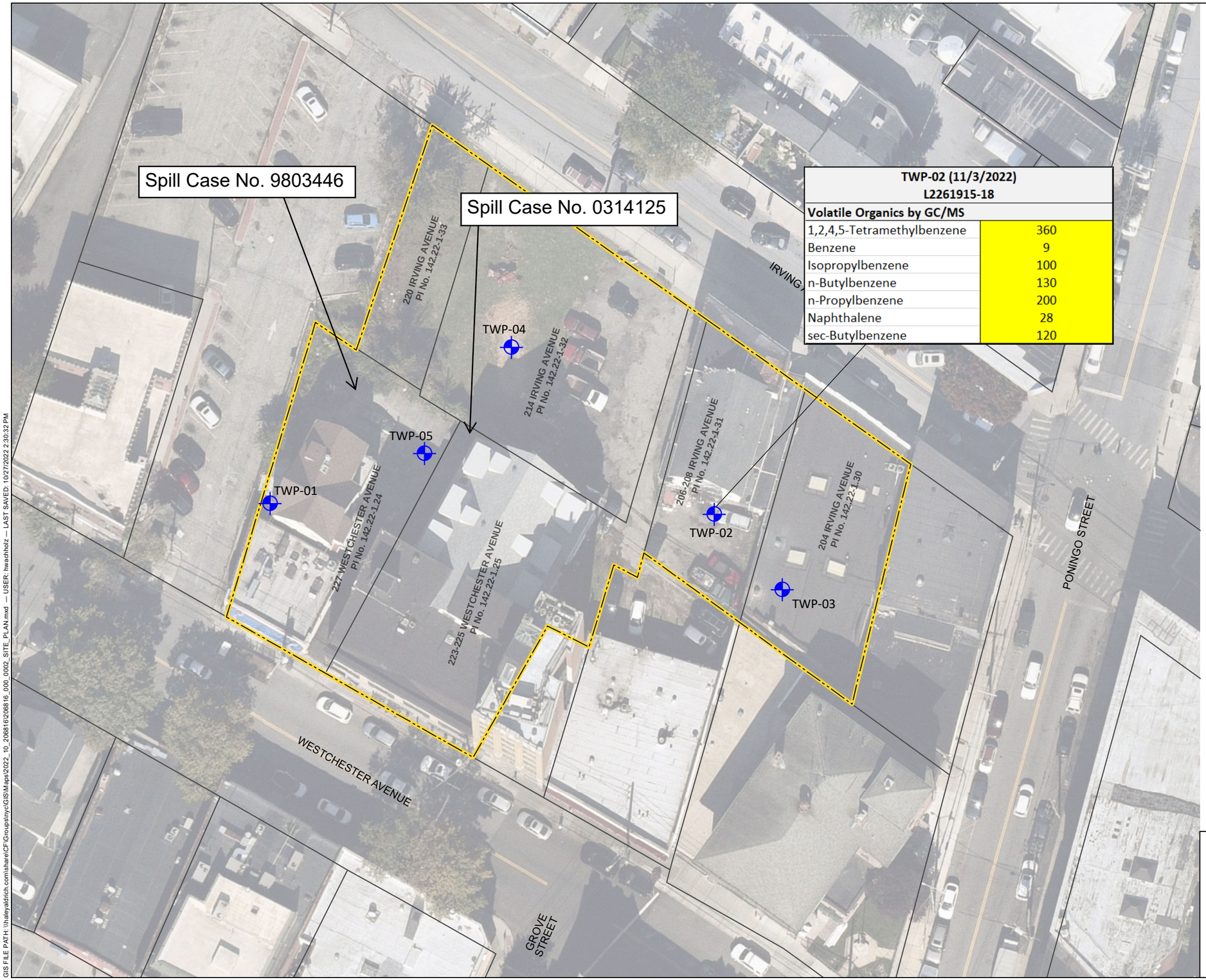
WESTCHESTER AVENUE DEVELOPMENT SITE
223-227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK

MAP OF SOIL CHEMISTRY

MAY 2025

FIGURE 3

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\GIS\Maps\2022_10_20681620681 6_000_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 10/27/2022 2:30:32 PM



TWP-02 (11/3/2022) L2261915-18	
Volatile Organics by GC/MS	
1,2,4,5-Tetramethylbenzene	360
Benzene	9
Isopropylbenzene	100
n-Butylbenzene	130
n-Propylbenzene	200
Naphthalene	28
sec-Butylbenzene	120

LEGEND

- CURRENT PARCEL BOUNDARY
- PROPOSED BCP SITE BOUNDARY (PENDING FUTURE LOT MERGER)
- MONITORING WELL / SOIL BORING LOCATION & SAMPLE COLLECTION

Analyte	Units	NY-AWQS
Volatile Organics		
1,2,4,5-Tetramethylbenzene	ug/l	5
Benzene	ug/l	1
Isopropylbenzene	ug/l	5
n-Butylbenzene	ug/l	5
n-Propylbenzene	ug/l	5
Naphthalene	ug/l	10
sec-Butylbenzene	ug/l	5

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. ASSESSOR PARCEL DATA SOURCE: WESTCHESTER COUNTY TAX ASSESSOR

3. AERIAL IMAGERY SOURCE: NEAR MAP, 28 SEPTEMBER 2022

4. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS).

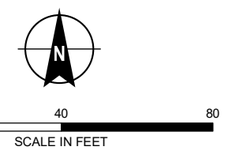
5. EXCEEDANCES OF THE NYSDEC AWQS ARE SHADED YELLOW. UNSHADED CELLS INDICATE RESULTS DETECTED BELOW THE RESPECTIVE AWQS. EXCEEDANCES ARE BASED ON 6 NYRR PART 703.

6. MICROGRAMS PER LITER (µg/L)

7. TWP-01, TWP-03, TWP-04, AND TWP-05 RESULTS DID NOT EXCEED GROUNDWATER COMPARISON CRITERIA.

8. PROPERTY IDENTIFICATION NUMBER (PI)

9. PARCELS CURRENTLY WITHIN THE PROPOSED BCP SITE BOUNDARY ARE PENDING A FUTURE LOT MERGER.



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223-227 WESTCHESTER AVENUE &
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PORT CHESTER, NEW YORK

MAP OF GROUNDWATER CHEMISTRY

MAY 2025

FIGURE 4

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\GIS\Mxds\2022_10_206816\206816_000_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 10/27/2022 2:30:32 PM



LEGEND

- CURRENT PARCEL BOUNDARY
- PROPOSED BCP SITE BOUNDARY (PENDING FUTURE LOT MERGER)
- SUB-SLAB SOIL VAPOR (SS) OR SOIL VAPOR (SV) SAMPLE LOCATION

Analyte	Units	NYSDOH AGVs
Volatile Organics		
Tetrachloroethene	ug/m^3	30
Trichloroethene	ug/m^3	2
cis-1,2-Dichloroethene	ug/m^3	NA
Methylene chloride	ug/m^3	60

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: WESTCHESTER COUNTY TAX ASSESSOR
3. AERIAL IMAGERY SOURCE: NEAR MAP, 28 SEPTEMBER 2022
4. SOIL VAPOR ANALYSIS - VOLATILE ORGANIC COMPOUNDS (VOCs)
5. SOIL VAPOR RESULTS ARE COMPARED TO THE NEW YORL STATE DEPARTMENT OF HEALTH (NYSDOH) AIR GUIDANCE VALUES (AGVs) CONCENTRATIONS CRITERIA PER GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION, OCTOBER 2006, AND UPDATED MAY 2017.
6. RESULTS ARE DISPLAYED IN MICROGRAMS PER CUBIC METER (µg/m3).
7. TOTAL DETECTED CONCENTRATION OF BENZENE, TOLUENE, ETHYLBENZENE AND XYLENES (BTEX)
8. PROPERTY IDENTIFICATION NUMBER (PI)
9. PARCELS CURRENTLY WITHIN THE PROPOSED BCP SITE BOUNDARY ARE PENDING A FUTURE LOT MERGER.

N

0 40 80
SCALE IN FEET

HALEY ALDRICH

WESTCHESTER AVENUE DEVELOPMENT SITE
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PORT CHESTER, NEW YORK

MAP OF SOIL VAPOR CHEMISTRY

MAY 2025

FIGURE 5

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\GIS\Maps\2022_10_206816\206816_000_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 10/27/2022 2:30:32 PM



LEGEND

- PROPOSED BCP SITE BOUNDARY (PENDING FUTURE LOT MERGER)
- CURRENT PARCEL BOUNDARY
- PROPOSED MONITORING WELL/ SOIL BORING LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED SOIL VAPOR LOCATION
- APPROXIMATE LOCATION OF ABOVE GROUND STORAGE TANK

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: WESTCHESTER COUNTY TAX ASSESSOR
3. AERIAL IMAGERY SOURCE: NEARMAP, 28 SEPTEMBER 2022

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SCALE IN FEET

HALEY ALDRICH

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223-227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK

PROPOSED SAMPLE LOCATION PLAN

MAY 2025

FIGURE 6

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LEGEND

- PROPOSED BCP SITE BOUNDARY (PENDING FUTURE LOT MERGER)
- CURRENT PARCEL BOUNDARY
- PROPOSED MONITORING WELL/ SOIL BORING LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED SOIL VAPOR LOCATION
- PROPOSED BUILDINGS SUBJECT TO PARTIAL DEMOLITION

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: WESTCHESTER COUNTY TAX ASSESSOR
3. AERIAL IMAGERY SOURCE: NEARMAP, 28 SEPTEMBER 2022
4. PROPOSED SELECTIVE DEMOLITION MAY INCLUDE PARTIAL REMOVAL OF ABOVE-GRADE AND INTERIOR BUILDING ELEMENTS, SUCH AS NON-STRUCTURAL WALLS, CEILINGS AND PARTITIONS WITHIN SHADED BUILDINGS TO IMPROVE ACCESS FOR REMEDIAL INVESTIGATION ACTIVITIES.
5. ALL EXISTING CONCRETE SLABS WILL REMAIN IN PLACE, AND NO BELOW-GRADE STRUCTURAL COMPONENTS WILL BE REMOVED.

N

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SCALE IN FEET

HALEY ALDRICH

WESTCHESTER AVENUE DEVELOPMENT SITE
223-227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK

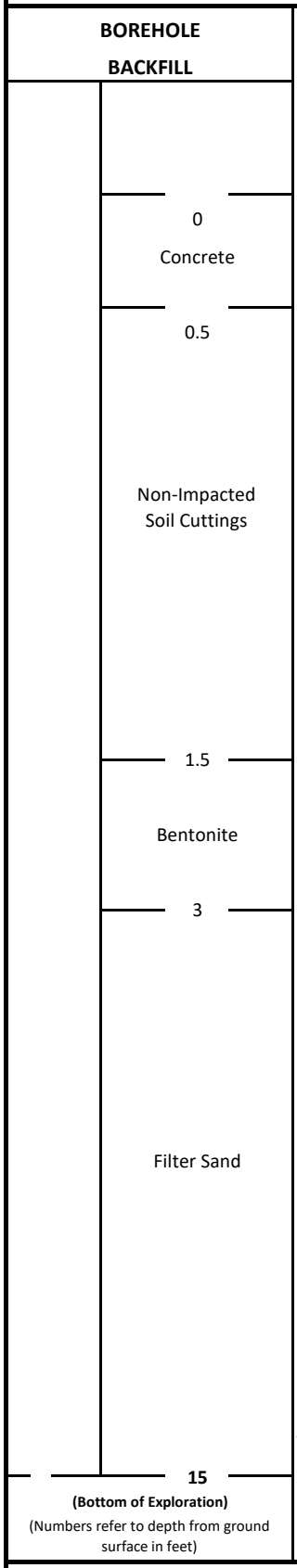
PROPOSED SELECTIVE DEMOLITION PLAN

MAY 2025

FIGURE 7

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\GIS\Maps\2022_10_206816\206816_000_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 10/31/2022 1:56:50 PM

FIGURE 8 - CONCEPTUAL MONITORING WELL CONSTRUCTION DIAGRAM[1]



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no._____

Height/Depth of top of guard pipe/roadway box above/below ground surface _____ ft

Height/Depth of top of riser pipe above/below ground surface _____ ft

Type of protective casing: _____

Length _____ ft

Inside Diameter _____ in

Depth of bottom of guard pipe/roadway box _____ ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete	0.0	1.0
Soil Cuttings	0.5	1.0
Bentonite Seal	1.5	1.5
Filter Sand	3.0	12.0

Type of riser pipe: 2-inch PVC

Inside diameter of riser pipe 2.0 in

Type of backfill around riser Non-impacted soil cuttings

Depth to top of well screen 5.0 ft

Type of screen Machine Slotted PVC

Screen gauge or size of openings 0.010 in

Diameter of screen 2.0 in

Groundwater Interface[2] 10.0 ft bgs

Type of backfill around screen Filter Sand

Depth of bottom of well screen 15.0 ft

Depth of bottom of borehole 15.0 ft

(Not to Scale)

5 ft	+	10 ft	=	15 ft
Riser Pay Length (L1)		Length of Screen (L2)		Pay length

COMMENTS: 1 - ACTUAL MONITORING WELL CONSTRUCTION DETAILS MAY VARY BASED ON FIELD CONDITIONS.
2 - DIAGRAM ASSUMES A DEPTH TO WATER OF APPROXIMATELY 10 FEET BELOW GRADE SURFACE.

APPENDIX A
Previous Reports (Provided as separate file)

APPENDIX B
GPR Findings Report

Coastal Environmental Solutions, Inc.

GEOPHYSICAL INVESTIGATION REPORT

11.8.2022

223 Westchester Avenue, Port Chester, NY
Date of Investigation: 11/3/2022

Prepared for:

Haley & Aldrich of New York
70 Blanchard Road, Suite 204
Burlington, MA 01803

Prepared By:

Dennis Berthold
Coastal Environmental Solutions, Inc.
PO Box 342
Medford, New York 11763

1.0 INTRODUCTION

On 11/3/2022, Coastal Environmental Solutions, Inc (Coastal) personnel performed a limited geophysical investigation at 223 Westchester Avenue, Port Chester, NY. The areas of interest included sections of soil/grass and asphalt parking areas throughout the properties. Surface conditions consisted of asphalt and soil/grass.

2.0 SCOPE OF WORK

1. Locate and mark detectable underground utilities within accessible areas throughout the property for the purposes of clearing soil boring locations.

3.0 EQUIPMENT

ImpulseRadar PinPointR Ultra-Wide Band (UWB) Penetrating Radar System

Ground Penetrating RADAR (GPR) is a non-destructive geophysical method that produces a continuous cross-sectional profile of subsurface features in real time. GPR operates by transmitting both high and low frequency electromagnetic wave pulses down into the ground through a transmitter in the antenna. The transmitted electromagnetic waves reflect off materials with contrasting dielectric properties from surrounding medium such as underground storage tanks, utilities, distinct contacts between different earth materials, and other various subsurface objects. The antenna receiver collects the reflected electromagnetic waves which are then interpreted by the operator.

The ImpulseRadar PinPointR UWB GPR utilizes a dual band 400/800 MHz HS antenna mounted to a stroller frame which rolls over the surface. The total depth of penetration achieved with the antenna can be up to 10 feet but widely varies based on site-specific subsurface conditions. Conductive materials in the soil attenuate the GPR signal causing a decrease in effective depth of penetration and clarity.

Vivax-Metrotech vLoc3-Pro Receiver/Transmitter

The vLoc3-Pro Receiver is a hand-operated antenna capable of detecting electromagnetic (EM) fields emitted from a source. The EM antenna can detect pipes and cables in the ground at depths of up to 20 feet using active or passive tracing techniques. Passive tracing is the act of locating an underground utility through the detection of electrical or radio signals travelling along conductive utilities. Active tracing is used in conjunction with the Transmitter that is directly connected to the target utility or to a conductive rodder within a non-conductive line. A signal is sent through the utility at a specific frequency that can be detected by the Receiver. The detectability of a target utility depends on many factors including access to the target utility, grounding, depth of utility, conductivity, and other site-specific factors.

TW-6 Pipe and Cable Locator

The TW-6 Pipe and Cable locator is a handheld magnetometer which utilizes a transmitter-receiver pair attached to opposite ends of a handle and carried approximately 1-2ft from the surface. The magnetometer induces an electromagnetic (EM) field into the ground that is generated by the transmitter. Once the induced EM field passes through a buried metallic object, it generates a

secondary EM field which is detected by the receiver, generating an audible tone. Based on the calibration of the magnetometer, the audible tone reflects the strongest response as the highest pitched sound, trailing off on all sides of the peak. This piece of technology can be used to detect subsurface features such as metallic USTs, large diameter conductive pipes, and buried manholes, especially in areas in which traditional GPR methods cannot be utilized, such as overgrown or uneven surfaces.

4.0 METHODOLOGY

1. A subsurface investigation was performed in close proximity to the client proposed soil boring locations. Active and passive detection methods were utilized with the VLoc3-Pro receiver/transmitter. Coastal personnel direct connected to all accessible and traceable pipes, conduits, valve covers, and any other surface feature throughout the site. A passive scan was performed throughout the site to detect any potential underground utilities that could not be located with active scan.
2. The TW-6 was utilized (if applicable) to sweep any accessible areas for suspected UST locations in 3-to-5-foot spacings for readings that may represent a buried metallic anomaly. Upon detection of a reading, the approximate size and shape of the anomalous area was marked on the surface to be investigated further with GPR.
3. GPR was utilized to further characterize the approximate dimensions, depth, and shape of the anomalies located with the TW-6. The remainder of the areas around suspected UST locations were scanned with GPR in 3-to-5-foot spacing to locate any anomalous features not previously detected such as non-conductive piping and former excavations.
4. All findings were marked on the surface utilizing the American Public Works Association (APWA) recommended color code, seen below:

WHITE	Proposed Excavation
PINK	Temporary Survey Markings (Approximate UST Locations, Soil Boring Locations)
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	Water (Domestic and Fire Lines)
PURPLE	Irrigation (Not commonly used)
GREEN	Sewers and Drain Lines

5.0 SUMMARY OF FINDINGS

Utility Locate

Coastal personnel conducted a utility locate within all accessible areas of concern. All detections were marked in the field in accordance with the APWA guide above. All detections were then reviewed with H&A personnel prior to drilling activities. Detected utilities included drain and sewer lines and other unknown pipes within the ground.

Limitations

The effective depth of GPR penetration was limited to approximately 2 feet below the asphalt grade. The limiting factor was likely due to soil conductivity attenuating the GPR signal, shallow bedrock containing moisture, or non-conductive materials utilized for the utilities. The GPR and TW-6 is unable to be utilized within close proximity to parked vehicles and exterior walls.

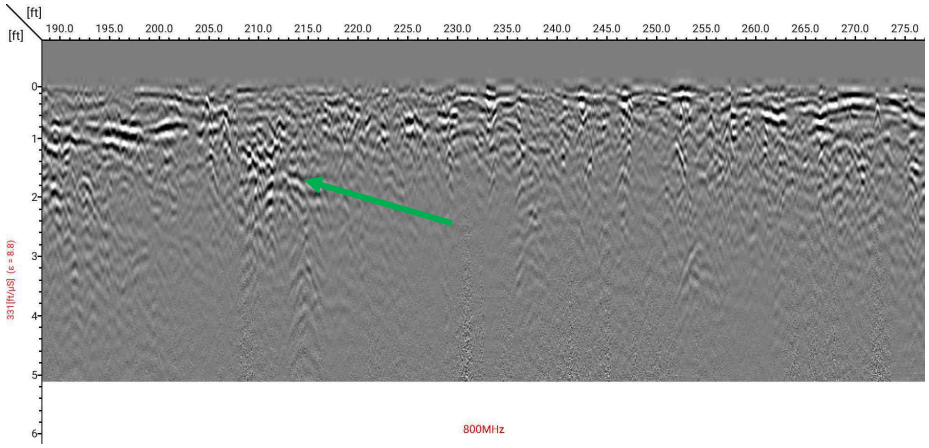
Disclaimer

The subsurface investigation was performed by Coastal after considering the limits of the scope of work and the time constraint for the investigation. The investigation that is described in this report was undertaken in accordance with current accepted standards and practices of the geophysical survey industry. The results and interpretations that are presented are based on professional judgment and are as accurate as can reasonably be achieved. However, no geophysical equipment can accurately depict all subsurface features due to the geology and environmental conditions of the subsurface. Any intrusive work in proximity to identified anomalies should be carefully considered and cross-referenced with all available site-specific documentation. Coastal is not liable for the use, interpretation, or application of the data and information in this report.

PHOTOS & GPR SCREENSHOTS



Photo 1 – Photo of the sanitary lines detected on the property proximate to multiple boring locations. The two lines leading into the manhole at the far side of the photo were shallow enough to view of GPR as well as visibly confirm. The deeper outlet line was determined to be beyond 8 feet deep and out of range for GPR detection.



GPR Screenshot 1 – GPR screenshot showing the shallow drain line indicated above. Note the absence of usable GPR data below 2 feet due to high moisture content within the soil.



Photo 2 – Photo of one of the proposed boring locations proximate to a suspected leaking AST.



Photo 3 – Photo of an additional proposed boring location within the grass field area.



Photo 4 – Photo of an additional proposed boring location in the area reportedly to previously contain a UST. No evidence of an existing UST was found.



Photo 5 – Photo of the additional asphalt parking area containing multiple proposed boring locations. The drain was thoroughly inspected and determined to have multiple inlets and a possible outlet (green arrow), but this outlet line was unable to be confirmed. The pink line was determined to be a 2" pvc pipe with no noticeable function leading towards the grass area previously shown.

APPENDIX C
Field Sampling Plan

HALEY ALDRICH

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FIELD SAMPLING PLAN
WESTCHESTER AVENUE DEVELOPMENT SITE
223-225, 227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK

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

for
Yorkland Partners, LLC, 227 Westchester LLC, and 204 Irving Two LLC
New York, New York

File No. 0206816
May 2025



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1. Introduction

This Field Sampling Plan (FSP) has been prepared as a component of the Remedial Investigation Work Plan (RIWP) for the Westchester Avenue Development located at 223-225, 227 Westchester Avenue and 204, 206-208, 214-220 Irving Avenue, Port Chester, New York (the "Site"). This document was prepared to establish field procedures for field data collection to be performed in support of the RIWP for the Site.

The RIWP includes this FSP, a Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP), 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 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 RIWP. The SOPs include numerous methods to execute the tasks of the RIWP. 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 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 Part 375 Remedial Program when applicable.

2. Field Program

This FSP provides the general purpose of sampling as well as procedural information. The RIWP 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 RIWP, and includes the following tasks:

- Soil sampling;
- Groundwater sampling;
- Soil vapor sampling;
- Sampling of investigation-derived wastes (IDW) as needed for disposal.

Previous investigations identified heavy metals and semi-volatile organic compounds (SVOCs), specifically polyaromatic hydrocarbons (PAHs), exceeding Restricted Residential Soil Cleanup Objectives (RRSCOs) throughout the Site in soil up to 5 feet (ft) below ground surface (bgs). Petroleum impacts were noted in the vicinity of the auto repair shop and operational aboveground storage tank (AST) located at 206-208 Irving Avenue, including elevated volatile organic compound (VOC) detections in soil and groundwater, light non-aqueous phase liquid (LNAPL) observed in groundwater from a temporary well point, and petroleum-like odors and elevated photoionization detector (PID) readings in soil down to 12 ft bgs. In addition, chlorinated volatile organic compounds (CVOCs), including trichloroethene (TCE) and tetrachloroethene (PCE), were identified in multiple soil vapor samples. TCE and PCE were also reported below the RRSCOs but above laboratory detection limits in shallow soil samples. These findings require additional investigation to ascertain and delineate on-Site source(s) and confirm the findings of the previous investigations conducted at the Site.

Previous investigations did not comprehensively delineate the extent of soil, groundwater, and soil vapor impacts at the Site. A Remedial Investigation (RI) will be performed upon acceptance of the Site into the Brownfield Cleanup Program (BCP) and approval of the RIWP, which will include additional targeted soil, groundwater, and soil vapor sampling. Results of the additional sample analyses will be used to confirm the results of the previous Site characterization activities, potentially identify an on-Site source, and determine a course for remedial action.

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.

Prior to any ground intrusive work, 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. The 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 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 (AWMA 4/99):

- White: Proposed Excavation or Drilling Location
- Pink: Temporary Survey Markings
- Red: Electrical Power Lines, Cables, Conduit, 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

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 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 entities:

- 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 the 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 that the clearance has failed to identify an existing facility. This may necessitate hand-excavation or probing to confirm the 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 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
- Available drawings

4. Field Data Recording

This procedure describes 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, 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 log book. Log books must be hard cover, 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 use of field log forms and log books:

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 a new form/page.
5. At the end of each day, the current log book 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 log book 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. Log books should be dedicated to one project only, i.e., do not record data from multiple projects in one log book.

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 the proper recording and management of electronic field data:

1. Field data management should follow 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 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

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 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 will be 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 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, and 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 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 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 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 screen 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
- When sampling for PFAS, acceptable materials for sampling include stainless-steel, high-density polyethylene (HDPE), 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®) 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 the methods presented in SOP 7.0.

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 NYSDEC, DER, Sampling, Analysis and Assessment of PFAS under NYSDEC Part 375 Remedial Program (April 2023).

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), 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 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 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 appropriate pump and lower tubing into well.
- Gauge well and calculate one well volume. Turn on pump. If well runs dry, shut off pump and allow to recover.
- Surging will be performed by raising and lowering the pump several times to pull fine-grained material from the well. Periodically measure 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 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.)

  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
  - VOCs
  - 1,4-dioxane
  - SVOCs
  - Total Analyte List (TAL) metals
  - PCBs and pesticides
- 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.
- 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, 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 NYSDEC, DER, Sampling, Analysis and Assessment of PFAS under NYSDEC Part 375 Remedial Program (April 2023).
- All samples must be labeled with:
  - A unique sample number
  - Date and time
  - Parameters to be analyzed
  - Project reference ID
  - 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, temperature gauge
- Field filtration units (if required)
- Purging/sampling equipment
  - Peristaltic pump
- Water level probe
- Sampling materials (containers, log book/forms, coolers, chain of custody [COC])
- Work Plan
- HASP

- 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 (USEPA)/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 E of the RIWP). Acceptable groundwater pumps include stainless-steel inertia pump with HDPE tubing, a peristaltic pump equipped with HDPE tubing and silicone tubing, stainless-steel bailer with 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 2.0 describes the data/recording procedure for field activities.
- The log book 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
- Problems encountered and any deviations made from the established sampling protocol.

A standard log form for documentation and reporting groundwater purging and sampling events are 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/Decontamination 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 public-owned treatment facilities
  - On-Site treatment at 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 Sub-Slab/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 NYSDOH protocols to serve as a quality assurance/quality control (QA/QC) device 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 by using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 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
- 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 (031824). 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-031824-01	TRIP BLANK
TB-031824-02	TRIP BLANK
FD-031824-01	FIELD DUPLICATE
FD-031824-02	FIELD DUPLICATE

NOTE: The QA/QC Sample # resets to 0001 EACH DAY, which 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 type of sample (must be in CAPITALS):

N	Normal Field Sample
FD	Field Duplicate (note sample number (i.e., 01) substituted for time)
TB	Trip Blank (note sample number (i.e., 01) substituted for time)
EB	Equipment Blank (note sample number (i.e., 01) substituted for time)
FB	Field Blank (note sample number (i.e., 01) 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 which 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.

- 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 use 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, clearly define the full interpretation of your designation (i.e., 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 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 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 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 removal of gross material (dirt, grease, oil, etc.), washing with a detergent, and multiple rinsing steps. In lieu of a series of wash 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 de-ionized 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 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;
- 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, test pit soils), rock core or rock flour (from coring, 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 trailer (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 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 a 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, auger,
- Sample mixing bowl,
- Sampling bailer, or pump,
- Sample glassware.

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APPENDIX A
Field Forms

HALEY & ALDRICH

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: ______________________

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:

SAMPLE IDENTIFICATION KEY

Page of

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

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**

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

APPENDIX D
Quality Assurance Project Plan

HALEY ALDRICH

www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
WESTCHESTER AVENUE DEVELOPMENT SITE
223-225, 227 WESTCHESTER AVENUE &
204, 206-208, 214-220 IRVING AVENUE
PORT CHESTER, NEW YORK

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

for
Yorkland Partners, LLC, 227 Westchester LLC, and 204 Irving Two LLC
New York, New York

File No. 0206816
August 2025



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 Remedial Investigation Work Plan for the Westchester Avenue Development Site (Site) located at 223-227 Westchester Avenue and 204, 206-208, 214-220 Irving Avenue in Port Chester, 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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1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the Remedial Investigation Work Plan (RIWP) for the Westchester Avenue Development located at 223-227 Westchester Avenue and 204, 206-208, 214-220 Irving Avenue in Port Chester, 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 RIWP appended to the Brownfield Cleanup Program (BCP) 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) + 10 highest-concentration VOC tentatively identified compounds (TICs) using United States Environmental Protection Agency (USEPA) method 8260C;
- TCL semi-volatile organic compounds (SVOCs) + 20 highest-concentration SVOC TICs using USEPA method 8270D;
- Total Analyte List (TAL) metals using USEPA method 6010;
- Total cyanide using USEPA method 9012;
- TCL pesticides using USEPA method 8081B
- Polychlorinated biphenyls (PCBs) using USEPA method 8082A
- Per- and polyfluoroalkyl substances (PFAS) using USEPA method 1633A
- 1,4-dioxane using USEPA method 8270SIM

The laboratory parameters for groundwater include:

- TCL VOCs + 10 highest-concentration VOC TICs using USEPA method 8260C
- TCL SVOCs + 20 highest-concentration SVOC TICs using USEPA method 8270D
- TAL metals (filtered and unfiltered) using USEPA method 6010;
- Total cyanide (filtered and unfiltered) using USEPA method 9012;
- PCBs using USEPA method 8082
- Pesticides by USEPA method 8081B
- PFAS using USEPA method 1633A

- 1,4-dioxane using USEPA method 8270SIM

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 Part 375 Remedial Program, 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, indoor air, and ambient air samples, as applicable, include:

- VOCs using USEPA 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 RIWP provides the locations of soil borings, soil vapor points, indoor air/ambient air locations, 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 RIWP 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 RIWP implementation. Applicable project team resumes are included in Attachment A.

NYSDEC Case Manager	Daniel Lanners
NYSDOH Case Manager	Michael Izdebski
Qualified Environmental Professional (QEP)	Mari C. Conlon, P.G.
Project Manager	Elizabeth Fitzgerald
Haley & Aldrich of New York* Health & Safety Director	Brian Fitzpatrick, CHMM
Health & Safety Officer (HSO)	Brian Ferguson
Quality Assurance (QA) Officer	Nicole Mooney
Third-Party Validator	Katherine Miller

** H & A of New York Engineering and Geology, LLP = Haley & Aldrich of New York*

2.2 MANAGEMENT RESPONSIBILITIES

The Project Manager is responsible for managing the implementation of the RIWP 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 RIWP monitoring activities; and
- Assure compliance with Site health and safety plan.

2.3 QUALITY ASSURANCE RESPONSIBILITIES

The QA team will consist of a QA Officer and the Data Validation Staff. QA 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:

- Assure 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
- Prepare and/or review data validation and audit reports.

The QA Officer will be assisted by the Data Validation staff in the evaluation and validation of field and laboratory-generated data.

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 Accreditation Program (ELAP)-approved laboratory to be used will be Alpha Analytical Inc. (Alpha), located in Westborough, Massachusetts. Laboratory services in support of the RIWP 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 reports, scheduling sample analyses, overseeing data review, and overseeing 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 chain-of-custody 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 Staff 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 (QAM) 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 Health & Safety Officer (HSO) to conduct operations in compliance with the project Health & Safety Plan (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 QAO, and Project Manager; 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 RIWP and in compliance with the Field Sampling Plan (FSP) and QAPP.
- 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 RIWP. 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 Part 375 Remedial Program (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 USEPA'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 blank 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 and sealing and then repeating for the second set of sample containers.

1. The samples are properly labeled as specified in Section 3.2.
2. Steps 1 through 4 are repeated for the bottles for each analysis. The samples are collected in order of decreasing analyte volatility as detailed in Section 3.3.1.
3. Chain-of-custody 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.

3. 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 removal of gross material (dirt, grease, oil, etc.), washing with a detergent, and multiple rinsing steps. In lieu of a series of wash 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.

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 preprinted 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 the 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 chain-of-custody 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 chain-of-custody 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) which 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 chain-of-custody 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 (i.e., unbroken, cooled, etc.) and that the associated paperwork, such as chain-of-custody forms, has been completed. The custodian will sign the chain-of-custody 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 chain-of-custody form, analyses by the laboratory's analysts will begin in accordance with the appropriate methodologies. Samples will be removed from secure storage with internal chain-of-custody 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 custody of the Project Director or his 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 chain-of-custody documentation;
- Correspondence;
- References, literature;
- Laboratory data deliverables;
- Data validation and assessment reports;

- Progress reports, QA reports; and,
- A final report.

The laboratory will be responsible for maintaining analytical logbooks, laboratory data, and sample chain-of-custody 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 (PE) materials will be obtained from approved vendors of the National Institute of Standards and Technology (NIST; formerly National Bureau of Standards), the USEPA Environmental Monitoring Support Laboratories (EMSL), 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 USEPA analytical protocols and/or project-specific SOP.

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 USEPA methodology requirements promulgated in:

- "Test Methods for Evaluating Solid Waste," SW-846 USEPA, Office of Solid Waste, and promulgated updates, 1986.

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

The method detection limits (MDLs) 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 RIWP. 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 7.0 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 blanks samples will be prepared by the project laboratory using 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 that contribute to the maintenance of overall laboratory QA/QC include appropriately cleaned 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:

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

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.

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x100\%$$

If the QC value falls outside the upper control limits or lower control limits (UCL or 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 provided in the attached 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 standard operating procedures. 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 RIWP 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 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, +/- 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 duplicate samples (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 that 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 data quality objectives. The calculation of data set completeness will be performed by the following equation.

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

8.5.2 Field Completeness Objectives

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

8.5.3 Laboratory Completeness Objectives

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 USEPA 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 (µg/kg) for PFAS analyses, milligrams per kilogram (mg/kg) of media (Dry Weight).
- Aqueous Matrices – nanograms per liter (ng/L) for PFAS analyses, micrograms per liter (µg/L) of media for organic analyses, and milligrams per liter (mg/L) 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 for every 20 investigative samples collected, or a minimum a minimum of one per day if fewer than 20 samples are collected.

If necessary, A separate equipment rinse blank sample will be collected for PFAS using the sample collection procedure described in Section 8.1.1 of the NYSDEC-approved FSP. (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 VOC. 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.

Matrix spikes 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 USEPA, “Test Methods for Evaluating Solid Waste,” SW-846, Third Edition. Errors will be noted; 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 USEPA 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 USEPA’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 ASP Category A and Category B data package requirements. The validator will determine whether the required items are present and 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,
- Chain-of-custody 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, chain-of-custody 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:

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

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

- Comparison of the 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 detect 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 (% R) 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. 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 QA Officer or designee who will review the laboratory results for compliance with the established QC criteria that are specified in Sections 7.0 and 8.0 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 the laboratory management.

References

1. New York State Department of Environmental Conservation, NYSDEC Analytical Services Protocol (ASP), Bureau of Environmental Investigation, 1991 with updates.

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

3. New York State Department of Environmental Conservation, NYSDEC, Division of Environmental Remediation, Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program, April 2023.

4. United States Environmental Protection Agency (1991). Preparation Aids for the Development of Category I Quality Assurance Project Plans. U.S. EPA/600/8-91/003, Risk Reduction Engineering Laboratory, Office of Research and Development, Cincinnati, Ohio, February 1991.

5. United States Environmental Protection Agency, (1992). Specifications and Guidance for Contaminant-Free Sample Containers. OSWER Directive 9240.0-05A, April 1992.

6. United States Environmental Protection Agency, (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 1993.

7. United States Environmental Protection Agency, (1999). EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R-5 Interim Final, November 1999.

8. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste, Office of Solid Waste, U.S. EPA, SW-846, November 1986, with updates.

9. United States Environmental Protection Agency. U.S. EPA National Functional Guidelines for Organic Data Review. U.S. EPA 540/R-2017-002.

10. United States Environmental Protection Agency. U.S. EPA National Functional Guidelines for Organic Data Review. U.S. EPA 540/R-2017-001.

TABLE

TABLE I
SUMMARY OF ANALYSIS METHOD, PRESERVATION METHOD, HOLDING TIME, SAMPLE SIZE REQUIREMENTS AND SAMPLE CONTAINERS
WESTCHESTER AVENUE DEVELOPMENT SITE
PORT CHESTER, NEW YORK

Analysis/Method[3]	Sample Type	Preservation	Holding Time	Volume/Weight	Container[4]
TCL Volatile Organic Compounds + 10 VOC TICs/8260C	Soil	1 - 1 Vial MeOH/2 Vial Water, Cool, 4 ± 2 °C	14 days[1]	120 mL	3 - 40ml glass vials
TCL Semivolatile Organic Compounds + 20 SVOC TICs/8270D	Soil	Cool, 4 ± 2 °C	14 days extraction / 40 days analysis	250 mL	1 - 8 oz Glass
Pesticides/8081B	Soil	Cool, 4 ± 2 °C	14 days extraction / 40 days analysis	250 mL	1 - 4 oz Glass
Polychlorinated Biphenyls/8082A	Soil	Cool, 4 ± 2 °C	14 days extraction / 40 days analysis	250 mL	1 - 4 oz Glass
Metals/6010D	Soil	Cool, 4 ± 2 °C	180 days	60 mL	1 - 4 oz Glass
Total Cyanide/9012	Soil	Cool, 4 ± 2 °C	14 days extraction / 40 days analysis	250 mL	1 - 4 oz Glass
PFAS/1633A	Soil	Cool, 4 ± 2 °C	28 days extraction / 40 days analysis	To be determined by laboratory	1 - HDPE container
1,4-Dioxane/8270	Soil	Cool, 4 ± 2 °C	14 days extraction / 40 days analysis	250 mL	1 - 8 oz Glass
TCL Volatile Organic Compounds + 10 VOC TICs/8260C	Groundwater	HCl, Cool, 4 ± 2 °C	14 days	120 mL	3 - 40 mL glass vials
TCL Semivolatile Organic Compounds + 20 SVOC TICs/8270D	Groundwater	Cool, 4 ± 2 °C	7 days extraction / 40 days analysis	500 mL	2 - 250 mL amber glass
TAL Metals/6020	Groundwater	HNO_3, Cool, 4 ± 2 °C	180 days	500 mL	1 - 500 mL plastic bottle
Total Cyanide/9012	Groundwater	NaOH, pH > 12, Cool, 4 ± 2 °C	14 days	250 mL	1 - 250 mL amber glass
Polychlorinated Biphenyls/8082A	Groundwater	Cool, 4 ± 2 °C	365 days extraction	2000 mL	2-1000 mL amber glass
Pesticides/8081B	Groundwater	Cool, 4 ± 2 °C	7 days extraction	1000 mL	2-500 mL amber glass
PFAS/1633A	Groundwater	H2O Cool, 4 ± 2 °C	28 days extraction / 28 days analysis	To be determined by laboratory	2 - HDPE container
1,4-Dioxane/8270SIM	Groundwater	Cool, 4 ± 2 °C	7 days extraction / 40 days analysis	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 L Summa Canister

Notes:
1. Terracores and encores must be frozen within 48 hours of collection
2. Refer to text for additional information.
3. Equivalent method can be used.
4. Volume may vary by laboratory and/or equivalent method.
5. The anticipated number of samples to be collected per media is provided in RIWP Table 1.
QAQC samples include:
MS/MSD - 1 for every 20 samples
Field Duplicate - 1 for every 20 samples
Trip Blanks - 1 per cooler of samples to be analyzed for VOCs
Field Blanks - 1 for every 20 samples

ATTACHMENT A
Project Team Resumes



MARI C. CONLON

Senior Client Account Manager

EDUCATION

MS, Geology, Boston College

BS, 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 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 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 concern 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 concern 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 completion and 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 soil vapor, indoor and outdoor air conditions for

potential vapor intrusion risk. As results indicated no evidence of vapor intrusion, continued pressure monitoring was conducted for 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 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, 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 monitored natural attenuation was not a feasible option and an in situ chemical oxidation (ISCO) remedy was approved by NYSDEC. Due to 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.

ELIZABETH R. FITZGERALD

Project Manager

EDUCATION

B.S., Earth Science with a minor in Sustainability Leadership, Pennsylvania State University

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA HAZWOPER Refresher Training
10-Hour OSHA Construction Safety Training
8-Hour DOT Hazmat Employee & RCRA Hazardous Waste Generator Training
American Red Cross First Aid/CPR/AED Training

Elizabeth is an environmental scientist and project manager with broad experience across environmental remediation, due diligence, regulatory compliance, and infrastructure development. She has managed and supported projects under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup (BCP), NYC Office of Environmental Remediation (NYC OER) Voluntary Cleanup Program (VCP), and New Jersey Department of Environmental Protection (NJDEP), with expertise in remedial construction oversight, regulatory coordination, and technical reporting. Elizabeth has authored numerous technical and regulatory reports and has successfully guided projects to regulatory closure or key milestones with agencies including NYSDEC, NYC OER, and NJDEP. Her project portfolio spans brownfield redevelopment, transportation and airport infrastructure, New York City School Construction Authority (NYCSCA) public school facilities, and resilience initiatives throughout the New York metropolitan area. Known for her strategic coordination, technical accuracy, and cross-disciplinary collaboration, Elizabeth delivers solutions that support regulatory closure, sustainable development, and long-term project success.

RELEVANT PROJECT EXPERIENCE

Remediation and Redevelopment

Elizabeth has managed and supported remedial investigations, remedy implementation, and regulatory coordination under the NYSDEC BCP, NYC OER VCP, and NJDEP oversight. Her experience includes overseeing remedial construction, authoring Final Engineering Reports (FERs) and Site Management Plans (SMPs), developing sampling and analysis strategies, and coordinating with contractors, regulators, and legal counsel throughout all phases of remediation.

Third at Third LLC, NYSDEC BCP site, Third Street Gowanus, Brooklyn, New York. Elizabeth managed remediation for a 0.47-acre former industrial site redeveloped into a 13-story mixed-use building under the BCP. She directed remedial activities, including excavation and off-site disposal of approximately 4,800 tons of impacted soil, in situ chemical oxidation (ISCO) to address arsenic impacts in groundwater, and installation of an active sub-slab depressurization system (SSDS), infiltration gallery, and composite cover system. Elizabeth led preparation of the FER and SMP and coordinated extensively with NYSDEC and legal counsel to support the issuance of the Certificate of Completion in January 2025.

Franklin 33 LLC, NYSDEC BCP site, 33 Franklin Street, Brooklyn, New York. Elizabeth supported a Track 1 unrestricted use remedy for a 0.48-acre former industrial site. She facilitated excavation and off-site disposal activities for over 9,500 tons of impacted soil, including chlorinated volatile organic compound (VOC)-impacted fill. Elizabeth managed post-excavation sampling and backfill approvals and directed field personnel during remedial activities. Elizabeth contributed to daily and monthly reporting to NYSDEC and New York State Department of Health (NYSDOH), prepared the FER and SMP, and supported regulatory communications to ensure issuance of the Certificate of Completion in December 2022.

Bedford N 1 LLC, NYC OER VCP site, 276 Bedford Avenue, Brooklyn, New York. Elizabeth implemented a Track 2 Residential remedy under the NYC OER VCP for a 2,736-square-foot site historically used for retail and residential purposes. Elizabeth managed transport and disposal operations of more than 2,600 tons of contaminated historical fill, assisted with endpoint sampling, daily reporting, air monitoring, and contractor oversight. Elizabeth helped ensure compliance with the Remedial Action Work Plan (RAWP), including installation of a composite cover system and a multi-layer vapor barrier integrated into the building foundation. She contributed to the Remedial Action Report and supported final certification with NYC OER.

DVL, Inc. Toch Park redevelopment, Kearny, New Jersey. Elizabeth managed polychlorinated biphenyl (PCB) concrete sampling program at a six-story brick-and-concrete warehouse formerly used for linoleum flooring manufacturing. She coordinated a team of six to collect over 800 grab samples on multiple floors, oversaw all decontamination procedures, maintained equipment and inventory, and ensured adherence to health and safety requirements.

S. Hekemian Group Montvale redevelopment, New Jersey. Elizabeth led a remedial investigation and action for a 25-acre former commercial farm property. She advanced 35 soil borings to delineate contamination, conducted synthetic precipitation leaching procedure (SPLP) sampling to establish site-specific cleanup goals, and identified and managed hotspot excavation. She also oversaw dust control during soil movement and supported Response Action Outcome (RAO) documentation to NJDEP to remove environmental restrictions on the property.

Due Diligence

Elizabeth has led environmental due diligence across a range of public and private properties, including commercial, industrial, residential, and institutional sites across all five boroughs of New York City, including NYCSCA school sites, former manufactured gas plant (MGP) sites, and legacy industrial parcels. Elizabeth has authored numerous Phase I Environmental Site Assessment (ESA) reports to support acquisition and redevelopment and has managed Phase II ESIs and Indoor Air Quality to evaluate subsurface conditions and vapor intrusion risks. Her work includes sampling design, regulatory review, and technical reporting to inform client decision-making.

The Jay Group, New York State Superfund site, Former NuHart Plastics site, New York State Superfund site (NuHart West) and BCP site (NuHart East), Brooklyn, New York. Elizabeth authored a Phase I ESA for a 0.6-acre property historically operated as a petroleum filling station and currently listed as a federal Superfund site. The assessment identified multiple Recognized Environmental Conditions (RECs), including historical and ongoing petroleum contamination from leaking underground storage tanks (USTs), improper hazardous material storage, and long-term operation as an auto service facility. Her evaluation included detailed regulatory records review, site reconnaissance, and assessment of historical land use and spill cases. The findings informed the client's acquisition and redevelopment strategy and addressed due diligence requirements under ASTM E1527-13 and the All Appropriate Inquiries (AAI) rule.

New York City Transit (NYCT) Mets/Willets Point Station Renovation Environmental Due Diligence Assessment (EDDA), Queens, New York. Elizabeth assisted with the preparation of an EDDA consistent with the requirements of New York's State Environmental Quality Review Act and City Environmental Quality Review for planned major renovations at NYCT's Mets/Willets Point station on the No. 7 Line as part of the environmental services group. Elizabeth consolidated the data from soil and groundwater sampling events and analyzed for sources of contamination and potential remedial actions prior to construction. In addition, her assessment included the potential impact of noise vibrations and other construction activities on the surrounding environment.

Transportation and Infrastructure

Elizabeth has supported environmental compliance and investigation efforts on high-profile transportation, education, and infrastructure projects in the NYC metro area.

Metropolitan Transportation Authority (MTA) Capital Construction (MTACC) / NYCT, Second Avenue Subway Phase 2, New York City. Elizabeth contributed to subsurface field investigations for the Supplemental Environmental Assessment and Environmental Impact Statement for Phase 2 of the Second Avenue Subway. Elizabeth conducted on-site soil and groundwater sampling, soil classification, contractor oversight, and soil disposal. Elizabeth also coordinated consultant field staff, managed daily site logistics with drilling contractors, tracked equipment and materials, and communicated field progress to the project team.

Port Authority of New York and New Jersey Newark Liberty (EWR) International Airport Terminal One, redevelopment design-build, Newark, New Jersey. Elizabeth assisted in designing a methane investigation program for the redevelopment of Terminal One at EWR. Her work included historical records review, evaluation of regional environmental conditions, and coordination with engineering and construction teams to support the design-build effort. Elizabeth helped interpret findings and communicate results to inform design planning for this LEED® Silver-certified $1.4 billion terminal redevelopment.

NYCSCA Citywide Lead in Water Testing and Potable Water Piping Disinfection Programs, various public schools, New York City. Elizabeth supported potable water investigation and remediation activities at over 100 public schools under NYCSCA contracts. As project coordinator for the Citywide Lead in Water Testing Program, Elizabeth managed the collection and analysis of more than 6,300 potable water samples at over 70 schools, overseeing complex after-hours scheduling and coordination with field teams, laboratories, and NYCSCA representatives. Elizabeth also supported more than 25 potable water piping disinfection projects, including oversight of bacteriological and lead sampling following system installation. At P.S. 62 in Staten Island, Elizabeth led field efforts to investigate blue-discolored water, collecting over 200 samples, assisting with bench-scale testing of copper corrosion, and implementing a targeted remedy to restore water quality and promote long-term passivation.

New York City Housing Authority (NYCHA), physical needs assessment and energy audit, New York City. Elizabeth analyzed more than 200 field reports to assess the overall quality and accuracy of site inspections during a $23-million physical needs assessment and energy audit of 2,413 buildings on 318 NYCHA developments. As quality control inspector, Elizabeth collaborated with a team of approximately 20 scientists, engineers, and architects to facilitate efficient and thorough quality control reviews. In this capacity, Elizabeth reviewed field reports and revised them as needed to display information in an organized, consistent, and accurate manner. These field reports contained information regarding the presence asbestos, mold, damaged building materials, and other such hazards.

NYCDEP Owl's Head Wastewater Treatment Plant (WWTP) resilience upgrades, Brooklyn, New York. Elizabeth supported the development of sustainability goals for $30 million in flood resilience upgrades at the 120-million gallons per day (mgd) Owl's Head WWTP**.** As sustainability officer, Elizabeth identified strategies to reduce greenhouse gas emissions, energy use, and waste generation across mechanical, electrical, and structural systems. Her work included evaluating opportunities for material reuse, water conservation, and stormwater management through permeable surfaces and topographic optimization. Elizabeth collaborated with the design team to incorporate these measures into the facility plan report, ensuring the project aligned with NYCDEP sustainability and environmental impact goals.

NICOLE MOONEY

Project Geologist

EDUCATION

BS, Earth and Environmental Science with a minor in Oceanography, University of Michigan-Ann Arbor

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)
8-Hour OSHA HAZWOPER Supervisor for Construction Training
OSHA 10-Hour Construction Safety
OSHA 30-Hour Construction
NYC SST-307 8-Hour Fall Prevention for Construction
NYC SST-302 2-Hour Drug and Alcohol Awareness for Construction
DOT Hazmat Employee & RCRA Hazardous Waste Generator Training
American Red Cross Adult First Aid/CPR/AED Training and Bloodborne Pathogens Training
USACE Construction Quality Management for Contractors
Level I Antiterrorism Awareness Training

Nicole is a geologist with over four years of experience in site characterization and investigation, subsurface investigations, preparation of technical reports and work plans, and data collection and analysis. She has extensive experience conducting Phase I Environmental Site Assessments (ESAs), Phase II Environmental Site Investigations (ESIs), and other aspects of environmental due diligence. She has experience with preparation and overseeing execution of remedial investigation and actions at sites within the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and the New York City Mayor's Office of Environmental Remediation (NYCOER). She has performed soil, groundwater, and soil vapor sampling events and has drafted various site investigation plans and reports.

RELEVANT PROJECT EXPERIENCE

Environmental Investigation, Site Characterization, and Remediation

340 Myrtle Development LLC, 340 Myrtle Avenue, Brooklyn, New York. As a project geologist, Nicole coordinated and managed implementation of the Remedial Action Work Plan (RAWP) at the approximately 8,828 square foot site enrolled in the NYSDEC BCP. The remedial action included excavation and off-site disposal of soil, installation of an active sub-slab depressurization system (including cover system), installation of injection wells, and reinstallation of permanent monitoring wells for post-remedy groundwater monitoring. Nicole was responsible for the preparation of the Final Engineering Report (FER) and the Site Management Plan (SMP) which are undergoing review by the NYSDEC. Construction for the new development is currently ongoing and, when completed, the site will be improved with a new eight-story mixed-use commercial and residential building with a full cellar level.

B Contractors Group, LLC, 711-713 East 214th Street, Bronx, New York. As a project geologist, Nicole was responsible for coordinating and managing the implementation of the NYCOER-approved Remedial Action Plan (RAP) and preparing the Remedial Closure Report (RCR) for the approximately 6,252 square foot site. The redevelopment included a new eight-story residential building with a full cellar level.

650 Southern Blvd Bronx LLC, 650 Southern Boulevard, Bronx, New York. As a project geologist, Nicole was responsible for preparation and implementation of the Remedial Investigation Work Plan (RIWP), which included the installation of eleven soil borings, seven permanent groundwater monitoring wells (some of which extended into

bedrock), and seven soil vapor points, and the collection of soil, groundwater, and soil vapor samples. Nicole was also responsible for preparation of the Citizen Participation Plan (CPP), Remedial Investigation Report (RIR), and RAWP. The site is in the pre-construction phase.

Degraw Holdings LLC, 563 Sackett Street Site, Brooklyn, New York. As a project geologist, Nicole was responsible for due diligence during acquisition, including preparation of the Phase I ESA and Limited Phase II ESI. The initial Limited Phase II ESI and delineation sampling have been completed and the Limited Phase II ESI Delineation Report, Brownfield Cleanup Agreement (BCA) Major Amendment Application, and Supplemental Remedial Investigation Report (SRIR) are being drafted.

291 Wallabout Realty LLC, 291 Wallabout Street, Brooklyn, New York. As a project geologist, Nicole was responsible for the due diligence during acquisition of the property, including preparation of a Phase I ESA, Phase II ESI, BCP Application, and RIWP.

401 West 207th Realty LLC, 401 West 207th Street, New York, New York. As a project geologist, Nicole was responsible for oversight during implementation of the RAWP under the NYSDEC BCP. During remediation, Nicole observed and documented the excavation and proper disposal of on-site soil required for installation of the foundational elements. Nicole oversaw the proper cleaning and removal of two underground storage tanks encountered during excavation.

BCP Applications and Remedial Investigation Work Plans for NYSDEC. Nicole has prepared several BCP Application packages for various clients in New York State, which requires reviewing the site's history, including any previous investigation reports available, to assist with entry into the BCP to be remediated and redeveloped in accordance with applicable NYSDEC requirements. Nicole also prepares an RIWP to be submitted to the NYSDEC either concurrently or following submittal of the BCP Application for full investigation of the site to facilitate proper remedial action.

Excavation Oversight and CAMP Monitoring, Various Sites, Bronx, Brooklyn, and Queens, New York. As a project geologist, Nicole completed remedial oversight for several projects in the NYCOER cleanup program and NYSDEC BCP. Her responsibilities included excavation oversight, air monitoring, truck logging during off-site disposal of excavated materials, collection of endpoint and/or documentation samples, vapor barrier inspection, and oversight of installation of post-remedy groundwater monitoring wells.

Multiple Clients, Phase I ESAs and Due Diligence, Multiple Locations in New York. As a project geologist, Nicole completed several Phase I ESAs for buyers of properties in New York. She has extensive experience completing site reconnaissance and reviewing historical site documentation to identify potential environmental concerns at properties.

Multiple Clients, Phase II ESIs, Multiple Locations in New York. As a project geologist, Nicole conducted several Phase II ESIs for projects in New York, including oversight of the installation of soil borings, groundwater monitoring wells, and soil vapor points and the collection of soil, groundwater, and soil vapor samples. She assisted with the development of sampling plans based on previous environmental investigations and due diligence findings.

Former Grissom Air Force Base, Kokomo, Indiana. As a project geologist, Nicole was responsible for coordinating and performing quarterly groundwater sampling and/or Land Use Control (LUC) inspections in accordance with the deeds and Decision Documents for nine sites (FT001, FT002, SS190, SS035, SS053, SS058, LF003, LF004, and SS049) located on the 2,722-acre former Grissom Air Force Base under the Base Realignment and Closure (BRAC)/Environmental Construction Optimization Services (BECOS) program. Nicole was also responsible for the coordination and implementation of a Data Gap Investigation (DGI) at the SS035, SS053, and SS058 sites and a Site Investigation (SI) at the former Navy Skeet Range (site SR406). Nicole prepared LUC Inspection reports, Annual Groundwater Monitoring Reports, an SI Report, a DGI Report, and the Five-Year Review Report for this work.

BRIAN A. FERGUSON

Senior Engineer

EDUCATION

M. S. Geotechnical Engineering, Tufts University, Medford, Massachusetts; 2012
B. S. Civil Engineering, State University of New York - Environmental, Science, and Forestry, Syracuse, New York; 2000
Ass. Science Degree in Applied Science and Technology (Nuclear Engineering), Thomas A. Edison State College, Trenton, New Jersey; 2000

PROFESSIONAL SOCIETIES

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

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

In addition to providing engineering design support, Mr. Ferguson has managed and participated in a number of 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, 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

St. Elizabeths Hostpital – 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, subcontractors, assisting with project management, reviewing subcontractors invoices, reviewing and summarizing subsurface data and writing data reports.

TUFTS University, New Central Energy Plant, Medford, MA. Project engineer for a new Central Energy Plant that will house new co-generation steam boilers, centralized chilled water and electrical transformer switchgear that is planned to occupy approximately 20,000 square feet across two or three levels. Responsibilities included coordination of construction monitoring, observing SOE and footing installation, assisting with project management,

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

Lahey Hospital and Medical Center – Stilts Infill Project, Burlington, MA Project Engineer for an addition to the existing Stilts building on the Lahey campus. Responsibilities included coordination and overseeing geotechnical and environmental subsurface investigations, coordination of construction monitoring, observing footing installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Gloucester Beauport Hotel, Gloucester, MA Project engineer for a four story hotel with a seawall constructed adjacent to tidal beach. Responsibilities included coordination and overseeing geotechnical and environmental subsurface investigations, coordination of construction monitoring, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings, design and implementation of a sub-slab gas mitigation system.

275 Wyman Street, New Office Building, Waltham, MA. Project engineer for a new office building and parking garage founded on a shallow foundation system. Responsibilities included preparing proposals, assisting with management and planning of a subsurface investigation program, summarizing subsurface data and reviewing geotechnical test boring logs, coordination of construction monitoring and instrumentation monitoring programs, reviewing weekly field construction reports, reviewing and responding to specialty geotechnical design submittals and RFIs by others and attending project meetings.

Suffolk University - 20 Somerset Street, Boston, MA Project engineer for design of 8-story academic building with two levels of below grade finished space. Responsibilities included coordination of construction monitoring, observing SOE and footing installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Worcester State University, New Student Housing, Worcester, MA Project engineer for design and construction of a 7-story residence/dining hall with a single level basement and a major site retaining wall structure. Responsibilities included overseeing geotechnical subsurface investigations, provided foundation recommendations and specifications, and prepared a retaining wall contract document. Responsibilities included coordination of construction monitoring, excavation and construction of footings, and soil reuse and management, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

University of Massachusetts Boston, General Academic Building No.1, Boston, MA. Project engineer responsible for assisting project manager in preliminary foundation engineering recommendations and construction considerations for a new academic building on a part of Columbia Point, a historic landfill area. Assisted in design phase services that included preparing foundation support design recommendations including the use of high allowable stresses for 190-ft long end-bearing H-piles and application of Slickcoat coating to address downdrag concerns and reduce foundation costs.

Waltham Watch Factory, Waltham, MA project engineer for redevelopment of former watch factory. Responsibilities included construction oversight of new precast parking garage, utilitiy upgrades, soil remediation and management, installation of gas mitigation systems, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Massachusetts Green High Performance Computing Center, Holyoke, MA. Project engineer for 60,000 sq. ft high level computing center and associated support utilities. Redevelopment of the site included recycling 50,000 cy of construction debris into the site fills at this historic site along the Connecticut River. Responsibilities included coordinating geotechnical and environmental field investigations, coordination of construction monitoring, seismic analysis, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

The Shops at Riverwood, Hyde Park, MA. The project consisted of the redevelopment of a colonial era paper mill. The multi-building complex was demolished and the concrete and brick from the previous buildings were recycled. The project involved crushing 50,000 cy of brick and concrete and placement of excavated soils and recycled brick and concrete as compacted fill materials to support proposed buildings, pavement areas, and achieve 5 to 9 ft. raises in grade. Field Representative was responsible for management and reuse of brick and concrete stockpiles, in-place density testing, coordination of test pits, installation of soldier pile and versa-lok walls, and backfilling of underground vaults. Remedial activities included: excavation of 5,000 cy of petroleum contaminated soils, on-site cement batching in a pug mill, and placement of compacted recycled materials in roadway areas; delineation, excavation and off-site disposal of TSCA-regulated PCB contaminated soils associated with historical Askarel transformers and dioxin-contaminated soils associated with historical bleaching operations; and disposition of 1,000 tons of paper mill sludge encountered within an abandoned granite-walled sluiceway structure. In addition, assisted with weekly project meetings, maintaining a record of material reuse, and providing weekly field reports.

Harvard Law School, Cambridge, MA. The Harvard Law School project is located on Massachusetts Avenue in Cambridge. The project consisted of a multistory building above ground with 5 levels below ground for a parking garage. Field Representative was responsible for overseeing the installation of slurry walls into bedrock and LBEs with three installation rigs while monitoring the removal of urban fill and transfer to several different receiving facilities from another portion of the site. The slurry walls were constructed into bedrock. Other Field Representative activities were: testing of the slurry, management of the excavated soils, and record keeping of the Contractor's obstruction and down time of the equipment. In addition, assisted with weekly project meetings, maintaining a record of obstruction and machine time, and providing weekly field 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 has over 25 years of experience in developing, implementing, and managing a wide range of environmental, health, and safety (EH&S) solutions for a variety of clients. Brian has served as the Health and Safety Manager and Incident Commander at several research and development sites and has managed extensive programs to maintain and clean contaminated sites under Federal and State regulatory programs. He has provided expertise in managing EH&S programs as a consultant, and has actively developed, implemented, and managed these programs as an EH&S professional for various industries.

Brian is currently working as the Chief Health and Safety Officer for Haley & Aldrich, Inc. He, and his staff, are involved in every project Haley & Aldrich, Inc. undertakes. Brian is involved on several projects, directly overseeing the health and safety on the project site of our staff, our contractors, and the public. Brian also acts as support for our on-site health and safety staff on other larger construction and remediation projects.

Through Brian's leadership our safety culture and focus extend from the top of our organization to each and every Haley & Aldrich employee as well as subconsultants and subcontractors. Utilizing a Behavior Based Safety approach, Haley & Aldrich expects every project team member to play an important role in making our projects safe and has given authority to every Haley & Aldrich employee, subconsultant, and subcontractor to stop any activity at any time for health or safety concerns. Our record illustrates that our hard work is paying off. The company has gone 4 years without a lost time injury, and our TRIR and EMR have consistently improved each of the last 3 years.

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 condition 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 sub-contracted 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 E

NYSDEC PFAS 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 F
Health And Safety Plan

HALEY & ALDRICH OF NEW YORK, INC.
SITE-SPECIFIC SAFETY PLAN

FOR

Westchester Avenue Development Site

223-227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue

Port Chester, Westchester County, New York 10573

Project/File No. 0206816

Gensuite EZ Scan®

BI - Developers

Prepared By: Luke J. McCartney, P.G.	**Date: 5/1/2025**
Approvals: The following signatures constitute approval of this Health & Safety Plan.	
Field Safety Manager: Brian Ferguson	**Date: 3/19/2024**
Project Manager: Elizabeth Fitzgerald	**Date: 3/18/2024**
HASP Valid Through: 12-31-2025	

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Note: This HASP has been developed for Haley & Aldrich of New York purposes only and is not for use by others.

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STOP WORK AUTHORITY

In accordance with H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) Stop Work Authority Operating Procedure (OP1035), any individual has the right to refuse to perform work that he or she believes to be unsafe without fear of retaliation. He or she also has the authority, obligation, and responsibility to stop others from working in an unsafe manner.

STOP Work Authority is the stop work policy for all personnel and subcontractors on the Site. When work has been stopped due to an unsafe condition, Haley & Aldrich of New York site management (e.g., Project Manager [PM], Site Health & Safety Officer [SHSO], etc.) and the Haley & Aldrich of New York Senior Project Manager (SPM) will be notified immediately.

Reasons for issuing a stop work order include, but are not limited to:

- The belief/perception that injury to personnel or accident causing significant damage to property or equipment is imminent.
- A Haley & Aldrich of New York subcontractor is in breach of site safety requirements and/or their own site HASP.
- Identifying a substandard condition (e.g., severe weather) or activity that creates an unacceptable safety risk as determined by a qualified person.

Work will not resume until the unsafe act has been stopped OR sufficient safety precautions have been taken to remove or mitigate the risk to an acceptable degree. Stop work orders will be documented as part of an on-site stop work log, on daily field reports to include the activity/activities stopped, the duration, person stopping work, person in-charge of stopped activity/activities, and the corrective action agreed to and/or taken. Once work has been stopped, only the Haley & Aldrich of New York SPM or SHSO can give the order to resume work. Haley & Aldrich of New York senior management is committed to support anyone who exercises his or her “Stop Work” authority.

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ISSUANCE AND COMPLIANCE

This HASP has been prepared in accordance with Occupational Safety and Health Administration (OSHA) regulations (CFR 29, Parts 1904, 1910, and 1926) if such are applicable.

The specific requirements of this HASP include precautions for hazards that exist during this project and may be revised as new information is received or as site conditions change.

- This HASP must be signed by all Haley & Aldrich of New York personnel involved in implementation of the SOW (Section 2 of this HASP).
- This HASP, or a current signed copy, must be retained at all times when Haley & Aldrich of New York staff are present.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the Field Safety Manager (FSM), Haley & Aldrich of New York, SSO and/or Project Manager (PM) may use Attachment 1 (HASP Amendment Form), presented at the end of this HASP. Any revision to the HASP requires employees and subcontractors to be informed of the changes so that they understand the requirements of the change.
- Deviations from this HASP are permitted with approval from the Haley & Aldrich of New York FSM, PM, or Senior Health & Safety Manager (SHSM). Unauthorized deviations may constitute a violation of Haley & Aldrich of New York company procedures/policies and may result in disciplinary action.
- This HASP will be relied upon by Haley & Aldrich of New York's subcontractors and visitors to the site. Haley & Aldrich of New York's subcontractors must have their own HASP which will address hazards specific to their trade that is not included in this HASP. This HASP will be made available for review to Haley & Aldrich of New York's subcontractors and other interested parties (e.g. Facility personnel and regulatory agencies) to ensure that Haley & Aldrich of New York has properly informed our subcontractors and others of the potential hazards associated with the implementation of the SOW to the extent that Haley &Aldrich is aware.

This site-specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment (PPE) selection, etc.) are described in detail in the Haley & Aldrich of New York Corporate Health and Safety Program Manual and within Haley & Aldrich of New York's Standard Operating Procedures. Both the manual and SOPs can be located on the Haley & Aldrich of New York's Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and SOPs are available to clients and regulators upon request.

Note: This HASP is developed for Haley & Aldrich of New York purposes only and not for use by others.

EMERGENCY EVENT PROCEDURES

1 - ASSESS THE SCENE

- **STOP WORK**
- Review the situation and ascertain if it's safe to enter the area.
- Evacuate the site if the conditions are unsafe.

2 - EVALUATE THE EMERGENCY

- **Call 911, or designated emergency number, if required.**
- **Provide first aid for the victim if qualified and safe to do so.**
  - First aid will be addressed using the onsite first aid kit. *
    - If providing first aid, remember to use proper first aid universal precautions if blood or bodily fluids are present.
- **If exposure to hazardous substance is suspected, immediately vacate the contaminated area.**
  - Remove any contaminated clothing and/or equipment.
  - Wash any affected dermal/ocular area(s) with water for at least 15 minutes.
  - Seek immediate medical assistance if any exposure symptoms are present.

** Note: Haley & Aldrich of New York employees are not required or expected to administer first aid / CPR to any Haley & Aldrich of New York staff member, Contractor, or Civilian personnel at any time; it is Haley & Aldrich of New York´s position that those who do are doing so on their own behalf and not as a function of their job.*

3 - SECURE THE AREA

- **Cordon off the incident area, if possible.**
  - Notify any security personnel, if required.
  - Escort all non-essential personnel out of the area, if able.

4 - REPORT ON-SITE ACCIDENTS / INCIDENTS TO PM / SSO

- **Notify the PM and SSO as soon as it is safe to do so.**
  - Assist PM and SSO in completing any additional tasks, as required.

5 - INVESTIGATE / REPORT THE INCIDENT

- **Record details of the incident for input to the Gensuite.**
  - Complete any additional forms as requested by the PM and SSO.

6 - TAKE CORRECTIVE ACTION

- **Implement corrective actions per the PM following root cause analysis.**
  - Complete Lessons Learned form.

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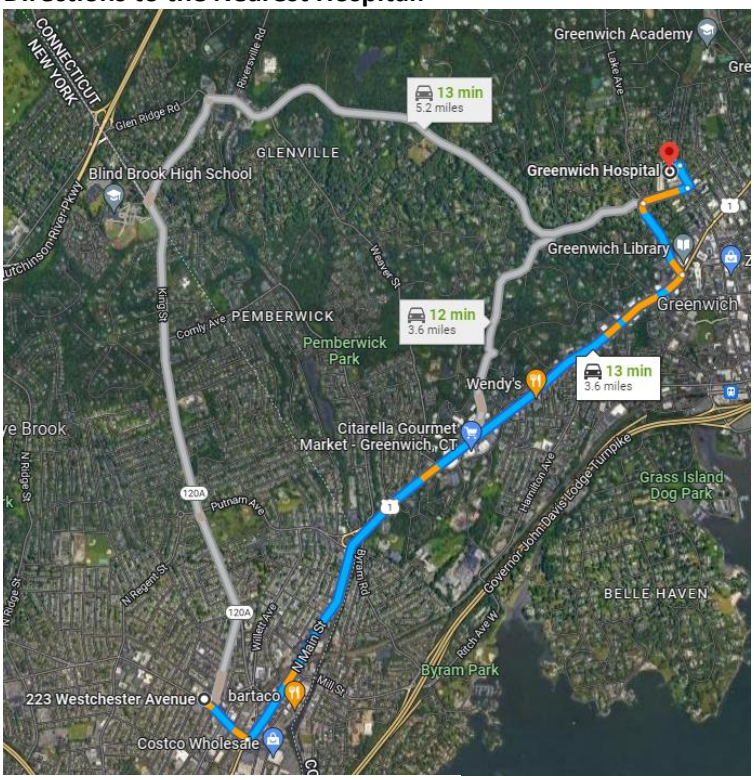
PROJECT INFORMATION AND CONTACTS	
Project Name: Westchester Avenue Development Site	**Haley & Aldrich of New York File No.:** 0206816
Location: 223-227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue, Port Chester, New York	
Client/Site Contact: Phone Number:	Yorkland Partners LLC/Richard Ortiz (212) 336-5265
Haley & Aldrich of New York Field Representative: Office Phone Number: Cell Phone Number:	**Matthew Cal** (646)-569-9664
Haley & Aldrich of New York Project Manager: Office Phone Number: Cell Phone Number:	**Elizabeth Scheuerman** (917) 765-7145 (508) 918-8558
Field Safety Manager: Office Phone Number: Cell Phone Number:	**Brian Ferguson** (617) 886-7439 (617) 908-2761
Subcontractor Project Manager: Phone Number:	Lakewood Environmental Services, Corp. (631) 257-5321
Nearest Hospital: Address: (see map on next page) Phone Number:	Greenwich Hospital 5 Perryridge Rd Greenwich, CT 06830 (203) 863-3000
Nearest Occ. Health Clinic: http://www.talispoint.com/liberty/ext/ Address: (see map on next page) Phone Number:	CityMD Rye Brook Urgent Care 108 S Ridge St Rye Brook, NY 10573 (914) 219-0187
Liberty Mutual Claim Policy	**WC6-Z11-254100-035**
WorkCare Injury Illness Hotline	**1-888-449-7787**
Emergency Response Number:	**911**
Other Local Emergency Response Number:	N/A
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

Note: This HASP is developed for Haley & Aldrich of New York purposes only and not for use by others.

DIRECTIONS TO THE NEA0REST HOSPITAL

Liberty Mutual Medical Location Directory

Directions to the Nearest Hospital:



223 Westchester Ave
Port Chester, NY 10573

- Head southeast on Westchester Ave toward Grove St
  0.2 mi
- Turn left onto US-1 N/N Main St
  - Continue to follow US-1 N
  - Pass by McDonald's (on the right in 2.3 mi)
  - Entering Connecticut
  2.7 mi
- Turn left onto Dearfield Dr
  0.3 mi
- At the traffic circle, take the 1st exit onto Lake Ave
  0.2 mi
- At the traffic circle, take the 2nd exit onto Perryridge Rd
  0.1 mi
- Turn left
  - Destination will be on the right
  138 ft

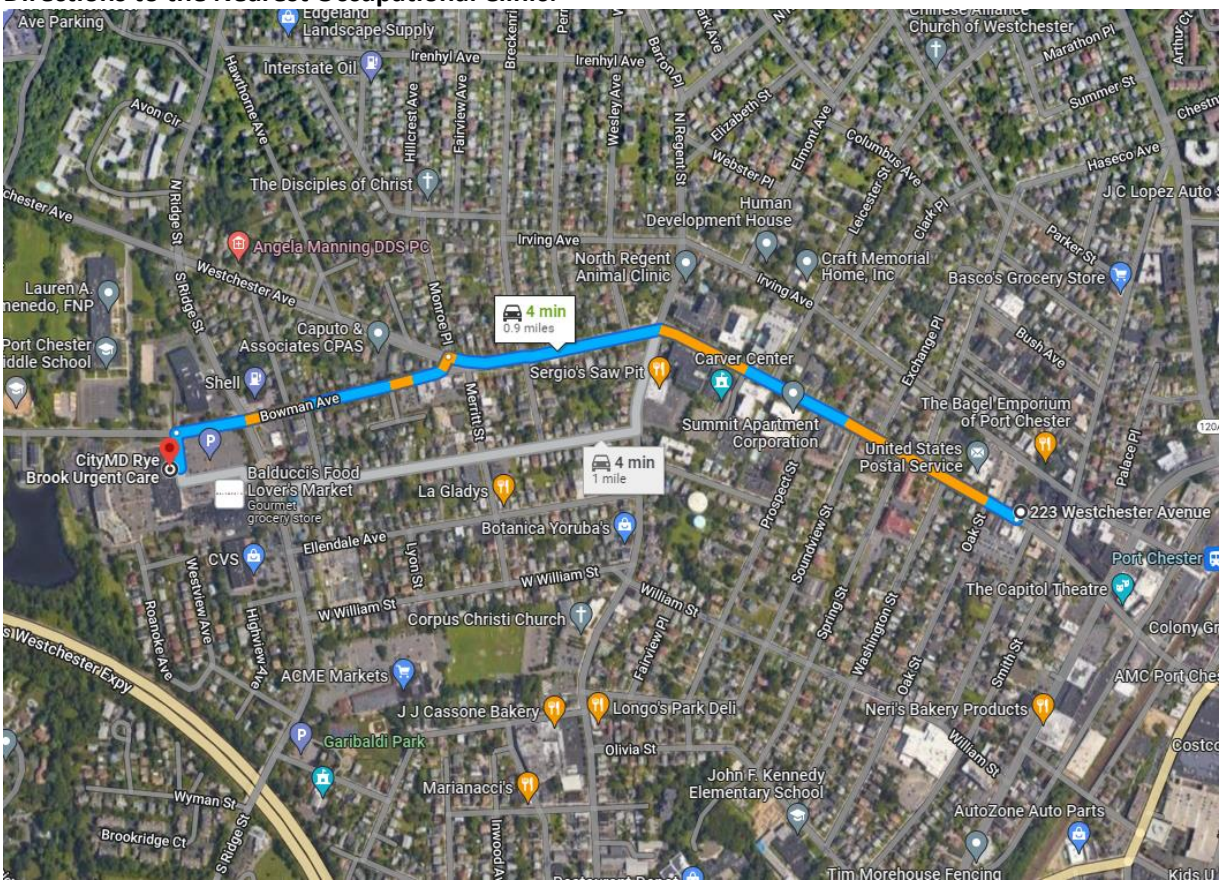
Greenwich Hospital
5 Perryridge Rd, Greenwich, CT 06830

Note: This HASP is developed for Haley & Aldrich of New York purposes only and not for use by others.

DIRECTIONS TO THE NEAREST URGENT CARE

Liberty Mutual Medical Location Directory

Directions to the Nearest Occupational Clinic:



223 Westchester Ave
Port Chester, NY 10573

↑ Head northwest on Westchester Ave toward Oak St

0.6 mi

↰ Turn left onto Bowman Ave

0.3 mi

↰ Turn left onto Rye Ridge Plaza
ⓘ Destination will be on the right

180 ft

CityMD Rye Brook Urgent Care
108 S Ridge St, Rye Brook, NY 10573

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1. WORK SCOPE

This Site-Specific Health and Safety Plan addresses the health and safety practices and procedures that will be exercised by all Haley & Aldrich of New York employees participating in all work on the Project Site. This plan is based on an assessment of the site-specific health and safety risks available to Haley & Aldrich of New York and Haley & Aldrich of New York's experience with other similar project sites. The scope of work includes the following:

Work tasks will include: 1.) Drilling and temporary monitoring well installation; and, 2.) Soil, soil vapor, and groundwater sampling.

Project Task Breakdown

Task No.	Task Description	Employee(s) Assigned	Work Date(s) or Duration
1	Drilling and temporary monitoring well installation	Cal, Matthew	2 Days
2	Soil, soil vapor, and groundwater sampling	Cal, Matthew	2 Days

Subcontractor(s) Tasks

Firm Name	Work Activity	Work Date(s) or Duration
Lakewood Environmental Services, Corp.	Drilling and temporary monitoring well installation	2 Days

Projected Start Date: 5/1/2025

Projected Completion Date: 8/1/2025

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2. SITE OVERVIEW / DESCRIPTION

Site Classification

Commercial, Manufacturing/Industrial, and Residential

Site Description

The Site, identified as parcels 142.22-1-24, 25, 30, 31, 32 and 33 on the Rye Tax Map, is located in a commercial zoning district and is approximately one acre. The site is currently improved by 1-story commercial /retail building occupied by a dry cleaner with an adjoining paved alleyway (Lot 24), a two- to three-story mixed-use building with a full basement and rear yard occupied by office/retail spaces on the upper floors and a restaurant on the first floor (Lot 25), a one- to two-story commercial/manufacturing building with a roll up door (Lot 30), a three-story mixed-use building occupied by an auto body shop on the first floor and residential spaces on upper floors (Lot 31) and undeveloped vacant land (Lots 32 and 33).

Background and Historic Site Usage

The Site was first developed in the late 1800s and has historically been utilized for mixed commercial and residential use.

Site Status

Indicate current activity status and describe operations at the site:

Partially Active

Lot 24 – Currently utilized as a dry cleaner

Lot 25 – Currently used as a restaurant and office/retail spaces

Lot 30 – Currently Utilized as a commercial/manufacturing building

Lot 31 – Currently utilized as an auto body shop and residential spaces

Lots 32 and 33 - Undeveloped

Site Plan

Is a site plan or sketch available? Yes

Work Areas

List and identify each specific work areas(s) on the job site and indicate its location(s) on the site plan:

The entire Site will be utilized as an active work area

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Site Plan



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3. HAZARD ASSESSMENT

Indicate all hazards that may be present at the site and for each task. If any of these potential hazards are checked, it is the Project Manager's responsibility to determine how to eliminate / minimize the hazard to protect onsite personnel.

Site Chemical Hazards

Is this Site impacted with chemical contamination? Yes

Source of information about contaminants: Previous Investigation

Contaminant of Concern	Location/Media	Concentration	Units
Polycyclic aromatic hydrocarbons (PAHs)/SVOCs	**Soil**	**15**	**mg/kg**
Arsenic	**Soil**	**73.6**	**mg/kg**
Barium	**Soil**	**408**	**mg/kg**
Copper	**Soil**	**18100**	**mg/kg**
Lead	**Soil**	**1830**	**mg/kg**
Mercury	**Soil**	**1.16**	**mg/kg**
Polycyclic aromatic hydrocarbons (PAHs)	**Groundwater**	**200**	**ug/L**
Tetrachloroethene	**Soil Vapor**	**540**	**ug/m3**
Trichloroethene	**Soil Vapor**	**7.9**	**ug/m3**

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Polycyclic aromatic hydrocarbons (PAHs): are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned. PAHs generated from these sources can bind to or form small particles in the air. High-temperature cooking will form PAHs in meat and in other foods. Naphthalene is a PAH that is produced commercially in the United States to make other chemicals and mothballs. Cigarette smoke contains many PAHs.

Arsenic: The Occupational Safety and Health Administration has set limits of 10 microgram arsenic per cubic meter of workplace air (10 µg/m3) for 8 hour shifts and 40 hour work weeks. Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Barium: is a soft, silvery metal that rapidly tarnishes in air and reacts with water. It is mostly used in drilling fluids for oil and gas wells and used in paint and in glassmaking. All barium compounds are toxic; however, barium sulfate is insoluble and so can be safely swallowed. A suspension of barium sulfate is sometimes given to patients suffering from digestive disorders.

Barium has no known biological role, although barium sulfate has been found in one type of algae. Barium is toxic, as are its water- or acid-soluble compounds. Barium occurs only in combination with other elements. The major ores are barite (barium sulfate) and witherite (barium carbonate). Barium metal can be prepared by electrolysis of molten barium chloride, or by heating barium oxide with aluminum powder.

Copper: Copper is a naturally occurring metal found in soil, often originating from geological processes or human activities such as agriculture, mining, and industrial operations. While copper is an essential nutrient for plants and animals in trace amounts, excessive exposure to high concentrations of copper in soil can pose health risks. Inhaling copper dust or fumes may lead to respiratory irritation, including coughing and shortness of breath. Additionally, ingestion of contaminated soil or water can cause gastrointestinal discomfort, nausea, and vomiting. Chronic exposure to elevated levels of copper in soil has been associated with more severe health effects, including liver and kidney damage.

Lead: The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system. Long-term exposure to lead can result in decreased performance in some tests measuring functions of the nervous system in adults. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys and ultimately cause death.

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Mercury: is an odorless, silver metallic liquid. It can be inhaled or absorbed through the skin. Contact may cause irritation to the skin or eyes. Toxic if ingested. Fume inhalation may cause irritation in the nose, throat or lungs. This is a corrosive chemical. Symptoms of poisoning include, muscle tremors, loss of appetite, and nausea. Long-term exposure may have effects on the central nervous system and kidneys. The PEL is 0.1 mg/m^3 averaged over an 8 hour shift.

Tetrachloroethene: Tetrachloroethene, commonly used in dry-cleaning and metal degreasing, can have various health impacts when inhaled at high levels over a short period. These include irritation of the eyes and upper respiratory tract, kidney problems, and neurological issues like mood swings, coordination difficulties, dizziness, headaches, and even unconsciousness. Long-term exposure may lead to neurological problems affecting cognitive and motor skills. Additionally, it can harm the kidney, liver, immune system, blood, and reproductive health, and may also impact development and reproduction.

Trichloroethene: Trichloroethene (TCE) is a volatile organic compound commonly found in soil vapor, often resulting from industrial activities like dry cleaning, metal degreasing, and chemical manufacturing. Inhalation of TCE vapors can lead to various health effects, including irritation of the respiratory tract and eyes, headaches, dizziness, nausea, and in severe cases, unconsciousness. Long-term exposure to TCE has been associated with more serious health concerns such as damage to the liver, kidneys, immune system, and neurological system. It is crucial to implement proper safety measures when dealing with TCE-contaminated soil vapor to minimize exposure risks and protect the health of workers and the surrounding environment.

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Site Hazards Checklist			
Weather			
Cold Temperatures	High Winds	Hot Temperatures	Select Hazard

Cold Temperatures

Cold stress may occur at any time work is being performed at low ambient temperatures and high velocity winds. Because cold stress is common and has potentially serious illnesses associated with outdoor work during cold seasons, regular monitoring and other preventative measures are vital.

Refer to OP1003-Cold Stress for additional information and mitigation controls.

High Winds

While high winds are commonly associated with severe thunderstorms and hurricanes they may also occur as a result of differences in air pressures, such as when a cold front passes across the area. They can cause downed trees and power lines, and flying debris (such as dust or larger debris), which adds additional risks and could lead to power outages, transportation disruptions, damage to buildings and vehicles, and serious injury.

Wind Advisory are issued for sustained winds 25 to 39 mph and/or gusts to 57 mph. High Wind warnings are issued by the National Weather Service when high wind speeds may pose a hazard or is life threatening. The criteria for this warning will varies by state. The Beaufort Wind Scale is a helpful tool to when dealing with high winds.

Hot Temperatures

Heat stress may occur at any time work is being performed at elevated ambient temperatures. Because heat stress is one of the most common and potentially serious illnesses associated with outdoor work during hot seasons, regular monitoring and other preventative measures are vital. Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management.

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working when there are hot temperatures or a high heat index. Refer OP1015-Heat Stress for a discussion on hot weather hazards.

Biological			
Mosquitoes	Stinging Insects	Large/Small Mammals	Choose an item.

Mosquitos

Work outdoors with temperatures above freezing will likely bring staff into contact with mosquitos. There are a variety of mosquito species that can transmit a range of diseases. Birds act as reservoirs for the viruses that can be collected by the mosquito and transmitted to a person. Majority of mosquitos are mainly a nuisance but staff need to take appropriate precautions to minimize the potential transmission of a virus that can result in one of the following diseases: West Nile, Eastern Equine Encephalitides and Western Encephalitides. Knowing some key steps that can minimize the risk of mosquito bites is, therefore, important in reducing the risks. Workers working outdoors should be

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aware that the use of PPE techniques is essential to preventing 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.

Large Mammals

When working in remote locations staff may come near wild or stray dogs, coyotes, foxes or other large animals. It is important that staff avoid contact with these animals.

There are increasing reports of wild dog attacks on household pets, attacks on human are uncommon and rare or infrequent at best. However, attacks by individual or small groups of domestic dogs occur frequently resulting in injury or a fatality on rare occasion. Wild dogs may become skilled at hunting in groups for small game and large game from rabbits and hares to deer and moose. The impact of wild dogs, on livestock and wildlife, varies by location and is influenced by factors such as availability of other food, number of dogs, and competition by other predators. Wild dogs kill house cats and may injure or kill domestic dogs. Areas where people have not hunted and trapped wild dogs, a fear of humans may not have developed and in such dogs may attack people and children. This can be a serious problem in areas where feral dogs feed at and live around garbage dumps near human dwellings. Such situations occur most frequently around small remote towns. In urban settings domestic dogs can be territorial and exhibit aggressive behavior such as barking and snarling when their area is encroached. It is not uncommon for domestic dogs to travel in small packs.

If the pack displays aggressive behavior and charges do not run or turn your back. When confronted by one or more dog it is important not to run or exhibit any behavior that may be construed as a challenge (e.g., looking the dog in the eyes, showing your teeth, or attempting to pet the dog).Stand still and place your work bag between you and the dog and then begin to move slowly away from the dog(s) while not turning your back. If you see a stray dog approaching from a distance, look for a place that's secure. Step inside a fenced area, enter a place of business, or knock on a neighbor's door. It is always better to be safe than risk a potentially dangerous situation.

Small Mammals

Rodents, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat. Other rodents you may encounter are mice, beavers, squirrels, guinea pigs, capybaras and coypu.

The Brown Rat has small ears, blunt nose, and short hair. It is approximately 14-18” long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, and supermarkets. They also frequent any space with an easy meal and potential nesting sites. The Black Rat is identified by its tail, that is always longer than the length from the head to the body. It is also slimmer and more agile than the Brown rat. Its size varies according to its environment and food supply.

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The House Mouse has the amazing ability to adapt and can frequently be found in human dwellings. In buildings, mice will live anywhere and difficult to keep out. Mice are omnivorous, they will eat anything. Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

Some major problems caused by rats and mice are contaminating the food they eat with urine and excrement. Gnawing into materials such as paper, wood, or upholstery, to use as nest material. Also gnawing plastic, cement, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard. Occasionally biting people and may kill small animals. They, or the parasites they carry, like fleas, mites and worms, spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and bubonic plague. They damage ornamental plants by burrowing among the roots or feeding on new growth. They also eat garden vegetables, such as corn and squash. These rodents have been a problem for centuries, because of their incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

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.

Stinging Insects

Stinging Insects fall into two major groups: Apidae (honeybees and bumblebees) and vespids (wasps, yellow jackets, and hornets). Apidae are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detach after a sting. Vespids have few barbs and can inflict multiple stings.

There are several kinds of stinging insects that might be encountered on the project site. Most stings will only result in a temporary injury. However, sometimes the effects can be more severe, even life-threatening depending on where you are stung and what allergies you have. Being stung in the throat area of the neck may cause edema (swelling caused by fluid build-up in the tissues) around the throat and may make breathing difficult.

In rare cases, a severe allergic reaction can occur. This can cause "anaphylaxis" or anaphylactic shock with symptoms appearing immediately or up to 30 minutes later. Symptoms include; Hives, itching and swelling in areas other than the sting site, swollen eyes/eyelids, wheezing, chest tightness, difficulty breathing, hoarse voice, swelling of the tongue, dizziness or sharp drop in blood pressure, shock, unconsciousness or cardiac arrest. Reactions can occur the first time you are stung or with subsequent stings. If you see any signs of reaction, or are unsure, call or have a co-worker call emergency medical services (e.g., 911) right away. Get medical help for stings near the eyes, nose or throat. Stay with the person who has been stung to monitor their reaction.

Staff who are allergic to bee stings are encouraged to inform their staff/project manager. If staff member carries an Epi-pen (i.e., epinephrine autoinjector) they are encouraged to inform their colleagues in case they are stung and are incapable of administering the injection. Examine site for any signs of activity or a hive/nest. If you see several insects flying around, see if they are entering/exiting from the same place. Most will not sting unless startled or attacked. Do not swat, let insects fly away on

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their own. If you must, walk away slowly or gently "blow" them away. If a nest is disturbed and you hear "wild" buzzing, protect your face with your hands and run from the area immediately. Wear long sleeves, long pants, and closed-toed boots. Wear light colored clothes such as khakis. Avoid brightly colored, patterned, or black clothing. Tie back long hair to avoid bees or wasps from entanglement. Do not wear perfumes, colognes or scented soaps as they contain fragrances that are attractive. If bee or wasp is found in your car, stop and leave windows open.

Location/Terrain			
Slip/Trip/Falls	Economically Depressed	SIMOPS	Choose an item.

Slips, Trips & Falls

Slip and trip injuries are the most frequent injuries to workers. Statistics show most falls happen on the same level resulting from slips and trips. Both slips and trips result from unintended or unexpected change in the contact between the feet and the ground or walking surface. Good housekeeping, quality of walking surfaces (flooring), awareness of surroundings, selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents.

Site workers will be walking on a variety of irregular surfaces, that may affect their balance. Extra care must be taken to walk cautiously near rivers because the bottom of the riverbed maybe slick and may not be visible. Rocks, gradient changes, sandy bottoms, and debris may be present but not observable.

Take your time and pay attention to where you are going. Adjust your stride to a pace that is suitable for the walking surface and the tasks you are doing. Check the work area to identify hazards - beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain. Establish and utilize a pathway free of slip and trip hazards. Choose a safer walking route. Carry loads you can see over. Keep work areas clean and free of clutter. Communicate hazards to on-site personnel and remove hazards as appropriate.

Economically Depressed Areas

Economically depressed areas may have high crime rates. Projects involving work in and around inactive industrial sites may bring staff into contact with indigent and homeless persons. Staff could be subjected to crime that includes but may not be limited to thievery, vandalism, and violence. Prior to the start of work staff need to understand the work locations and the potential for exposure to low level crime.

Staff members should never work alone in these areas. A buddy system is required. Conduct during daylight hours. Secure equipment and vehicles. If warranted, contact the local police department for a security detail. Leave the work area immediately and contact the local authorities if staff members feel threatened or are threatened.

SIMOPS

SIMOPS are described as the potential class of activities which could bring about an undesired event or set of circumstances, e.g., safety, environment, damage to assets, schedule, commercial, financial, etc. SIMOPS are defined as performing two or more operations concurrently.

SIMOPS should be identified at an early stage before operations commence to understand issues such

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as schedule and physical clashes, maintenance activities, failure impacts, interferences between vessels, contracts and third part interfaces and environmental impacts.

Coordinate project with site activities. Identify and understand the hazards associated with the host and client's activities. Integrate site emergency response protocols where appropriate and communicate to all project staff. Integrate site communication protocols and communicate to all project staff.

Miscellaneous			
Extended Shift	Choose an item.	Choose an item.	Choose an item.

Extended Shift

An extended shift can include extending a workday beyond eight hours. Extended or unusual work shifts may be more stressful physically, mentally, and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased fatigue, stress, and lack of concentration. This leads to an increased risk of operator error, injuries and/or accidents. The degree to which an individual is exposed to fatigue risk factors depends upon the work schedule. As both the duration of the workday and the number of days worked increase so does the fatigue risk factors. Staff Managers need to be aware of the fatigue risk factors and ensure projects are structured to mitigate these factors. Staff Members also have a responsibility to manage the personal fatigue risk factors that they can control outside of work (e.g, duration and quality of sleep, diet, drugs, and alcohol)

Fatigue is a message to the body to rest and can be eliminated with proper rest. However, if rest is not possible, fatigue can increase and becomes distressing and eventually debilitating. Fatigue symptoms, both mental and physical, vary and depend on the person and degree of overexertion. Examples include: weariness, sleepiness, irritability, reduced alertness, lack of memory, concentration and motivation, increased susceptibility to illness, depression, headache, loss of appetite, and digestive problems.

When possible, managers should limit use of extended shifts and increase the number of days worked. Working shifts longer than 8 hours generally result in reduced productivity and alertness. Additional breaks and meals should be provided when working extended shift periods. Tasks requiring heavy physical labor or intense concentration should be performed at the beginning of the shift if possible. This is an important consideration for pre-emergency planning.

Make efforts, when feasible, to ensure that unavoidable extended work shifts and shift changes allow affected employees time for adequate rest and recovery. Project Managers need to plan to have an adequate number of personnel available to enable workers to take breaks, eat meals, relax, and sleep.

Plan for regular and frequent breaks throughout the work shift. If at remote sites, ensure if possible, that there is a quiet, secluded area designated for rest and recuperation. In addition to formal breaks such as lunch or dinner, encourage use of micro breaks to change positions, move about, and shift concentration. Personnel should look to obtain an adequate quantity and quality of sleep.

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Task Hazard Summary

Task 1 – Drilling and Temporary Monitoring Well Installation

Drilling is conducted for a range of services that can include but are not limited to: soil characterization, environmental investigation, well installation, and ore exploration. Familiarity with basic drilling safety is an essential component of all drilling projects. Potential hazards related to drilling operations include, but are not limited to encountering underground or overhead utilities, traffic and heavy equipment, hoisting heavy tools, steel impacts, open rotation entanglement, and the planned or unexpected encountering of toxic or hazardous substances. While staff members do not operate drilling equipment, they may work in close proximity to operating drilling equipment and may be exposed to many of the same hazards as the drilling subcontractor. It is imperative that staff are aware of emergency stops and establish communication protocols with the drillers prior to the start of work.

See OP 1002 Drilling Safety for more information.

Task 2A – Soil Sampling

Soil sampling by H&A staff on active construction sites can be conducted in conjunction with a wide range activities such as building construction, earthwork and soil management related activities. These activities can include, but are not limited to: drill spoil characterization and management during building foundation element installation, characterization of excavated soils for management/disposal/reuse during earthwork activities, and as part of environmental remedial activities such as delineation and confirmation sampling. Familiarity with basic heavy construction safety, site conditions (geotechnical and environmental), and potential soil contaminants are essential components of soil sampling performed on active sites. Potential hazards related to soil sampling at construction sites include, but are not limited to: encountering site vehicle traffic and heavy equipment operations, manual lifting, generated waste, contact or exposure to impacted soil, and encountering unknown toxic or hazardous substances. Although soil sampling is commonly performed within active excavations, from stockpiles, or within trench excavations, sampling locations and situations will vary depending on site conditions. Care should be taken while entering and exiting excavations or trenches, and when accessing (climbing up or down) soil stockpiles, ensuring that the sampling area is not being actively accessed by construction equipment. Care should also be taken with handling of potentially environmentally impacted soil during sampling, with appropriate PPE identified and used. At no time during classification activities are personnel to reach for debris near machinery that is in operation, place any samples in their mouth, or come in contact with the soils without the use of gloves. Staff will have to carry and use a variety of sampling tools, equipment, containers, and potentially heavy sample bags. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Task 2B – Water Sampling

Environmental water sampling could include activities such as groundwater sampling from permanent or temporary wells, or surface water sampling from streams, rivers, lakes, ponds, lagoons, and surface impoundments.

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Sampling tasks could involve uncapping, purging (pumping water out of the well), and sampling, and/or monitoring, new or existing monitoring wells. A mechanical pump may be used to purge the wells and can be hand-, gas-, or electric-operated. Water samples taken from the wells are then placed in containers and shipped to an analytical laboratory for analysis. The physical hazards of these operations are primarily associated with the collection methods and procedures used.

When sampling bodies of water containing known or suspected hazardous substances, adequate precautions must be taken to ensure the safety of sampling personnel. The sampling team member collecting the sample should not get too close to the edge, where ground failure or slips, trips or falls may cause him/her to lose his/her balance. The person performing the sampling should have fall restraint or protection for the task. When conducting sampling from a boat in an impoundment or flowing waters, appropriate vessel safety procedures should be followed. Avoid lifting heavy coolers with back muscles; instead, use ergonomic lifting techniques, team lift or mechanical lifts. Wear proper gloves, such as when handling sample containers to avoid contacting any materials that may have spilled out of the sample containers.

Inhalation and absorption of COCs are the primary routes of entry associated with water sampling, due to the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. During this project, several different groundwater sampling methodologies may be used based on equipment accessibility and the types of materials to be sampled. These sampling methods may include hand or mechanical bailing. The primary hazards associated with these specific sampling procedures are not potentially serious; however, other operations in the area or the conditions under which samples must be collected may present chemical and physical hazards. The hazards directly associated with groundwater sampling procedures are generally limited to strains or sprains from hand bailing, and potential eye hazards. Exposure to water containing COCs is also possible. All tools and equipment that will be used at the site must be intrinsically safe (electronics and electrical equipment) and non-sparking or explosion-proof (hand tools).

Task 2C – Soil Vapor

Soil gas sampling is employed as an indirect indicator of contamination in soil or groundwater particularly over and around landfill waste sites, or groundwater plumes. Soil gas sampling points can be installed manually using a slam bar or power driven mechanical devices (e.g., demolition hammer or Geoprobe) may be used based on site conditions (i.e., pavement, frozen ground, very dense clays, etc.). Soil gas samples can be drawn through the probe itself, or through Teflon tubing inserted through the probe and attached to the probe point. Samples are collected and analyzed as described below. Other field air monitoring devices, such as the Combustible Gas Indicator (CGI) and the Organic Vapor Analyzer (OVA), can also be used, depending on specific site conditions.

Because the sample is being drawn from underground, and no contamination is introduced into the breathing zone, soil gas sampling usually occurs in Level D. Nevertheless, ambient air should be constantly monitored to obtain background and breathing zone readings during the sampling procedure in the event the seal around the sampling point is breached. As long as the levels in ambient air do not rise above background, no upgrade of the level of protection is needed. Also, an underground utility search must be performed prior to sampling.

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Task Physical Hazards Checklist				
Potential Task Hazards	**Task 1** **Drilling and Temporary Monitoring Well Installation**	**Task 2** **Soil, Soil Vapor, Groundwater Sampling**	Task Name	Task Name
Noise	☒	☐	☐	☐
Heavy Equipment	☒	☐	☐	☐
Hot Work	☒	☒	☐	☐
Slippery Surfaces	☒	☒	☐	☐
Ergonomics	☒	☒	☐	☐
Congested Area	☒	☒	☐	☐
Ground Disturbance	☒	☐	☐	☐
Line of Fire	☒	☐	☐	☐
Manual Lifting	☒	☒	☐	☐
Sharp Objects	☒	☒	☐	☐
Underground Utilities	☒	☐	☐	☐
Hand/Power Tools	☒	☒	☐	☐
Repetitive Motion	☒	☒	☐	☐
Other: Specify	☐	☐	☐	☐

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Summary of Physical Hazards & Controls

Noise

Working around heavy equipment (drill rigs, excavators, etc.) often creates excessive noise. The effects of noise include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities. Noise monitoring data that indicates that working within 25 feet of operating heavy equipment result in exposure to hazardous levels of noise (levels greater than 85 dBA).

See OP 1031 Hearing Conservation for additional information.

Controls

- Personnel are required to use hearing protection (earplugs or earmuffs) within 25 feet of any operating piece of heavy equipment.
- Limit the amount of time spent at a noise source.
- Move to a quiet area to gain relief from hazardous noise sources.
- Increase the distance from the noise source to reduce exposure.

Heavy Equipment

Staff must be careful and alert when working around heavy equipment, failure or breakage and limited visibility can lead to accidents and worker injury. Heavy equipment such as cranes, drills, haul trucks, or other can fail during operation increasing chances of worker injury. Equipment of this nature shall be visually inspected and checked for proper working order prior to commencement of field work. Those operating heavy equipment must meet all requirements to operate the equipment. Haley & Aldrich of New York, Inc. staff that supervise projects or are associated with high risk projects that involve digging or drilling should use due diligence when working with a construction firm.

See OP1052 Heavy Equipment for additional information.

Controls

- Only approach equipment once you have confirmed contact with the operator (e.g., operator places the bucket on the ground).
- Always maintain visual contact with operators and keep out of the strike zone whenever possible.
- Always be alert to the position of the equipment around you.
- Always approach heavy equipment with an awareness of the swing radius and traffic routes of all equipment and never go beneath a hoisted load.
- Avoid fumes created by heavy equipment exhaust.

Hot Work

Hot work is any work that could produce a source of ignition or temperature high enough to cause the ignition of flammable gases and combustible materials. Hot work activities include burning, welding, grinding, braising, soldering, using fire or spark-producing tools. The main hazards associated with hot work are getting burned directly by the hot work activity or by fires or explosions that result from an accumulation of combustible materials in the work area.

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Performing hot work in Classified and Non-Classified areas are considered a hazardous activity, and a Permit to Work may be required. In general, the Hot Work Permit has five purposes:

- To serve as written permission to do the work;
- To provide a minimum checklist prior to the commencement of hot work;
- To outline the steps necessary for making the work site safe for conducting hot work;
- To alert operating personnel to the hot work in progress; and
- To provide a record of safe work practices performed during the permitted activity.

Work shall be conducted in accordance with OP1034 Hot Work.

Controls

- Hot Work Permit must be completed.
- Conduct a risk assessment of the proposed work area to identify combustible or flammable material.
- If potential for flammable gases exists in the work area they must be monitored with a gas detector prior to starting any hot work.
- The hot work equipment shall be in satisfactory operating condition and in good repair.
- All combustible and flammable materials shall be relocated at least 35' in all directions from the work site.

If relocating these materials is impractical, the following precautions shall be taken:

- Materials shall be shielded with fire-retardant covers or metal or fire-retardant guards or curtains.
- The edges of covers at the floor shall be tight to prevent the entrance of sparks, including at the point where several covers overlap when a large pile is being protected.
- A fire watch may be required.
- A fully charged and operable fire extinguisher appropriate for the type of potential fire shall be available for use in the work area (20lbs minimum).
- A nonflammable, impervious material shall seal sewer openings, ducts and drains. Where sealing is insecure or impractical, water spray or stream should be directed across openings.
- The location of the hot work relative to combustible and flammable materials and classified areas shall determine the need for a fire watch
- Personnel within the vicinity of the hot work shall be suitably protected against such dangers as heat, sparks, flash and slag.

Slippery Surfaces

Both slips and trips result from unintended or unexpected change in the contact between the feet and ground or walking surface. Good housekeeping, quality of walking surfaces, selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents. Slips happen where there is too little friction or traction between the footwear and walking surface.

Common causes of slips are wet or oily surfaces, spills, weather hazards, loose unanchored rugs or mats and flooring or other walking surfaces that do not have same degree of traction in all areas.

Weather-related slips and falls become a serious hazard as winter conditions often make for wet or icy surfaces outdoors. Even wet organic material or mud can create hazardous walking conditions. Spills and leaks can also lead to slips and falls.

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Controls

- Evaluate the work area to identify any conditions that may pose a slip hazard.
- Address any spills, drips or leaks immediately.
- Mark areas where slippery conditions exist.
- Select proper footwear or enhance traction with additional PPE.
- Where conditions are uncertain or environmental conditions result in slippery surfaces walk slowly, take small steps, and slide feet on wet or slippery surfaces.

Ergonomics

Most Work-related Musculoskeletal Disorders (WMSDs) are caused by Ergonomic Stressors. Ergonomic Stressors are caused by poor workplace practices and/or insufficient design, which may present ergonomic risk factors. These stressors include, but not limited to, repetition, force, extreme postures, static postures, quick motions, contact pressure, vibration, and cold temperatures.
WMSDs are injuries to the musculoskeletal system, which involves bones, muscles, tendons, ligaments, and other tissues in the system. Symptoms may include numbness, tightness, tingling, swelling, pain, stiffness, fatigue, and/or redness. WMSD are usually caused by one or more Ergonomic Stressors. There may be individual differences in susceptibility and symptoms among employees performing similar tasks. Any symptoms are to be taken seriously and reported immediately.

See OP1053 Ergonomics for more information.

Controls

- Ensure workstations are ergonomically correct so bad posture is not required to complete tasks.
- Take periodic breaks over the course of the day.
- Stretch during break times.
- Break up tasks that require repetitive motion.
- Contact Corporate H&S with any ergonomic concerns

Congested Areas

Working in congested areas can expose both workers and the public to a wide range of hazards depending upon the specific activities taking place. Staff Members need to understand the work scope, work areas, equipment on-site, and internal traffic patterns to minimize or eliminate exposure potential.

Controls

- Provide barricades, fencing, warning signs/signals and adequate lighting to protect people while working in or around congested areas.
- Vehicles and heavy equipment with restricted views to the rear should have functioning back-up alarms that are audible above the surrounding noise levels. Whenever possible, use a signaler to assist heavy equipment operators and/or drivers in backing up or maneuvering in congested areas.
- Lay out traffic control patterns to eliminate excessive congestion.
- Workers in congested areas should always wear high visibility clothing.
- Be aware of Line of Fire hazards when performing work activities in congested areas.
- Hazards associated with SIMOPs should be discussed daily at Tailgate Safety Meetings.

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Ground Disturbance

Ground disturbance is defined as any activity disturbing the ground. Ground disturbance activities include, but are not limited to, excavating, trenching, drilling (either mechanically or by hand), digging, plowing, grading, tunneling and pounding posts or stakes.
Because of the potential hazards associated with striking an underground utility or structure, the operating procedure for underground utility clearance shall be followed prior to performing any ground disturbance activities.

See OP1020 Working Near Utilities

Controls

Prior to performing ground disturbance activities, the following requirements should be applied:

- Confirm all approvals and agreements (as applicable) either verbal or written have been obtained.
- Request for line location has been registered with the applicable One-Call or Dial Before You Dig organization, when applicable.
    - Whenever possible, ground disturbance areas should be adequately marked or staked prior to the utility locators site visit.
- Notification to underground facility operator/owner(s) that may not be associated with any known public notification systems such as the One-Call Program regarding the intent to cause ground disturbance within the search zone.
- Notifications to landowners and/or tenant, where deemed reasonable and practicable.
- Proximity and Common Right of Way Agreements shall be checked if the line locator information is inconclusive.

Line of Fire

Line of fire refers to the path an object will travel. Examples of line of fire situations typically observed on project sites include lifting/hoisting, lines under tension, objects that can fall or roll, pressurized objects or lines, springs or stored energy, work overhead, vehicles and heavy equipment.

Controls

- Never walk under a suspended load.
- Be aware and stay clear of tensioned lines such as cable, chain and rope.
- Be cautious of torque stresses that drilling equipment and truck augers can generate. Equipment can rotate unexpectedly long after applied torque force has been stopped.
- Springs and other items can release tremendous energy if compressed and suddenly released
- Items under tension and pressure can release tremendous energy if it is suddenly released.
- Not all objects may be overhead; be especially mindful of top-heavy items and items being transported by forklift or flatbed.
- Secure objects that can roll such as tools, cylinders, and pipes.
- Stay clear of soil cuttings or soil stockpiles generated during drilling operations and excavations, be aware that chunks of soil, rocks, and debris can fall or roll.

Manual Lifting/Moving

Most materials associated with investigation, remedial, or construction-related activities are moved by hand. The human body is subject to damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process.

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Controls

- Under no circumstances should any one person lift more than 49 pounds unassisted.
- Always push, not pull, the object when possible.
- Size up the load before lifting. If it is heavy or clumsy, get a mechanical aid or help from a worker.
- Bend the knees; it is the single most important aspect of lifting.
- When performing the lift:
    - Place your feet close to the object and center yourself over the load.
    - Get a good handhold.
    - Lift straight up, smoothly and let your legs do the work, not your back!
    - Avoid overreaching or stretching to pick up or set down a load.
    - Do not twist or turn your body once you have made the lift.
    - Make sure beforehand that you have a clear path to carry the load.
    - Set the load down properly.

Sharp Objects

Workers who handle sharp edged objects like sheets of steel or glass are at risk of cuts. Workers who handle sharp edged objects are also at risk of cuts. Injuries may occur to hands, fingers, or legs when they are in the way of the blade, when the blade slips, or if an open blade is handled unexpectedly. Other hazards at job sites include stepping on sharp objects (e.g. wooden boards with protruding nails, sharp work-tools, chisels, etc.) and colliding with sharp and/or protruding objects.

Controls

Always be alert when handling sharps. Never look away or become distracted while handling sharp objects. Use caution when working with tools; use right tool for the job. Keep tools sharp, dull blades are a safety hazard, requiring more force to make cuts which can lead to tool slippage. Wear appropriate PPE and do not handle sharp objects (i.e., broken glass) with bare hands. Use mechanical devices, when possible. Stay away from building debris; avoid handling site debris or placing your hand where you cannot see. Watch out for barbed wire and electrical fences; cover with a car mat or equivalent to cross or walk around; use the buddy system to avoid entanglement; wear gloves. Do not leave unprotected sharps unattended. Use protective shields, cases, styrofoam blocks, etc. Pass a sharp by handing it over carefully by the handle with the blade down or retracted. Fixed open blades are prohibited. Always cut away from the body, making several passes when cutting thicker materials. Make sure blades are fitted properly into the knife. Never cut items with a blade or other sharp object on your lap. Never try to catch a blade or cutting tool that is falling.

Underground Utilities

Various forms of underground/overhead utility lines or conveyance pipes may be encountered during site activities. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the SHSO, Project Manager, and Regional H&S Manager shall be notified immediately. Work will be suspended until the client and applicable utility agency is contacted and the appropriate actions for the situation can be addressed.
See OP1020 Work Near Utilities for complete information.

Controls

- Obtain as-built drawings for the areas being investigated from the property owner;

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- Visually review each proposed soil boring locations with the property owner or knowledgeable site representative;
- Perform a geophysical survey to locate utilities;
- Hire a private line locating firm to determine location of utility lines that are present at the property;
- Identifying a no-drill or dig zone;

Hand dig or use vacuum excavation in the proposed ground disturbance locations if insufficient data is unavailable to accurately determine the location of the utility lines.

Hand and Power Tools

Hand and power tools can expose staff to a wide range of hazards depending upon the tool used. Hazards can include but are not limited to: falling, flying, abrasive, and splashing objects, or harmful dusts, fumes, mists, vapors, or gases.

Serious accidents often occur before steps are taken to evaluate and avoid or eliminate tool-related hazards. Staff must recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent those hazards.

See OP 1026 Hand and Power Tools for more information.

Controls

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job. Do not use a tool for a task which it was not designed for.
- Examine each tool for damage before use and do not use damaged tools.
- For tools that are damaged or defective, red tag the tool and take out of service.
- Operate tools per the manufacturers' instructions.
- Use the appropriate personal protective equipment.
- All electrically powered tools will be connected through a ground fault circuit interrupter (GFCI).
- All personnel must be trained on the use of the tool they are utilizing.

Repetitive Motion

Repetitive Motion or Strain Injuries are injuries effecting muscles, nerves, and tendons by repetitive movement and overuse. Almost any kind of awkward or repetitive motion you make could lead to an injury over time. Actions like bending or twisting of the wrists, reaching for materials, working with your hands above shoulder level, or grasping objects can increase wear and tear on the body. The condition mostly effects the upper body.

Controls

- Arrange your work zone, supplies and tools as much as possible to avoid reaching, leaning, bending and twisting your waist or wrists.
- During rest breaks, use stretches to loosen up your body.
- Vary tasks if you can so that you are not making the same movement repeatedly over for a long period.

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4. PROTECTIVE MEASURES

The personal protective equipment and safety equipment (if listed) is specific to the associated task. The required PPE and equipment listed must be onsite during the task being performed. Work shall not commence unless the required PPE or Safety Equipment is present.

Required Safety & Personal Protective Equipment

Required Personal Protective Equipment (PPE)	**Task 1**	**Task 2**		
	Drilling and Temporary Monitoring Well Installation	Soil, Soil Vapor, And Groundwater Sampling	Enter task description.	Enter task description.
Safety Glasses	☒	☒	☐	☐
Safety Toed Shoes	☒	☒	☐	☐
Hearing Protection	☒	☐	☐	☐
Class 2 Safety Vest	☒	☒	☐	☐
Cut Resistant Gloves	☒	☒	☐	☐
Choose an item.	☐	☐	☐	☐
Level of protection required	D	D	Select	Select
Required Safety Equipment				
First Aid Kit	☒	☒	☐	☐

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5. TRAINING REQUIREMENTS

The table below lists the training requirements staff must have respective to their assigned tasks and that are required to access the Site.

Site Specific Training Requirements
HAZWOPER - 40 Hour (Initial)
HAZWOPER - 8 Hour (Annual Refresher)

Task Specific Training Requirements				
Required Training Type	**Task 1**	**Task 2**	**Task 3**	**Task 4**
	Drilling and Temporary Monitoring Well Installation	Soil, Soil Vapor, And Groundwater Sampling	Enter task description.	Enter task description.
HAZWOPER - 40 Hour (Initial); HAZPOWER -8 Hour (Annual Refresher); and Site - Specific Orientation	☒	☒	☐	☐

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6. AIR MONITORING PLAN AND EQUIPMENT

Exposures to airborne substances shall be fully characterized throughout project operations to ensure that exposure controls are effectively selected and modified as needed.

Is air/exposure monitoring required at this work site for personal protection? Yes

Is perimeter monitoring required for community protection? Yes

Air monitoring plan not applicable? No

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7. DECONTAMINATION & DISPOSAL METHODS

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials.)

Personal Hygiene Safeguards

The following minimum personal hygiene safeguards shall be adhered to:

1. No smoking or tobacco products in any project work areas.
2. No eating or drinking in the exclusion zone.
3. It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.

It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Decontamination Supplies

All decontamination should be conducted at the project site in designated zones or as dictated by Client requirements. Decontamination should not be performed on Haley & Aldrich of New York 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: Specify

Location of Decontamination Station

Decontamination will take place prior to leaving the Site at the exit.

Standard Personal Decontamination Procedures

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 other 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 and Field Safety Manager to discuss proper decontamination procedures.

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The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

1. Remove and wipe clean hard hat
2. Rinse boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Remove outer boots (if applicable)
6. Remove outer gloves (if applicable)
7. Remove Tyvek coverall (if applicable)
8. Remove respirator, wipe clean and store (if applicable)
9. Remove inner gloves (if outer gloves were used)

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles.

Small Equipment Decontamination

Pretreatment of heavily contaminated equipment may be conducted as necessary:

1. Remove gross contamination using a brush or wiping with a paper towel
2. Soak in a solution of Alconox and water (if possible)
3. Wipe off excess contamination with a paper towel

Standard decontamination procedure:

4. Wash using a solution of Alconox and water
5. Rinse with potable water
6. Rinse with methanol (or equivalent)
7. Rinse with distilled/deionized water

Inspect the equipment for any remaining contamination and repeat as necessary.

Disposal Methods

Procedures for disposal of contaminated materials, decontamination waste, and single use personal protective equipment shall meet applicable client, locate, State, and Federal requirements.

Disposal of Single Use Personal Protective Equipment

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles. PPE that is grossly contaminated must be bagged (sealed and field personnel should communicate with the Project Manager to determine proper disposal.

- Contaminated soil cuttings and spoils must be containerized for disposal off-site unless otherwise specifically directed.
- Soil cuttings and spoils determined to be free of contamination through field screening can usually be returned to the boreholes or excavations from which they came.

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8. SITE CONTROL

The overall purpose of site control is to minimize potential contamination of workers, protect the public from the site's hazards, and prevent vandalism. Site control is especially important in emergency situations. The degree of site control necessary depends on site characteristics, site size, and the surrounding community. The following information identifies the elements used to control the activities and movements of people and equipment at the project site.

Communication
Internal Haley & Aldrich of New York site personnel will communicate with other Haley & Aldrich of New York staff member and/or subcontractors or contractors with: Face to Face Communication
External H&S site personnel will use the following means to communicate with off-site personnel or emergency services. Cellular Phones
Visitors
Project Site Will visitors be required to check-in prior to accessing the project site? Yes
Visitor Access Authorized visitors that require access to the project site need to be provided with known information with respect to the site operations and hazards as applicable to the purpose of their site visit. Authorized visitors must have the required PPE and appropriate training to access the project site. Nicole Mooney is responsible for facilitating authorized visitor access.
Zoning
Work Zone The work zone will be clearly delineated to ensure that the general public or unauthorized worker access is prevented. The following will be used: Cones, locked doors/gates

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9. SITE SPECIFIC EMERGENCY RESPONSE PLAN

The Emergency Response Plan addresses potential emergencies at this site, procedures for responding to these emergencies, roles, responsibilities during emergency response, and training. This section also describes the provisions this project has made to coordinate its emergency response with other contractors onsite and with offsite emergency response organizations (as applicable).

During the development of this emergency response plan, local, state, and federal agency disaster, fire, and emergency response organizations were consulted (if required) to ensure that this plan is compatible and integrated with plans of those organizations. Documentation of the dates of these consultations are the names of individuals contacted is kept on file and available upon request.

The site has been evaluated for potential emergency occurrences, based on site hazards, and the major categories of emergencies that could occur during project work are:

- Fire(s)/Combustion
- Hazardous Material Event
- Medical Emergency
- Natural Disaster

A detailed list of emergency types and response actions are summarized in Table X below. Prior to the start of work, the SSO will update the table with any additional site-specific information regarding evacuations, muster points, or additional emergency procedures. The SSO will establish evacuation routes and assembly areas for the Site. All personnel entering the Site will be informed of these routes and assembly areas.

Pre-Emergency Planning

Before the start of field activities, the Project Manager will ensure preparation has been made in anticipation of emergencies. Preparatory actions include the following:

Meeting with the subcontractor/and or client concerning the emergency procedures in the event a person is injured. Appropriate actions for specific scenarios will be reviewed. These scenarios will be discussed, and responses determined before the sampling event commences. A form of emergency communication (i.e.; Cell phone, Air horn, etc.) between the Project Manager and subcontractor and/or client will be agreed on before the work commences.

A training session (i.e., “safety meeting”) given by the Project Manager or their designee informing all field personnel of emergency procedures, locations of emergency equipment and their use, and proper evacuation procedures.

Ensuring field personnel are aware of the existence of the emergency response HASP and ensuring a copy of the HASP accompanies the field team(s).

Onsite Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate work rescue, contamination control and reduction or post-emergency cleanup. Emergency response equipment stocked

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Table 9.1 Emergency Equipment and Emergency PPE			
Emergency Equipment	**Specific Type**	**Quantity Stocked**	**Location Stored**
First Aid Kit	General First Aid Kit	1	With H&A personnel
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**
Gloves - "Nitrile"	General Nitrile Gloves	1 Box	With H&A personnel

EVACUATION ALARM
Verbal Communication (Site Personnel are adjacent in work zone)
EVACUATION ROUTES
Will be given a map after site specific training
EVACUATION MUSTER POINT(S)/ SHELTER AREA(S)
Will be given location after site specific training
EVACUATION RESPONSE DRILLS
The Site relies on outside emergency responders and a drill is not required.

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Table 9-2 – Emergency Planning

Emergency Type	Notification	Response Action	Evacuation Plan/Route
Chemical Exposure	Report event to SSO immediately	Refer to Safety Data Sheet for required actions	Remove personnel from work zone
Fire - Small	Notify SSO and contact 911	Use fire extinguisher if safe and qualified to do so	Mobilize to *Muster Point*
Fire – Large/Explosion	Notify SSO and contact 911	Evacuate immediately	Mobilize to *Muster Point*
Hazardous Material – Spill/Release	Notify SSO; SSO will contact PM to determine if additional agency notification is	If practicable don PPE and use spill kit and applicable procedures to contain the release	See Evacuation Map for route, move at least 100 ft upwind of spill location
Medical – Bloodborne Pathogen	Notify SSO	If qualified dispose in container or call client or city to notify for further instruction.	None Anticipated
Medical – First Aid	Notify SSO	If qualified perform first aid duties	None Anticipated
Medical – Trauma	If life threatening or transport is required call 911, immediately	Wait at site entrance for ambulance	None Anticipated
Security Threat	Notify SSO who will call 911 as warranted	Keep all valuables out of site and work zones delineated.	None Anticipated
Weather – Earthquake/Tsunami's	STOP WORK and evacuate Site upon any earthquake	Turn off equipment and evacuate as soon as is safe to do so	Mobilize to *Shelter Location*
Weather – Lightning Storm	STOP WORK	Work may resume 30 minutes after the last observed lightning.	None Anticipated
Weather – Tornadoes/Hurricanes	Monitor weather conditions STOP WORK and evacuate the site	Evacuate to shelter location or shelter in place immediately	Mobilize to *Shelter Location*
MUSTER POINT Sidewalk along Westchester Avenue		*SHELTER LOCATION* Personal vehicle	
In case of site emergencies, site personnel shall be evacuated per this table and will not participate in emergency response activities. Site emergencies shall be reported to local, state, and federal governmental agencies as required.			

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10. HASP ACKNOWLEDGEMENT FORM

All Haley & Aldrich of New York employees onsite must sign this form prior to entering the site.

I hereby acknowledge receipt of, and briefing on, this HASP prior to the start of on-site work. I declare that I understand and agree to follow the provisions, processes, and procedures set forth herein at all times while working on this site.

Printed Name	Signature	Date

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ATTACHMENT A
HASP AMENDMENT FORM

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HASP AMENDMENT FORM

This form is to be used whenever there is an immediate change in the project scope that will require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the Haley & Aldrich of New York Project Manager.

This original form must remain on site with the original HASP. If additional copies of this HASP have been distributed, it is the Project Manager's responsibility to forward a signed copy of this amendment to those who have copies.

Amendment No.	
Site Name	
Work Assignment No.	
Date	
Type of Amendment	
Reason for Amendment	
Alternate Safeguard Procedures	
Required Changes in PPE	

Project Manager Name (Print)	Project Manager Signature	Date

Health & Safety Approver Name (Print)	Health & Safety Approver Signature	Date

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ATTACHMENT B
TRAINING REQUIREMENTS

Note: This HASP has been developed for Haley & Aldrich of New York purposes only and is not for use by others.

TRAINING REQUIREMENTS

Health and Safety Training Requirements

Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. Haley & Aldrich of New York staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The Haley & Aldrich of New York Project Manager/FSM will be responsible for maintaining and providing to the client/site manager documentation of Haley & Aldrich of New York staff members' compliance with required training as requested. Records shall be maintained per OSHA requirements.

40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120.

8-hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hour refresher training course within the past 12 months.

8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

Additional Training for Specific Projects

Haley & Aldrich of New York personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities including:

- Client specific training or orientation
- Competent person excavations
- Confined space entry (entrant, supervisor, and attendant)
- Heavy equipment including aerial lifts and forklifts
- First aid/ CPR
- Use of fall protection
- Use of nuclear density gauges
- Asbestos awareness

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ATTACHMENT C
ROLES AND RESPONSIBILITIES

Note: This HASP has been developed for Haley & Aldrich of New York purposes only and is not for use by others.

SITE ROLES AND RESPONSIBILITIES

Haley & Aldrich of New York Personnel

Field Safety Manager (FSM)

The FSM is a full-time Haley & Aldrich of New York staff member, trained as a safety and health professional, who is responsible for the interpretation and approval of this Safety Plan. Modifications to this Safety Plan cannot be undertaken by the PM or the SSO without the approval of the FSM.

Specific duties of the FSM include:

- Approving and amending the Safety Plan for this project
- Advising the PM and SHSOs on matter relating to health and safety
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation
- Maintaining regular contact with the PM and SSO to evaluate the conditions at the property and new information which might require modifications to the HASP and
- Reviewing and approving JSAs developed for the site-specific hazards.

Project Manager (PM)

The Haley & Aldrich of New York PM is responsible for ensuring that the requirements of this HASP are implemented at that project location. Some of the PM´s specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have received a copy of it;
- Providing the FSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SHSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SHSO;
- Maintaining regular communications with the SHSO and, if necessary, the FSM;
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project;
- Providing project scheduling and planning activities; and
- Providing guidance to field personnel in the development of appropriate Job Safety Analysis (JSA) relative to the site conditions and hazard assessment.

Site Health & Safety Officer (SHSO)

The SHSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SHSO functions may include some or all of the following:

- Act as Haley & Aldrich of New York´s liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by Haley & Aldrich of New York subcontractors.

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- Oversee day-to-day implementation of the Safety Plan by Haley & Aldrich of New York personnel on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the safety plan.
- Inspect and maintain Haley & Aldrich of New York safety equipment, including calibration of air monitoring instrumentation used by Haley & Aldrich of New York.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving Haley & Aldrich of New York and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the Haley & Aldrich of New York PM and FSM as needed.

The SHSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with Haley & Aldrich of New York employees and Haley & Aldrich of New York subcontractors at regular intervals and in accordance with Haley & Aldrich of New York policy and contractual obligations. The SHSO will track the attendance of site personnel at Haley & Aldrich of New York orientations, toolbox talks, and safety meetings.

Field Personnel

Haley & Aldrich of New York personnel are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed Safety Plan Acceptance Form and documentation of medical surveillance and training to the SHSO prior to the start of work;
- Attending the pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of the Safety Plan to the PM or the SHSO prior to the start of work;
- Stopping work when it is not believed it can be performed safely;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SHSO;
- Complying with the requirements of this safety plan and the requests of the SHSO; and
- Reviewing the established JSAs for the site-specific hazards on a daily basis and prior to each shift change, if applicable.

Visitors

Authorized visitors (e.g., Client Representatives, Regulators, Haley & Aldrich of New York management staff, etc.) requiring entry to any work location on the site will be briefed by the Site Supervisor on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer´s health and safety policies. In addition, this safety plan specifies the minimum acceptable qualifications, training and personal

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protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times. Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

SUBCONTRACTOR PERSONNEL

Subcontractor Site Representative

Each contractor and subcontractor shall designate a Contractor Site Representative. The Contractor Site Representative will interface directly with Insert Staff Name Here, the Subcontractor Site Safety Manager, with regards to all areas that relate to this safety plan and safety performance of work conducted by the contractor and/or subcontractor workforce. Contractor Site Representatives for this site are listed in the Contact Summary Table at the beginning of the Safety Plan.

Subcontractor Site Safety Manager

Each contractor / subcontractor will provide a qualified representative who will act as their Site Safety Manager (Sub-SSM). This person will be responsible for the planning, coordination, and safe execution of subcontractor tasks, including preparation of job hazard analyses (JHA), performing daily safety planning, and coordinating directly with the Haley & Aldrich of New York SHSO for other site safety activities. This person will play a lead role in safety planning for Subcontractor tasks, and in ensuring that all their employees and lower tier subcontractors are in adherence with applicable local, state, and/or federal regulations, and/or industry and project specific safety standards or best management practices.

General contractors / subcontractors are responsible for preparing a site-specific HASP and/or other task specific safety documents (e.g., JHAs), which are, at a minimum, in compliance with local, state, and/or federal other regulations, and/or industry and project specific safety standards or best management practices. The contractor(s)/subcontractor(s) safety documentation will be at least as stringent as the health and safety requirements of the Haley & Aldrich of New York Project specific HASP.

Safety requirements include, but are not limited to: legal requirements, contractual obligations and industry best practices. Contractors/subcontractors will identify a site safety representative during times when contractor/subcontractor personnel are on the Site. All contractor/subcontractor personnel will undergo a field safety orientation conducted by the Haley & Aldrich of New York SHSO and/or PM prior to commencing site work activities. All contractors / subcontractors will participate in Haley & Aldrich of New York site safety meetings and their personnel will be subject to training and monitoring requirements identified in this Safety Plan. If the contractors / subcontractors means and methods deviate from the scope of work described in Section 1 of this Safety Plan, the alternate means and methods must be submitted, reviewed and approved by the Haley & Aldrich of New York SHSO and/or PM prior to the commencement of the work task. Once approved by the Haley & Aldrich of New York SHSO and/or PM, the alternate means and methods submittal will be attached to this Safety Plan as an Addendum.

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ATTACHMENT D
JOB SAFETY ANALYSES

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WESTCHESTER AVENUE DEVELOPMENT SITE

KEY TASK 1: Drilling and Temporary MW Installation		
Subtask Category	**Potential Hazards**	**Controls**
Drilling	Site Security	• Observe all work site access and controls before entering work area • Use only routes that are designated for personnel • Do not change or alter established work site access or controls
Drilling	Heavy equipment	• Personal protective equipment, licensed excavator/machine operators • Maintain a safe distance from moving equipment and observe equipment swing radii • Make eye contact with operators and get their acknowledgement before moving around heavy equipment • Stay out of line of fire • Avoid pinch points
Drilling	Vehicle traffic/safety	• Watch out for vehicular traffic in and around work area • Access work area along routes that are least busy
Drilling	Slips, trips, and falls	• Take your time and pay attention to where you are going • Adjust your stride to a pace that is suitable for the walking surface and tasks you are doing • Check the work area to identify hazards – beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain • Establish and utilize a pathway free of slip and trip hazards • Choose a safer walker route

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		• Carry loads you can see over • Keep work areas clean and free of clutter • Communicate hazards to on-site personnel – remove hazards as appropriate
Drilling	Cold stress	• Taking cooling breaks, maintain hydration
Drilling	Weather-related hazards	• Avoid slippery surfaces as a result of cold weather • Seek shelter in the event of a lightning storm and stay clear of potential

KEY TASK 2: Soil, Soil Vapor, and Groundwater Sampling, If Necessary		
Subtask Category	**Potential Hazards**	**Controls**
Drilling and Soil and Groundwater Sampling	Site Security	• See above
Drilling	Heavy equipment	• See above
Drilling and Soil and Groundwater Sampling	Vehicle traffic/safety	• See above
Drilling and Soil and Groundwater Sampling	Slips, trips, and falls	• See above
Drilling and Soil and Groundwater Sampling	Cold stress	• See above
Drilling and Soil and Groundwater Sampling	Weather-related hazards	• See above
Soil and Groundwater Sampling	Other	• Chemical and splash protection during sampling (nitrile gloves and eye protection)

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ATTACHMENT E
SITE SAFETY FORMS

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Health & Safety Tailgate Meeting Form

Project:	Project No.:
Location:	Project Manager:
Subcontractor(s):	Date:
Site Safety & Health Officer (SSHO):	SSHO Contact Info:

Emergency Procedures

If an emergency occurs, follow procedure outlined in the HASP and contact numbers below. If non-life-threatening injury occurs, contact PM to report the incident. Seek first-aid treatment from the Occupational Health Center, as outlined in the HASP.

Emergency Dispatch phone number if other than 911:	
Local Hospital:	Local Hospital Phone #:
Evacuation/Muster Point:	Alt Evacuation/Muster Point:

Simultaneous Operations (SIMOPS)

SIMOPS or Multi-Crew Activity	☐ Yes	☐ No	If yes, describe SIMOPS:	
Has SIMOPS been communicated to all workforce?	☐ Yes	☐ No		
SIMOPS PIC:			**Phone Number:**	

Task Identification

Task	Responsible Company	Task Supervisor

Required Permits/Forms (*check all that apply*)

☐None	☐Lifting Plan	☐Other:
☐Confined Space Entry Permit	☐Hot Work Permit	☐Other:
☐Lock-out / Tag-out (LOTO)	☐Ground Disturbance Permit	☐Other:
☐Excavation Permit	☐Other:	☐Other:

Discussion of Work Hazards *(check all that apply)*

☐Chemical	☐Hazardous materials (lead, asbestos, etc.)	☐Radiological
☐Confined space	☐Hosting and rigging	☐Stored energy LOTO
☐Congested work area	☐Hot work	☐Traffic control
☐Elevated work	☐Material handling	☐Weather and/or temp extremes
☐Ergonomics	☐Noise pollution	☐Waste generation
☐Emergency egress	☐Oxygen deficiency	☐Other:

Required PPE *(check all that apply)*

										
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hearing Protection	Safety Eyewear	Hard Hat	Safety Toed Shoes	Leather or Palm Protective	Safety Vest	Protective Clothing	Respiratory Protection	PFD	Face Shield	Fall Protection

All information and content in this form is for information purposes only and is not medical advice, diagnosis, or treatment. Printed copies are not document controlled.

HALEY ALDRICH

Tailgate Topic / Hazard Discussion

Item	Discussion

Management of Change (MoC)

Does the work activity require a MoC? If yes, has it been authorized by applicable management? ☐No ☐Yes
Has the safety information been updated to incorporate any change in product, equipment, material or process? This information should include how to investigate accidents, audit compliance with safety procedures, and plan for emergency responses. ☐No ☐Yes
Have the procedures for a MoC been reviewed and evaluated? ☐No ☐Yes
Have all affected staff been informed and trained on the new equipment, process, or other changes? Health and safety hazards must be emphasized including processes/procedures in an emergency. The training must occur before any staff is allowed to operate the equipment or perform the job relating to the changes. ☐No ☐Yes
Have written procedures been put into place for the next time there is a change in safety management? ☐No ☐Yes

Best Practice(s) Observed? ☐ Yes ☐ No If yes, describe:	**H&S Observations/ Near Misses/ Incidents Reported?** ☐ Yes ☐ No If yes, describe:
Safe Work Interventions? ☐ Yes ☐ No If yes, describe:	**Have additional hazards and risk controls been identified for future work?** ☐ Yes ☐ No If yes, update appropriate job hazard analysis (JHA).

Site Safety & Health Officer Acknowledgement

At the conclusion of the day, I certify that the work site has been inspected and is being left in a safe and clean condition and any incidents have been properly reported.

Signature Date

All information and content in this form is for information purposes only and is not medical advice, diagnosis, or treatment. Printed copies are not document controlled.

HALEY ALDRICH

Worker Acknowledgement

By signing here, you are stating the following:

1. You understand the hazards and risk control actions associated with each task you are about to perform.
2. You understand the permit to work requirements pertinent to the work you are about to perform (if applicable).
3. You are aware that no tasks or work that is not risk-assessed is to be performed.
4. You also are aware of your obligation to implement 'Safe Work'.
5. You arrived and departed fit for duty.
6. You are physically and mentally fit for duty.
7. You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
8. You are aware of your responsibility to bring any illness, injury (regardless of where or when it occurred), or fatigue issue you may have to the attention of the SSHO.
9. You signed out uninjured unless you have otherwise informed the SSHO.

Name (print)	Company	Initials & Sign In/Out Time		COVID-19 Self-Declaration
		In & Fit	Out & Fit	On File

Visitor Log (*Site Visitors not involved in the work activities*)

Name (print)	Company	Initials & Sign In/Out Time		COVID-19 Self Declaration
		In & Fit	Out & Fit	On File

All information and content in this form is for information purposes only and is not medical advice, diagnosis, or treatment. Printed copies are not document controlled.

Subsurface Clearance Field Checklist

PROJECT INFORMATION

Site Name:		Project Manager:	
Location:		Client Leader/LSRP:	
Client Name:		Scope of Work:	
Project Number:		Date of SSC Event:	

PROJECT BASICS (Completed prior to the start of field activities)

Site Contact Person Identified? Circle one: Yes No			
Contact Person/Company Name/Phone Number:			
Subcontractor & On-Site Representatives:			
Have the subsurface activities been explained to the subcontractor? Circle one: Yes No			
Public utility mark-out completed? Circle one: Yes No			
Public Mark-out/called in by Company/Representative:		Date:	
Ticket Number:		Utilities Notified and Response received:	

PRE-CLEARANCE (Completed prior to breaking ground or determining final locations)

Private Utility Mark-out completed? Circle one: Yes No		Date:	
Work area and each intrusive location scanned for all utilities? Circle one: Yes No			
Private Mark-out completed by Subcontractor & Representative:			
Depth of accuracy (feet):		Limitations:	
Type of equipment used:			

Utility Identified & Marked-out	Depth (ft)	Yes	No	Utility Identified & Marked-out	Depth (ft)	Yes	No
Electricity (Red)				Sewer (Green)			
Gas (Yellow)				Telephone Data (Orange)			
Water (Blue)				Fuel/Oil			
Reclaimed H_2O/Irrigation (Purple)				Proposed excavation (white)			

SCOPE OF WORK

Scope of Work provided to subcontractors? Circle one: Yes No					
Number of intrusive locations:		Targeted depth (feet):		Diameter of Borehole (inches):	
Proposed intrusive locations within 10 feet of marked and/or known utility? Circle one: Yes No					
Final locations confirmed at least 10 feet away from all utilities? Circle one: Yes No					

FIELD OBSERVATIONS

Other Utilities & Visual Clues Observed	Yes	No	Other Utilities & Visual Clues Observed	Yes	No
Natural gas meters			Fire suppression		
Water meters			Fire hydrants		
Cable markers			Fire sprinkler lines		
Sewer drains/cleanouts			Sprinkler/irrigation systems		
Overhead lines (give 15' x 15' of clearance)			Utility poles with conduit leading to the ground		
Pipeline and pipeline markers			Utility boxes		
Underground storage tank (UST)			Manholes		
UST fill ports and vent pipes			Pavement scarring		
Lights			Remote buildings with no visible utilities		
Signage			Other (specify):		
Steam lines			Other (specify):		

Any mitigations taken if points cannot be obtained or site type was not listed:_____

_____

Mitigations taken by whom: _____

Subsurface Clearance Field Checklist

Utility Point System: Gain points to protect against utility strike

Site Description	Minimum Points Needed
Combination of 2 or more Site Types	5
Commercial/Office Park	5
Downtown/Urban Development	5
Manufacturing/Active	5
Manufacturing/Non-Active	5
Mine	5
Rail	5
Residential	5
Roadway (right-of-way, highway, and secondary routes)	5
Roadway (right-of-way, rural route)	5
Universities/Government Campus/Airports	5
Abandoned/Non-Active/Vacant	3
Remote (field, woods, undisturbed)	2
Work over water	2
Site Type Not Listed Above	Consult with the PM, Utility Specialist, and Project Team
Cannot Gain Minimum Points	Perform hand clearing/soft dig/vacuum excavation

1 Point Value (2 Maximum from this Category)
Facility/contact supplied information (GIS figure with photo overlay; extensive client records and drawings)
The utilities have been marked using GPS or surveyed (with minimum accuracy of 0.1 foot)
A review of the work scope with a knowledgeable site contact (client contact, site manager, maintenance manager or other site personnel) about the site's history and utility locations/conditions (with a utility site drawing). **A knowledgeable site contact is someone who has regular responsibilities for managing site infrastructure, construction activities, and/or retaining site drawings/figures.**
A visual inspection of the site to verify that the utilities match the drawings and figures (completed after the State One Call Subsurface Clearance Checklist)
Confirmation of the low density of subsurface utilities (based on site maps, previous private utility locates)
Shallow boring advancement (<2 feet below ground surface (bgs) with non-mechanical drilling techniques)

2 Point Values
As-built drawings (plot plans, as-builts, pipeline or facilities maps, and/or lease drawings), reviewed and verified by client for updated changes
Confirmation that utilities cut off at street and align with drawings and figures
Drawing/figure (measured to scale, shows site utilities as visually verified during site walk); includes any new or repaired lines that match site (e.g., pavement scarring); depth and diameter of utilities; and recent (includes any new construction activity)
Survey data and figures produced by Haley & Aldrich and/or Haley & Aldrich site utility experience with additional site inspection
Site drawing and figures from prior private utility locate created by Haley & Aldrich (drawing must include GPS coordinates and utilities are to scale)
GPR/EM Cable location by private utility locate directly above proposed ground disturbance/borehole location

3 Point Values	3 Point Values (Open Excavations Only)
Hand Clearing/Soft Dig/Vacuum Excavation to 5 feet bgs using the following soft dig clearance methods listed from least invasive to most: • Probing • Hand Digging • Hand Auguring • Vacuum Extraction • Air/Water Knife with Vacuum Extraction	Hand Clearing/Soft Dig/Vacuum Excavation using the following soft dig clearance methods to confirm location of known utilities prior to using mechanical excavation: • Probing • Hand Digging • Vacuum Extraction

APPENDIX G
NYSDOH Generic Community Air Monitoring Plan

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.

APPENDIX H
Environmental Footprint Analysis

H & A OF NEW YORK ENGINEERING
AND GEOLOGY, LLP
213 W. 35th Street
7th Floor
New York, NY 10001
646.277.5685

August 8, 2025
File No. 0206816

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7014

Subject: Remedial Investigation Report
Proposed 227 Westchester Avenue Development
223-225, 227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue
Westchester, New York
BCP Site C360253

H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) presents the following environmental footprint analysis in accordance with U.S. Environmental Protection Agency (EPA) 542-R-12-002 for the proposed Remedial Investigation (RI) of the above-referenced site located at 223-225, 227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue, Queens, New York (Site).

FORMER NEW CITY LINK AUTO REPAIR SITE – INVESTIGATION

The RI is anticipated to result in estimated totals of:

- 1,991.23 metric million British thermal units (MMBtus) of energy used;
- 154.62 tons of total greenhouse gas emissions (CO2e);
- 7,666.37 pounds (lbs) of NOx + SOx +PM emissions; and,
- 45.94 lbs of Hazardous Air Pollutants (HAP) emissions.

Energy

- 32.57 MMbtus used for on-site activities, such as well development and air monitoring.
- 0.08 MMbtus used for Grid Electricity Generation.
- 27.97 MMbtus used for transportation of personnel and investigation materials.
- 1,930.61 MMbtus used for off-site activities.

Greenhouse Gas Emissions (CO2e)

- 2.39 tons of CO2e produced from on-site activities, such as drilling and selective demolition.
- 0.01 tons of CO2e produced from Grid Electricity Generation.
- 2.05 tons of CO2e produced from transportation of contractors, personnel, and investigation materials.
- 135.83 tons of CO2e produced from off-site activities.

Water Usage

- 29 gallons of water are estimated to be used during the investigation.

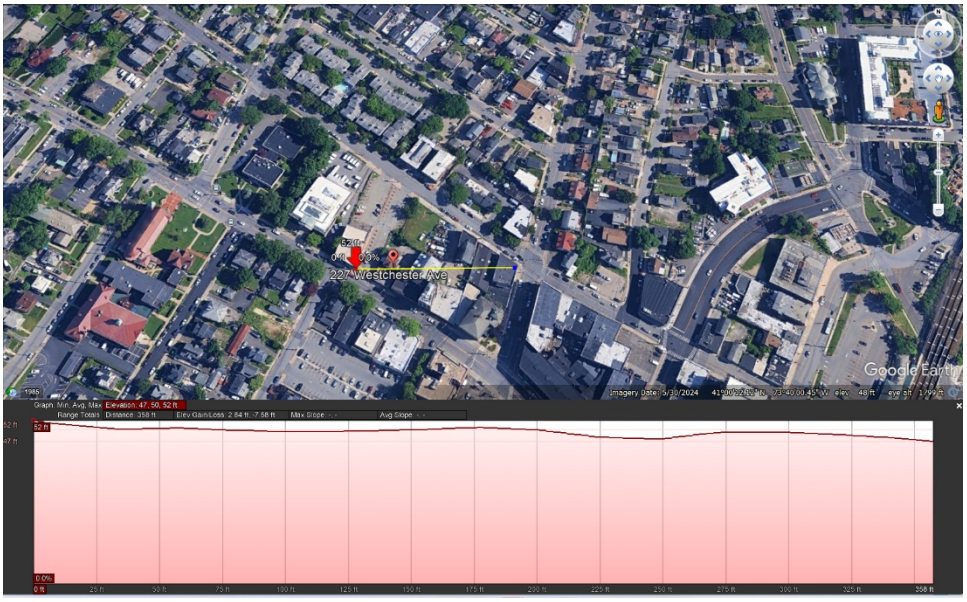
Overall, the estimated environmental footprint of the RI is dominated by off-site activities, which includes off-site laboratory analysis. Transportation of materials and personnel is the next largest contributor to the environmental footprint of the RI with an anticipated to generate 4,509 lbs of CO2e and use 28 MMbtus of energy. Off-site energy use is anticipated to comprise of 96.96% of all energy use and off-site greenhouse gas emissions to comprise 96.84% of all emissions for the investigation.

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

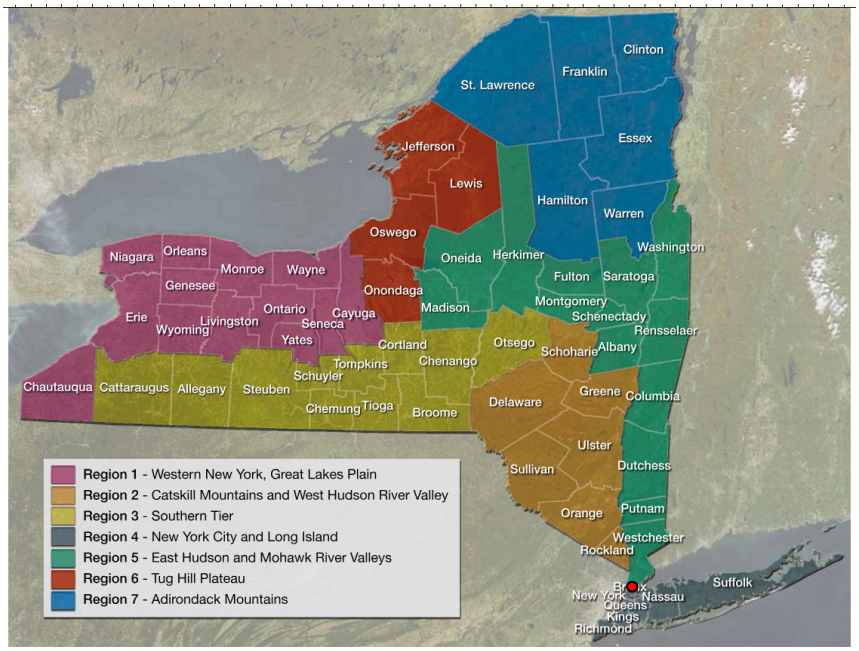
Climate Screening Checklist

Background Information

- Project Manager: Elizabeth Fitzgerald
- Site Name: Proposed 227 Westchester Avenue Development (the "Site")
- Site Number: C360253
- Site Location: 223-225, 227 Westchester Avenue & 204, 206-208, 214-220 Irving Avenue, Westchester, New York
- Site Elevation (average above sea level): Approximately 27 feet above sea level (Google Earth)



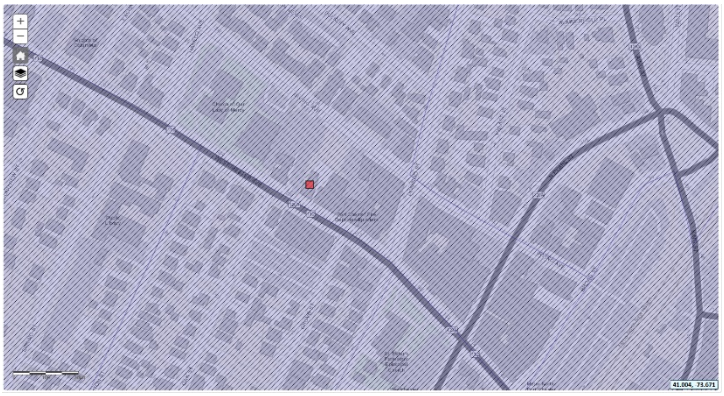
- ClimAID Region (Responding Climate Change in New York State (ClimAID) - NYSERDA): Region 4 – New York City and Long Island



- Remedial Stage/Site Classification: Investigation.
- Contamination - Media Impacted/ Contaminants of Concern: Volatile organic compounds (VOCs) specifically petroleum-related VOCs (benzene, toluene, ethylbenzene, and xylenes [BTEX]) and chlorinated VOCs (CVOCs), Semi-volatile organic compounds (SVOCs) specifically polycyclic aromatic hydrocarbons (PAHs), metals including arsenic, barium, copper, lead, and mercury in soil; VOCs in groundwater; and CVOCs in soil vapor.
- Proposed/Current Remedy: The remedy will be proposed on the completion of the pending Remedial Investigation (RI) when the extent of environmental impacts at the Site is determined. 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? The predicated timeframe is unknown as environmental impacts at the Site is undetermined.
- Is the site in proximity to any sensitive receptors? (e.g., wetlands, waterbodies, residential properties, hospitals, schools, drinking water supplies, etc.) There are four sensitive receptors within a 500-ft radius of the Site: Port Chester Head Start school located at 17 Spring Street, Port Chester, Sunny Side Daycare Center located at 27 Smith Street, Port Chester, the Port Chester-Rye Brook Public Library located at 1 Haseco Avenue, Port Chester, and the Saavedra Healthcare Center medical clinic located at 216 Westchester Avenue, Port Chester.

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

X Yes ☐ 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)	N	N/A	N/A	N/A
Sea Level Rise	N	N/A	N/A	N/A
Flooding	N	N/A	N/A	N/A
Storm Surge	N	N/A	N/A	N/A
Wildfire	N	N/A	N/A	N/A
Drought	N	N/A	N/A	N/A
Storm Severity	N	N/A	N/A	N/A
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):

Conduct severe weather storm inspections during the active remedy. Inspect dewatering systems prior to anticipated storm events that could result in a power outage, and after storm events.

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

Environmental Footprint Summary

Core Element	Metric		Unit of Measure	Footprint						
				Proposed Remedial Investigation						Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	1.1	0.0	0.0	0.0	0.0	0.0	1.1
	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	11,660.0	0.0	0.0	0.0	0.0	0.0	11,660.0
	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	0.00003	0.0	0.0	0.0	0.0	0.0	0.0000
	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	1,991.2	0.0	0.0	0.0	0.0	0.0	1,991.2
	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	0.012	0.000	0.000	0.000	0.000	0.000	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	41.8	0.0	0.0	0.0	0.0	0.0	41.8
	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	7,666.4	0.0	0.0	0.0	0.0	0.0	7,666.4
	A-3A	Total NOx emissions	Pounds	1,816.0	0.0	0.0	0.0	0.0	0.0	1,816.0
	A-3B	Total SOx emissions	Pounds	1,144.2	0.0	0.0	0.0	0.0	0.0	1,144.2
	A-3C	Total PM emissions	Pounds	4,706.1	0.0	0.0	0.0	0.0	0.0	4,706.1
	A-4	Total HAP emissions	Pounds	45.9	0.0	0.0	0.0	0.0	0.0	45.9
	A-5	Total greenhouse gas emissions	Tons CO2e*	154.6	0.0	0.0	0.0	0.0	0.0	154.6
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:

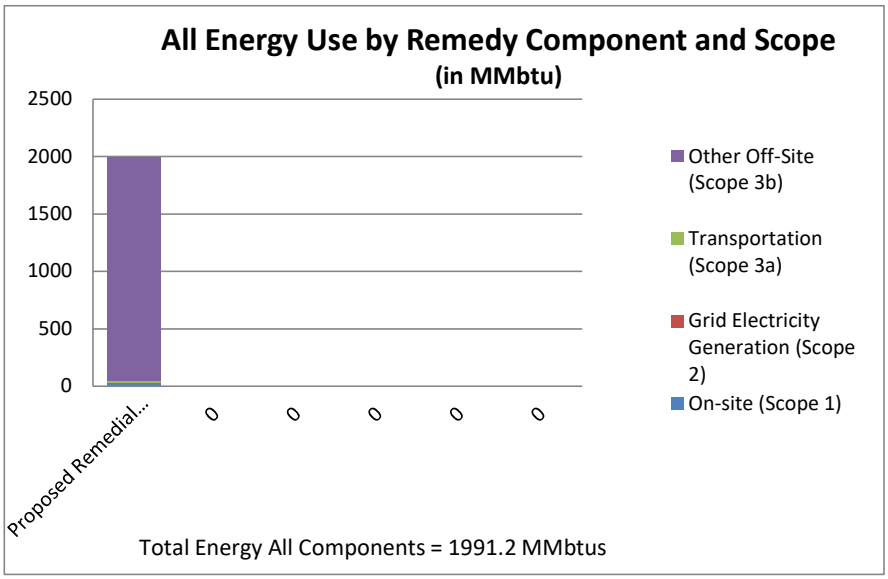
All - Energy & Air Compiled Results

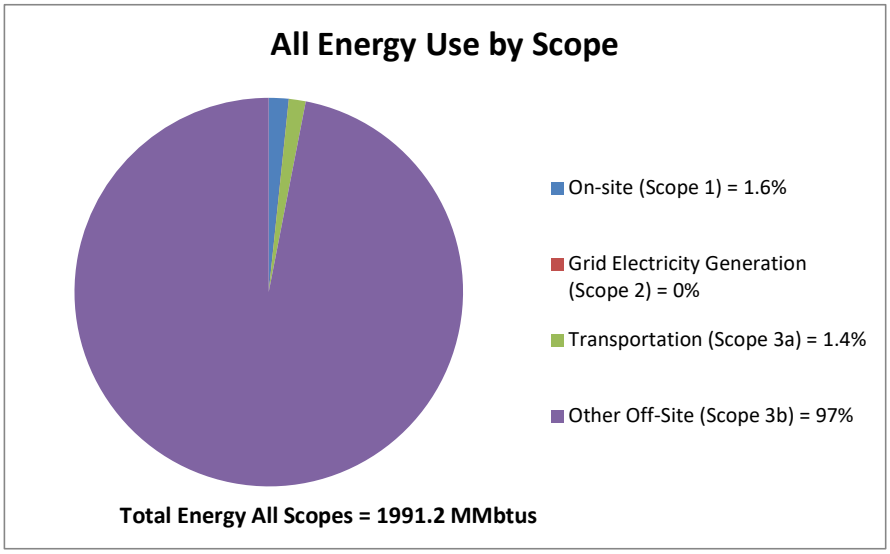
Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	**33**	**5,265**	**40**	**1**	**1**	**42**	**0**
Grid Electricity Generation (Scope 2)	**0.081**	**13**	**0**	**0**	**0**	**0**	**0**
Transportation (Scope 3a)	**28**	**4,509**	**26**	**1**	**1**	**28**	**0**
Other Off-Site (Scope 3b)	**1,931**	**299,453**	**1,750**	**1,142**	**4,705**	**7,597**	**46**
Remedy Totals	**1,991**	**309,239**	**1,816**	**1,144**	**4,706**	**7,666**	**46**

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)
2500
2000
1500
1000
500
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 1991.2 MMbtus

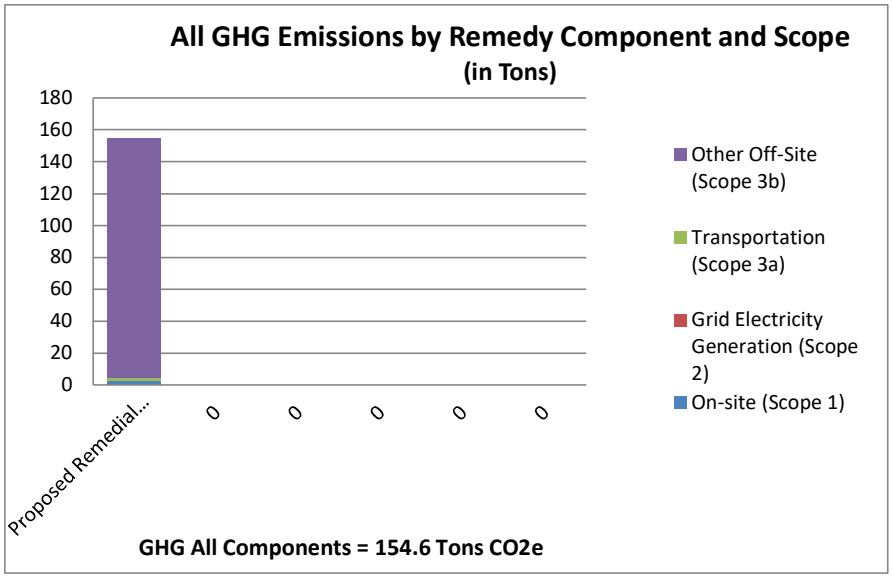

All Energy Use by Scope
On-site (Scope 1) = 1.6%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.4%
Other Off-Site (Scope 3b) = 97%
Total Energy All Scopes = 1991.2 MMbtus

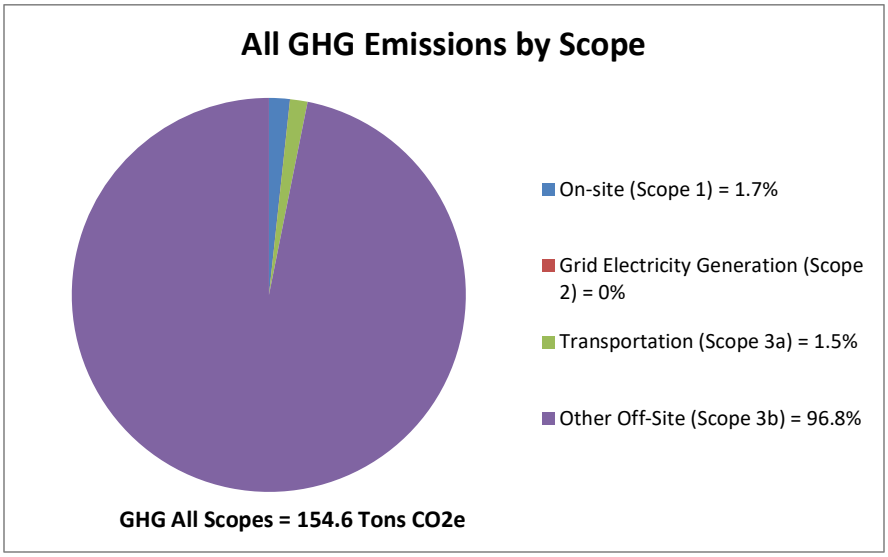
Total Energy MMbtus								
	Proposed F	0	0	0	0	0	Total	
On-site (Scope 1)	32.6	0.0	0.0	0.0	0.0	0.0	32.6	
Generation (Scope 2)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	Electricity
nsportation (Scope 3a)	28.0	0.0	0.0	0.0	0.0	0.0	28.0	Tran
ner Off-Site (Scope 3b)	1,930.6	0.0	0.0	0.0	0.0	0.0	1,930.6	Oth
Total	1,991.2	0.0	0.0	0.0	0.0	0.0	1,991.2	

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 1.6%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.4%
Other Off-Site (Scope 3b) = 97%

Total Energy All Components = 1991.2 MMbtus
Total Energy All Scopes = 1991.2 MMbtus


All GHG Emissions by Remedy Component and Scope
(in Tons)
180
160
140
120
100
80
60
40
20
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 154.6 Tons CO2e

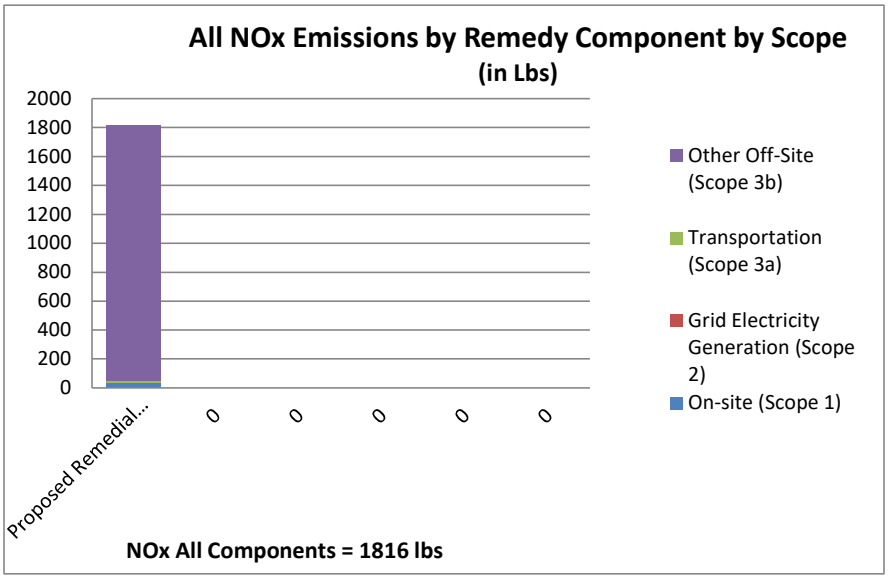

All GHG Emissions by Scope
On-site (Scope 1) = 1.7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 96.8%
GHG All Scopes = 154.6 Tons CO2e

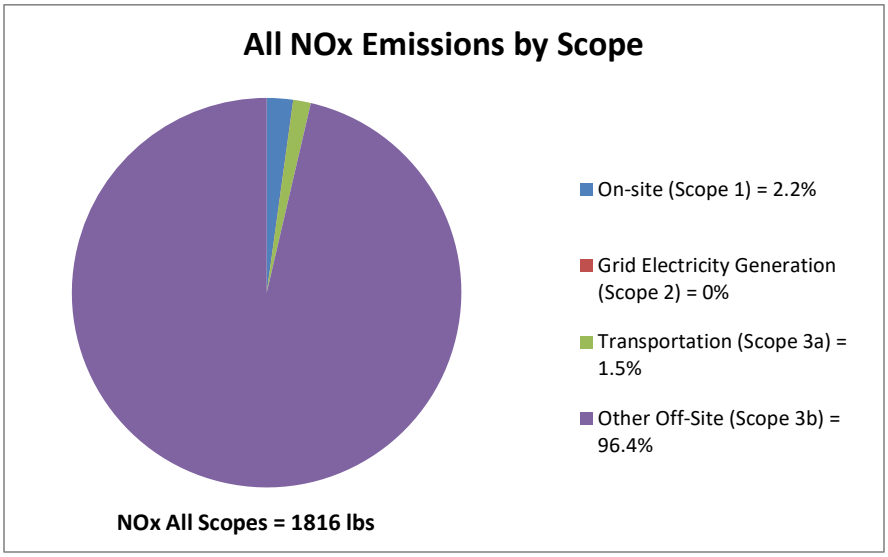
GHG Tons CO2e								
	Proposed F	0	0	0	0	0	Total	
On-site (Scope 1)	2.6	0.0	0.0	0.0	0.0	0.0	2.6	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	2.3	0.0	0.0	0.0	0.0	0.0	2.3	Tran
ıer Off-Site (Scope 3b)	149.7	0.0	0.0	0.0	0.0	0.0	149.7	Oth
Total	154.6	0.0	0.0	0.0	0.0	0.0	154.6	

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 1.7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 96.8%

GHG All Components = 154.6 Tons CO2e
GHG All Scopes = 154.6 Tons CO2e


All NOx Emissions by Remedy Component by Scope
(in Lbs)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 1816 lbs

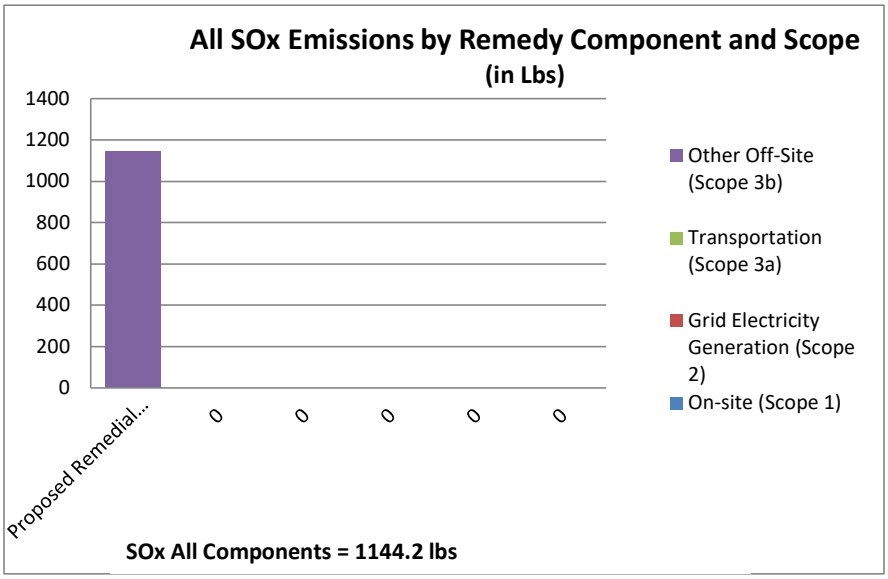

All NOx Emissions by Scope
On-site (Scope 1) = 2.2%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 96.4%
NOx All Scopes = 1816 lbs

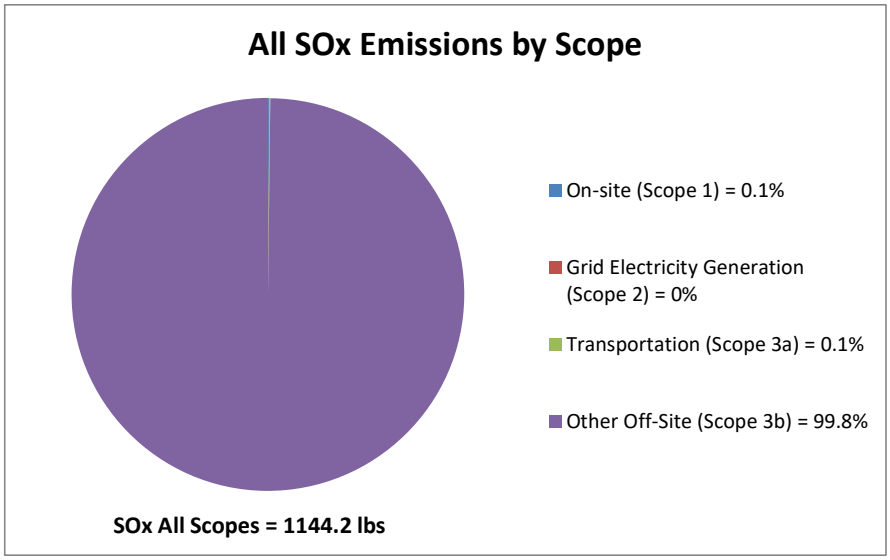
NOx lbs								
	Proposed F	0	0	0	0	0	Total	
On-site (Scope 1)	39.8	0.0	0.0	0.0	0.0	0.0	39.8	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	26.4	0.0	0.0	0.0	0.0	0.0	26.4	Tran
ıer Off-Site (Scope 3b)	1,749.8	0.0	0.0	0.0	0.0	0.0	1,749.8	Oth
Total	1,816.0	0.0	0.0	0.0	0.0	0.0	1,816.0	

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 2.2%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 96.4%

NOx All Components = 1816 lbs
NOx All Scopes = 1816 lbs


All SOx Emissions by Remedy Component and Scope
(in Lbs)
1400
1200
1000
800
600
400
200
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 1144.2 lbs

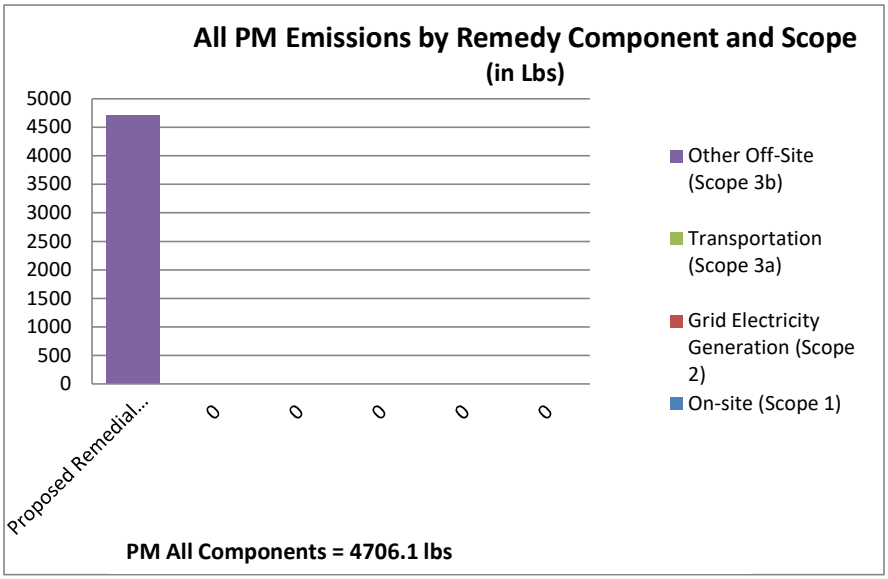

All SOx Emissions by Scope
On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.1%
Other Off-Site (Scope 3b) = 99.8%
SOx All Scopes = 1144.2 lbs

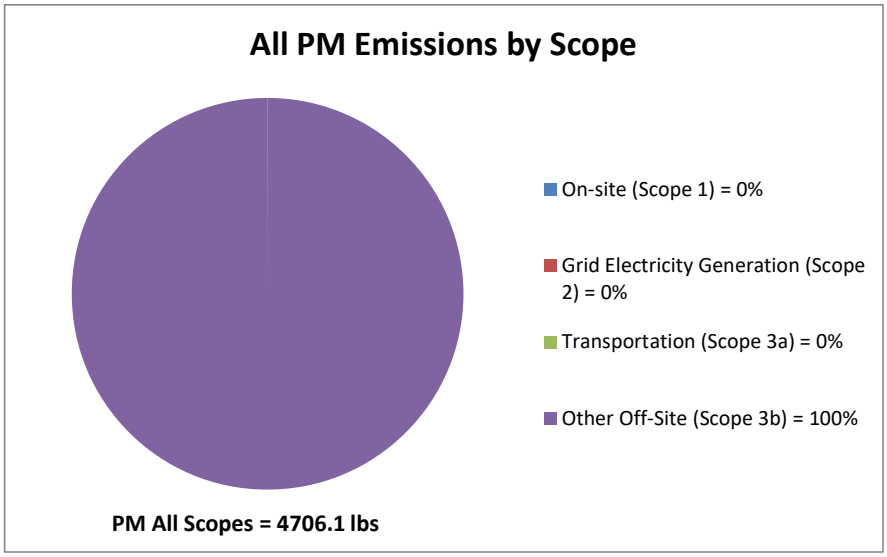
SOx lbs								
	Proposed F	0	0	0	0	0	Total	
On-site (Scope 1)	1.3	0.0	0.0	0.0	0.0	0.0	1.3	
Generation (Scope 2)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	d Electricity
ısportation (Scope 3a)	0.8	0.0	0.0	0.0	0.0	0.0	0.8	Tran
ıer Off-Site (Scope 3b)	1,142.1	0.0	0.0	0.0	0.0	0.0	1,142.1	Oth
Total	1,144.2	0.0	0.0	0.0	0.0	0.0	1,144.2	

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.1%
Other Off-Site (Scope 3b) = 99.8%

SOx All Components = 1144.2 lbs
SOx All Scopes = 1144.2 lbs


All PM Emissions by Remedy Component and Scope
(in Lbs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 4706.1 lbs

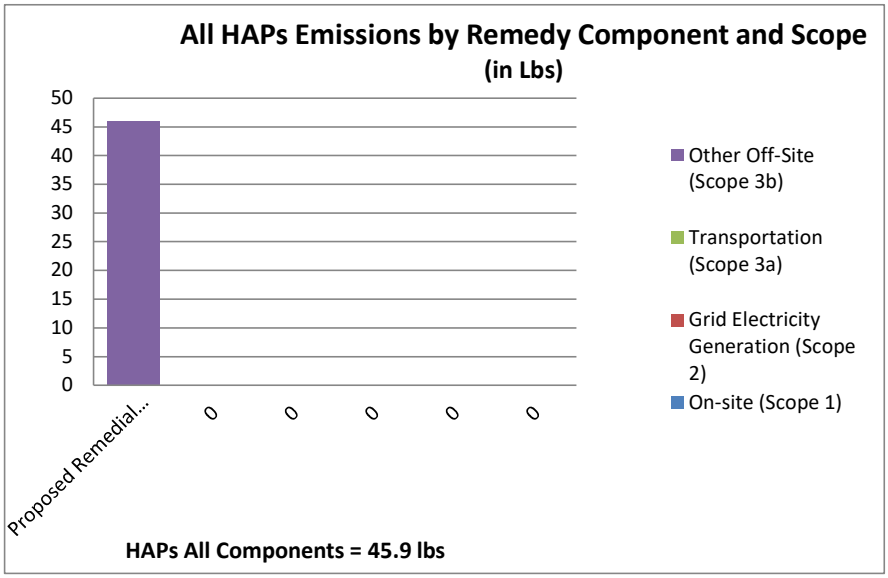

All PM Emissions by Scope
On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0%
Other Off-Site (Scope 3b) = 100%
PM All Scopes = 4706.1 lbs

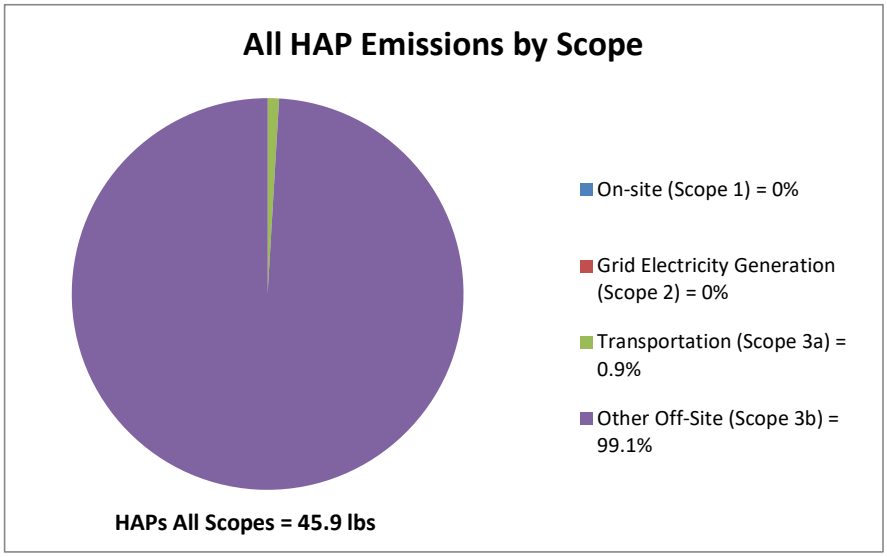
PM lbs							
Proposed F	0	0	0	0	0	Total	
On-site (Scope 1)	0.8	0.0	0.0	0.0	0.0	0.8	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	0.7	0.0	0.0	0.0	0.0	0.7	Tran
ıer Off-Site (Scope 3b)	4,704.6	0.0	0.0	0.0	0.0	4,704.6	Oth
Total	4,706.1	0.0	0.0	0.0	0.0	4,706.1	

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0%
Other Off-Site (Scope 3b) = 100%

PM All Components = 4706.1 lbs
PM All Scopes = 4706.1 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
50
45
40
35
30
25
20
15
10
5
0
Proposed Remedial...
0
0
0
0
0
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 45.9 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.9%
Other Off-Site (Scope 3b) = 99.1%
HAPs All Scopes = 45.9 lbs

HAPs lbs							
	Proposed F	0	0	0	0	0	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)	0.4	0.0	0.0	0.0	0.0	0.0	0.4
ıer Off-Site (Scope 3b)	45.5	0.0	0.0	0.0	0.0	0.0	45.5
Total	45.9	0.0	0.0	0.0	0.0	0.0	45.9

Proposed Remedial Investigation = 100%
0 = 0%
0 = 0%
0 = 0%
0 = 0%
0 = 0%

On-site (Scope 1) = 0%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.9%
Other Off-Site (Scope 3b) = 99.1%

HAPs All Components = 45.9 lbs
HAPs All Scopes = 45.9 lbs